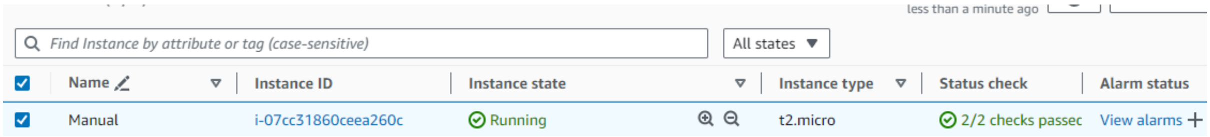
Manual Project Build with Tomcat 10

1) Launch an EC2 Instance



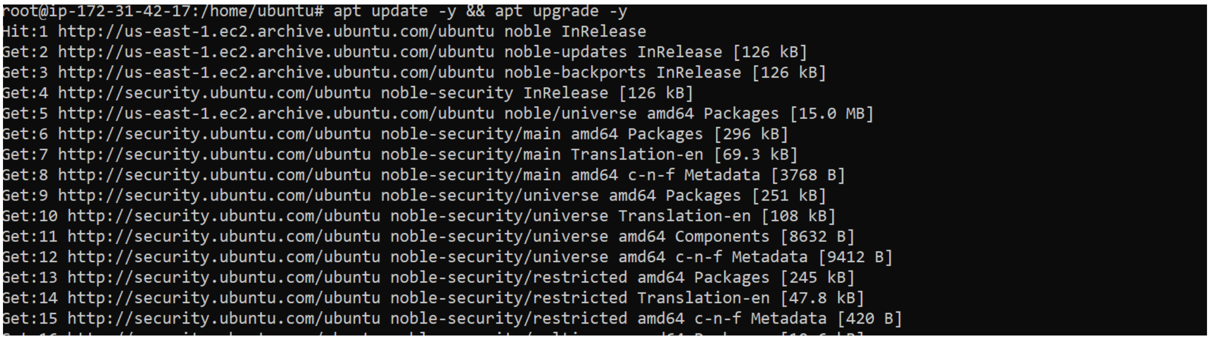
less than a minute ago

Find Instance by attribute or tag (case-sensitive) | All states

☑	Name	Instance ID	Instance state	Instance type	Status check	Alarm status
☑	Manual	i-07cc31860ceea260c	✓ Running	t2.micro	✓ 2/2 checks passec	View alarms +

2) Now login and run the below commands to update and upgrade the packages of the OS.

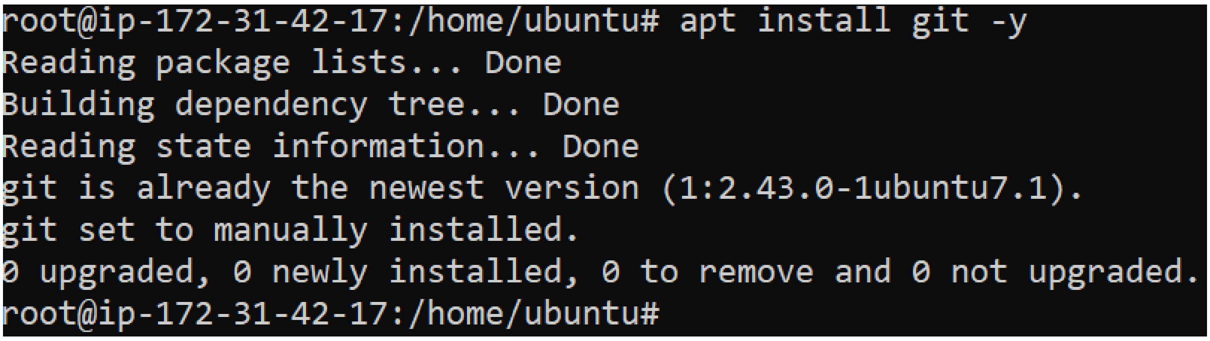
apt update -y && apt upgrade -y



```
root@ip-172-31-42-17:/home/ubuntu# apt update -y && apt upgrade -y
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]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:6 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [296 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [69.3 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [3768 B]
Get:9 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [251 kB]
Get:10 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [108 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [8632 B]
Get:12 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [9412 B]
Get:13 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [245 kB]
Get:14 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [47.8 kB]
Get:15 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 c-n-f Metadata [420 B]
```

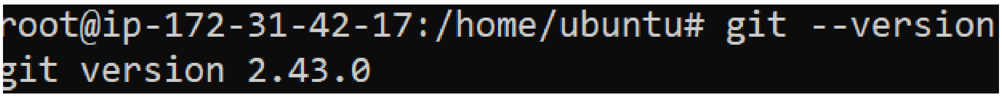
3) Now install git and git version using the below command.

apt install git -y



```
root@ip-172-31-42-17:/home/ubuntu# apt install git -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
git is already the newest version (1:2.43.0-1ubuntu7.1).
git set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
root@ip-172-31-42-17:/home/ubuntu#
```

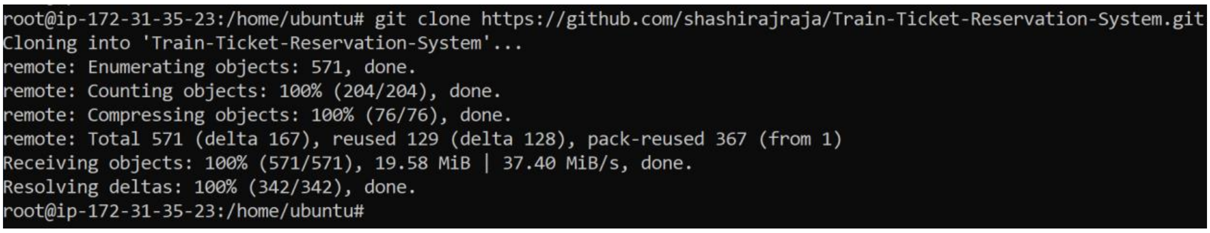
git –version



```
root@ip-172-31-42-17:/home/ubuntu# git --version
git version 2.43.0
```

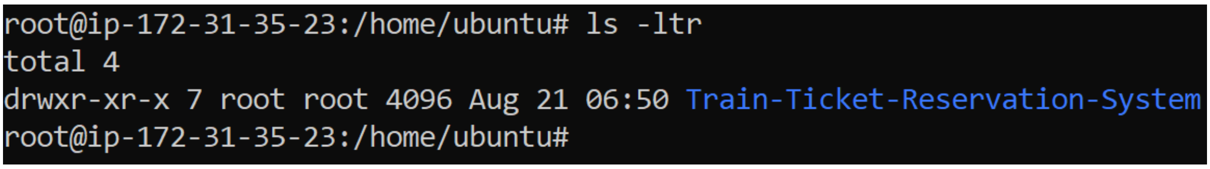
4) Now clone the git repository which you want to build the project and check if the repo is cloned properly.

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



```
root@ip-172-31-35-23:/home/ubuntu# git clone https://github.com/shashirajraja/Train-Ticket-Reservation-System.git
Cloning into 'Train-Ticket-Reservation-System'...
remote: Enumerating objects: 571, done.
remote: Counting objects: 100% (204/204), done.
remote: Compressing objects: 100% (76/76), done.
remote: Total 571 (delta 167), reused 129 (delta 128), pack-reused 367 (from 1)
Receiving objects: 100% (571/571), 19.58 MiB | 37.40 MiB/s, done.
Resolving deltas: 100% (342/342), done.
root@ip-172-31-35-23:/home/ubuntu#
```

ls -ltr

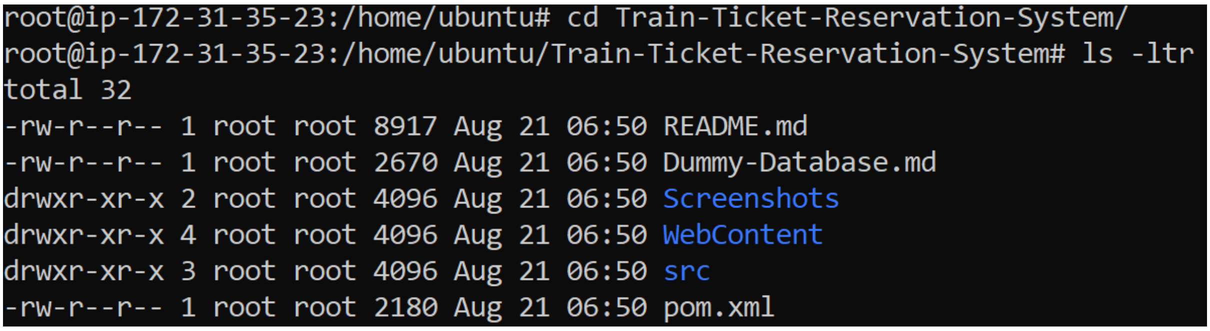


```
root@ip-172-31-35-23:/home/ubuntu# ls -ltr
total 4
drwxr-xr-x 7 root root 4096 Aug 21 06:50 Train-Ticket-Reservation-System
root@ip-172-31-35-23:/home/ubuntu#
```

5) **Go inside the cloned project directory and verify the source code and pom.xml file is present so that we can build the project.**

cd Train-Ticket-Reservation-System/

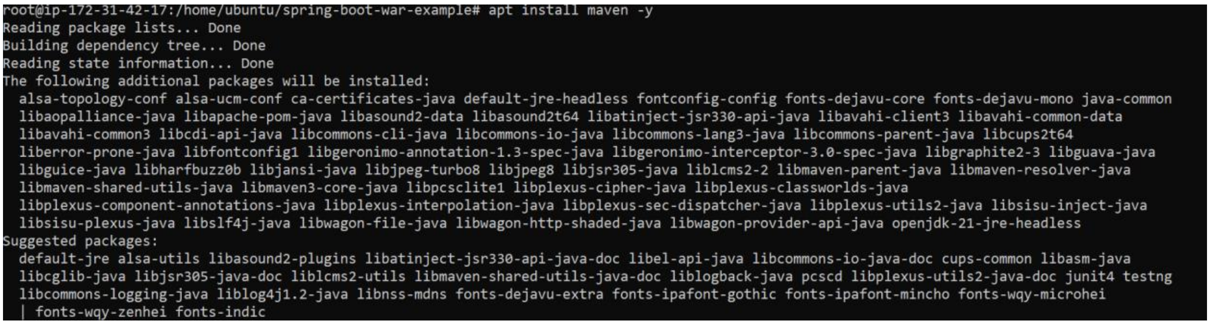
ls -ltr



```
root@ip-172-31-35-23:/home/ubuntu# cd Train-Ticket-Reservation-System/
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System# ls -ltr
total 32
-rw-r--r-- 1 root root 8917 Aug 21 06:50 README.md
-rw-r--r-- 1 root root 2670 Aug 21 06:50 Dummy-Database.md
drwxr-xr-x 2 root root 4096 Aug 21 06:50 Screenshots
drwxr-xr-x 4 root root 4096 Aug 21 06:50 WebContent
drwxr-xr-x 3 root root 4096 Aug 21 06:50 src
-rw-r--r-- 1 root root 2180 Aug 21 06:50 pom.xml
```

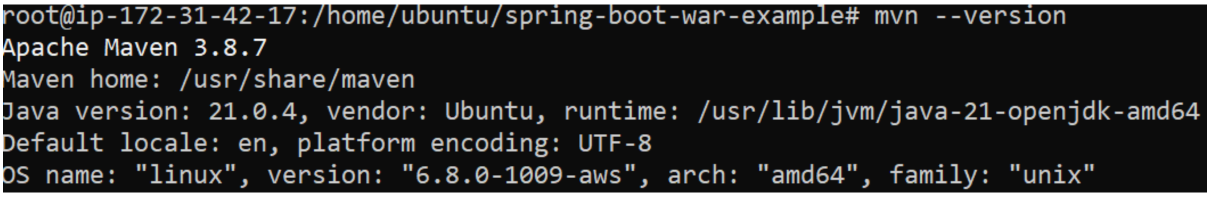
6) **To Build the project, we need to install Apache Maven Tool and verify version which helps in testing the source code and builds it as a war or jar file in case of java.**

apt install maven -y



```
root@ip-172-31-42-17:/home/ubuntu/spring-boot-war-example# apt install maven -y
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 default-jre-headless fontconfig-config fonts-dejavu-core fonts-dejavu-mono java-common
  libaopalliance-java libapache-pom-java libasound2-data libasound2t64 libatinject-jsr330-api-java libavahi-client3 libavahi-common-data
  libavahi-common3 libcdi-api-java libcommons-cli-java libcommons-io-java libcommons-lang3-java libcommons-parent-java libcups2t64
  liberror-prone-java libfontconfig1 libgeronimo-annotation-1.3-spec-java libgeronimo-interceptor-3.0-spec-java libgraphite2-3 libguava-java
  libguice-java libharfbuzz0b libjansi-java libjpeg-turbo8 libjpeg8 libjsr305-java liblcms2-2 libmaven-parent-java libmaven-resolver-java
  libmaven-shared-utils-java libmaven3-core-java libpcsclite1 libplexus-cipher-java libplexus-classworlds-java
  libplexus-component-annotations-java libplexus-interpolation-java libplexus-sec-dispatcher-java libplexus-utils2-java libsisu-inject-java
  libsisu-plexus-java libslf4j-java libwagon-file-java libwagon-http-shaded-java libwagon-provider-api-java openjdk-21-jre-headless
Suggested packages:
  default-jre alsa-utils libasound2-plugins libatinject-jsr330-api-java-doc libel-api-java libcommons-io-java-doc cups-common libasm-java
  libcglib-java libjsr305-java-doc liblcms2-utils libmaven-shared-utils-java-doc liblogback-java pcscd libplexus-utils2-java-doc junit4 testng
  libcommons-logging-java liblog4j1.2-java libnss-mdns fonts-dejavu-extra fonts-ipafont-gothic fonts-ipafont-mincho fonts-wqy-microhei
  | fonts-wqy-zenhei fonts-indic
```

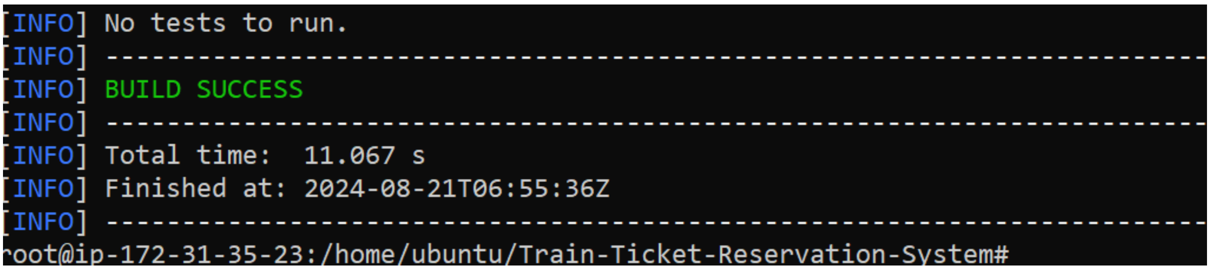
mvn –version



```
root@ip-172-31-42-17:/home/ubuntu/spring-boot-war-example# mvn --version
Apache Maven 3.8.7
Maven home: /usr/share/maven
Java version: 21.0.4, vendor: Ubuntu, runtime: /usr/lib/jvm/java-21-openjdk-amd64
Default locale: en, platform encoding: UTF-8
OS name: "linux", version: "6.8.0-1009-aws", arch: "amd64", family: "unix"
```

7) **Now we will test the code using below Maven command which uses information from pom.xml.**
NOTE: We need to run the below command from the same location where pom.xml is located

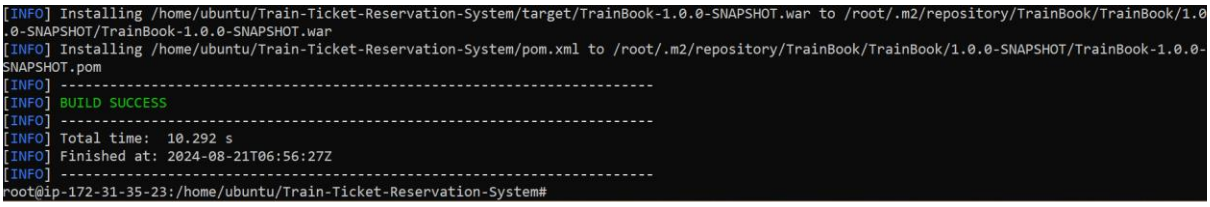
mvn test [Below output comes if the source code is without any errors]



```
[INFO] No tests to run.
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  11.067 s
[INFO] Finished at: 2024-08-21T06:55:36Z
[INFO] ------------------------------------------------------------------------
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System#
```

8) **Now once we get the above output, we run the below command to build the project.**

mvn install [Below output shows project build is successful and war file is created]



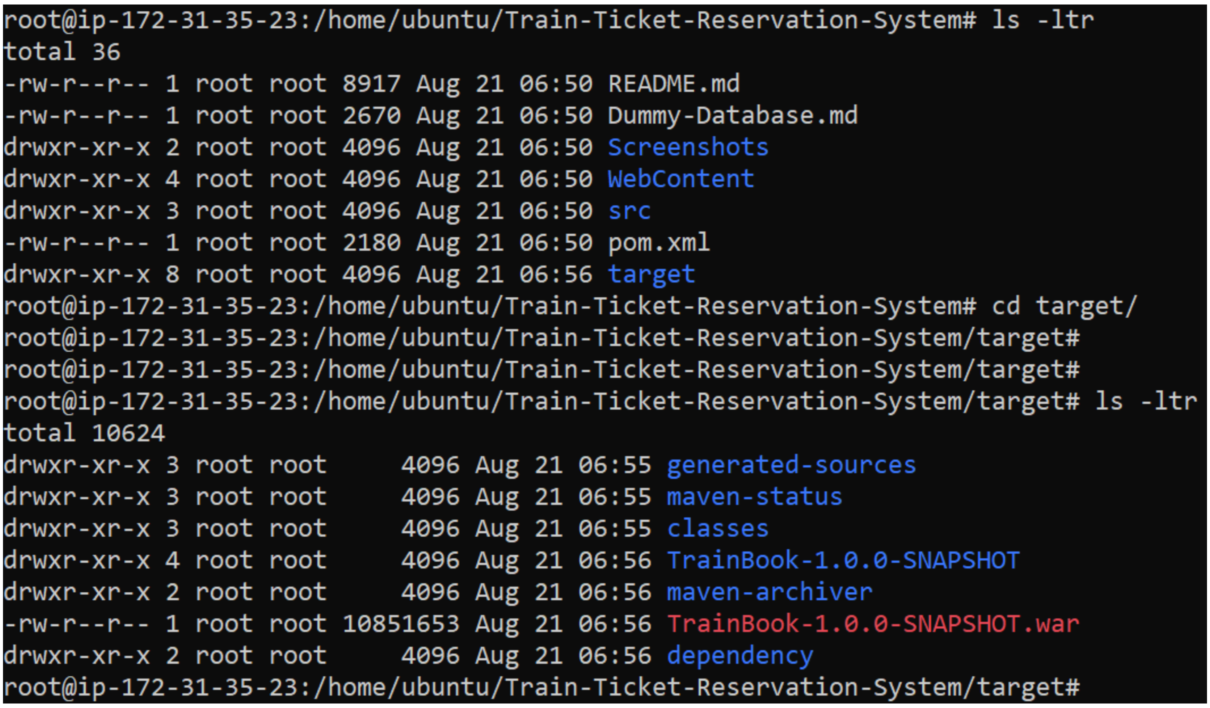
```
[INFO] Installing /home/ubuntu/Train-Ticket-Reservation-System/target/TrainBook-1.0.0-SNAPSHOT.war to /root/.m2/repository/TrainBook/TrainBook/1.0
.0-SNAPSHOT/TrainBook-1.0.0-SNAPSHOT.war
[INFO] Installing /home/ubuntu/Train-Ticket-Reservation-System/pom.xml to /root/.m2/repository/TrainBook/TrainBook/1.0.0-SNAPSHOT/TrainBook-1.0.0-
SNAPSHOT.pom
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  10.292 s
[INFO] Finished at: 2024-08-21T06:56:27Z
[INFO] ------------------------------------------------------------------------
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System#
```

9) **Once the build is successful, a folder named “target” is created which has the war file in it.**

ls -ltr

cd target/

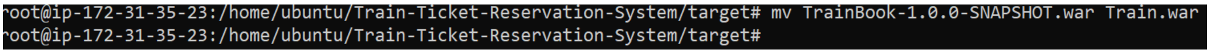
war file created by the name TrainBook-1.0.0-SNAPSHOT.war



```
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System# ls -ltr
total 36
-rw-r--r-- 1 root root 8917 Aug 21 06:50 README.md
-rw-r--r-- 1 root root 2670 Aug 21 06:50 Dummy-Database.md
drwxr-xr-x 2 root root 4096 Aug 21 06:50 Screenshots
drwxr-xr-x 4 root root 4096 Aug 21 06:50 WebContent
drwxr-xr-x 3 root root 4096 Aug 21 06:50 src
-rw-r--r-- 1 root root 2180 Aug 21 06:50 pom.xml
drwxr-xr-x 8 root root 4096 Aug 21 06:56 target
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System# cd target/
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target# ls -ltr
total 10624
drwxr-xr-x 3 root root     4096 Aug 21 06:55 generated-sources
drwxr-xr-x 3 root root     4096 Aug 21 06:55 maven-status
drwxr-xr-x 3 root root     4096 Aug 21 06:55 classes
drwxr-xr-x 4 root root     4096 Aug 21 06:56 TrainBook-1.0.0-SNAPSHOT
drwxr-xr-x 2 root root     4096 Aug 21 06:56 maven-archiver
-rw-r--r-- 1 root root 10851653 Aug 21 06:56 TrainBook-1.0.0-SNAPSHOT.war
drwxr-xr-x 2 root root     4096 Aug 21 06:56 dependency
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
```

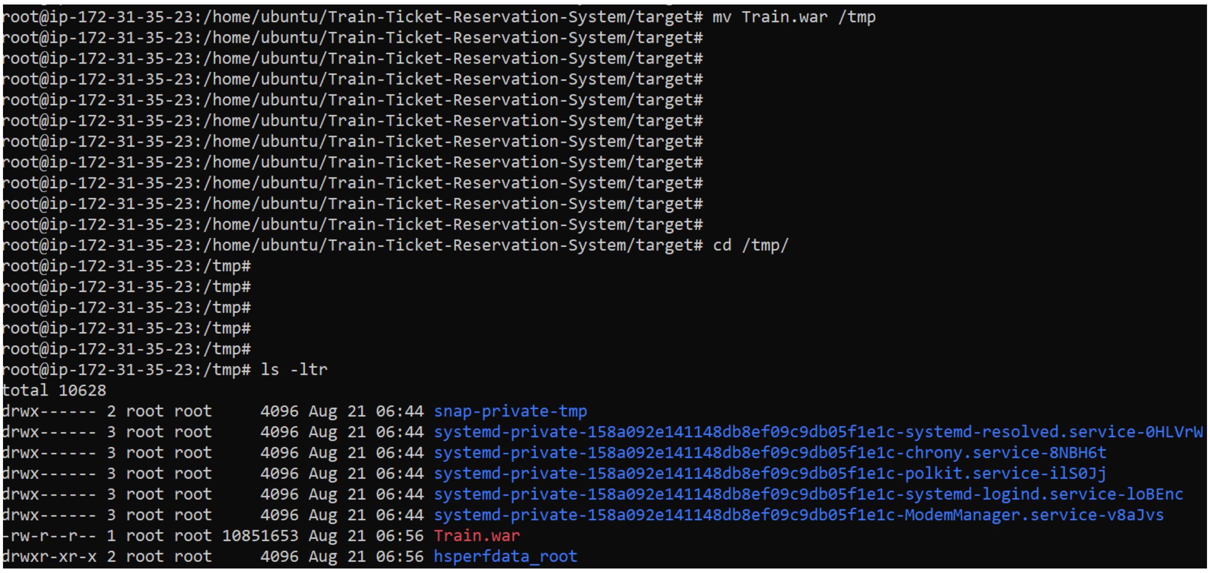
10) Now we can rename the war file to example hello.war and move it to an artifact (in our case the artifact is /tmp)

mv TrainBook-1.0.0-SNAPSHOT.war Train.war (rename war file)



```
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target# mv TrainBook-1.0.0-SNAPSHOT.war Train.war
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
```

mv Train.war /tmp (war file moved to artifact location)

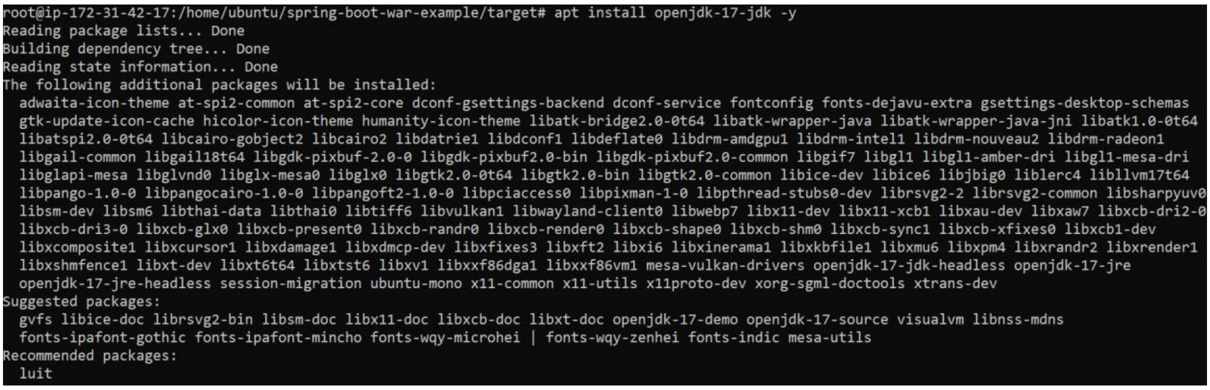


```
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target# mv Train.war /tmp
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target#
root@ip-172-31-35-23:/home/ubuntu/Train-Ticket-Reservation-System/target# cd /tmp/
root@ip-172-31-35-23:/tmp#
root@ip-172-31-35-23:/tmp#
root@ip-172-31-35-23:/tmp#
root@ip-172-31-35-23:/tmp#
root@ip-172-31-35-23:/tmp#
root@ip-172-31-35-23:/tmp# ls -ltr
total 10628
drwx------ 2 root root     4096 Aug 21 06:44 snap-private-tmp
drwx------ 3 root root     4096 Aug 21 06:44 systemd-private-158a092e141148db8ef09c9db05f1e1c-systemd-resolved.service-0HLVrW
drwx------ 3 root root     4096 Aug 21 06:44 systemd-private-158a092e141148db8ef09c9db05f1e1c-chrony.service-8NBH6t
drwx------ 3 root root     4096 Aug 21 06:44 systemd-private-158a092e141148db8ef09c9db05f1e1c-polkit.service-ilS0Jj
drwx------ 3 root root     4096 Aug 21 06:44 systemd-private-158a092e141148db8ef09c9db05f1e1c-systemd-logind.service-loBEnc
drwx------ 3 root root     4096 Aug 21 06:44 systemd-private-158a092e141148db8ef09c9db05f1e1c-ModemManager.service-v8aJvs
-rw-r--r-- 1 root root 10851653 Aug 21 06:56 Train.war
drwxr-xr-x 2 root root     4096 Aug 21 06:56 hsperfdata_root
```

11) Now we install Apache tomcat version 10 so that we can check code is working in WEBGUI.

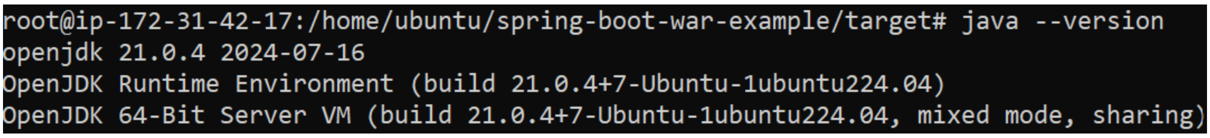
Pre-requisite for installing Tomcat is to install open-jdk and check java version

apt install openjdk-17-jdk -y



```
root@ip-172-31-42-17:/home/ubuntu/spring-boot-war-example/target# apt install openjdk-17-jdk -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  adwaita-icon-theme at-spi2-common at-spi2-core dconf-gsettings-backend dconf-service fontconfig fonts-dejavu-extra gsettings-desktop-schemas
  gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0t64
  libatspi2.0-0t64 libcairo-gobject2 libcairo2 libdatrie1 libdconf1 libdeflate0 libdrm-amdgpu1 libdrm-intel1 libdrm-nouveau2 libdrm-radeon1
  libgail-common libgail18t64 libgdk-pixbuf-2.0-0 libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-amber-dri libgl1-mesa-dri
  libglapi-mesa libglvnd0 libglx-mesa0 libglx0 libgtk2.0-0t64 libgtk2.0-bin libgtk2.0-common libice-dev libice6 libjbig0 liblerc4 libllvm17t64
  libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpciaccess0 libpixman-1-0 libpthread-stubs0-dev librsvg2-2 librsvg2-common libsharpyuv0
  libsm-dev libsm6 libthai-data libthai0 libtiff6 libvulkan1 libwayland-client0 libwebp7 libx11-dev libx11-xcb1 libxau-dev libxaw7 libxcb-dri2-0
  libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-shm0 libxcb-sync1 libxcb-xfixes0 libxcb1-dev
  libxcomposite1 libxcursor1 libxdamage1 libxdmcp-dev libxfixes3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxpm4 libxrandr2 libxrender1
  libxshmfence1 libxt-dev libxt6t64 libxtst6 libxv1 libxxf86dga1 libxxf86vm1 mesa-vulkan-drivers openjdk-17-jdk-headless openjdk-17-jre
  openjdk-17-jre-headless session-migration ubuntu-mono x11-common x11-utils x11proto-dev xorg-sgml-doctools xtrans-dev
Suggested packages:
  gvfs libice-doc librsvg2-bin libsm-doc libx11-doc libxcb-doc libxt-doc openjdk-17-demo openjdk-17-source visualvm libnss-mdns
  fonts-ipafont-gothic fonts-ipafont-mincho fonts-wqy-microhei | fonts-wqy-zenhei fonts-indic mesa-utils
Recommended packages:
  luit
```

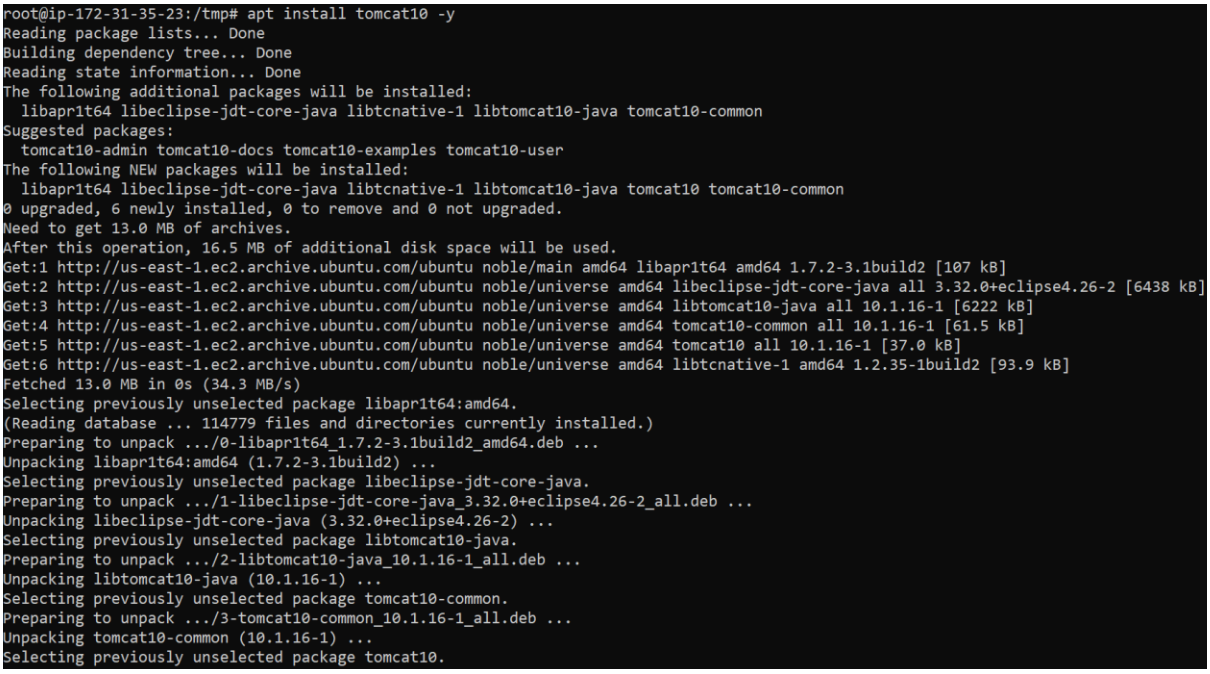
java –version



```
root@ip-172-31-42-17:/home/ubuntu/spring-boot-war-example/target# java --version
openjdk 21.0.4 2024-07-16
OpenJDK Runtime Environment (build 21.0.4+7-Ubuntu-1ubuntu224.04)
OpenJDK 64-Bit Server VM (build 21.0.4+7-Ubuntu-1ubuntu224.04, mixed mode, sharing)
```

12) Now install Tomcat10. Below are the steps to install tomcat 10.

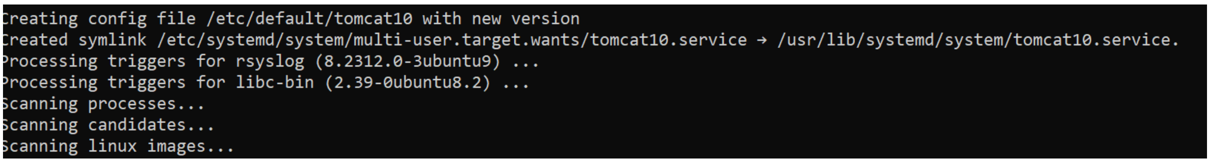
Apt install tomcat10 -y



```
root@ip-172-31-35-23:/tmp# apt install tomcat10 -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libapr1t64 libeclipse-jdt-core-java libtcnative-1 libtomcat10-java tomcat10-common
Suggested packages:
  tomcat10-admin tomcat10-docs tomcat10-examples tomcat10-user
The following NEW packages will be installed:
  libapr1t64 libeclipse-jdt-core-java libtcnative-1 libtomcat10-java tomcat10 tomcat10-common
0 upgraded, 6 newly installed, 0 to remove and 0 not upgraded.
Need to get 13.0 MB of archives.
After this operation, 16.5 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libapr1t64 amd64 1.7.2-3.1build2 [107 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 libeclipse-jdt-core-java all 3.32.0+eclipse4.26-2 [6438 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 libtomcat10-java all 10.1.16-1 [6222 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 tomcat10-common all 10.1.16-1 [61.5 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 tomcat10 all 10.1.16-1 [37.0 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 libtcnative-1 amd64 1.2.35-1build2 [93.9 kB]
Fetched 13.0 MB in 0s (34.3 MB/s)
Selecting previously unselected package libapr1t64:amd64.
(Reading database ... 114779 files and directories currently installed.)
Preparing to unpack .../0-libapr1t64_1.7.2-3.1build2_amd64.deb ...
Unpacking libapr1t64:amd64 (1.7.2-3.1build2) ...
Selecting previously unselected package libeclipse-jdt-core-java.
Preparing to unpack .../1-libeclipse-jdt-core-java_3.32.0+eclipse4.26-2_all.deb ...
Unpacking libeclipse-jdt-core-java (3.32.0+eclipse4.26-2) ...
Selecting previously unselected package libtomcat10-java.
Preparing to unpack .../2-libtomcat10-java_10.1.16-1_all.deb ...
Unpacking libtomcat10-java (10.1.16-1) ...
Selecting previously unselected package tomcat10-common.
Preparing to unpack .../3-tomcat10-common_10.1.16-1_all.deb ...
Unpacking tomcat10-common (10.1.16-1) ...
Selecting previously unselected package tomcat10.
```

13) Since Tomcat10 is installed with Ubuntu, the tomcat service is now installed on below location

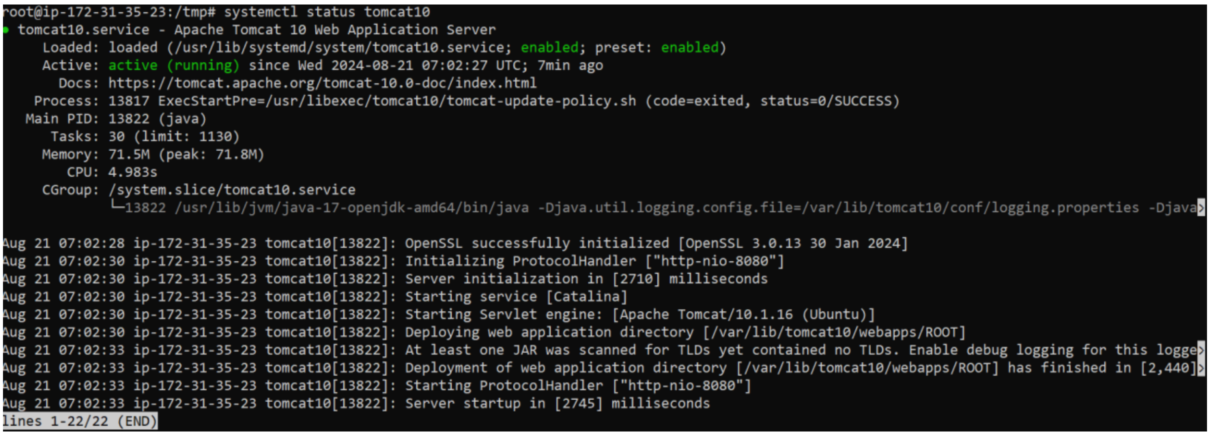
/usr/lib/systemd/system/tomcat10.service



```
Creating config file /etc/default/tomcat10 with new version
Created symlink /etc/systemd/system/multi-user.target.wants/tomcat10.service → /usr/lib/systemd/system/tomcat10.service.
Processing triggers for rsyslog (8.2312.0-3ubuntu9) ...
Processing triggers for libc-bin (2.39-0ubuntu8.2) ...
Scanning processes...
Scanning candidates...
Scanning linux images...
```

14) We will verify that the tomcat10 service is running.

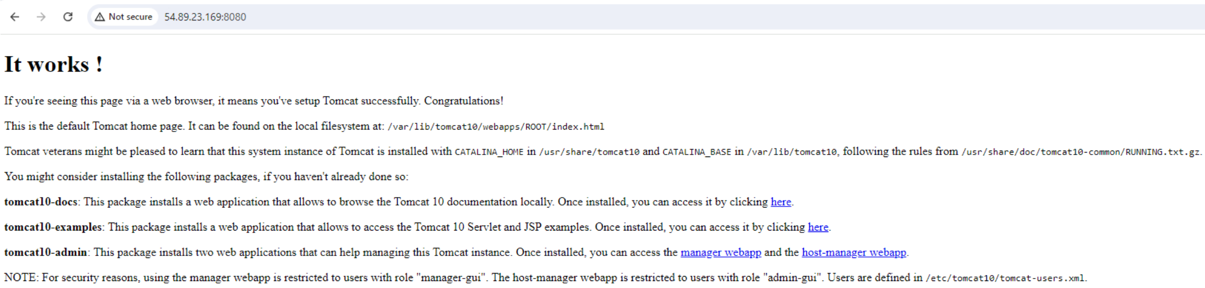
systemctl status tomcat10



```
root@ip-172-31-35-23:/tmp# systemctl status tomcat10
● tomcat10.service - Apache Tomcat 10 Web Application Server
     Loaded: loaded (/usr/lib/systemd/system/tomcat10.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-08-21 07:02:27 UTC; 7min ago
       Docs: https://tomcat.apache.org/tomcat-10.0-doc/index.html
    Process: 13817 ExecStartPre=/usr/libexec/tomcat10/tomcat-update-policy.sh (code=exited, status=0/SUCCESS)
   Main PID: 13822 (java)
      Tasks: 30 (limit: 1130)
     Memory: 71.5M (peak: 71.8M)
        CPU: 4.983s
     CGroup: /system.slice/tomcat10.service
             └─13822 /usr/lib/jvm/java-17-openjdk-amd64/bin/java -Djava.util.logging.config.file=/var/lib/tomcat10/conf/logging.properties -Djava>

Aug 21 07:02:28 ip-172-31-35-23 tomcat10[13822]: OpenSSL successfully initialized [OpenSSL 3.0.13 30 Jan 2024]
Aug 21 07:02:30 ip-172-31-35-23 tomcat10[13822]: Initializing ProtocolHandler ["http-nio-8080"]
Aug 21 07:02:30 ip-172-31-35-23 tomcat10[13822]: Server initialization in [2710] milliseconds
Aug 21 07:02:30 ip-172-31-35-23 tomcat10[13822]: Starting service [Catalina]
Aug 21 07:02:30 ip-172-31-35-23 tomcat10[13822]: Starting Servlet engine: [Apache Tomcat/10.1.16 (Ubuntu)]
Aug 21 07:02:30 ip-172-31-35-23 tomcat10[13822]: Deploying web application directory [/var/lib/tomcat10/webapps/ROOT]
Aug 21 07:02:33 ip-172-31-35-23 tomcat10[13822]: At least one JAR was scanned for TLDs yet contained no TLDs. Enable debug logging for this logge>
Aug 21 07:02:33 ip-172-31-35-23 tomcat10[13822]: Deployment of web application directory [/var/lib/tomcat10/webapps/ROOT] has finished in [2,440]>
Aug 21 07:02:33 ip-172-31-35-23 tomcat10[13822]: Starting ProtocolHandler ["http-nio-8080"]
Aug 21 07:02:33 ip-172-31-35-23 tomcat10[13822]: Server startup in [2745] milliseconds
lines 1-22/22 (END)
```

15) We will verify that tomcat is running or not on the WEG UI by accessing tomcat URL – PublicIP of EC2 instance:8080 (Tomcat works on port 8080)



It works !

If you're seeing this page via a web browser, it means you've setup Tomcat successfully. Congratulations!

This is the default Tomcat home page. It can be found on the local filesystem at: `/var/lib/tomcat10/webapps/ROOT/index.html`

Tomcat veterans might be pleased to learn that this system instance of Tomcat is installed with `CATALINA_HOME` in `/usr/share/tomcat10` and `CATALINA_BASE` in `/var/lib/tomcat10`, following the rules from `/usr/share/doc/tomcat10-common/RUNNING.txt.gz`.

You might consider installing the following packages, if you haven't already done so:

tomcat10-docs: This package installs a web application that allows to browse the Tomcat 10 documentation locally. Once installed, you can access it by clicking here.

tomcat10-examples: This package installs a web application that allows to access the Tomcat 10 Servlet and JSP examples. Once installed, you can access it by clicking here.

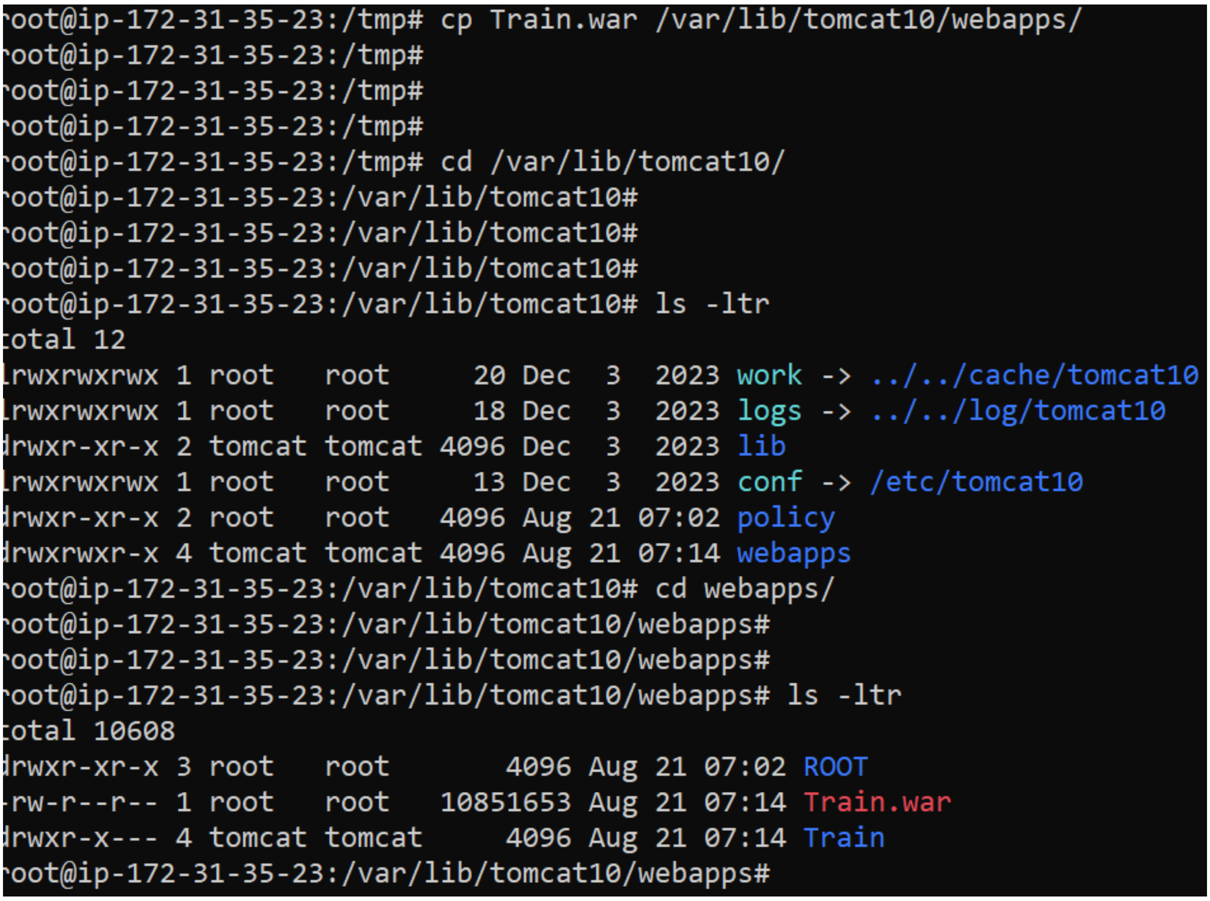
tomcat10-admin: This package installs two web applications that can help managing this Tomcat instance. Once installed, you can access the manager webapp and the host-manager webapp.

NOTE: For security reasons, using the manager webapp is restricted to users with role "manager-gui". The host-manager webapp is restricted to users with role "admin-gui". Users are defined in `/etc/tomcat10/tomcat-users.xml`.

16) Now we will copy the Train.war file from /tmp to /var/lib/tomcat10/webapps (Location of Tomcat10). Once the war file is copied in webapps folder we see that Train folder is also created in it.

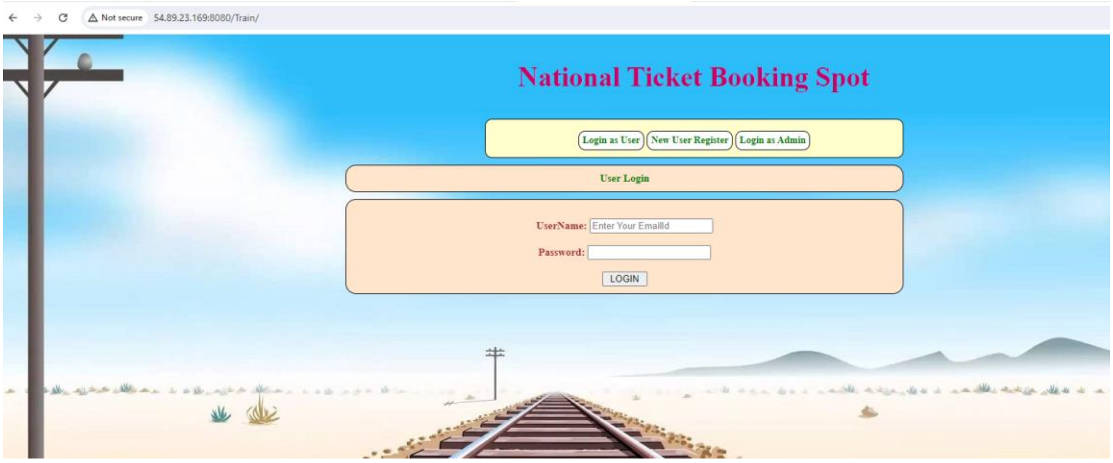
cp Train.war /var/lib/tomcat10/webapps/

ls -ltr



```
root@ip-172-31-35-23:/tmp# cp Train.war /var/lib/tomcat10/webapps/
root@ip-172-31-35-23:/tmp#
root@ip-172-31-35-23:/tmp#
root@ip-172-31-35-23:/tmp#
root@ip-172-31-35-23:/tmp# cd /var/lib/tomcat10/
root@ip-172-31-35-23:/var/lib/tomcat10#
root@ip-172-31-35-23:/var/lib/tomcat10#
root@ip-172-31-35-23:/var/lib/tomcat10#
root@ip-172-31-35-23:/var/lib/tomcat10# ls -ltr
total 12
lrwxrwxrwx 1 root   root     20 Dec  3  2023 work -> ../../cache/tomcat10
lrwxrwxrwx 1 root   root     18 Dec  3  2023 logs -> ../../log/tomcat10
drwxr-xr-x 2 tomcat tomcat 4096 Dec  3  2023 lib
lrwxrwxrwx 1 root   root     13 Dec  3  2023 conf -> /etc/tomcat10
drwxr-xr-x 2 root   root   4096 Aug 21 07:02 policy
drwxrwxr-x 4 tomcat tomcat 4096 Aug 21 07:14 webapps
root@ip-172-31-35-23:/var/lib/tomcat10# cd webapps/
root@ip-172-31-35-23:/var/lib/tomcat10/webapps#
root@ip-172-31-35-23:/var/lib/tomcat10/webapps#
root@ip-172-31-35-23:/var/lib/tomcat10/webapps# ls -ltr
total 10608
drwxr-xr-x 3 root   root       4096 Aug 21 07:02 ROOT
-rw-r--r-- 1 root   root   10851653 Aug 21 07:14 Train.war
drwxr-x--- 4 tomcat tomcat     4096 Aug 21 07:14 Train
root@ip-172-31-35-23:/var/lib/tomcat10/webapps#
```

17) Now we will verify that code is accessible on tomcat GUI by accessing tomcat URL:8080/Train



18) Once we get the above output, we are sure that our manual build is successful visible and tested.