Lesson 07 Demo 01

Configuring Deploy Plugin for Performing Automated CD

Objective: To configure a CI/CD pipeline in Jenkins for deploying a Java application to Tomcat Apache

Tools required: GitHub, Jenkins, and Tomcat Apache

Prerequisites: You need to have a Jenkins up and running.

Steps to be followed:

1. Install Tomcat Apache 9 on Ubuntu VM
2. Log in to the Jenkins CI tool and install the Deploy to container plugin
3. Configure the deployment stage in the Jenkins pipeline

Step 1: Install Tomcat Apache 9 on Ubuntu VM

1.1 Open the terminal in your lab and use the following command to switch to the root user:
sudo su

```
sakshiguptasimp@ip-172-31-25-100:~$ sudo su
root@ip-172-31-25-100:/home/sakshiguptasimp#
```

1.2 Install Tomcat Apache and other required packages using the following command:

apt update

apt install tomcat9 tomcat9-admin

```
root@ip-172-31-25-100:/home/sakshiguptasimp# apt update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [109 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:5 https://download.docker.com/linux/ubuntu jammy InRelease [48.8 kB]
Ign:6 https://pkg.jenkins.io/debian-stable binary/ InRelease
Get:8 https://pkg.jenkins.io/debian-stable binary/ Release [2044 B]
Get:9 https://pkg.jenkins.io/debian-stable binary/ Release.gpg [833 B]
Get:7 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.28/deb  InRelease [1189 B]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [1638 kB]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [307 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [1864 kB]
Get:13 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [1421 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [316 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1073 kB]
Get:16 https://download.docker.com/linux/ubuntu jammy/stable amd64 Packages [31.5 kB]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [245 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [42.7 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [10.4 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [67.1 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [11.0 kB]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [27.2 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.2 kB]
Get:24 https://pkg.jenkins.io/debian-stable binary/ Packages [26.7 kB]
Get:25 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [246 kB]
Get:26 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.28/deb  Packages [13.9 kB]
```

```
root@ip-172-31-25-100:/home/sakshiguptasimp# apt install tomcat9 tomcat9-admin
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 160 not upgraded.
Need to get 12.7 MB of archives.
After this operation, 16.4 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libapr1 amd64 1.7.0-8ubuntu0.22.04.1 [108 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libeclipse-jdt-core-java all 3.27.0+eclipse4.21-1 [6240 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 libtomcat9-java all 9.0.58-1ubuntu0.1 [6047 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 tomcat9-common all 9.0.58-1ubuntu0.1 [60.9 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 tomcat9 all 9.0.58-1ubuntu0.1 [37.0 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 tomcat9-admin all 9.0.58-1ubuntu0.1 [68.8 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libtcnative-1 amd64 1.2.31-1build1 [95.1 kB]
Fetched 12.7 MB in 1s (11.3 MB/s)
```

1.3 Once the installation is complete, open the **tomcat-users.xml** file using the following command:

vi /etc/tomcat9/tomcat-users.xml

```
root@ip-172-31-25-100:/home/sakshiguptasimp# vi /etc/tomcat9/tomcat-users.xml
```

1.4 Add the following content in **tomcat-users.xml** file:

<user username="tomcat" password="password" roles="admin-gui,manager-gui,manager-script"/>

```
<!--
  <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="tomcat" password="password" roles="admin-gui,manager-gui,manager-script"/>
</tomcat-users>
"/etc/tomcat9/tomcat-users.xml" 58L, 2850B
```

Note: To save the file and exit, press **Esc**, then type **:wq**, and press **Enter**

1.5 Open the **server.xml** file using the following command and scroll down to change the connector port number of Tomcat to **9090**:

vim /etc/tomcat9/server.xml

```
root@ip-172-31-25-100:/home/sakshiguptasimp# vim /etc/tomcat9/server.xml
```

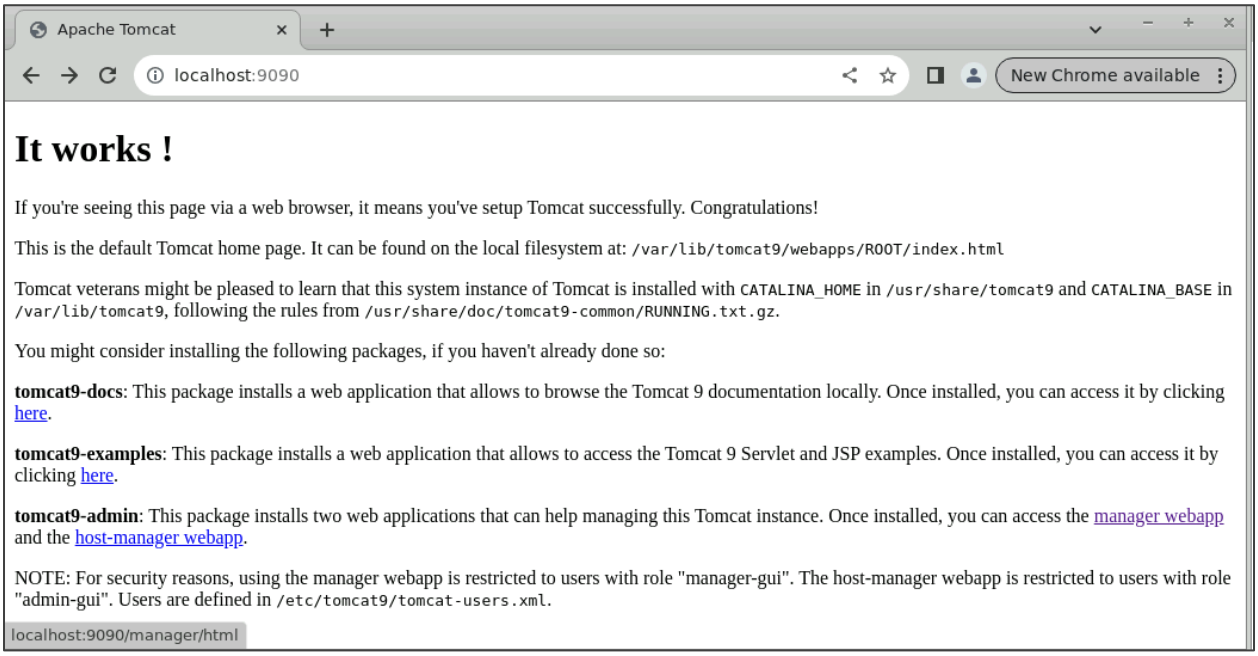
```
  <Service name="Catalina">

    <!--The connectors can use a shared executor, you can define one or more named thread pools-->
    <!--
    <Executor name="tomcatThreadPool" namePrefix="catalina-exec-"
        maxThreads="150" minSpareThreads="4"/>
    -->


    <!-- A "Connector" represents an endpoint by which requests are received
         and responses are returned. Documentation at :
         Java HTTP Connector: /docs/config/http.html
         Java AJP  Connector: /docs/config/ajp.html
         APR (HTTP/AJP) Connector: /docs/apr.html
         Define a non-SSL/TLS HTTP/1.1 Connector on port 8080
    -->
    <Connector port="9090" protocol="HTTP/1.1"
               connectionTimeout="20000"
               redirectPort="8443" />
    <!-- A "Connector" using the shared thread pool-->
    <!--
    <Connector executor="tomcatThreadPool"
               port="8080" protocol="HTTP/1.1"
               connectionTimeout="20000"
               redirectPort="8443" />
    -->
```

Note: To save the file and exit, press **Esc**, then type **:wq**, and press **Enter**

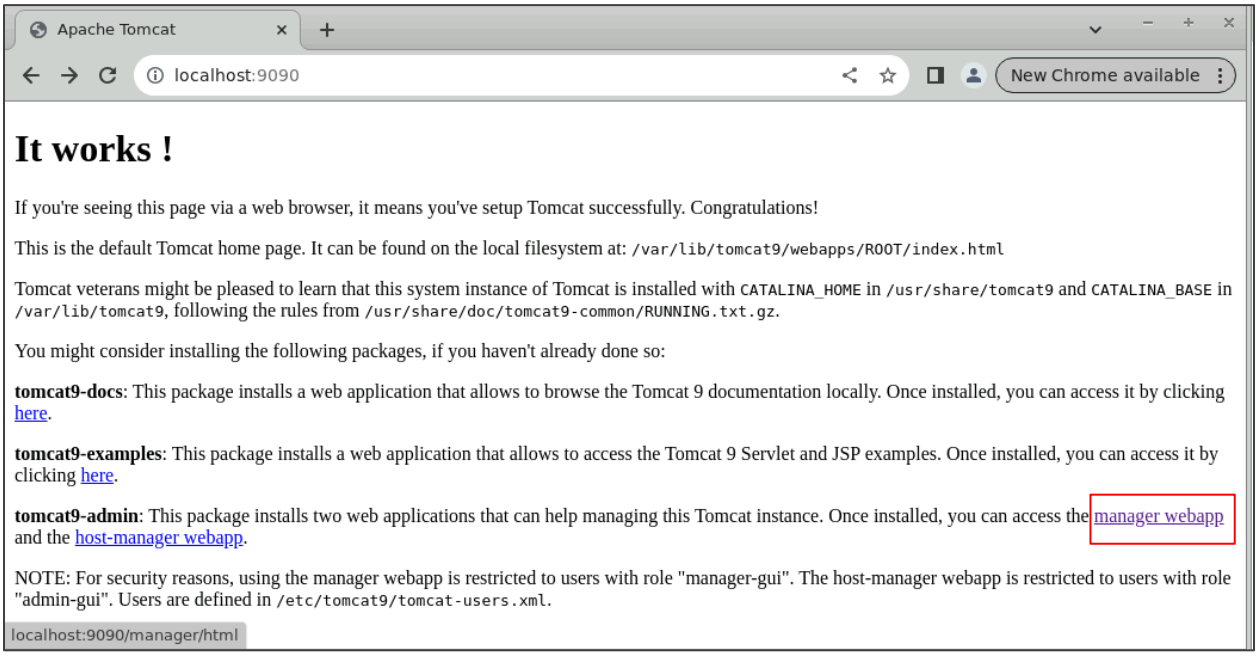
1.6 Restart Tomcat using the following command:
systemctl restart tomcat9

```
root@ip-172-31-25-100:/home/sakshiguptasimp# systemctl restart tomcat9
root@ip-172-31-25-100:/home/sakshiguptasimp#
```

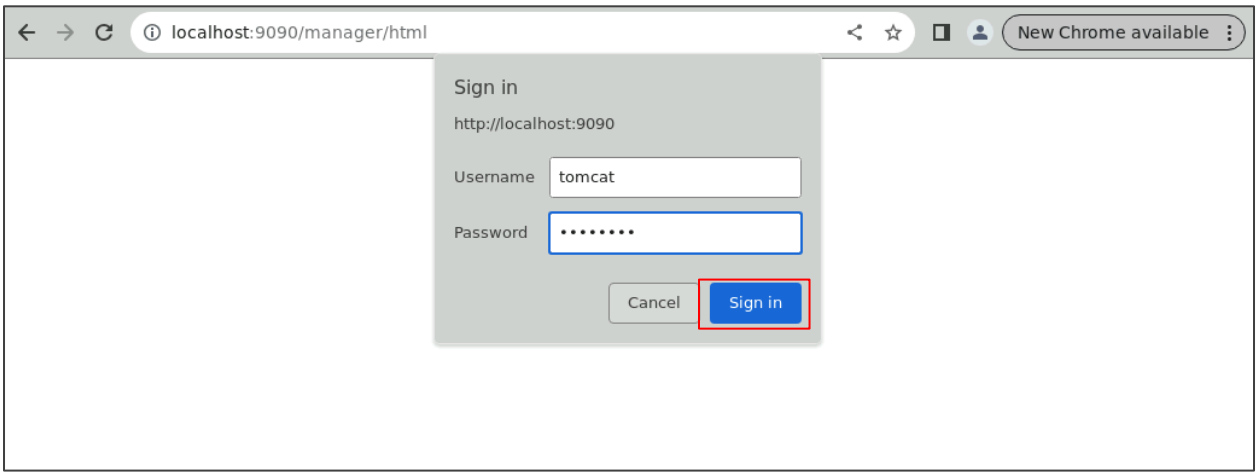
1.7 Navigate to **localhost:9090** in your web browser and access Tomcat



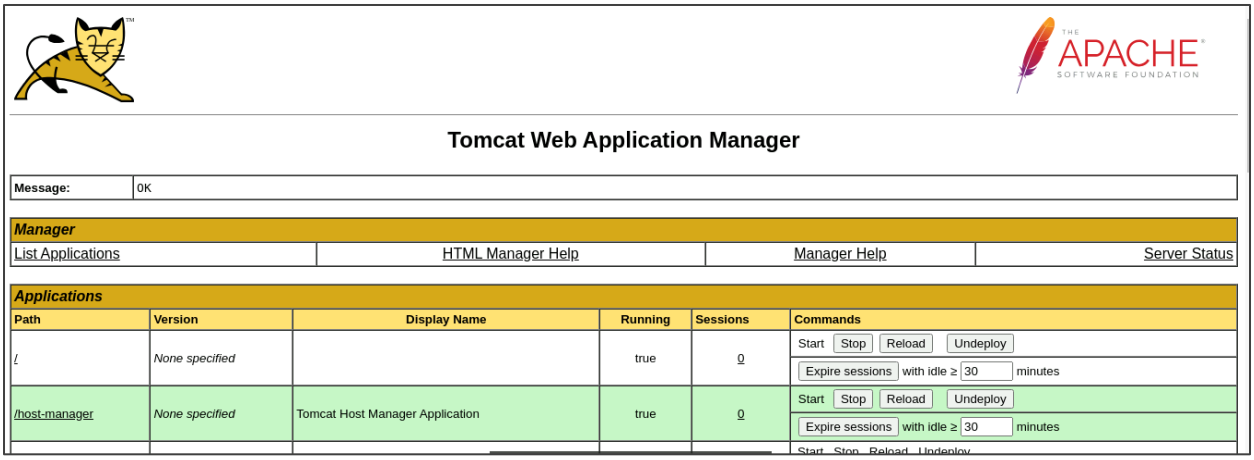
1.8 Click and access **manager webapp** to make sure the Tomcat setup is complete



1.9 Enter the credentials and click on **Sign in**



Note: The credentials for accessing Tomcat manager web app are Username: **tomcat** and Password: **password**.



Tomcat Web Application Manager

Message:	OK

Manager

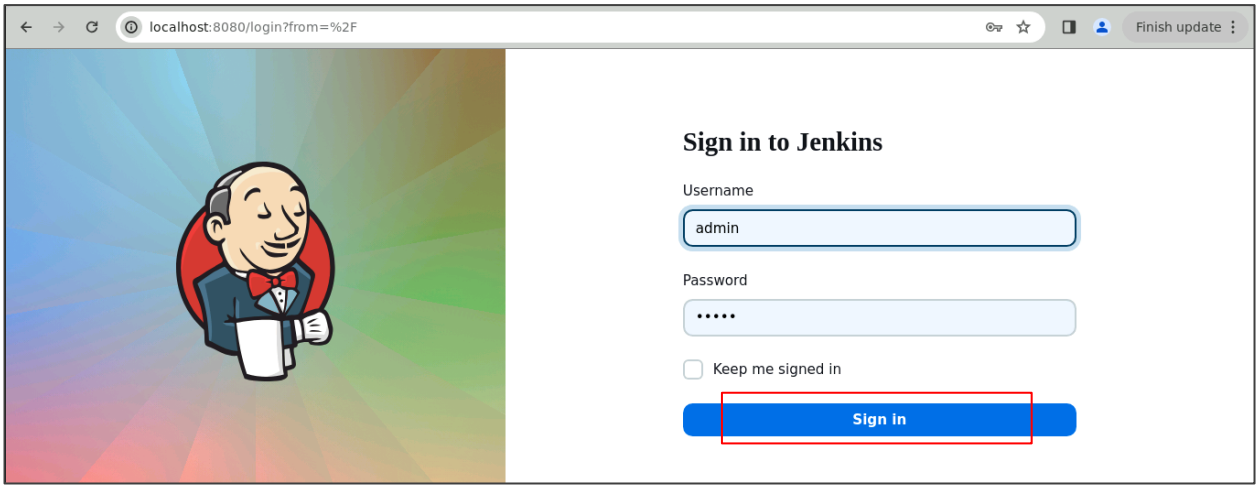
List Applications	HTML Manager Help	Manager Help	Server Status

Applications

Path	Version	Display Name	Running	Sessions	Commands
/	None specified		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

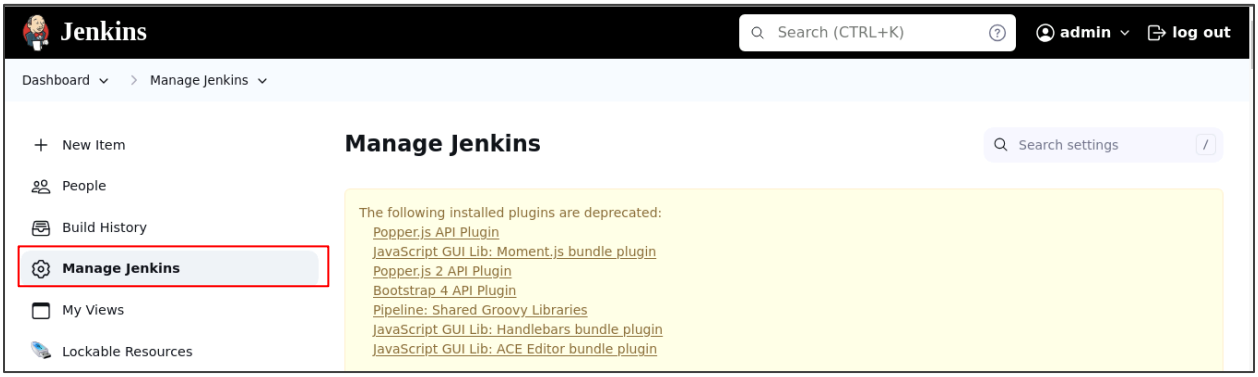
Step 2: Log in to Jenkins CI tool and install Deploy to container plugin

2.1 Navigate to **localhost:8080** in your web browser, enter your credentials, and click on **Sign in**

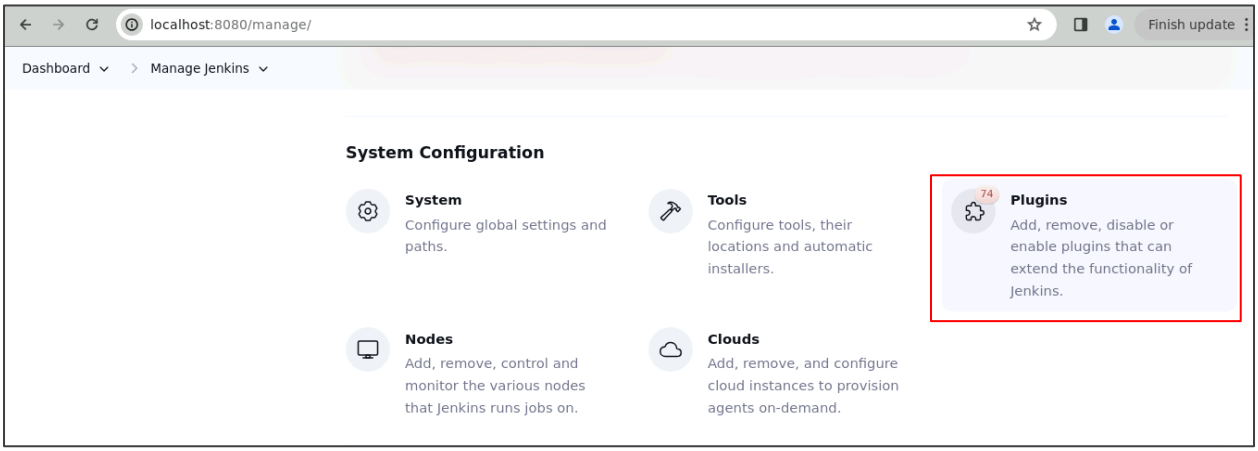


Note: The credentials for accessing Jenkins in the lab are Username: **admin** and Password: **Root123$**.

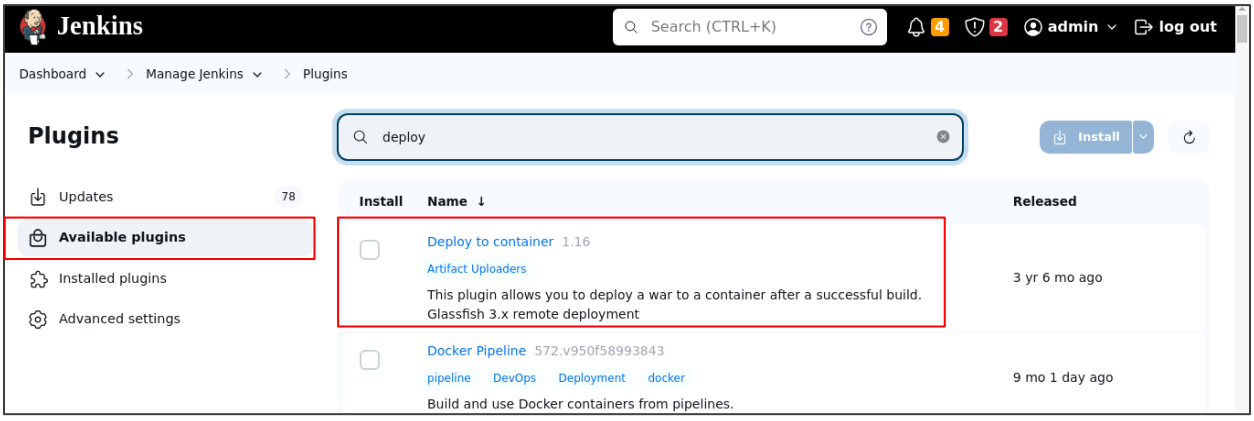
2.2 Click on **Manage Jenkins** on the Jenkins dashboard



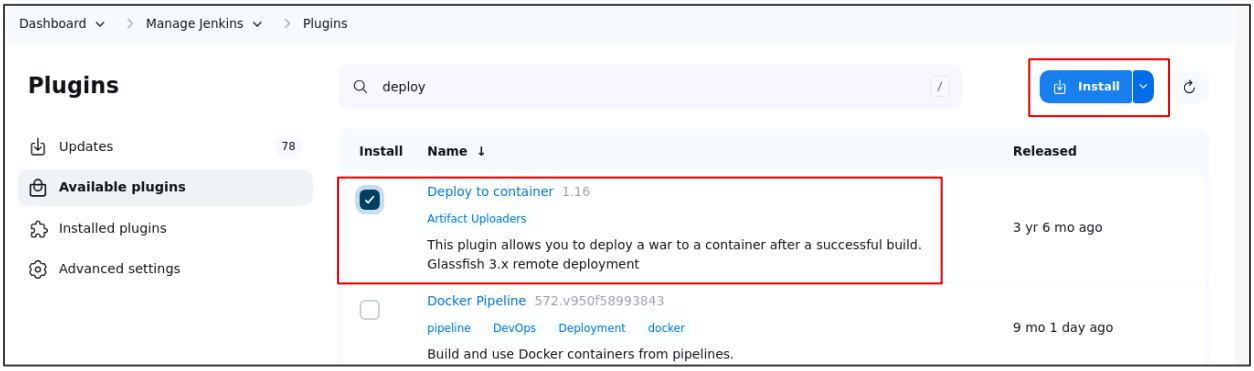
2.3 Scroll down and click on **Plugins** under **System Configuration**



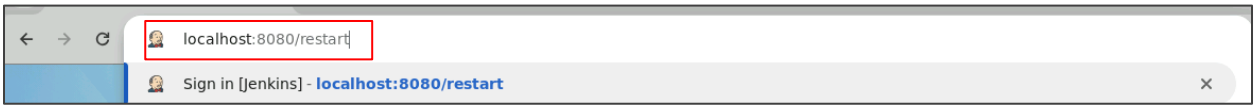
2.4 Navigate to **Available plugins** and search for **Deploy to container** plugin



2.5 Select **Deploy to container** plugin, click on **Install**

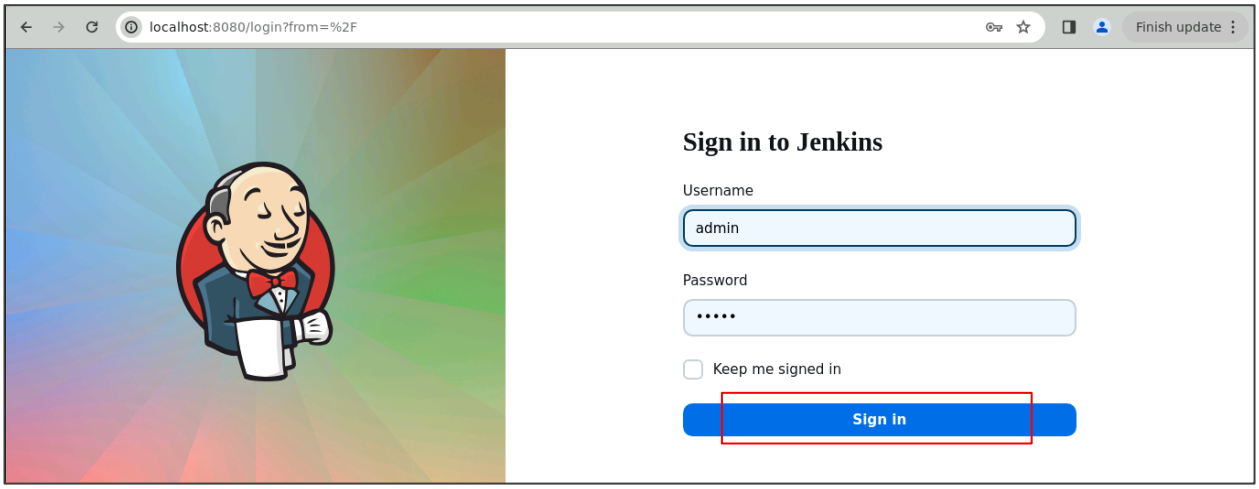


2.6 After installation, navigate to the following URL to restart Jenkins:
http://localhost:8080/restart



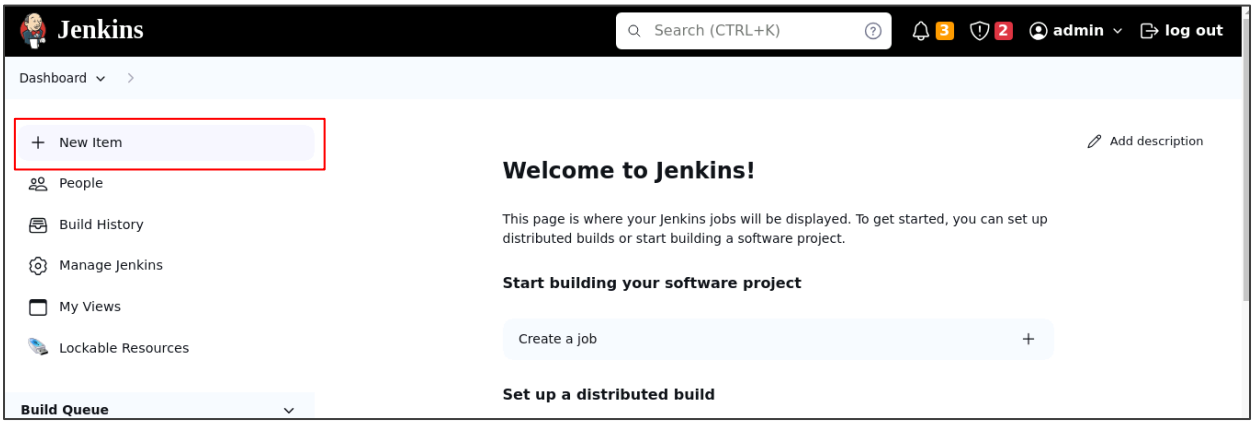
Step 3: Configure the deployment stage in the Jenkins pipeline

3.1 Enter your credentials and **Sign in** to Jenkins CI tool

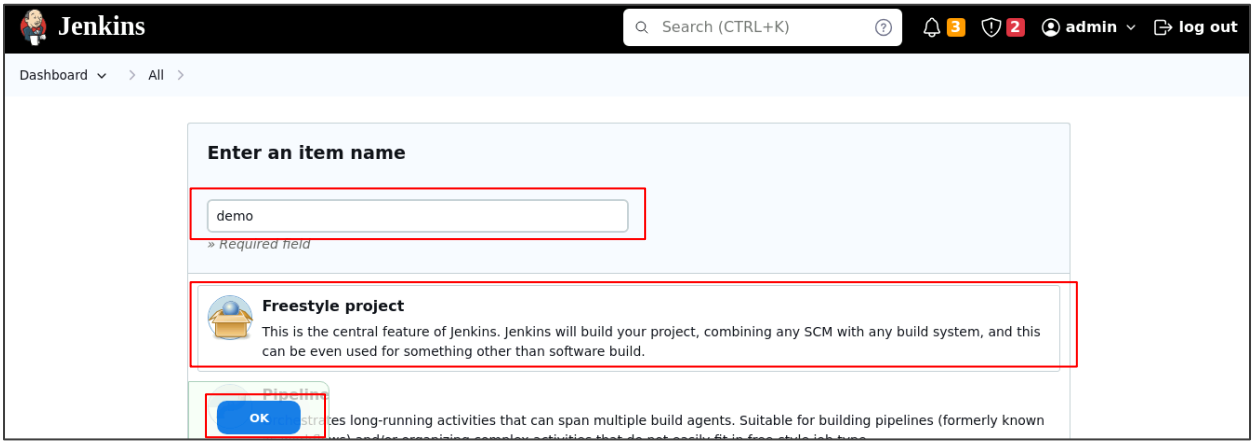


Note: The credentials for accessing Jenkins in the lab are Username: **admin** and Password: **Root123$**.

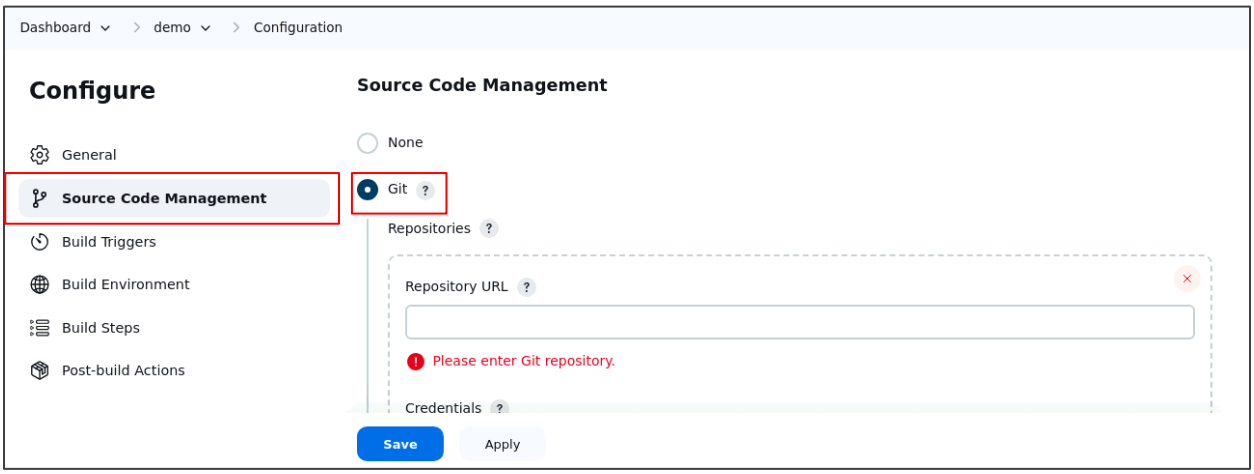
3.2 Click on **New Item** to create new Jenkins job



3.3 Select **Freestyle project** while creating Jenkins job and provide a custom job name, then click on **OK** to continue

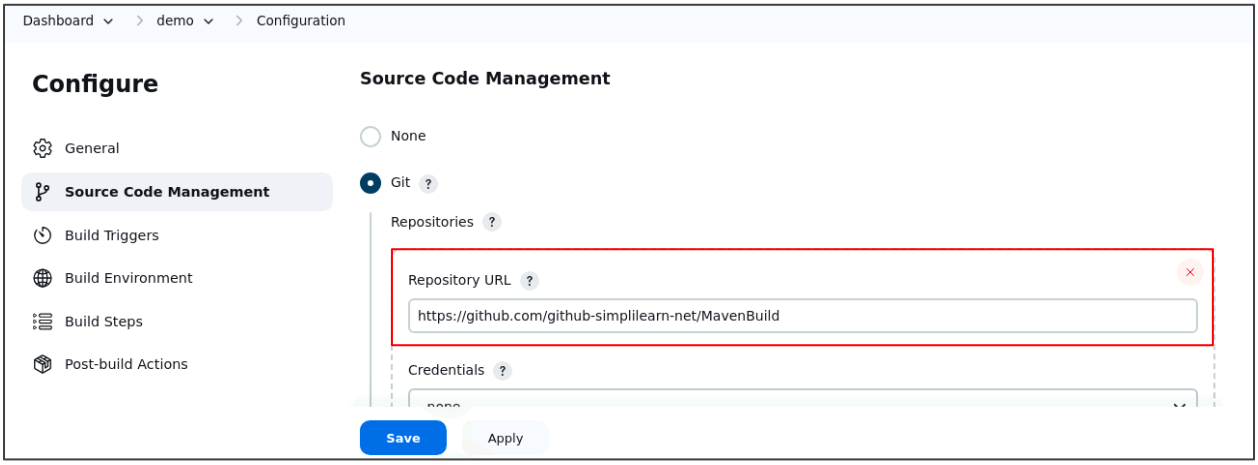


3.4 Go to **Source Code Management** and select **Git**

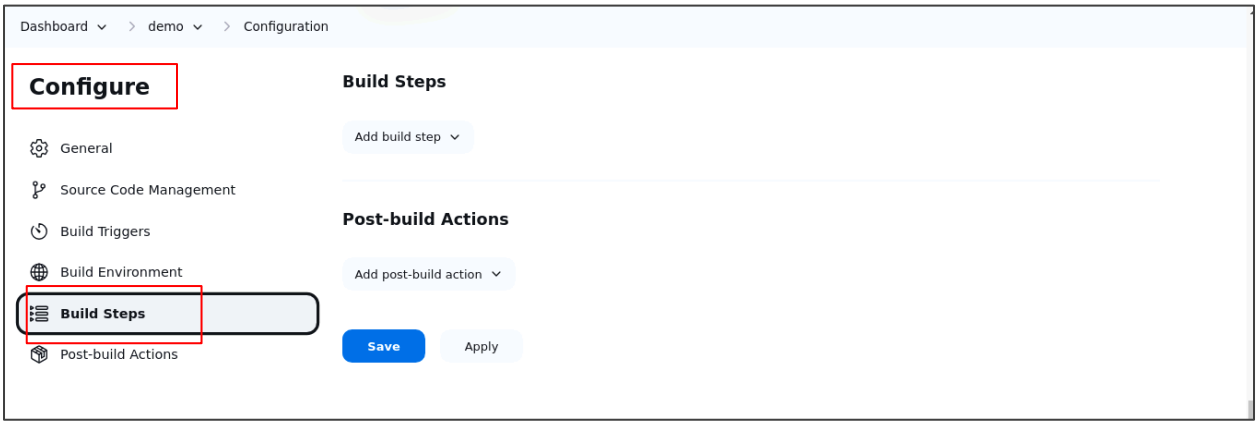


3.5 Enter the following **Repository URL**:

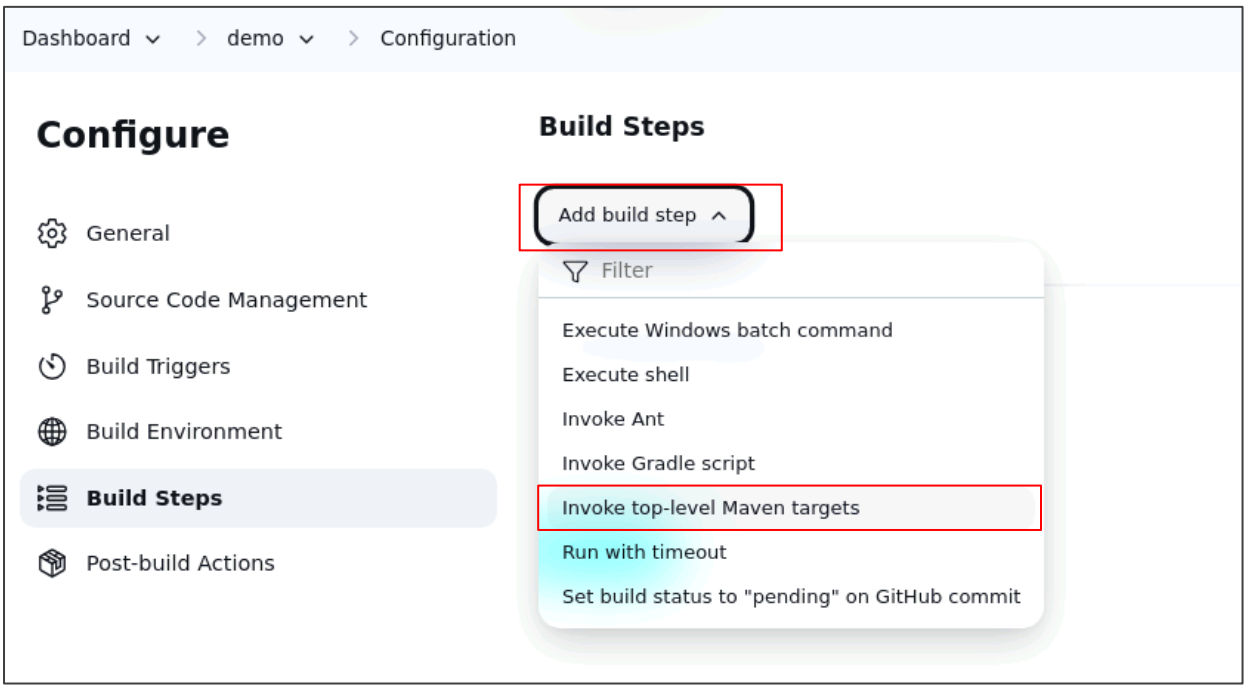
https://github.com/github-simplilearn-net/MavenBuild



3.6 Go to **Build Steps** under **Configure**:



3.7 Click on **Add build step** and select **Invoke top-level Maven targets**

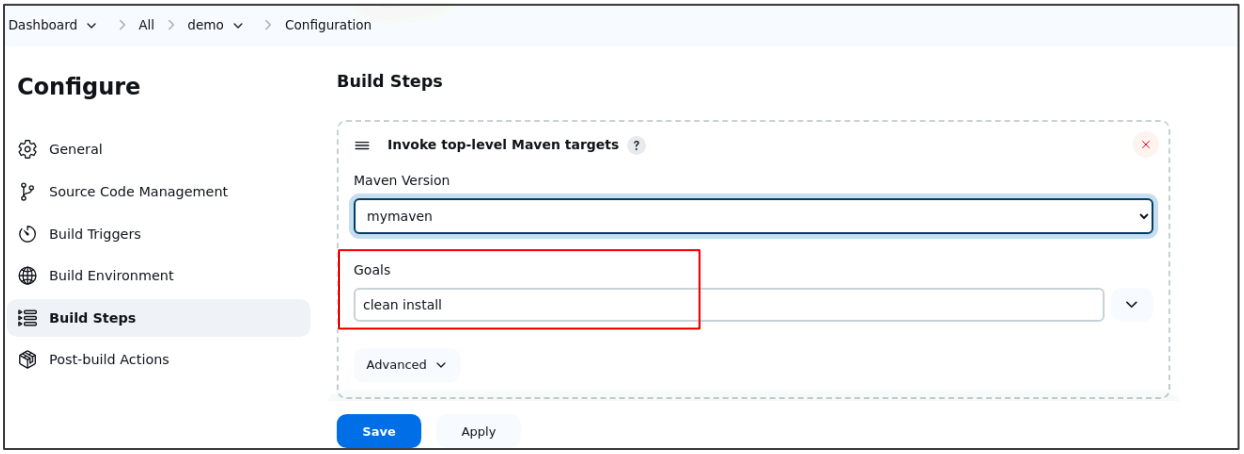


3.8 Enter the following **Maven Version**:

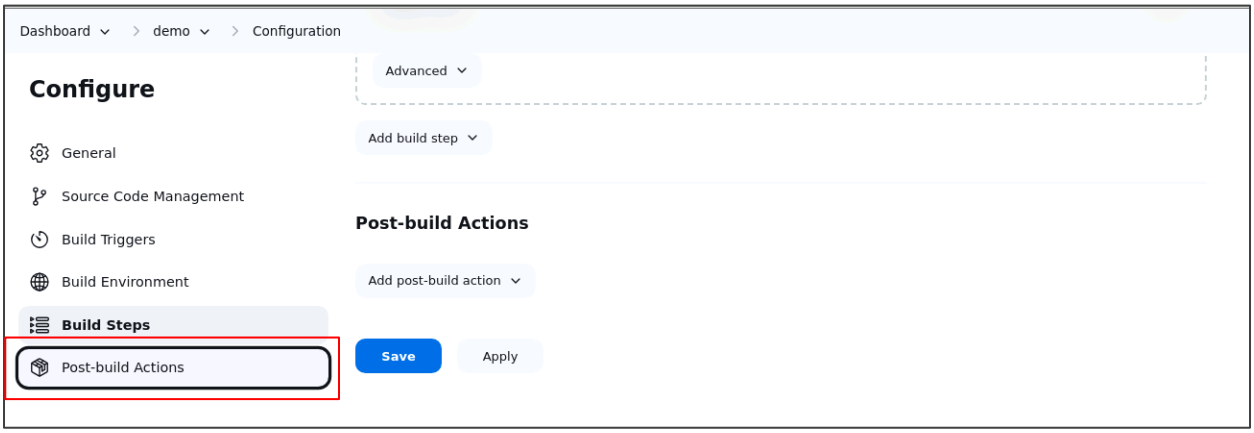
mymaven

3.9 Enter the following **Goals**:

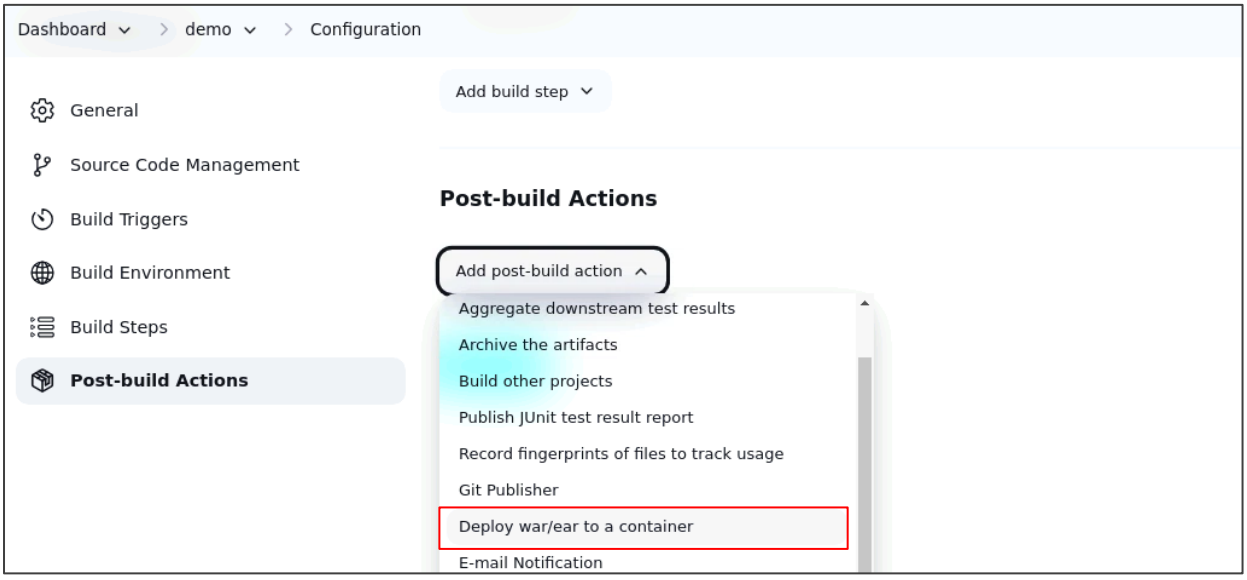
clean install



3.10 Go to **Post-build Actions**

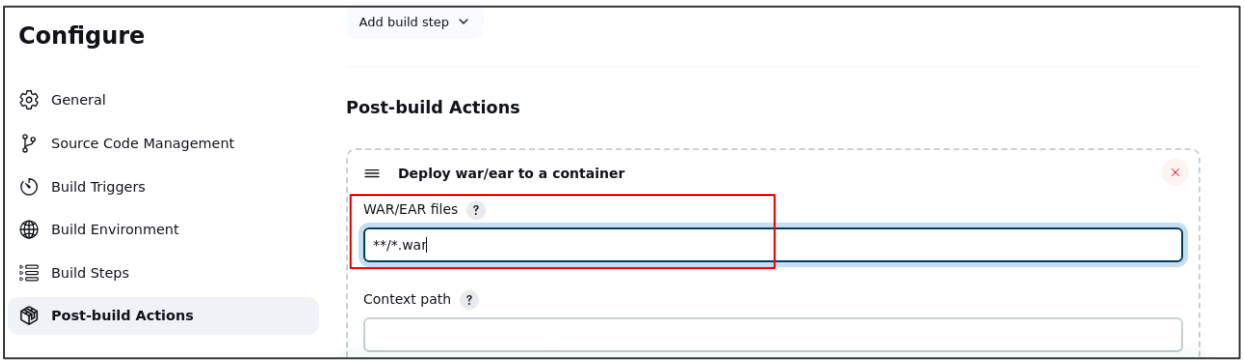


3.11 Click on **Add post-build action** and select **Deploy war/ear to a container**

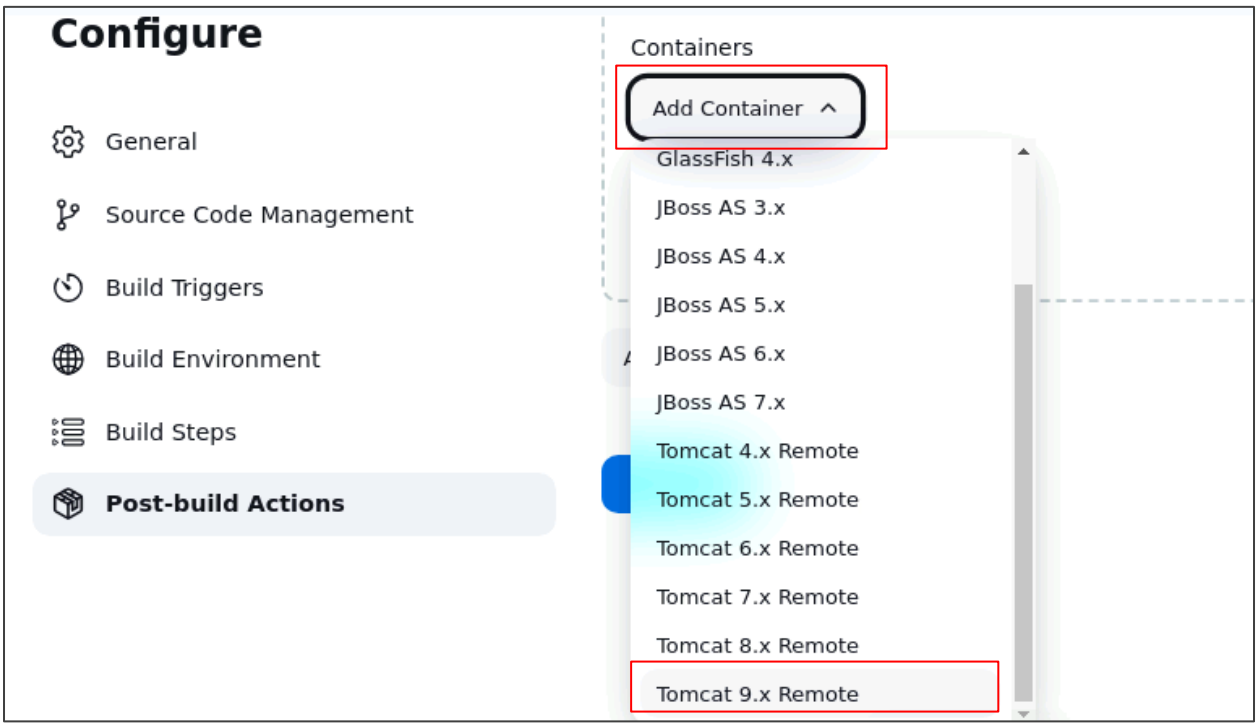


3.12 Enter the following path under **WAR/EAR files**:

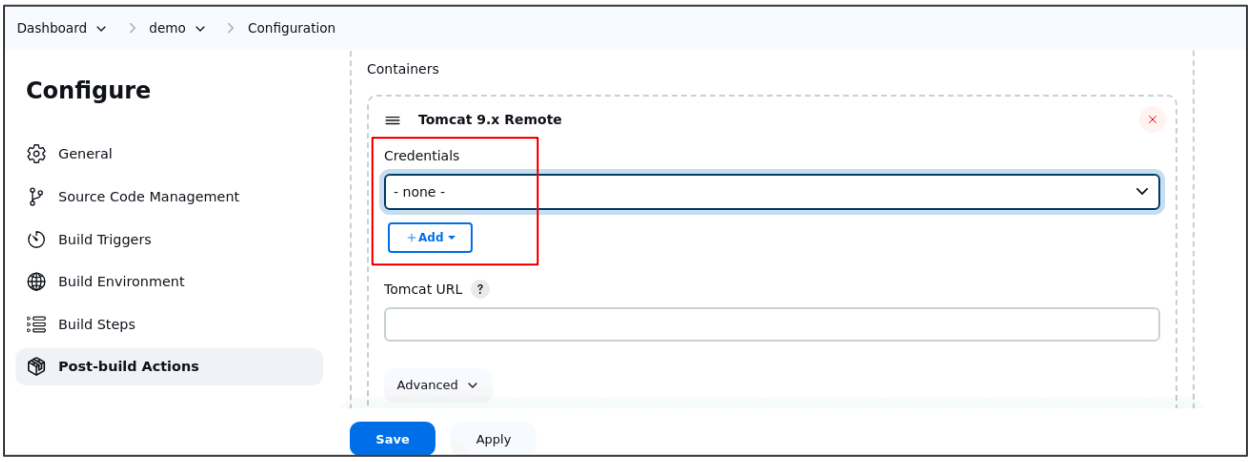
****/*.war**

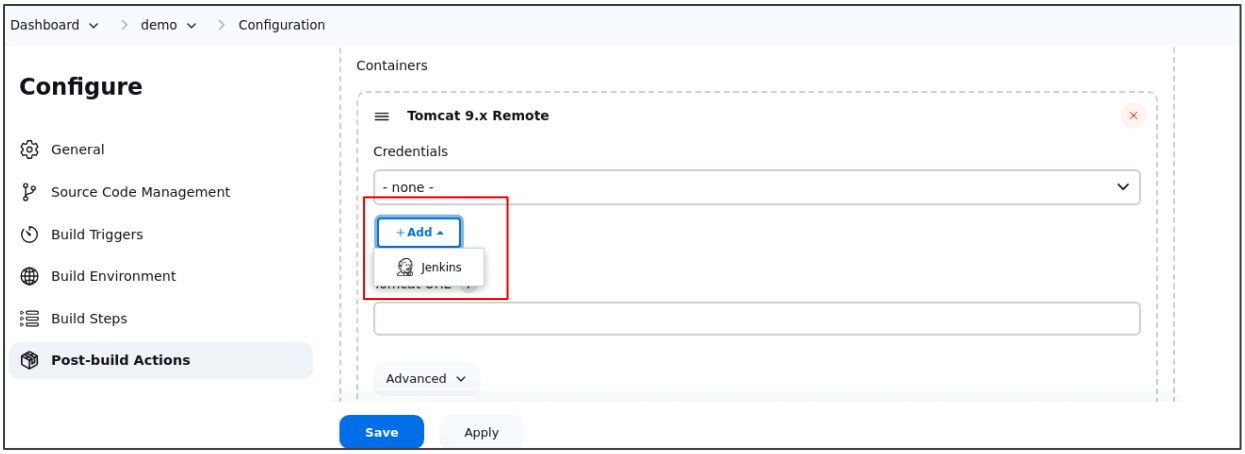


3.13 Click on **Add Container** and select **Tomcat 9.x Remote**



3.14 Click on **Add** under **Credentials** and select **Jenkins** to add the Tomcat credentials





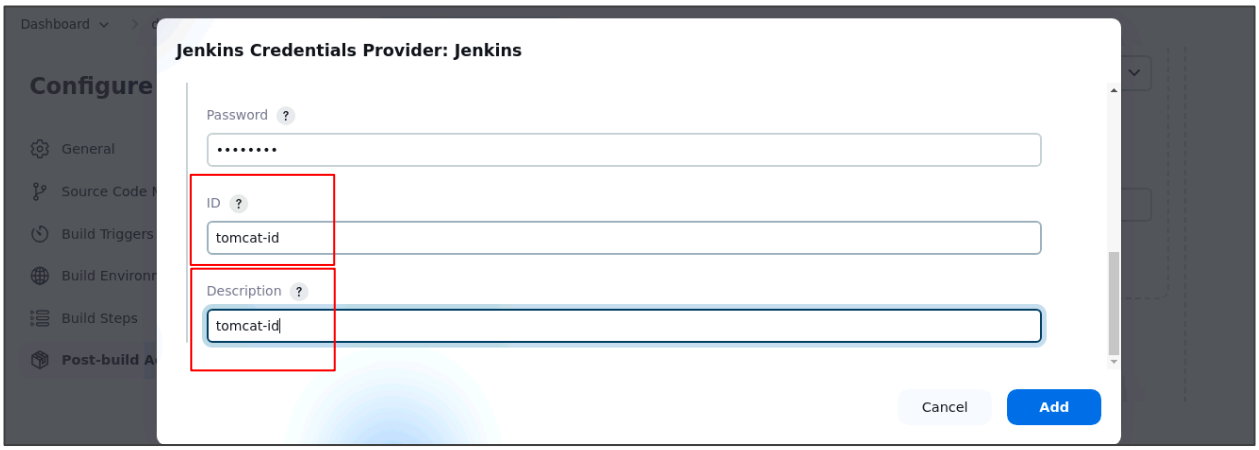
3.15 Scroll down and enter the following details:

Username: tomcat

Password: password

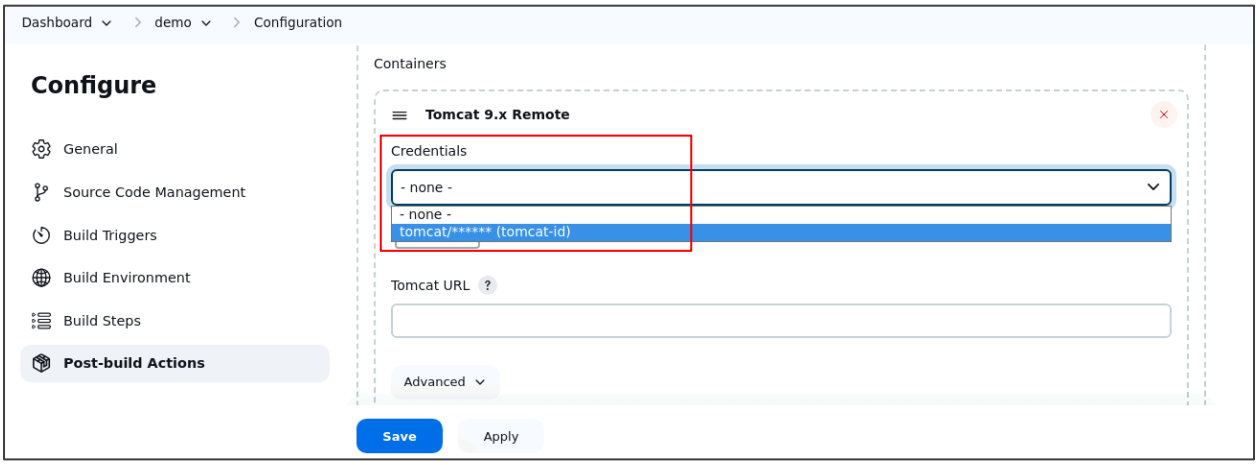
ID: tomcat-id

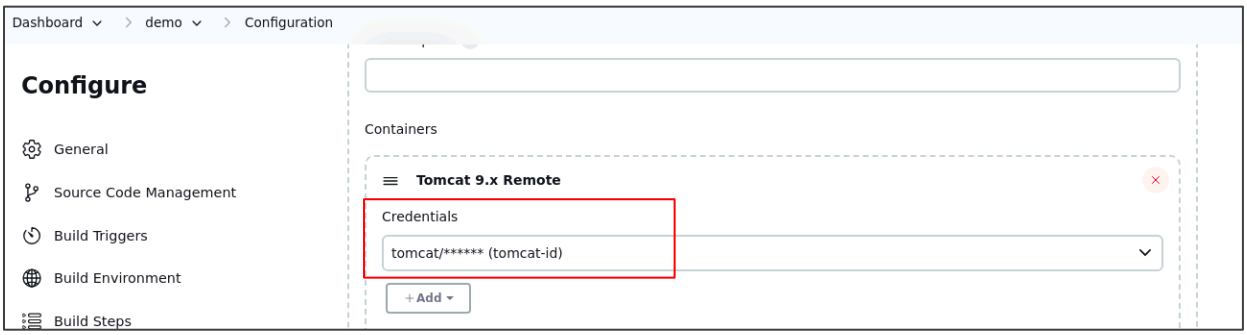
Description: tomcat-id



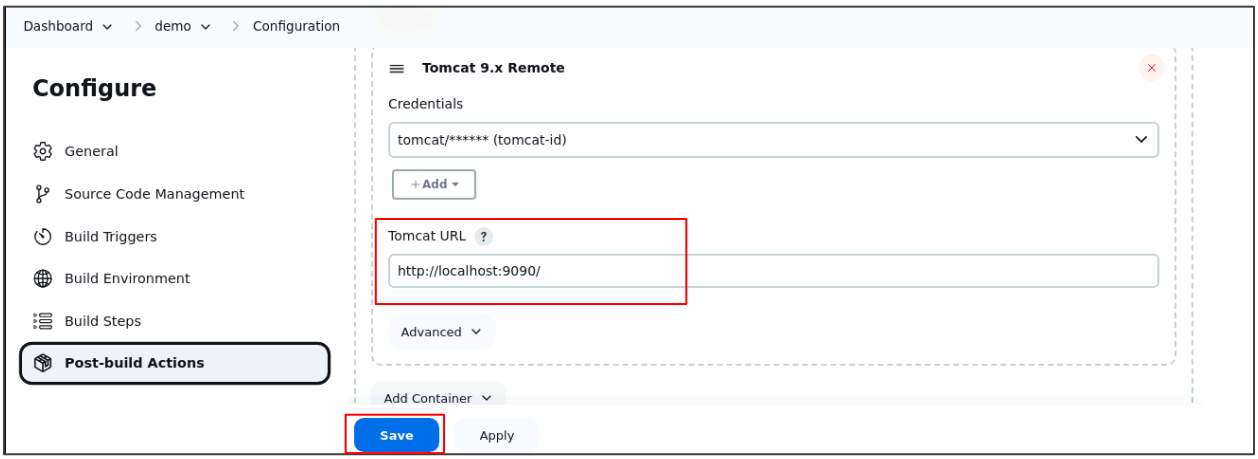
3.16 Click on **Add** to save the credentials

3.17 In the **Credentials** dropdown menu, select the added credentials

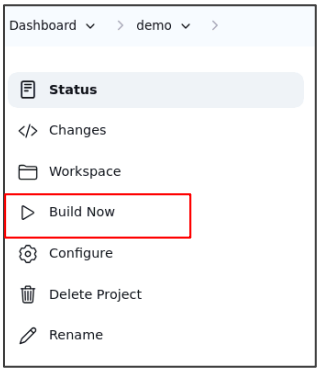


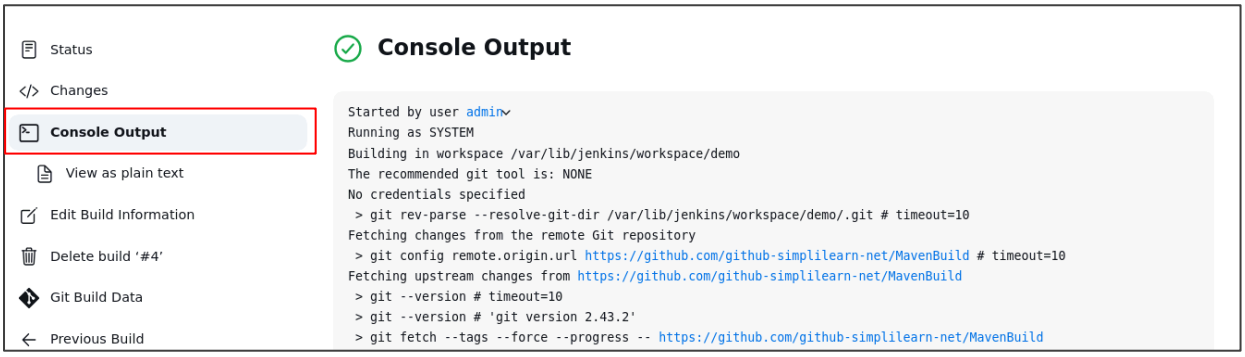


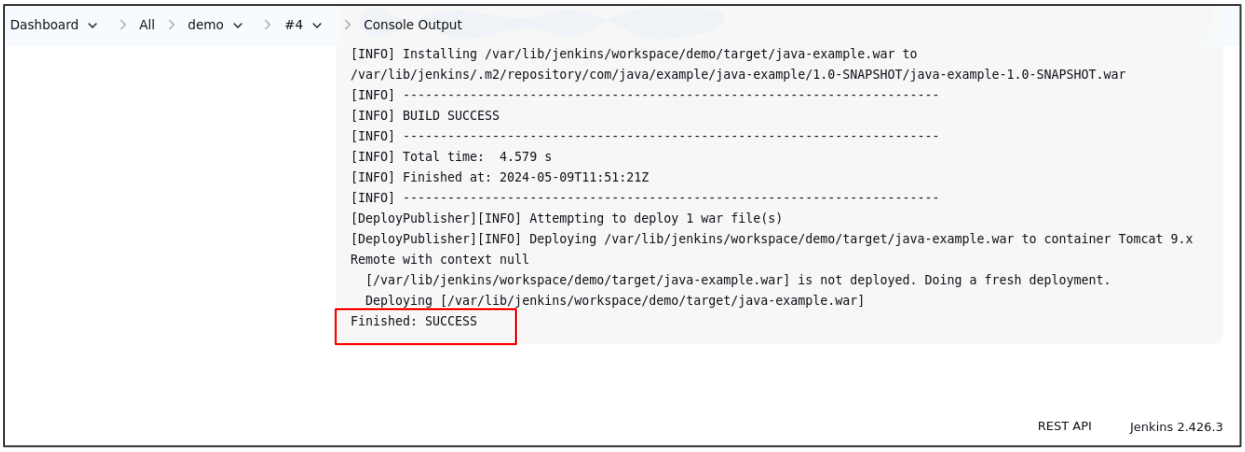
3.18 Enter the following **Tomcat URL** and **Save** the job:
http://localhost:9090/



3.19 Click on **Build Now** and then select **Console Output** to check the output







3.20 Access the deployed application in your web browser with the following URL:
http://localhost:9090/java-example/

By following these steps, you have successfully configured a CI/CD pipeline in Jenkins for deploying a Java application to Apache Tomcat.