

**Name :-** Komal

**Role :-** DevOps Engineer

**Task :-** Deploy Java Application To Apache Tomcat

## Apache Tomcat

### Introduction:-

Apache Tomcat is an open-source web server and servlet container developed by the Apache Software Foundation. It's one of the most popular choices for deploying Java-based web applications. Tomcat implements several Java EE specifications, providing a robust environment for running Java Servlets, JavaServer Pages (JSP), and other Java-based web technologies. It's lightweight, easy to configure, and widely used in both development and production environments.

**Functionality:-** Tomcat serves as both a web server and a servlet container. It can handle HTTP requests, serve static and dynamic web content, and execute Java servlets and JSP pages. It provides a runtime environment for Java web applications, allowing them to run efficiently and securely.

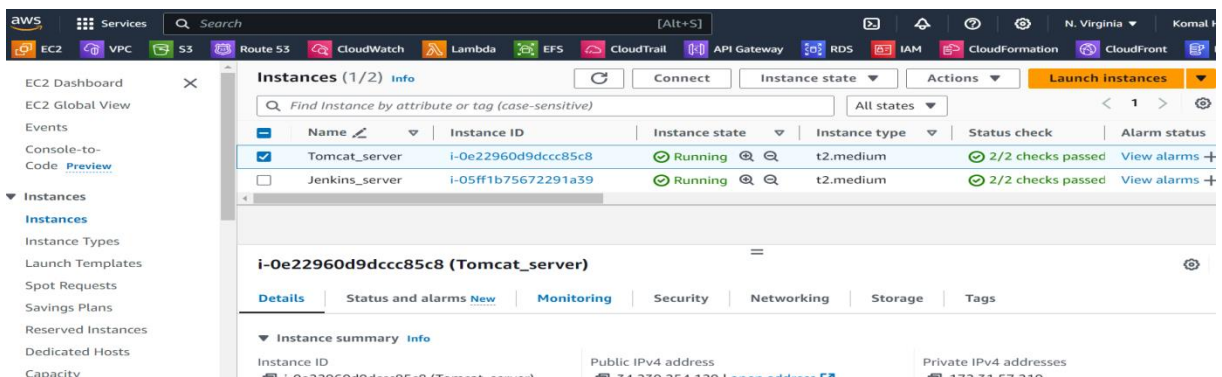
**Configuration:-** Tomcat's configuration is done through XML files, particularly the [server.xml](#), [context.xml](#), and [web.xml](#). These files define server settings, context configurations, and web application deployment descriptors respectively.

### Components:-

Tomcat itself is comprised of three main components: [Jasper](#), [Catalina](#), and [Coyote](#). These components combined allow for the parsing and compilation of JavaServer Pages into java servlet code, the delivery of these servlets, and request processing.

### 1. Install and configure tomcat and Jenkins server.

**Create two EC2 instance. One for tomcat and one for Jenkins. Here we will take t2 medium or t2 large instance type.**



## 2. Install java inside Apache tomcat server

```
sudo apt update-y
sudo apt install default-jdk-y
java --version
```

```
ubuntu@ip-172-31-63-61:~$ java --version
openjdk 21.0.3 2024-04-16
OpenJDK Runtime Environment (build 21.0.3+9-Ubuntu-lubuntul)
OpenJDK 64-Bit Server VM (build 21.0.3+9-Ubuntu-lubuntul, mixed mode, sharing)
ubuntu@ip-172-31-63-61:~$ cd /opt
ubuntu@ip-172-31-63-61:/opt$ sudo wget https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.89/bin/apache-tomcat-9.0.89.zip
--2024-05-11 09:14:01-- https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.89/bin/apache-tomcat-9.0.89.zip
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: 12305238 (12M) [application/zip]
Saving to: 'apache-tomcat-9.0.89.zip'

apache-tomcat-9.0.89.zip      100%[=====>]  11.73M

2024-05-11 09:14:02 (146 MB/s) - 'apache-tomcat-9.0.89.zip' saved [12305238/12305238]
```

## 3. Next go to opt and install the tomcat

```
Cd /opt
Sudo wget https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.89/bin/apache-tomcat-9.0.89.zip
sudo apt install unzip
sudo unzip apache-tomcat-9.0.89.zip
```

```
ubuntu@ip-172-31-63-61:/opt$ ls
apache-tomcat-9.0.89  apache-tomcat-9.0.89.zip
ubuntu@ip-172-31-63-61:/opt$ cd apache-tomcat-9.0.89/
ubuntu@ip-172-31-63-61:/opt/apache-tomcat-9.0.89$ ls
BUILDING.txt  CONTRIBUTING.md  LICENSE  NOTICE  README.md  RELEASE-NOTES  RUNNING.txt  bin  conf  lib  logs  temp  webapps  work
```

## 4. Add user, Password and roles under

```
cd apache-tomcat-9.0.89/
```

```
sudo vi conf/tomcat-users.xml
```

```
ubuntu@ip-172-31-63-61:/opt/apache-tomcat-9.0.89$ sudo vi conf/tomcat-users.xml
```

```
-->
<!--
The sample user and role entries below are intended for use with the
examples web application. They are wrapped in a comment and thus are ignored
when reading this file. If you wish to configure these users for use with the
examples web application, do not forget to remove the <!-- ..> that surrounds
them. You will also need to set the passwords to something appropriate.
-->
<!--
<role rolename="tomcat"/>
<role rolename="role1"/>
<user username="tomcat" password="<must-be-changed>" roles="tomcat"/>
<user username="both" password="<must-be-changed>" roles="tomcat,role1"/>
<user username="role1" password="<must-be-changed>" roles="role1"/>
-->
<user username="admin" password="123456" roles="admin-gui,manager-gui,manager-script"/>
</tomcat-users>
```

5. Add comment for two lines under.

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

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

```
ubuntu@ip-172-31-63-61:/opt/apache-tomcat-9.0.89$ sudo vi webapps/manager/META-INF/context.xml
ubuntu@ip-172-31-63-61:/opt/apache-tomcat-9.0.89$ sudo vi webapps/manager/META-INF/context.xml
ubuntu@ip-172-31-63-61:/opt/apache-tomcat-9.0.89$ sudo vi webapps/host-manager/META-INF/context.xml
ubuntu@ip-172-31-63-61:/opt/apache-tomcat-9.0.89$ cd bin
ubuntu@ip-172-31-63-61:/opt/apache-tomcat-9.0.89/bin$ ll
total 824
drwxr-xr-x 2 root root 4096 May 3 20:22 ./
drwxr-xr-x 9 root root 4096 May 3 20:22 ../
-rwxr-xr-x 1 root root 35451 May 3 20:22 bootstrap.jar*
-rwxr-xr-x 1 root root 1703 May 3 20:22 catalina-tasks.xml*
-rwxr-xr-x 1 root root 16856 May 3 20:22 catalina.bat*
-rwxr-xr-x 1 root root 25323 May 3 20:22 catalina.sh*
-rwxr-xr-x 1 root root 2123 May 3 20:22 ciphers.bat*
-rwxr-xr-x 1 root root 1997 May 3 20:22 ciphers.sh*
-rwxr-xr-x 1 root root 214214 May 3 20:22 commons-daemon-native.tar.gz*
-rwxr-xr-x 1 root root 25661 May 3 20:22 commons-daemon.jar*
-rwxr-xr-x 1 root root 2040 May 3 20:22 configtest.bat*
-rwxr-xr-x 1 root root 1922 May 3 20:22 configtest.sh*
-rwxr-xr-x 1 root root 9100 May 3 20:22 daemon.sh*
-rwxr-xr-x 1 root root 2091 May 3 20:22 digest.bat*
-rwxr-xr-x 1 root root 1965 May 3 20:22 digest.sh*
-rwxr-xr-x 1 root root 3606 May 3 20:22 makebase.bat*
-rwxr-xr-x 1 root root 3382 May 3 20:22 makebase.sh*
-rwxr-xr-x 1 root root 3814 May 3 20:22 setclasspath.bat*
```

```
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limitations under the License.
```

```
-->
<Context antiResourceLocking="false" privileged="true" >
  <CookieProcessor className="org.apache.tomcat.util.http.Rfc6265CookieProcessor"
    sameSiteCookies="strict" />
  <!-- <Valve className="org.apache.catalina.valves.RemoteAddrValve"
    allow="127\.\d+\.\d+\.\d+|::1|0:0:0:0:0:0:0:1" />
-->
  <Manager sessionAttributeValueClassNameFilter="java\.lang\.(?:Boolean|Integer|Long|Number|S
    ntionFilter\$\LruCache(?:\$\$1)?|java\.util\.(?:Linked)?HashMap"/>
</Context>
```

6. Give the permission and start the tomcat server

```
Cd bin/
```

```
Chmod u+x*.sh
```

```
ubuntu@ip-172-31-63-61:/opt/apache-tomcat-9.0.89$ cd bin
ubuntu@ip-172-31-63-61:/opt/apache-tomcat-9.0.89/bin$ ls
bootstrap.jar      ciphers.bat        configtest.bat     digest.sh          setclasspath.sh    startup.sh          tool-wrapper.sh
catalina-tasks.xml ciphers.sh          configtest.sh      makebase.bat       shutdown.bat       tomcat-juli.jar    version.bat
catalina.bat       commons-daemon-native.tar.gz daemon.sh           makebase.sh        shutdown.sh        tomcat-native.tar.gz version.sh
catalina.sh        commons-daemon.jar  digest.bat         setclasspath.bat   startup.bat        tool-wrapper.bat
```

7. To start tomcat  
Sudo sh catalina.sh start or  
./startup.sh

```
ubuntu@ip-172-31-63-61:/opt/apache-tomcat-9.0.89/bin$ sudo sh catalina.sh start
Using CATALINA_BASE:   /opt/apache-tomcat-9.0.89
Using CATALINA_HOME:   /opt/apache-tomcat-9.0.89
Using CATALINA_TMPDIR: /opt/apache-tomcat-9.0.89/temp
Using JRE_HOME:        /usr
Using CLASSPATH:        /opt/apache-tomcat-9.0.89/bin/bootstrap.jar:/opt/apache-tomcat-9.0.89/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Tomcat started.
ubuntu@ip-172-31-63-61:/opt/apache-tomcat-9.0.89/bin$
ubuntu@ip-172-31-63-61:/opt/apache-tomcat-9.0.89/bin$
```


8. Copy the public ip of tomcat and paste on browser with the port number  
<http://localhost:8080>  
Then to login into  
Host-Manager we need - Manager -gui role  
Server Status, Manager App – Admin – gui Role  
Login to server status enter the user name and password which we given earlier.

Not secure 54.145.83.4:8080

Home Documentation Configuration Examples Wiki Mailing Lists Find Help

## Apache Tomcat/10.1.23

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](#)  
[First Web Application](#)  
[Realms & AAA](#)  
[JDBC DataSources](#)  
[Examples](#)  
[Servlet Specifications](#)  
[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 10.1 access to the manager application is split between different users.

**Documentation**  
[Tomcat 10.1 Documentation](#)  
[Tomcat 10.1 Configuration](#)  
[Tomcat Wiki](#)  
Find additional important configuration

**Getting Help**  
[FAQ and Mailing Lists](#)  
The following mailing lists are available:  
[tomcat-announce](#)  
Important announcements, releases, security vulnerability notifications. (Low volume).

Not secure 34.232.66.227:8080/manager/status

### Server Status

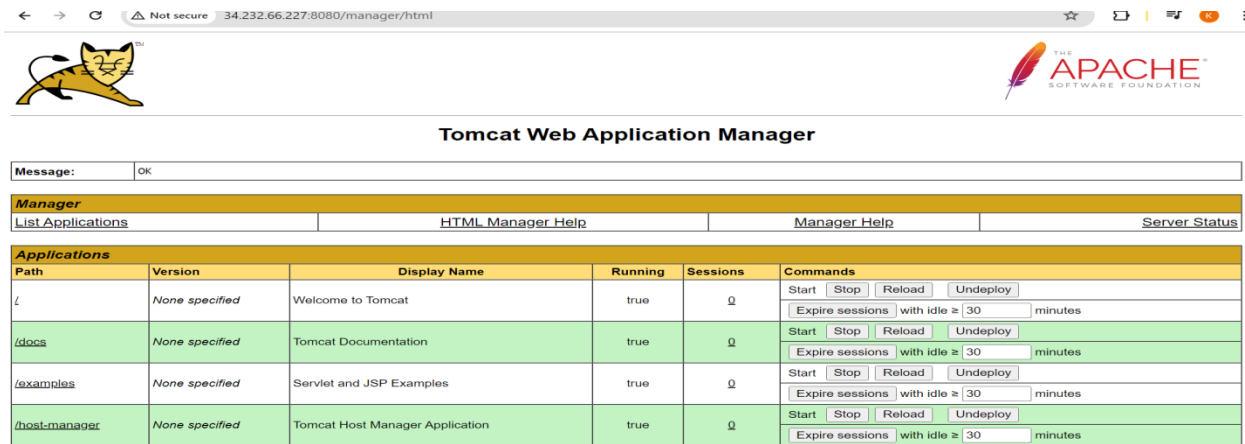
**Manager**  
[List Applications](#) [HTML Manager Help](#) [Manager Help](#) [Complete Server Status](#)

**Server Information**

Tomcat Version	JVM Version	JVM Vendor	OS Name	OS Version	OS Architecture	Hostname	IP Address
Apache Tomcat/10.1.23	21.0.3+9-Ubuntu-1ubuntu1	Ubuntu	Linux	6.8.0-1008-aws	amd64	ip-172-31-48-250	172.31.48.250

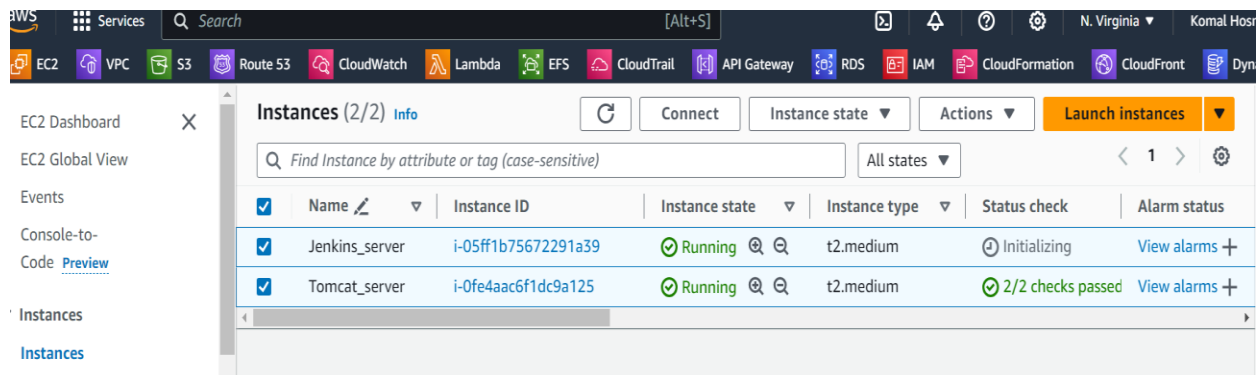
**JVM**  
Free Memory: 22.07 MiB Total Memory: 60.00 MiB Max Memory: 980.00 MiB

Memory Pool	Type	Initial	Total	Maximum	Used
G1 Eden Space	Heap memory	6.00 MiB	36.00 MiB	-0.00 MiB	24.00 MiB
G1 Old Gen	Heap memory	56.00 MiB	22.00 MiB	980.00 MiB	11.63 MiB (1%)
G1 Survivor Space	Heap memory	0.00 MiB	2.00 MiB	-0.00 MiB	1.52 MiB
CodeHeap 'non-nmethods'	Non-heap memory	2.43 MiB	2.43 MiB	5.55 MiB	1.45 MiB (26%)
CodeHeap 'non-profiled nmethods'	Non-heap memory	2.43 MiB	2.43 MiB	117.22 MiB	1.42 MiB (1%)
CodeHeap 'profiled nmethods'	Non-heap memory	2.43 MiB	7.50 MiB	117.21 MiB	7.44 MiB (6%)



The screenshot shows the Tomcat Web Application Manager interface. At the top, there's a message bar with "Message: OK". Below it, a navigation bar includes "List Applications", "HTML Manager Help", "Manager Help", and "Server Status". The main section is titled "Applications" and contains a table with columns: Path, Version, Display Name, Running, Sessions, and Commands.

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



The screenshot shows the AWS Management Console interface for EC2 instances. The left sidebar contains navigation links like "EC2 Dashboard", "EC2 Global View", "Events", "Console-to-Code", and "Instances". The main panel is titled "Instances (2/2) Info" and includes a search bar, filters, and a table of instances.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status
Jenkins_server	i-05ff1b75672291a39	Running	t2.medium	Initializing	View alarms +
Tomcat_server	i-0fe4aac6f1dc9a125	Running	t2.medium	2/2 checks passed	View alarms +

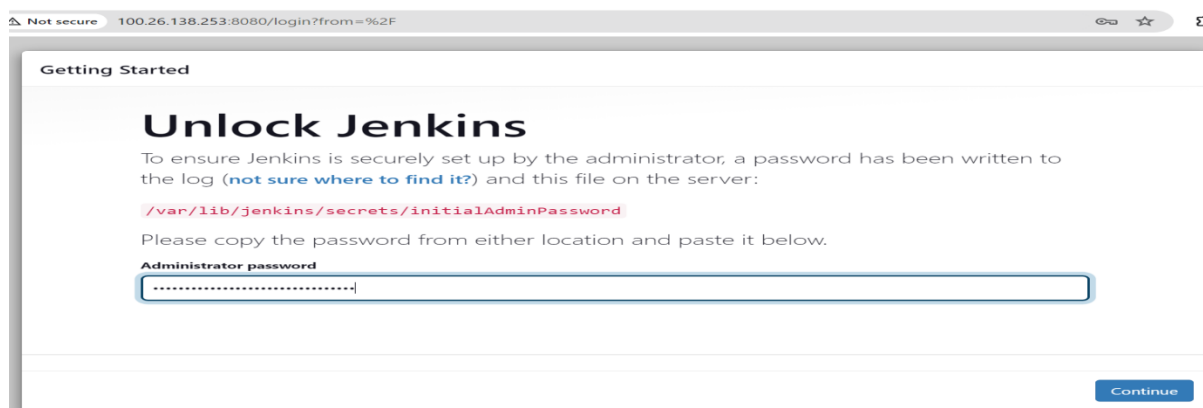
## 9. Install Jenkins to another ubuntu server and configure it

```

ubuntu@ip-172-31-51-138:~$ sudo systemctl start jenkins
ubuntu@ip-172-31-51-138:~$ sudo systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
   Loaded: loaded (/usr/lib/systemd/system/jenkins.service; enabled; preset: enabled)
   Active: active (running) since Wed 2024-05-08 17:51:57 UTC; 40s ago
     Main PID: 3764 (java)
       Tasks: 52 (limit: 4676)
      Memory: 1.2G (peak: 1.2G)
         CPU: 38.701s
        CGroup: /system.slice/jenkins.service
                └─3764 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/

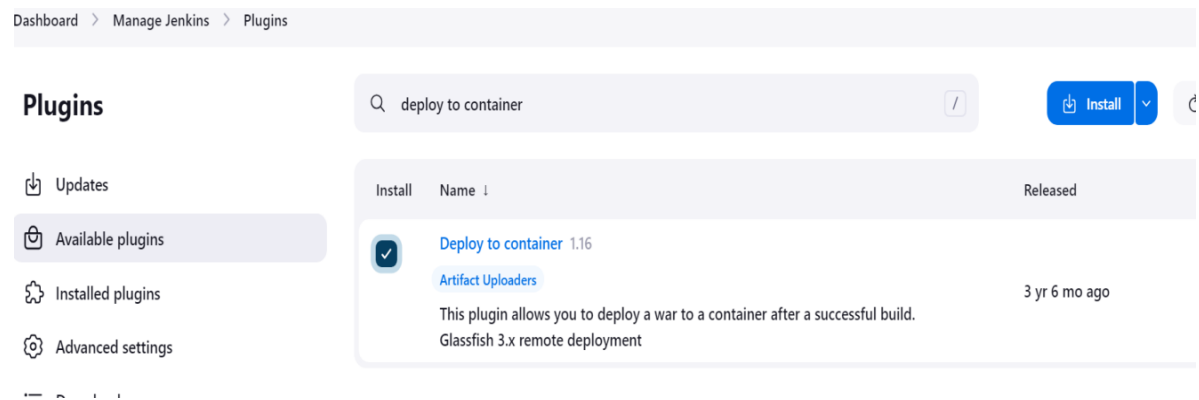
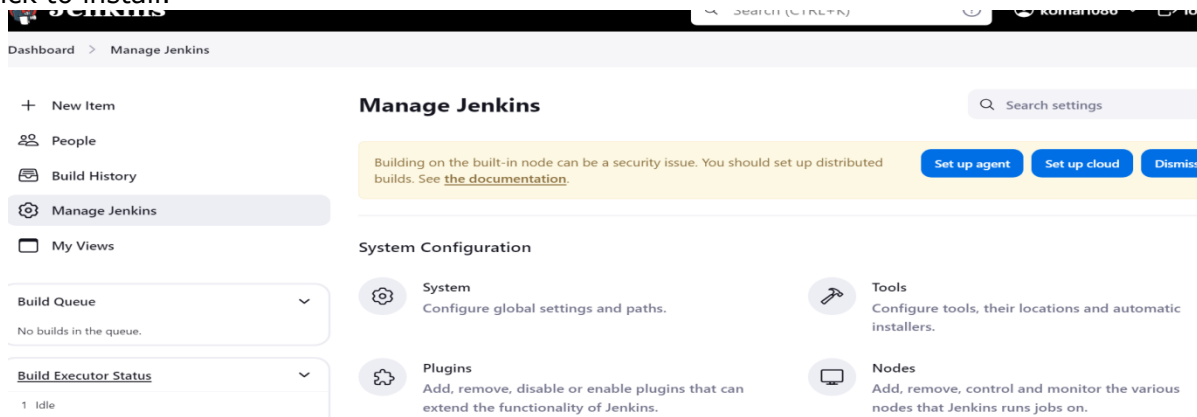
May 08 17:51:42 ip-172-31-51-138 jenkins[3764]: 9fb5b3813006488a8aa6af2813a2ecc8
May 08 17:51:42 ip-172-31-51-138 jenkins[3764]: This may also be found at: /var/lib/jenkins/secrets/initialAdminPassword
May 08 17:51:42 ip-172-31-51-138 jenkins[3764]: *****
May 08 17:51:42 ip-172-31-51-138 jenkins[3764]: *****

```



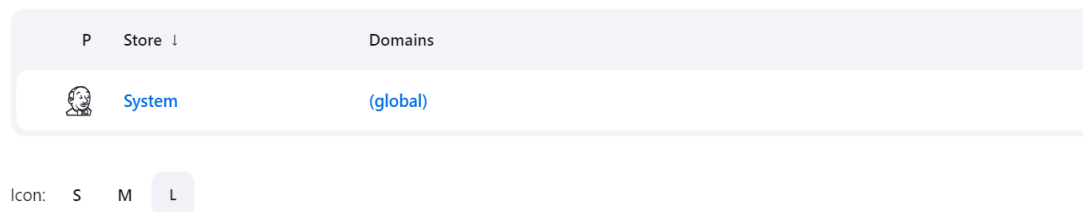
The screenshot shows the Jenkins "Getting Started" screen. It has a heading "Unlock Jenkins" and a paragraph explaining that a password has been written to the log and a file on the server. The file path is highlighted in red: `/var/lib/jenkins/secrets/initialAdminPassword`. Below this, it says "Please copy the password from either location and paste it below." There is a text input field for the "Administrator password" and a "Continue" button at the bottom right.

10. Add tomcat in Jenkins,  
Dashboard –Manage Jenkins – plugins - Available plugins and then search deploy to container  
click to install.



11. Add the tomcat credential in Jenkins...  
Jenkins Dashboard- Manage Jenkins – Credential - Click on Global - Add credential. Enter  
username and password of tomcat.

### Stores scoped to Jenkins



12. Add the Maven in Manage Jenkins - Tools

Dashboard > Manage Jenkins > Tools

**Maven**

Name  
maven3

☒ Install automatically ?

**Install from Apache**

Version  
3.9.6

Add Installer ▾

Add Maven

Save Apply

### 13. Create a Jenkins Pipeline

Click on create new item , Enter a name , click on pipeline ok, write a pipeline.

Dashboard > All >

Enter an item name

tomcat-2

» Required field

**Freestyle project**  
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.

**Pipeline**  
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

**Multi-configuration project**  
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific etc.

OK

### 14. Write a Jenkins pipeline to deploy application to tomcat.

Click on pipeline syntax and generate a pipeline.

Sample step deploy: Deploy war/ear to container enter required parameters and click on generate.

Dashboard > tomcat-3 > Pipeline Syntax

Global Variables Reference  
Online Documentation  
Examples Reference  
IntelliJ IDEA GDSDL

Sample Step  
deploy: Deploy war/ear to a container

deploy

WAR/EAR files ?  
\*\*/\*.war

Context path ?

Containers

**Tomcat 9.x Remote**

Credentials  
admin/\*\*\*\*\*

← → ↻ Not secure 18.233.67.137:8080/job/tomcat-3/pipeline-syntax/ ☆ 📄 |

Dashboard > tomcat-3 > Pipeline Syntax

Tomcat URL ?

http://34.232.66.227:8080

Advanced ▾


Add Container ▾

☒ Deploy on failure

Generate Pipeline Script

deploy adapters: [tomcat9(credentialsId: '8f6e67b4-7bfa-455e-905c-bd7ceb45d856', path: '', url: 'http://34.232.66.227:8080'), contextPath: null, war: '\*\*/\*.war']

15. paste the generated script in the pipeline. Write a pipeline.

 **Jenkins** 🔍 Search (CTRL+K) ? 🛡️ 1 👤 koma

Dashboard >

+ New Item

👤 People

📅 Build History

⚙️ Manage Jenkins

📁 My Views

S	W	Name ↓	Last Success	Last Failure	Last Duration
...	☀️	tomcat	N/A	N/A	N/A

Icon: S M L Icon legend 📡 Atom feed for all 📡 Atom feed for failures 📡 Atom fe

```

pipeline {
  agent any
  tools {
    maven 'maven3'
    jdk 'jdk11'
  }
  stages {
    stage('git checkout') {
      steps {
        git branch:'master', url:'https://github.com/komal10m/maven-web-application.git'
      }
    }
    stage('build') {
      steps {
        sh'mvn clean install'
      }
    }
  }
}

```



```

}
stage('deploy to tomcat') {
  steps {
    deploy adapters: [tomcat9(credentialsId: 'Tomcatcredential', path: '', url:
'http://35.153.98.145:8080')], contextPath: null, war: '**/*.war'
  }
}
}
}
}

```

## 16. Click On Build Now...

← → ↻ ⚠ Not secure 100.26.254.77:8080/job/Tomcat/ ☆

Dashboard > Tomcat > Build Now

⚙ Configure

🗑 Delete Pipeline

🔍 Full Stage View

✎ Rename

❓ Pipeline Syntax

### Stage View

Average stage times:  
(Average full run time: ~8s)

	Declarative: Tool Install	git checkout	build	deploy to tomcat
#10 May 11 16:35 No Changes	295ms	562ms	5s	2s

Build History trend

← → ↻ ⚠ Not secure 100.26.254.77:8080/job/Tomcat/10/console

Dashboard > Tomcat > #10

📄 Status

</> Changes

📄 Console Output

📄 View as plain text

✎ Edit Build Information

🗑 Delete build '#10'

📁 Git Build Data

↶ Restart from Stage

### Console Output

```

Started by user komal1086
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/Tomcat
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Declarative: Tool Install)
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] }

```

```
Dashboard > Tomcat > #10

[INFO] No tests to run.
[INFO]
[INFO] --- war:3.4.0:war (default-war) @ maven-web-application ---
[INFO] Packaging webapp
[INFO] Assembling webapp [maven-web-application] in [/var/lib/jenkins/workspace/Tomcat/target/maven-web-application]
[INFO] Processing war project
[INFO] Copying webapp resources [/var/lib/jenkins/workspace/Tomcat/src/main/webapp]
[INFO] Building war: /var/lib/jenkins/workspace/Tomcat/target/maven-web-application.war
[INFO]
[INFO] --- install:3.1.1:install (default-install) @ maven-web-application ---
[INFO] Installing /var/lib/jenkins/workspace/Tomcat/pom.xml to /var/lib/jenkins/.m2/repository/com/mt/maven-web-application/0.0.1-SNAPSHOT/maven-web-application-0.0.1-SNAPSHOT.pom
[INFO] Installing /var/lib/jenkins/workspace/Tomcat/target/maven-web-application.war to /var/lib/jenkins/.m2/repository/com/mt/maven-web-application/0.0.1-SNAPSHOT/maven-web-application-0.0.1-SNAPSHOT.war
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
```

```
Dashboard > Tomcat > #10

[Pipeline] envVarsForTool
[Pipeline] withEnv
[Pipeline] {
[Pipeline] deploy
[DeployPublisher][INFO] Attempting to deploy 1 war file(s)
[DeployPublisher][INFO] Deploying /var/lib/jenkins/workspace/Tomcat/target/maven-web-application.war
Tomcat 9.x Remote with context null
[/var/lib/jenkins/workspace/Tomcat/target/maven-web-application.war] is not deployed. Doing a full redeploy
Deploying [/var/lib/jenkins/workspace/Tomcat/target/maven-web-application.war]
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

17. Go to the tomcat server refresh the page. You will get the application deployed.  
Copy the URL <http://localhost:8080/application name>. When you visit this URL, you will receive the output.

34.207.227.246:8080/maven-web-application/

---

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**Server Side IP Address**

Server Host Name :: ip-172-31-63-61  
Server IP Address :: 172.31.63.61

**Client Side IP Address**

Client IP Address :: 103.164.241.255  
Client Name Host :: 103.164.241.255

---



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