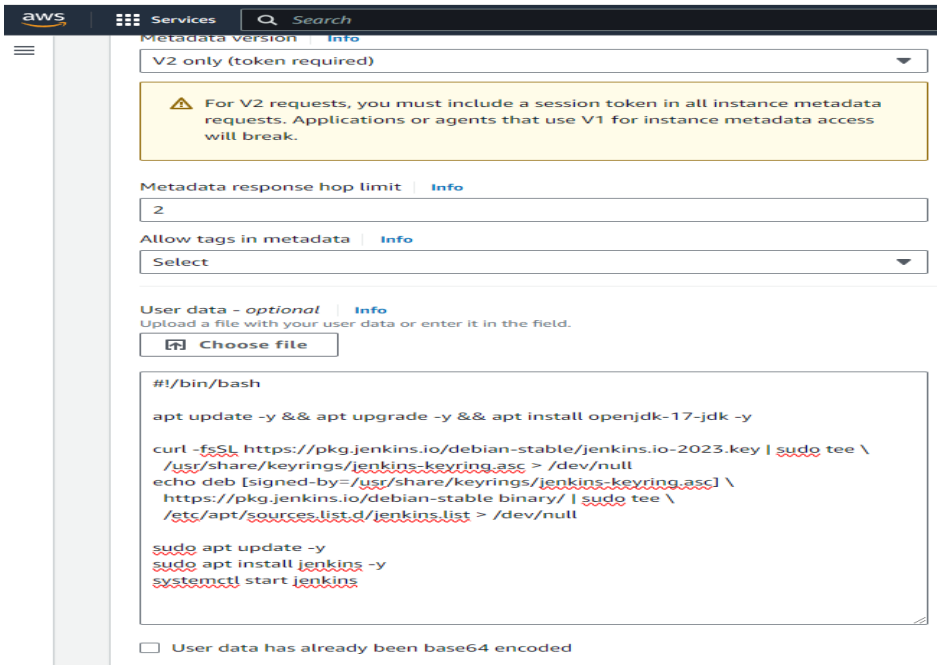
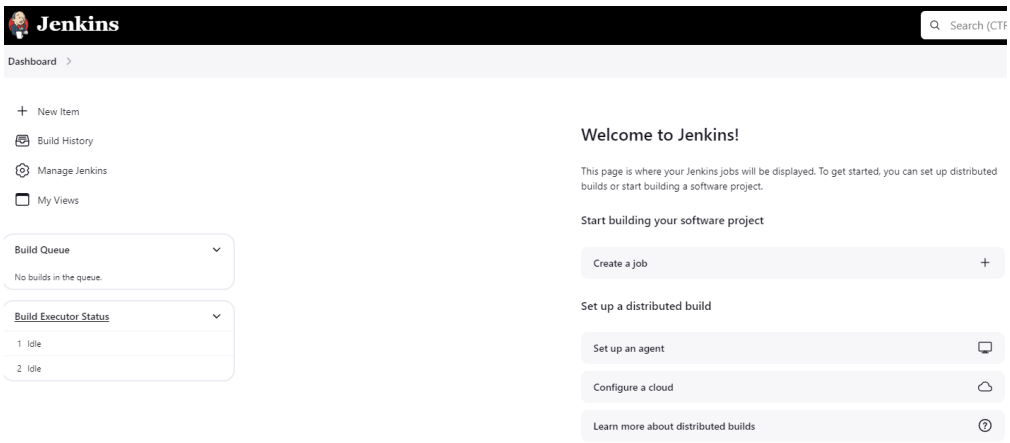
Automate Project Build with Tomcat 10 using Jenkins

1. To automate project build, we need to have a Jenkins Server EC2 instance.

   Add the below commands in user data section of EC2 instance before launching it to install Jenkins on it

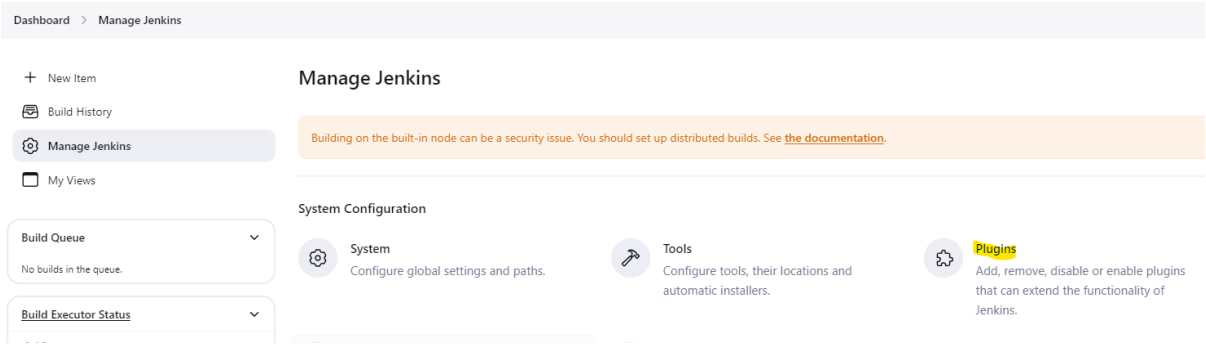


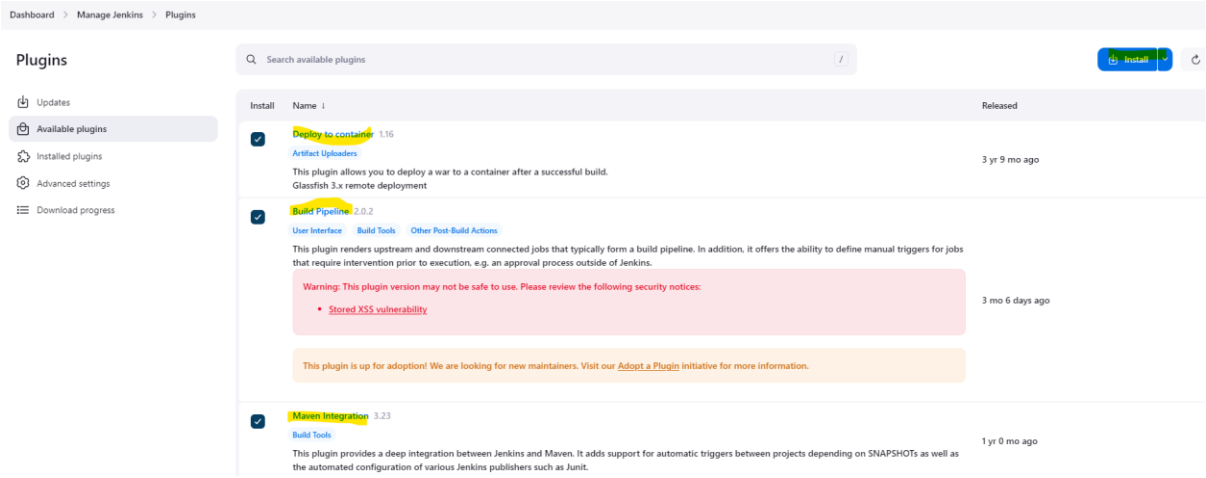
2. Once the EC2 instance is up, Post deployment steps are performed for configuring Jenkins to setup the Jenkins server. Once Jenkins is configured, we see the below dashboard screen.

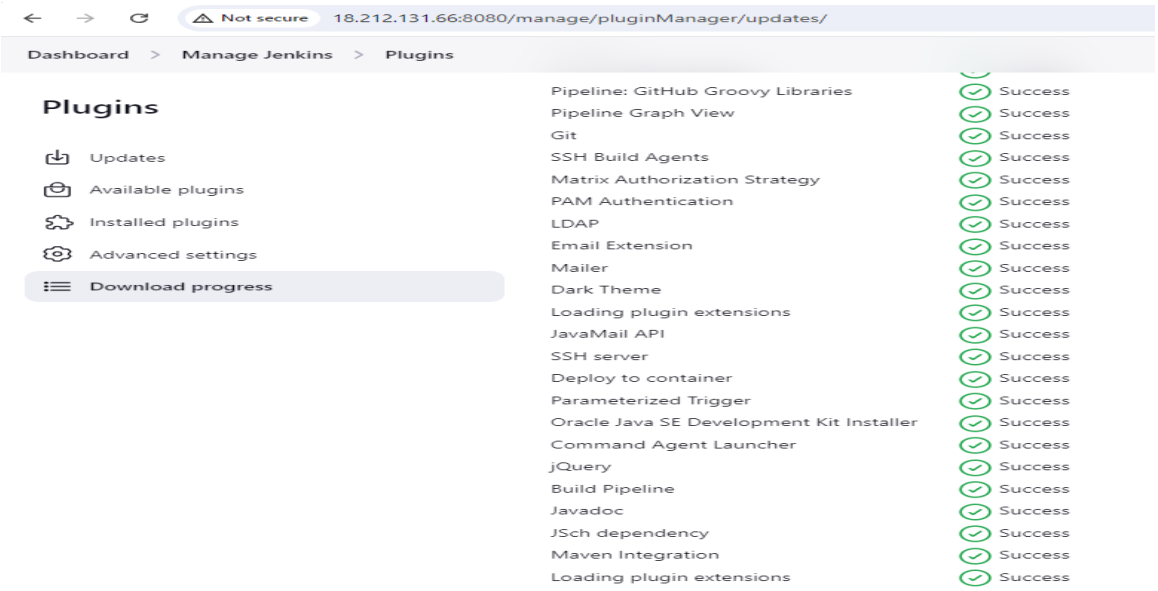


3. Once Jenkins dashboard is visible, we need to install the below mentioned 3 plugins for automating our project build by going to Manage Jenkins > Plugins > Available Plugins

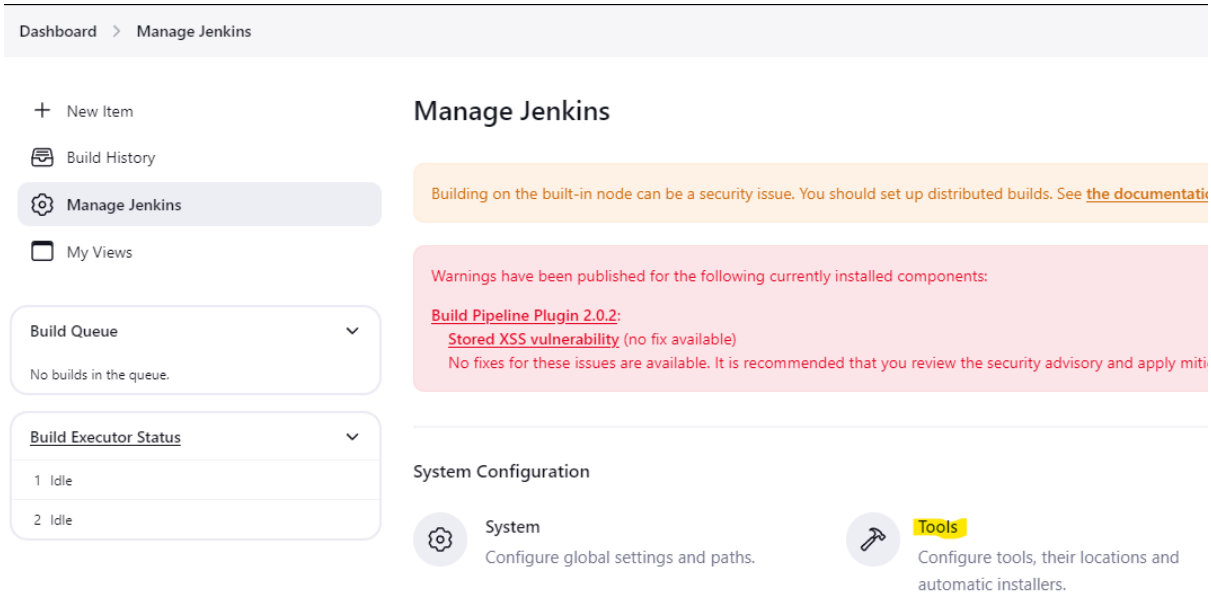
build pipeline
maven Integration
deploy to container



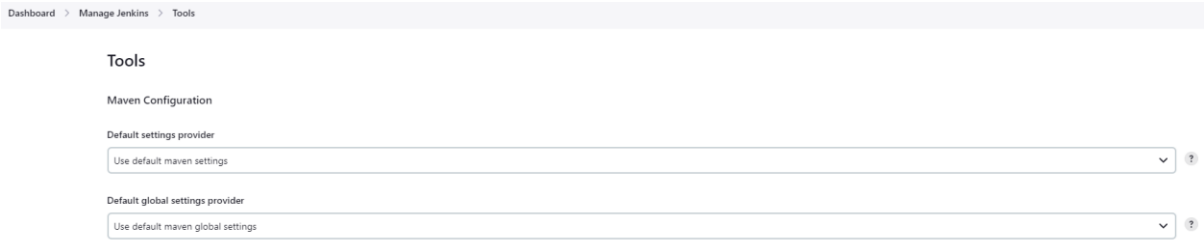




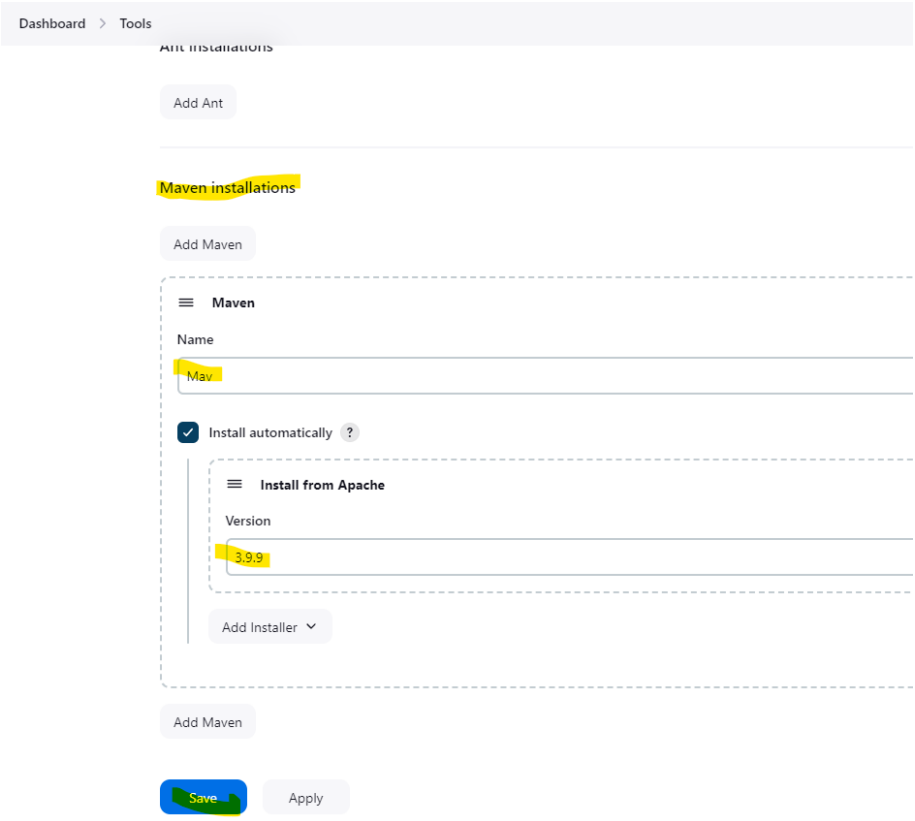
4. Once the Plugins are installed, we will go to Manage Jenkins > Tools



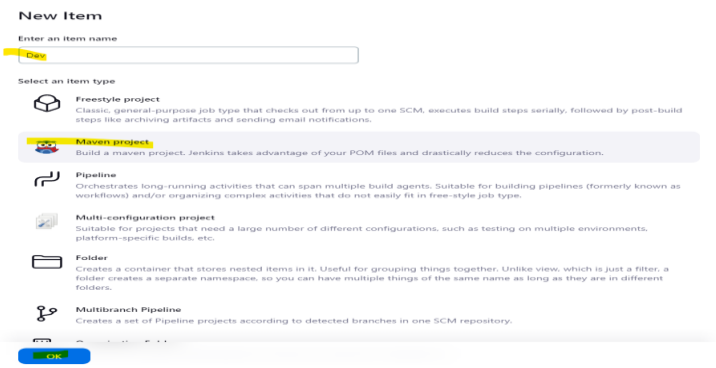
5. Under Maven Configuration, Below Settings should be there.



and also, we need to define Maven Installations, we can give it a name for e.g. MAV and select install automatically and under Install from Apache > Version, keep the default visible version. In our case 3.9.9 and click Save.



6. Now we need to create the first job, which we will give the name as "DEV", it will be a maven project since we need to run the maven test command to check the source code and pom.xml



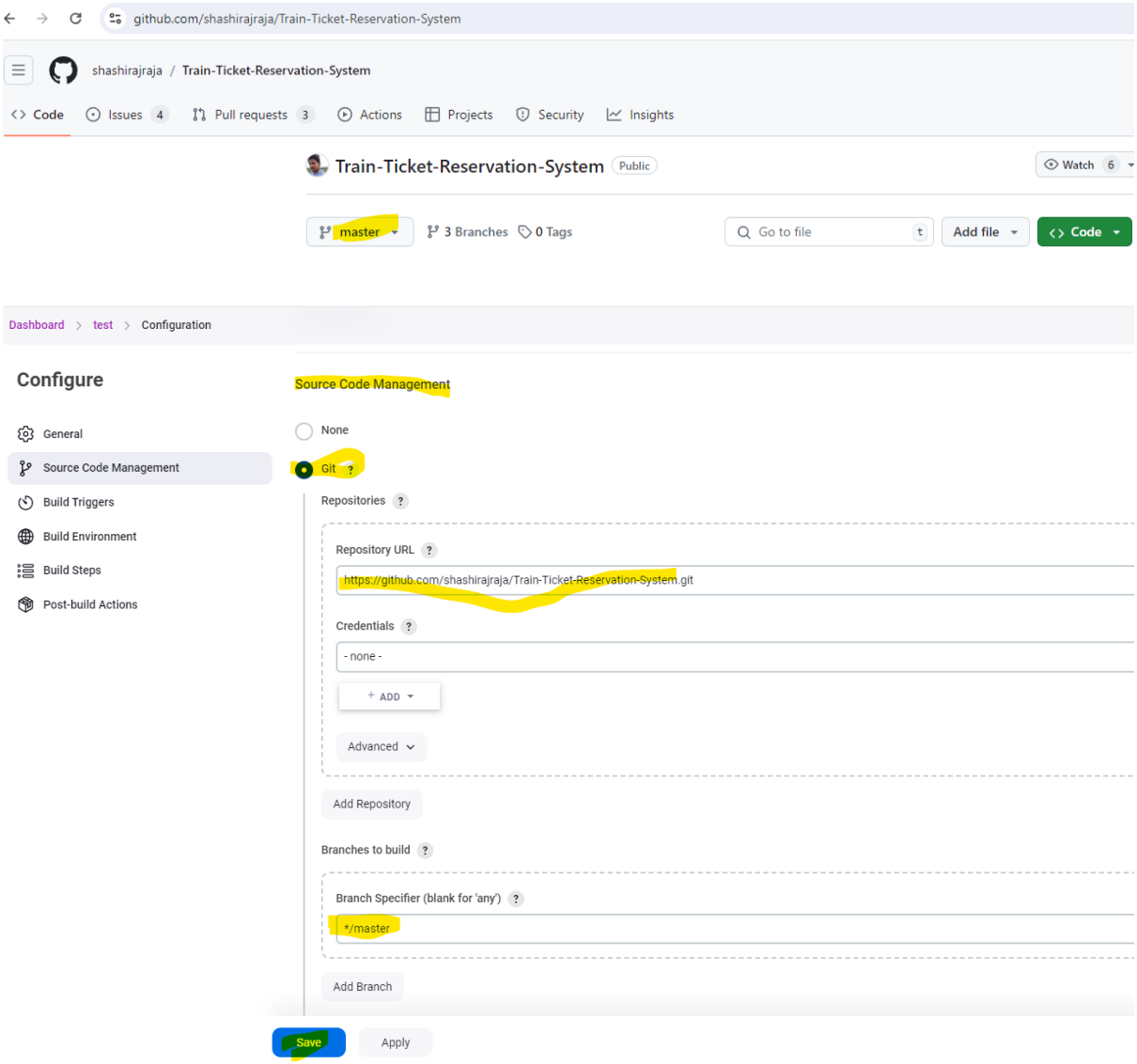
7. Now we will configure the "Dev" job as below.

We need to select git under Source Code Management

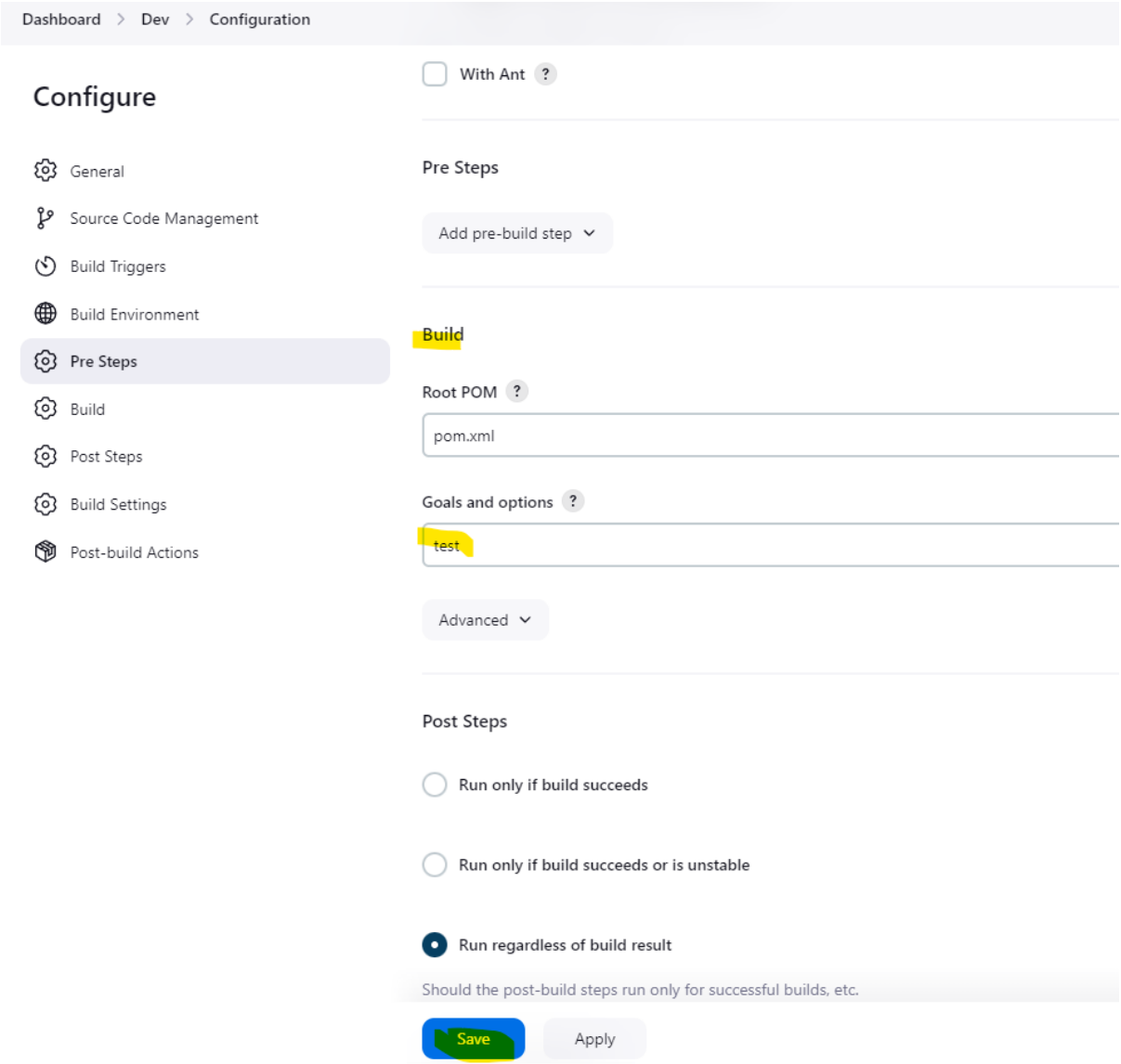
We need to give the Repository URL under repositories

https://github.com/shashirajraja/Train-Ticket-Reservation-System.git

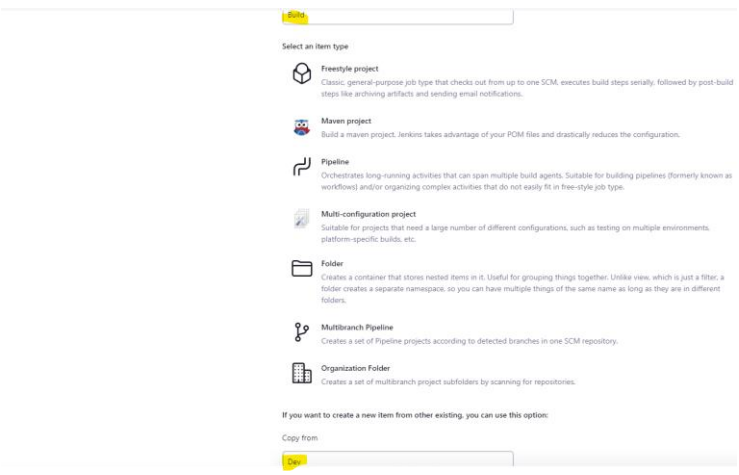
Lastly, we need to specify the branch name same as it is on the git hub link, in our case its */master in the git link also so we need to specify the same in the job also. Then Click Save

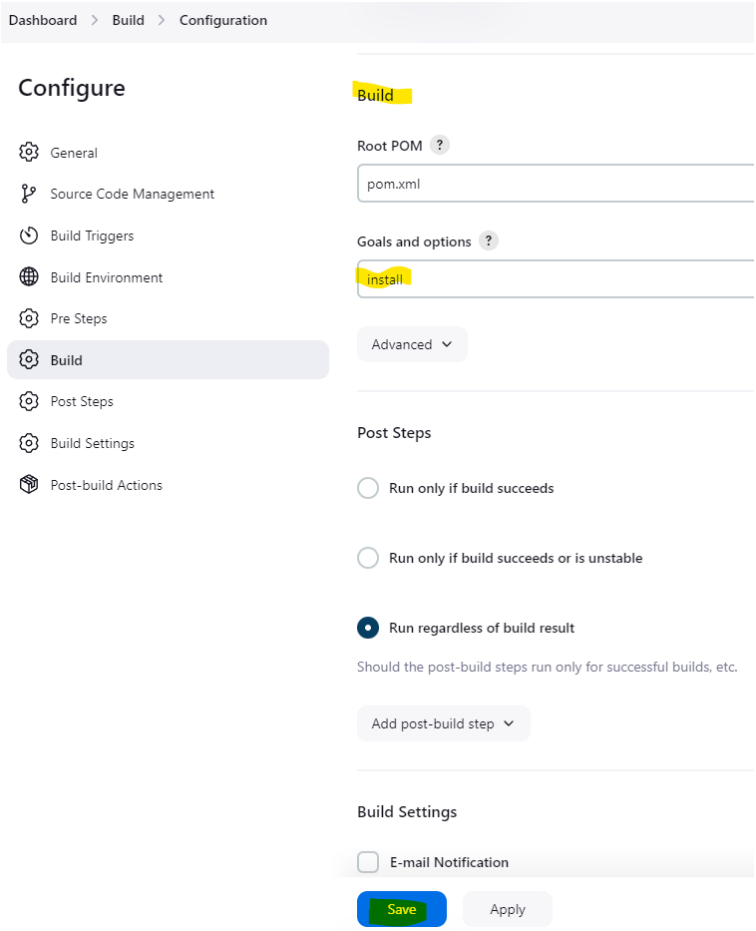


8. Under Build, we need to give Goals and options as test since we are testing the build and then click Save.

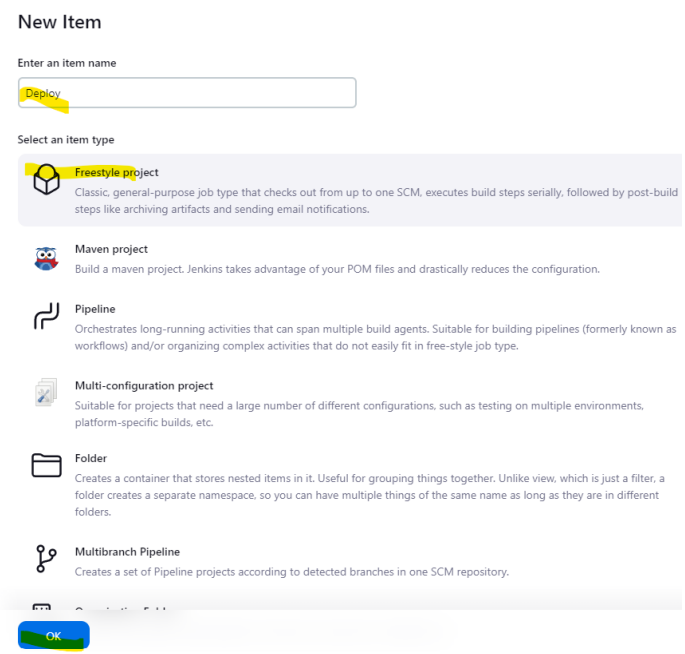


9. Now we create the second job as “Build” which we will copy the project from “Dev”. Just we need to change the Goal and Options under Build to install and click save, since we are building the code.

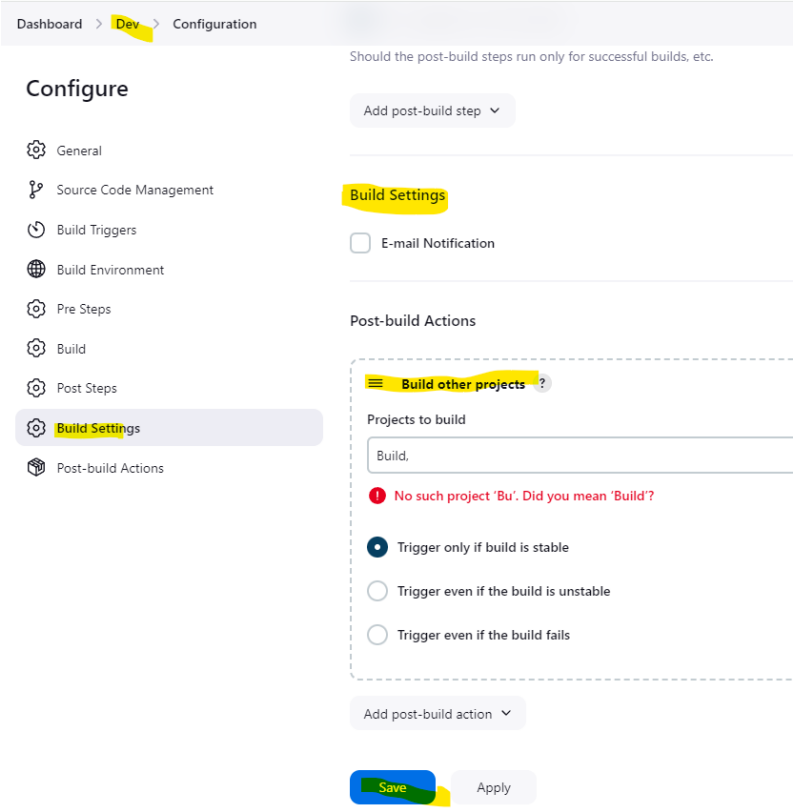


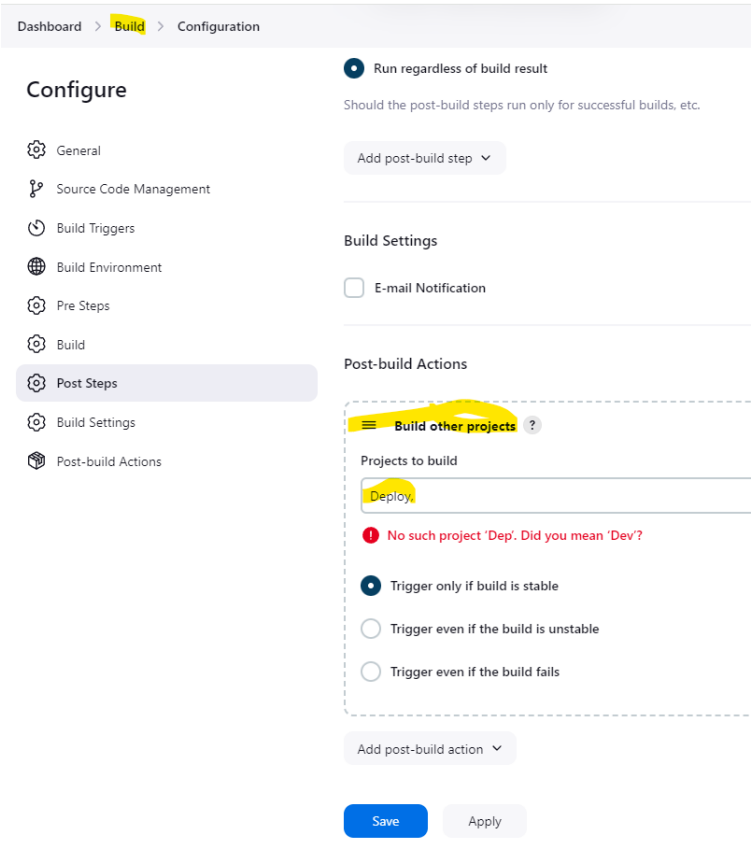


10. Now we will create the third job as “Deploy” and select it freestyle project and for now, we do not need to configure anything in that job.



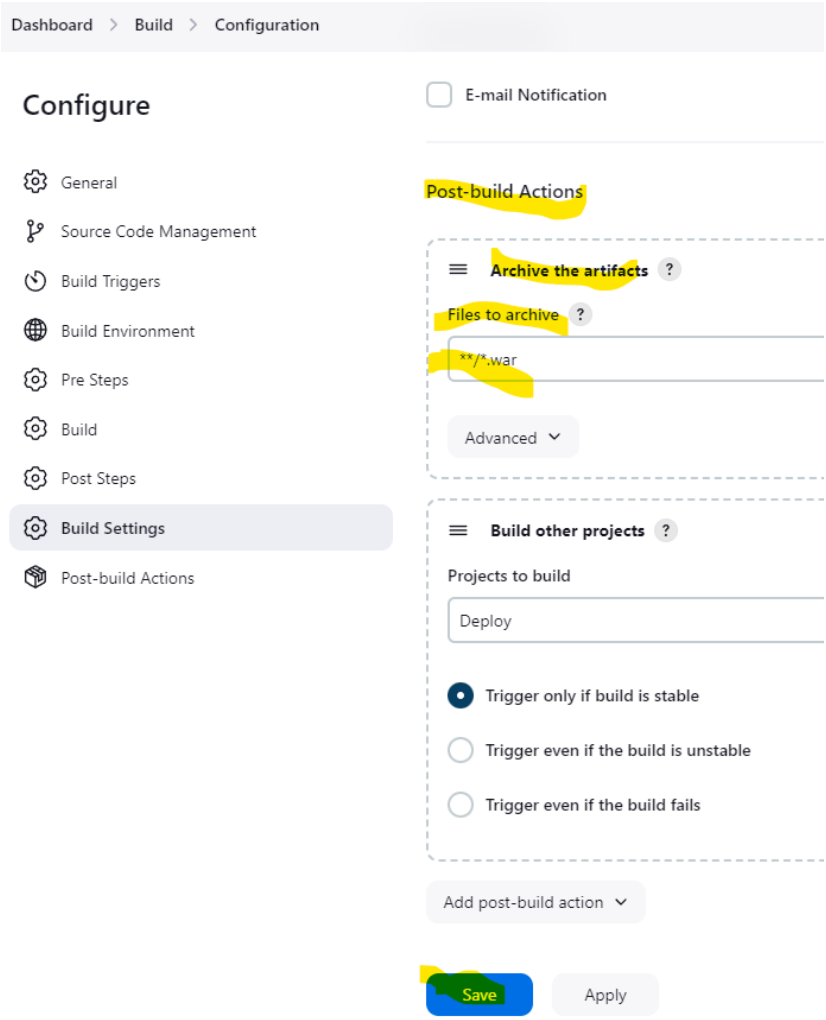
11. Now we define the dependency on each job i.e. Dev to trigger Build Project and Build to Trigger Deploy Project.



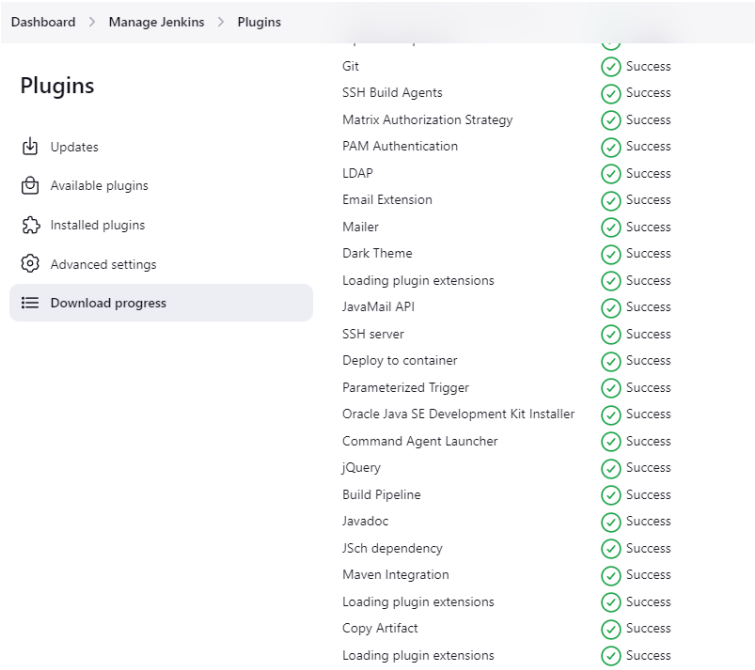


12. Now we configure the “Build” Project to archive the artifact by following the below steps.

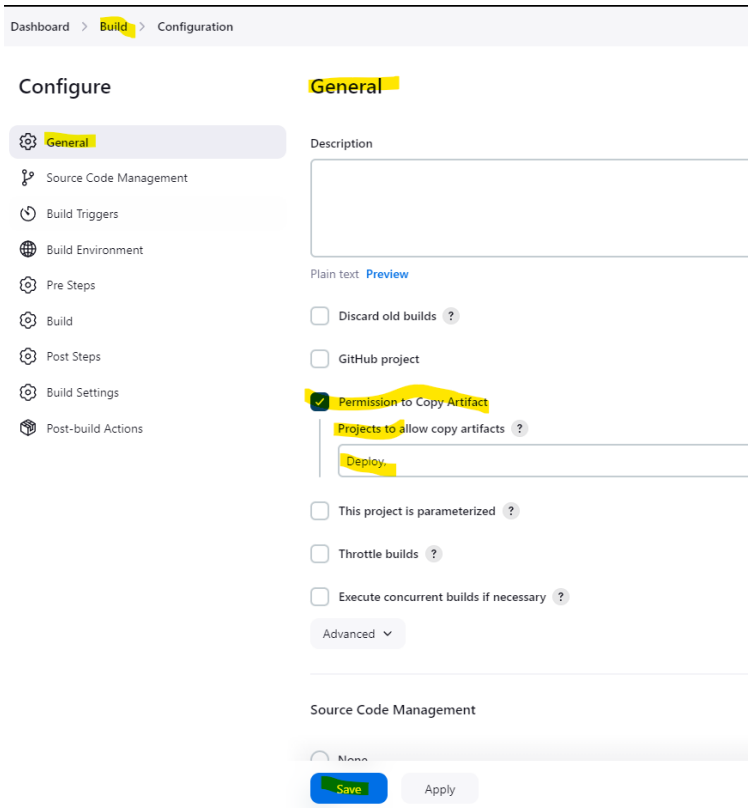
Configure the Build Job and go to Post Build Actions and add post-build action and select Archive the artifacts and in that under Files to archive, Type **/*.war (this defines any type of war file) and click save.



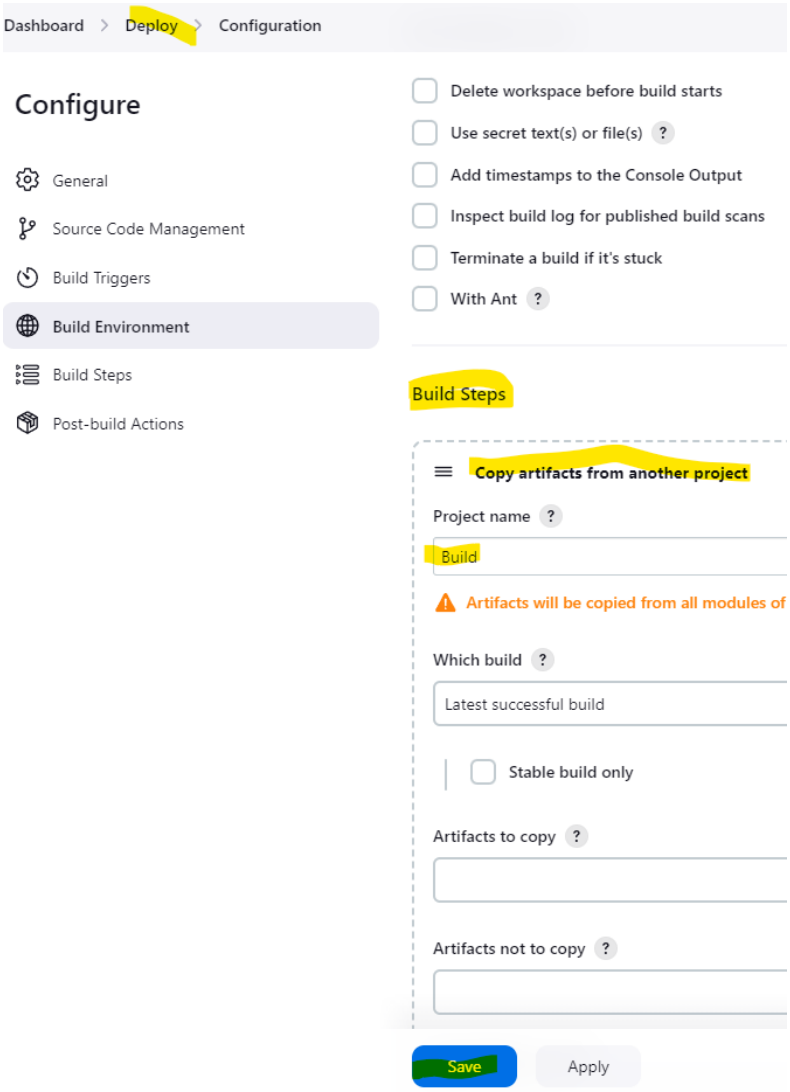
13. Now we need to install a plugin named copy artifact (So that archives files like war can be copied to artifacts)



14. Now we will configure the “Build” project again and under General select the option of Permission to Copy Artifact and under Projects to allow copy artifacts we need to give “Deploy” project and then click Save.

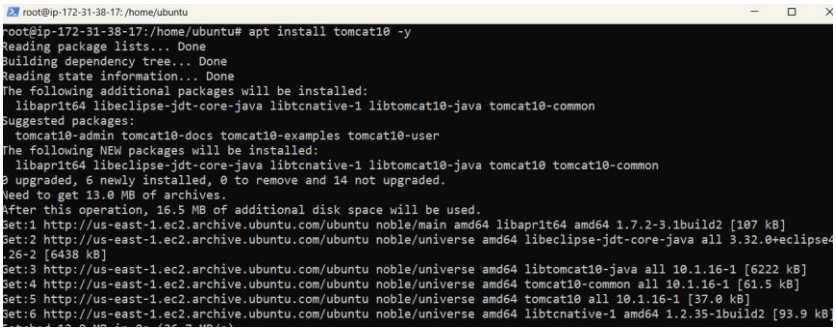


15. Now we will configure “Deploy” project and go to option Build steps > Add Build step and select Copy artifact from another project and under Project Name, we will give “Build” since we are copying artifacts from build project and click Save.



16. Now we will install Tomcat10 on Jenkins server through terminal.

apt install tomcat10 -y



Next, we will install tomcat10 admin to configure roles and users.

apt install tomcat10-admin -y

```
root@ip-172-31-38-17:/home/ubuntu# apt install tomcat10-admin -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  tomcat10-admin
0 upgraded, 1 newly installed, 0 to remove and 14 not upgraded.
Need to get 67.9 kB of archives.
After this operation, 326 kB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 tomcat10-admin all 10.1.16-1 [67.9 kB]
Fetched 67.9 kB in 0s (2166 kB/s)
Selecting previously unselected package tomcat10-admin.
(Reading database ... 114278 files and directories currently installed.)
Preparing to unpack .../tomcat10-admin_10.1.16-1_all.deb ...
Unpacking tomcat10-admin (10.1.16-1) ...
Setting up tomcat10-admin (10.1.16-1) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.
```

Since tomcat and Jenkins run on same port 8080 by default, so we need to change the port for tomcat10 from 8080 to 8081.

vi /etc/tomcat10/server.xml

Search for the line <Connector port=”8080” and change it to 8081

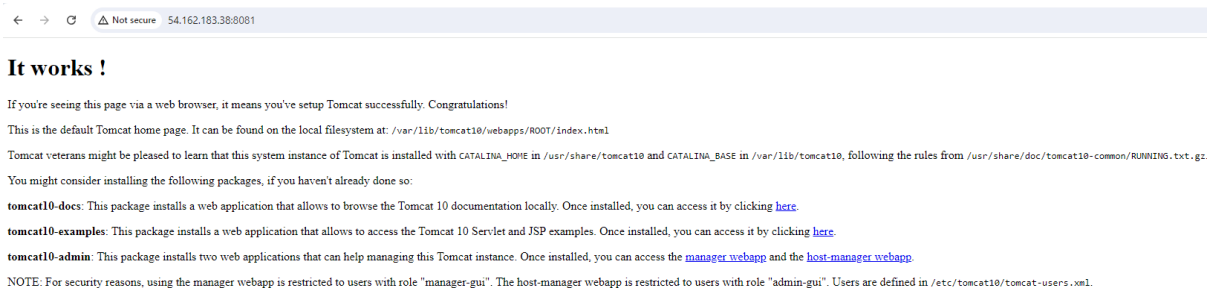
```
root@ip-172-31-38-17: /home/ubuntu

    <!--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 :
         HTTP Connector: /docs/config/http.html
         AJP  Connector: /docs/config/ajp.html
         Define a non-SSL/TLS HTTP/1.1 Connector on port 8080
    -->
    <Connector port="8081" protocol="HTTP/1.1"
               connectionTimeout="20000"
               redirectPort="8443"
               maxParameterCount="1000"
               />
    <!-- A "Connector" using the shared thread pool-->
    <!--
    <Connector executor="tomcatThreadPool"
               port="8080" protocol="HTTP/1.1"
               connectionTimeout="20000"
               redirectPort="8443"
               maxParameterCount="1000"
/8080
```

Now we will restart tomcat10 to make the changes

systemctl restart tomcat10

```
root@ip-172-31-38-17:/home/ubuntu# systemctl restart tomcat10
root@ip-172-31-38-17:/home/ubuntu#
```

Verify tomcat10 is running on the new port 8081. So, it works



Now we will provide the ownership to tomcat user from root.

Before ownership change

```
drwxr-xr-x  5 root      root      4096 Aug 22 14:05 tomcat10
root@ip-172-31-38-17:/var/lib#
```

We will run the ownership change command

chown -R tomcat:tomcat /var/lib/tomcat10

After Ownership change

```
drwxr-xr-x  5 tomcat    tomcat    4096 Aug 22 14:05 tomcat10
root@ip-172-31-38-17:/var/lib#
```

Now we will assign the tomcat10 roles by going to the location /etc/tomcat10

vi tomcat-users.xml and append the below lines in the file.

```
root@ip-172-31-38-17:/etc/tomcat10# vi tomcat-users.xml
```

```
<role rolename="manager-gui"/>
<role rolename="manager-script"/>
<role rolename="manager-jmx"/>
<role rolename="manager-status"/>
```

<role rolename="host-manager-gui"/>
<role rolename="host-manager-script"/>
<user username="tomcat" password="tomcat" roles="manager-gui, manager-script, manager-jmx, manager-status, host-manager-gui, host-manager-script"/>

(In the above lines, we also make sure that username should be tomcat only since tomcat user has been given ownership of tomcat10 folder)

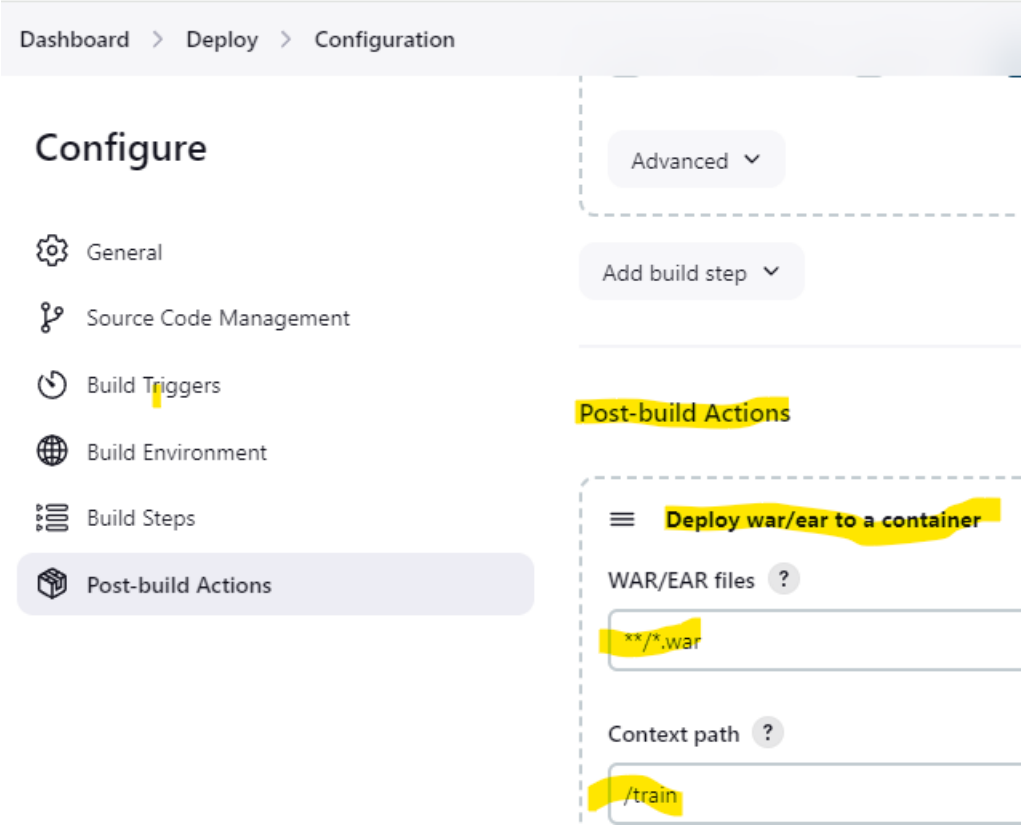
```
root@ip-172-31-38-17: /etc/tomcat10
  <user username="admin" password="<must-be-changed>" roles="manager-gui"/>
  <user username="robot" password="<must-be-changed>" roles="manager-script"/>
-->
<!--
  The sample user and role entries below are intended for use with the
  examples web application. 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"/>
-->
        <role rolename="manager-gui"/>
        <role rolename="manager-script"/>
        <role rolename="manager-jmx"/>
        <role rolename="manager-status"/>
        <role rolename="host-manager-gui"/>
        <role rolename="host-manager-script"/>
        <user username="tomcat" password="tomcat" roles="manager-gui,manager-script,manager-jmx,manager-status,host-
manager-gui,host-manager-script"/>
</tomcat-users>
-- INSERT --                                                    62,146-153    Bot
```

Again, we will restart tomcat10 service.

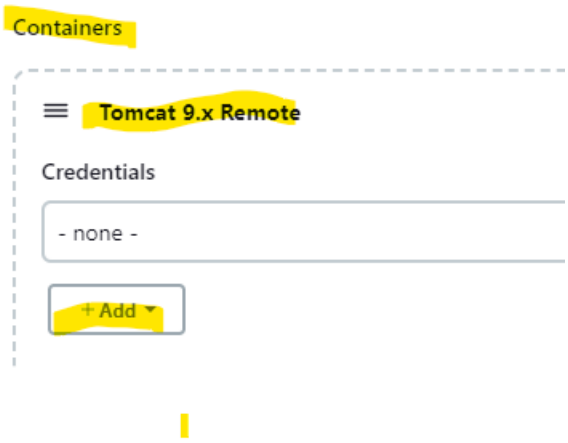
systemctl restart tomcat10

```
root@ip-172-31-38-17:/home/ubuntu# systemctl restart tomcat10
root@ip-172-31-38-17:/home/ubuntu#
```

17. Next, we will configure again “Deploy” Project then go to Post Build Actions> Add post-build actions then select Deploy war/ear to a container and in WAR/EAR files we will give **/*.war and in the context path we will give /train in our example.

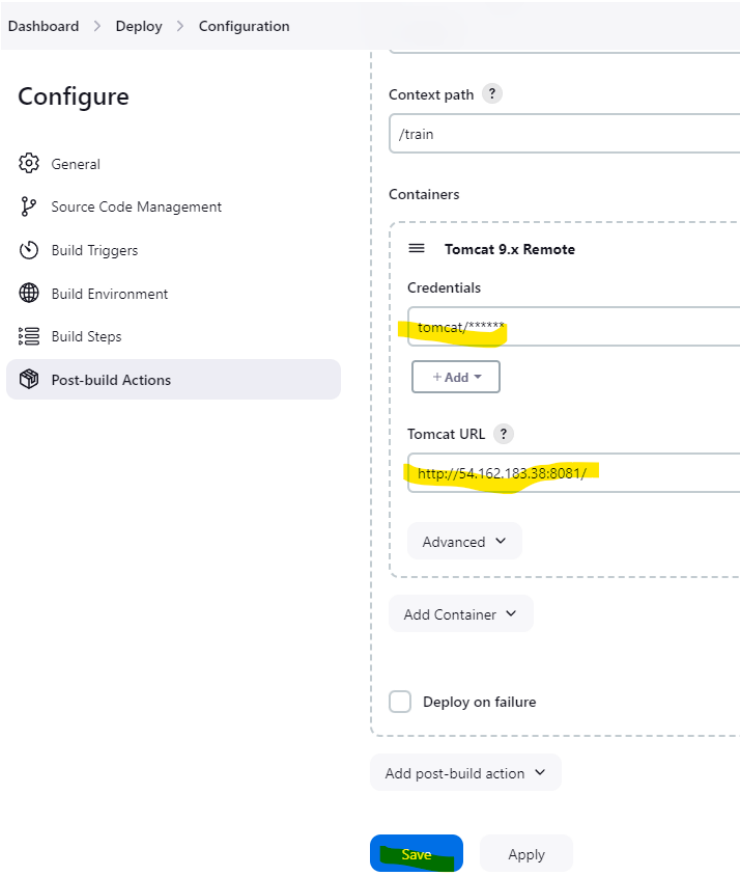


After this, under Containers > Add Container then select Tomcat 9.x Remote. Under this we will click Add the credentials.



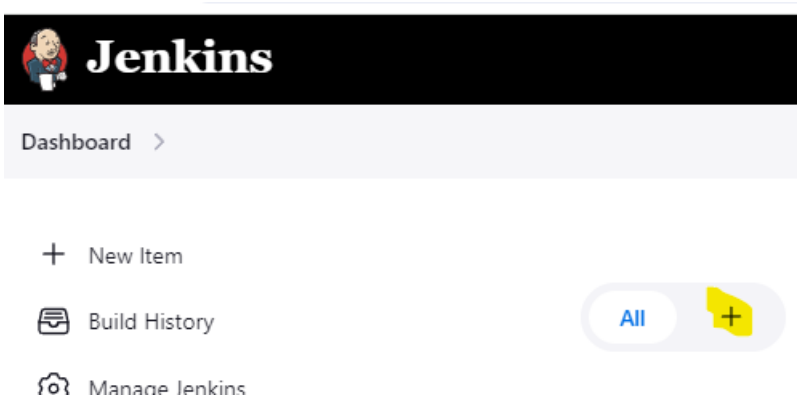
Under Credentials we will give username – tomcat and password – tomcat (same credentials which we gave while adding roles in tomcat-users.xml file) and click Add.

Once the credentials are added, then we will select those credentials under Tomcat 9.x Remote and also add the Tomcat URL with port 8081 and click Save.

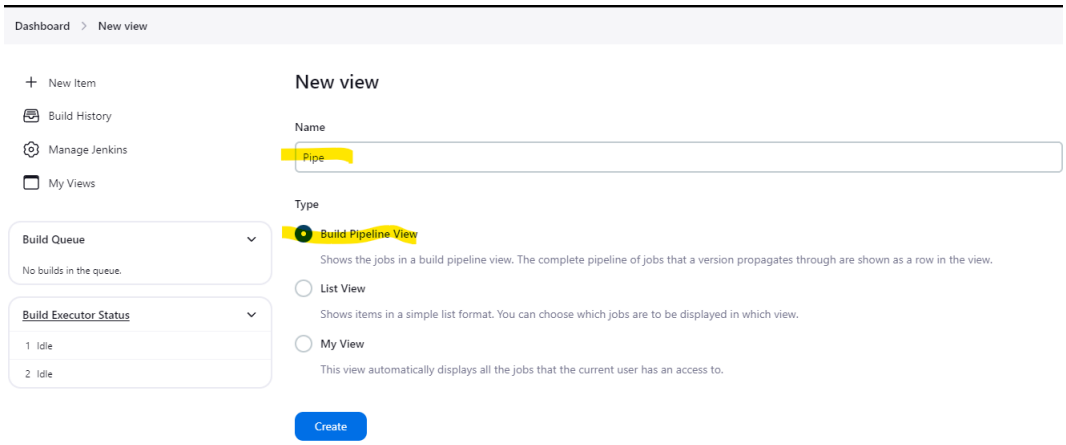


18. Now we will build the pipeline to check whether it works according to the flow.

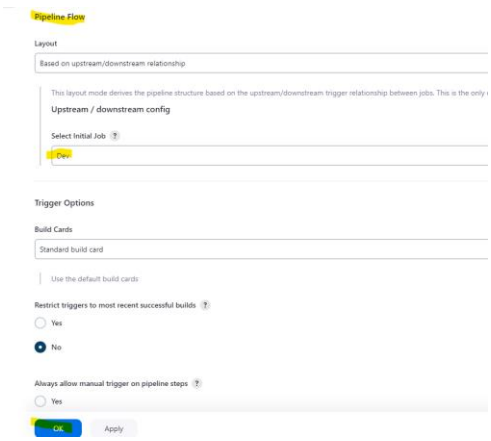
Now click on + sign on dashboard



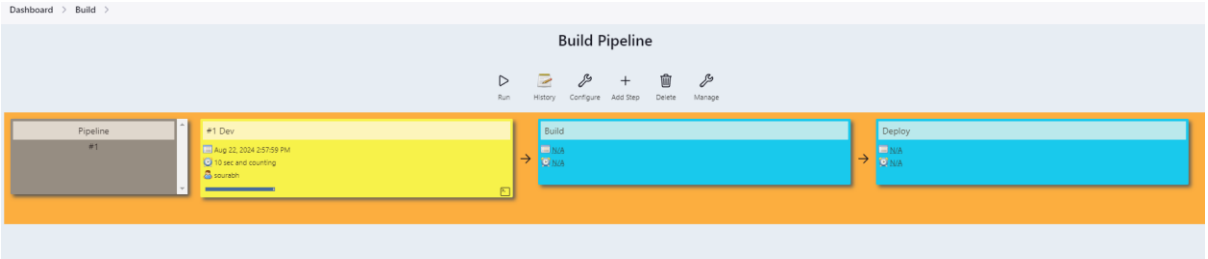
Give Pipeline view a name and select Build Pipeline View

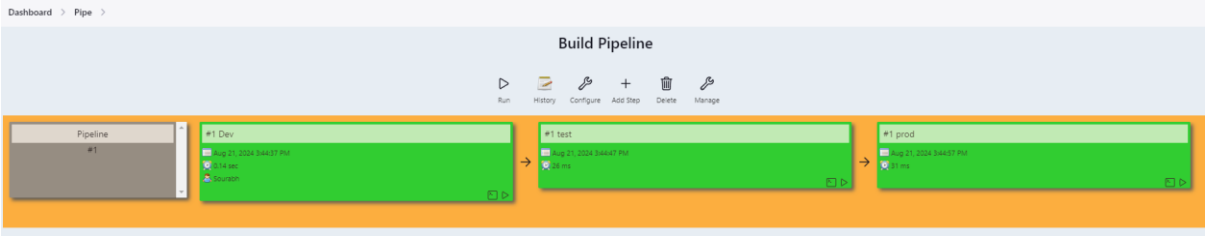


Select Initial Job as Dev under Pipeline Flow and Click OK.



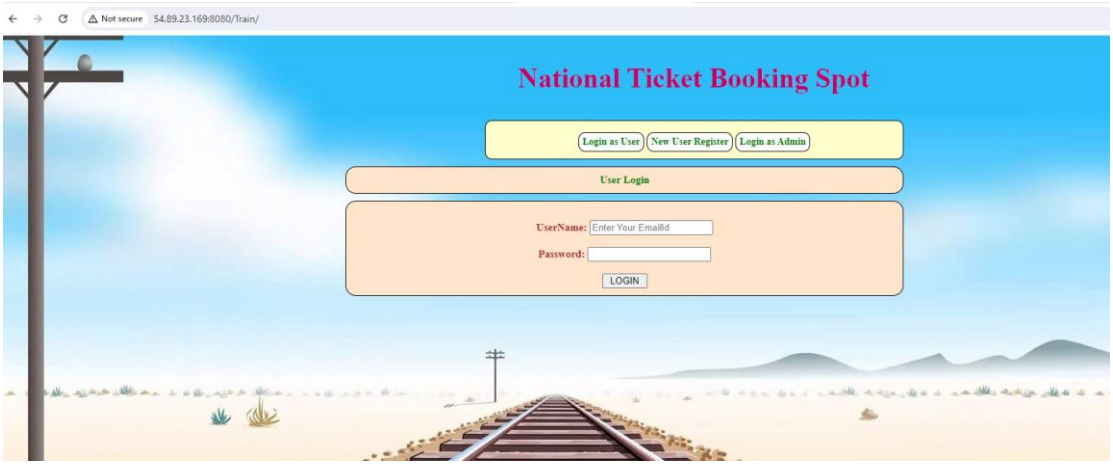
Now will run the Build Pipeline and see the output below.





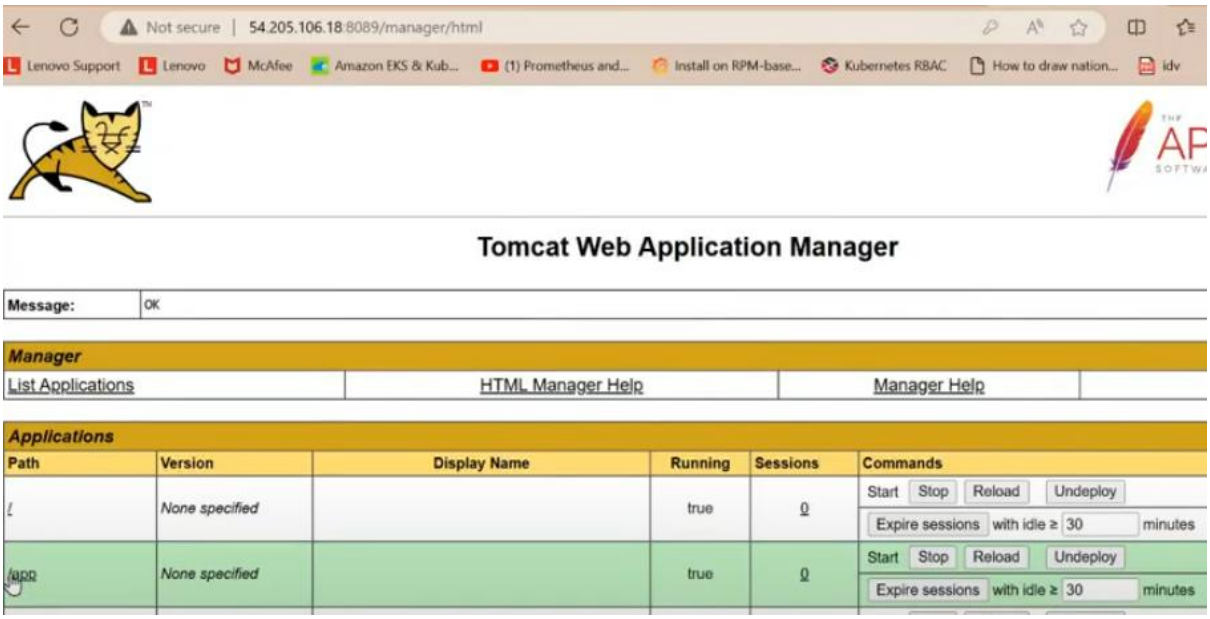
19. Our job ran successfully in the pipeline.

20. The output will come out as below, Note Screenshot details may differ but it works.



21. We will access the manager also in tomcat10 and see that our project is visible there. In the below screenshot, we need to enter the tomcat role credentials i.e. username – tomcat and password – tomcat

22. Below screenshot is different from the actual one. But the result will be same. /App is there in screenshot instead of /train.



23. Automate Project build is completed using Jenkins.