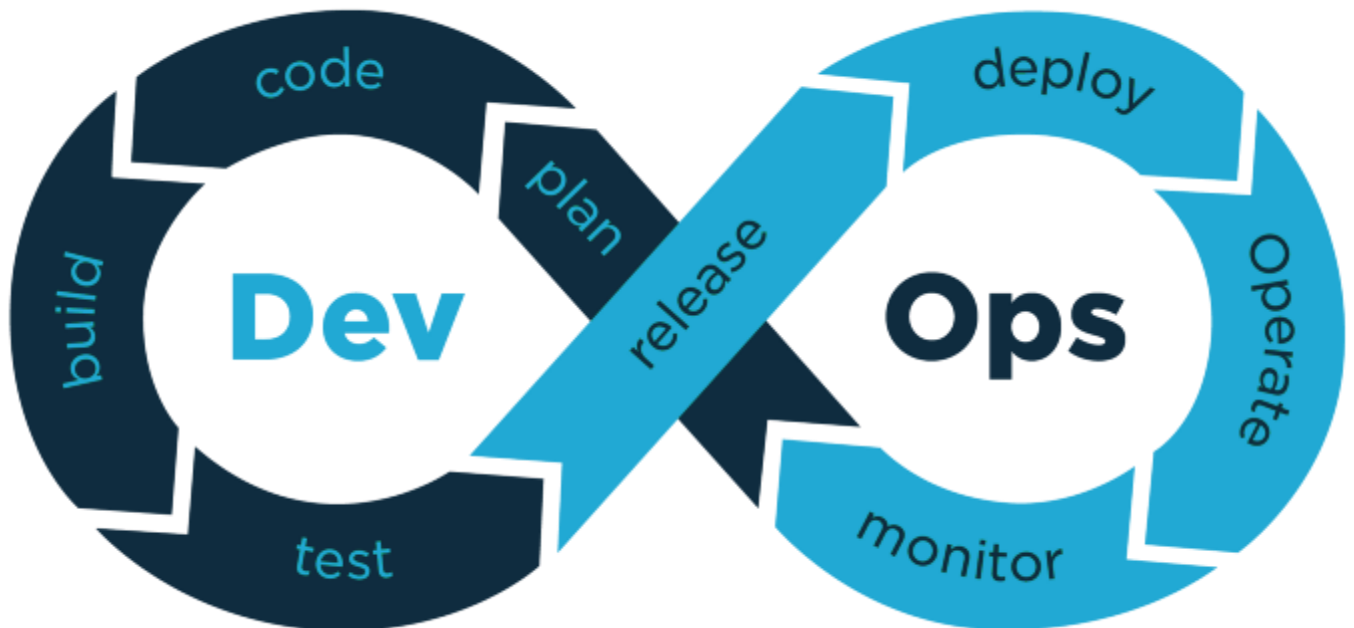


Simple DevOps Project — Integrating Tomcat to CI/CD Pipeline



Welcome to the Simple DevOps project. At this point Jenkins should be up, running and ready.

NOTE BEFORE GET STARTED:- Both Jenkins & Tomcat will run on default port 8080., So, in my case I have taken tomcat port number as 8090. Jenkins is by default 8080

We can change the port number in server.xml file in conf directory of tomcat. → **`/opt/tomcat/conf/server.xml`**

Also, allow 8090 in security group in our cloud environment.

Example:-

- for Jenkins -> ipaddress:8080
- for tomcat -> ipaddress:8090

Jenkins Installation:-

Install Jenkins as per the distribution(in my case, I'm using RHEL Distribution) from here:-

<https://www.jenkins.io/doc/book/installing/linux/>

It looks like this below:-

```
sudo wget -O /etc/yum.repos.d/jenkins.repo \
    https://pkg.jenkins.io/redhat-stable/jenkins.repo
sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io.key
sudo yum upgrade
# Add required dependencies for the jenkins package
sudo yum install java-11-openjdk
sudo yum install jenkins
sudo systemctl daemon-reload
```

Once Installed, Start & enable the Jenkins

Start Jenkins

You can enable the Jenkins service to start at boot with the command:

```
sudo systemctl enable jenkins
```

You can start the Jenkins service with the command:

```
sudo systemctl start jenkins
```

You can check the status of the Jenkins service using the command:

```
sudo systemctl status jenkins
```

Once it is in Running State, Now copy the instance id & paste it in URL Address, It will display like below:-

Getting Started

Unlock Jenkins

To ensure Jenkins is securely set up by the administrator, a password has been written to the log (not sure where to find it?) and this file on the server:

```
/var/jenkins_home/secrets/initialAdminPassword
```

Please copy the password from either location and paste it below.

Administrator password

Continue

Go to Jenkins server in Terminal & copy the admin password from secrets directory as below:-

```
cat /var/Jenkins_home/secrets/initialAdminPassword
```

Now, Proceed with usernames & password and then install suggested plugins. Done..!

We will now be introducing Tomcat:-

The installation and integration process will be the one detailed in github here — <https://github.com/Hussain147/TomcatInstallation.git>

First we will need to launch a new Amazon EC2 instance Linux AMI.

Once this has also been done, the instance is ready and running. Start up the server through MobaXterm or GitBash (what else you may be using). We will need to download Apache tomcat from the link <http://apache.mirrors.nublu.co.uk/tomcat/tomcat-8/v8.5.51/bin/apache-tomcat-8.5.51.tar.gz>

To see any other versions of Apache tomcat you can use — <https://tomcat.apache.org/download-80.cgi>

34.207.179.11 (ec2-user)

Terminal Sessions View X server Tools Games Settings Macros Help

Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help X server Exit

Quick connect...

/home/ec2-user/

Sessions

Tools

Macros

Sftp

Remote monitoring

☐ Follow terminal folder

```
[root@ip-172-31-33-223 ~]# hostname tomcat
[root@ip-172-31-33-223 ~]# sudo su -
Last login: Sun Mar  8 16:24:23 UTC 2020 on pts/0
[root@tomcat ~]# cd /opt
[root@tomcat opt]# wget http://apache.mirrors.nublu.co.uk/tomcat/tomcat-8/v8.5.51/bin/apache-tomcat-8.5.51.tar.gz
--2020-03-08 16:30:53-- http://apache.mirrors.nublu.co.uk/tomcat/tomcat-8/v8.5.51/bin/apache-tomcat-8.5.51.tar.gz
Resolving apache.mirrors.nublu.co.uk (apache.mirrors.nublu.co.uk)... 141.0.161.104
Connecting to apache.mirrors.nublu.co.uk (apache.mirrors.nublu.co.uk)|141.0.161.104|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 10315164 (9.8M) [application/x-gzip]
Saving to: 'apache-tomcat-8.5.51.tar.gz'

apache-tomcat-8.5.5 100%[=====] 9.84M 4.80MB/s in 2.1s

2020-03-08 16:30:55 (4.80 MB/s) - 'apache-tomcat-8.5.51.tar.gz' saved [10315164/10315164]

[root@tomcat opt]#
[root@tomcat opt]#
```

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Copy the link address and paste it into your tomcat server. I have renamed mine with “hostname tomcat server” followed by “sudo su — “. Then change the directory to /opt and insert tomcat download link.

34.207.179.11 (ec2-user)

Terminal Sessions View X server Tools Games Settings Macros Help

Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help X server Exit

Quick connect...

/home/ec2-user/

Sessions

Tools

Macros

Sftp

Remote monitoring

☐ Follow terminal folder

```
[root@ip-172-31-33-223 ~]# sudo su -
Last login: Sun Mar  8 16:24:23 UTC 2020 on pts/0
[root@tomcat ~]# cd /opt
[root@tomcat opt]# wget http://apache.mirrors.nublu.co.uk/tomcat/tomcat-8/v8.5.51/bin/apache-tomcat-8.5.51.tar.gz
--2020-03-08 16:30:53-- http://apache.mirrors.nublu.co.uk/tomcat/tomcat-8/v8.5.51/bin/apache-tomcat-8.5.51.tar.gz
Resolving apache.mirrors.nublu.co.uk (apache.mirrors.nublu.co.uk)... 141.0.161.104
Connecting to apache.mirrors.nublu.co.uk (apache.mirrors.nublu.co.uk)|141.0.161.104|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 10315164 (9.8M) [application/x-gzip]
Saving to: 'apache-tomcat-8.5.51.tar.gz'

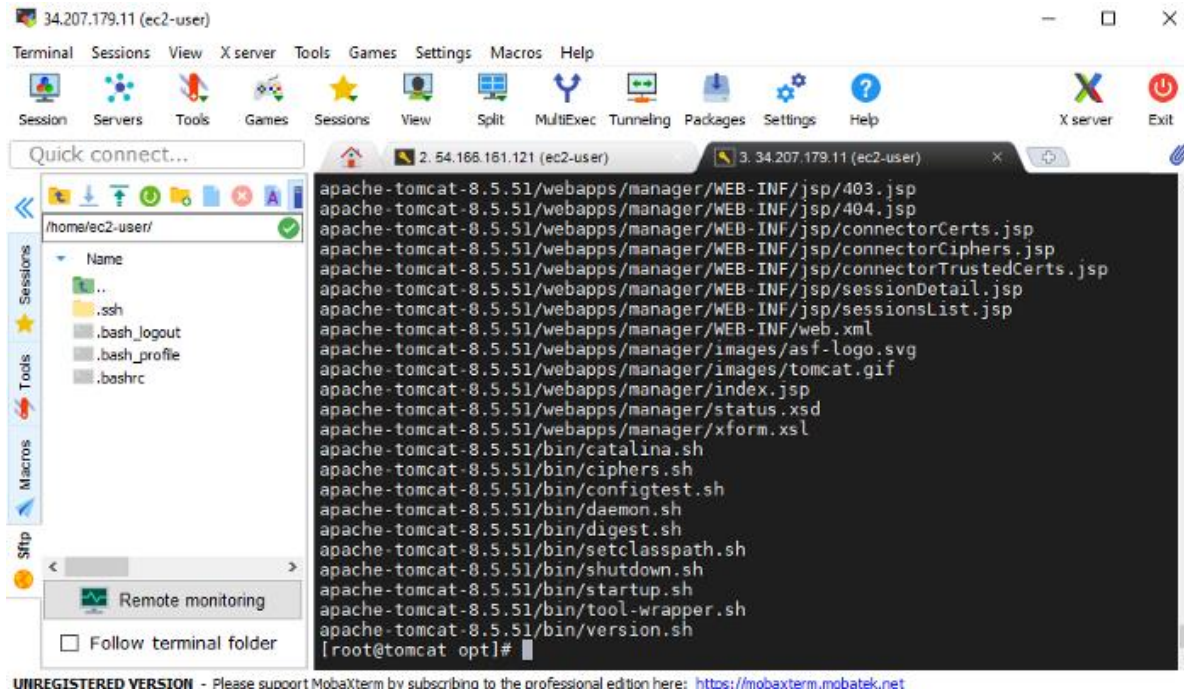
apache-tomcat-8.5.5 100%[=====] 9.84M 4.80MB/s in 2.1s

2020-03-08 16:30:55 (4.80 MB/s) - 'apache-tomcat-8.5.51.tar.gz' saved [10315164/10315164]

[root@tomcat opt]#
[root@tomcat opt]# ls
apache-tomcat-8.5.51.tar.gz  aws
[root@tomcat opt]# tar -xvzf apache-tomcat-8.5.51.tar.gz
```

UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: <https://mobaxterm.mobatek.net>

apache-tomcat-8.5.51.tar.gz

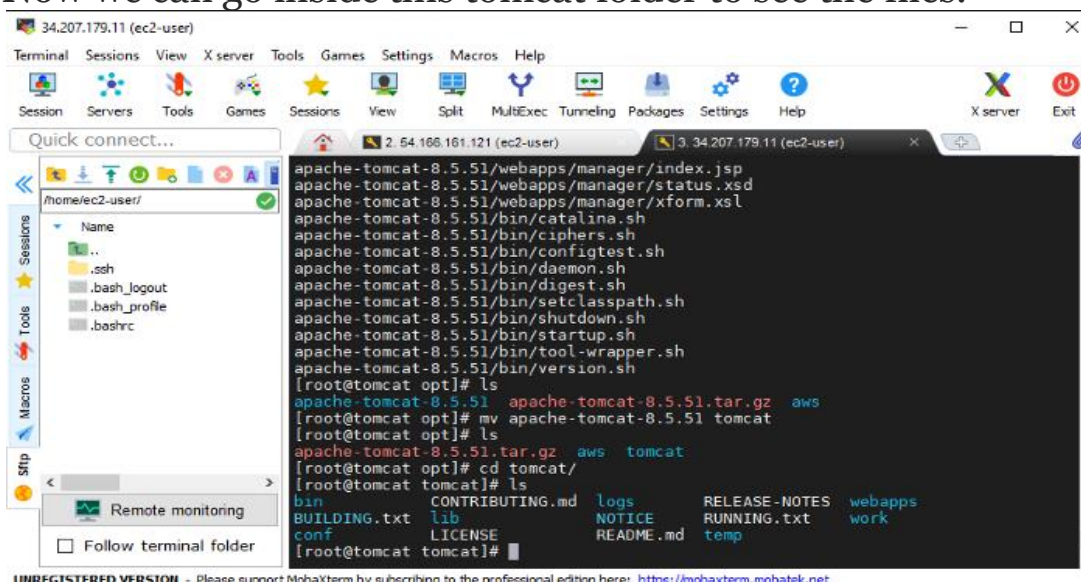


The screenshot shows the MobaXterm interface with a terminal window titled '3. 34.207.179.11 (ec2-user)'. The terminal displays a list of files and directories in the 'apache-tomcat-8.5.51' directory. The files include various JSP files, XML files, and shell scripts. The terminal output is as follows:

```
apache-tomcat-8.5.51/webapps/manager/WEB-INF/jsp/403.jsp
apache-tomcat-8.5.51/webapps/manager/WEB-INF/jsp/404.jsp
apache-tomcat-8.5.51/webapps/manager/WEB-INF/jsp/connectorCerts.jsp
apache-tomcat-8.5.51/webapps/manager/WEB-INF/jsp/connectorCiphers.jsp
apache-tomcat-8.5.51/webapps/manager/WEB-INF/jsp/connectorTrustedCerts.jsp
apache-tomcat-8.5.51/webapps/manager/WEB-INF/jsp/sessionDetail.jsp
apache-tomcat-8.5.51/webapps/manager/WEB-INF/jsp/sessionsList.jsp
apache-tomcat-8.5.51/webapps/manager/WEB-INF/web.xml
apache-tomcat-8.5.51/webapps/manager/images/asf-logo.svg
apache-tomcat-8.5.51/webapps/manager/images/tomcat.gif
apache-tomcat-8.5.51/webapps/manager/index.jsp
apache-tomcat-8.5.51/webapps/manager/status.xsd
apache-tomcat-8.5.51/webapps/manager/xform.xsl
apache-tomcat-8.5.51/bin/catalina.sh
apache-tomcat-8.5.51/bin/ciphers.sh
apache-tomcat-8.5.51/bin/configtest.sh
apache-tomcat-8.5.51/bin/daemon.sh
apache-tomcat-8.5.51/bin/digest.sh
apache-tomcat-8.5.51/bin/setclasspath.sh
apache-tomcat-8.5.51/bin/shutdown.sh
apache-tomcat-8.5.51/bin/startup.sh
apache-tomcat-8.5.51/bin/tool-wrapper.sh
apache-tomcat-8.5.51/bin/version.sh
[root@tomcat opt]#
```

Now once those two things have been done. we can rename it to something simpler like “mv apache-tomcat-8.5.51 tomcat” (wording may differ for your version). list again to see the difference.

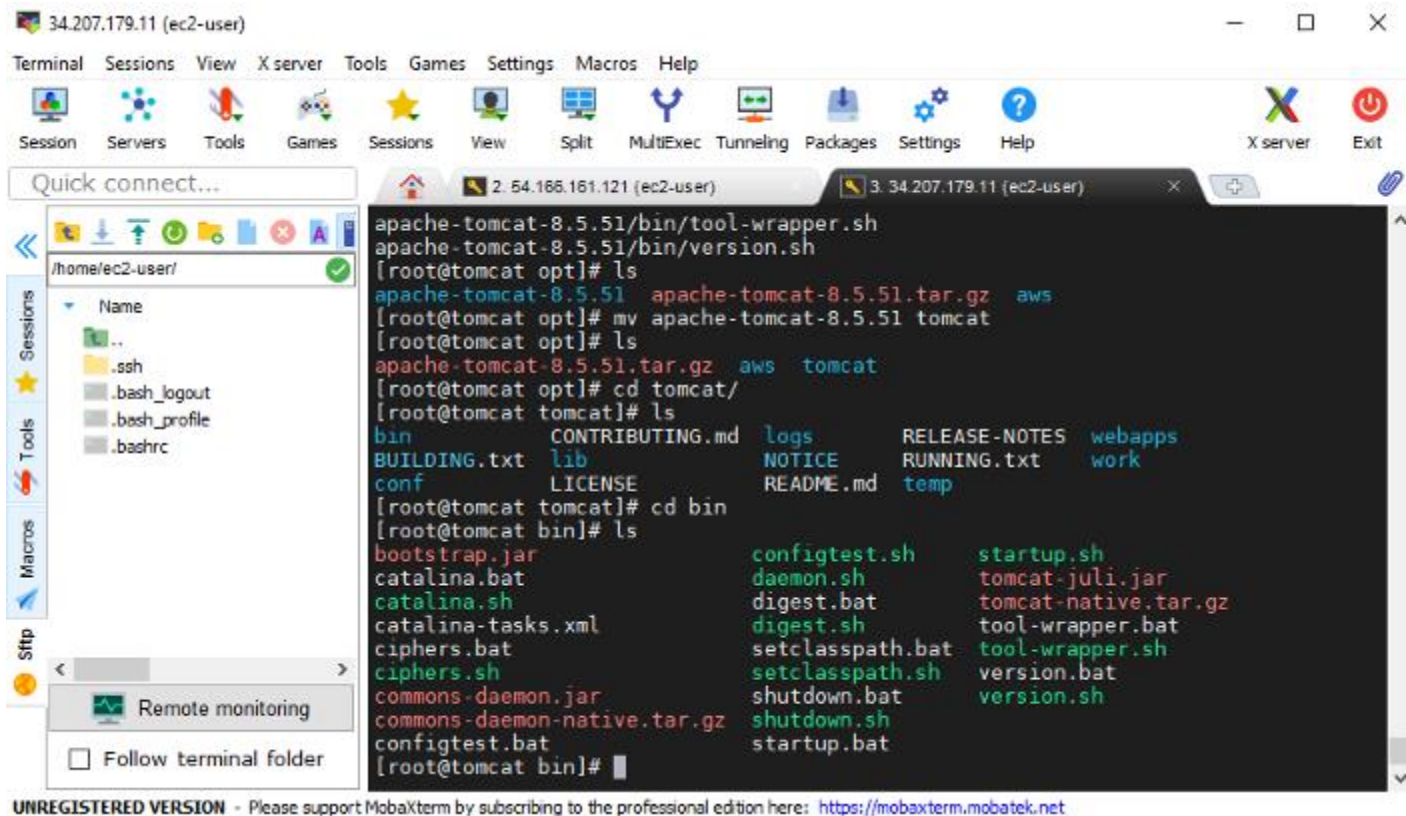
Now we can go inside this tomcat folder to see the files.



The screenshot shows the MobaXterm interface with a terminal window titled '3. 34.207.179.11 (ec2-user)'. The terminal displays the following commands and output:

```
[root@tomcat opt]# ls
apache-tomcat-8.5.51  apache-tomcat-8.5.51.tar.gz  aws
[root@tomcat opt]# mv apache-tomcat-8.5.51 tomcat
[root@tomcat opt]# ls
apache-tomcat-8.5.51.tar.gz  aws  tomcat
[root@tomcat opt]# cd tomcat/
[root@tomcat tomcat]# ls
bin          CONTRIBUTING.md  logs          RELEASE-NOTES  webapps
BUILDING.txt  lib             NOTICE       RUNNING.txt    work
conf         LICENSE         README.md    temp
[root@tomcat tomcat]#
```


Again change directory to bin (cd bin on your terminal) to see all the files.



```
34.207.179.11 (ec2-user)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
/home/ec2-user/
Name
..
.ssh
.bash_logout
.bash_profile
.bashrc
Sessions
Tools
Macros
Sftp
Remote monitoring
Follow terminal folder

apache-tomcat-8.5.51/bin/tool-wrapper.sh
apache-tomcat-8.5.51/bin/version.sh
[root@tomcat opt]# ls
apache-tomcat-8.5.51  apache-tomcat-8.5.51.tar.gz  aws
[root@tomcat opt]# mv apache-tomcat-8.5.51 tomcat
[root@tomcat opt]# ls
apache-tomcat-8.5.51.tar.gz  aws  tomcat
[root@tomcat opt]# cd tomcat/
[root@tomcat tomcat]# ls
bin          CONTRIBUTING.md  logs          RELEASE-NOTES  webapps
BUILDING.txt lib             NOTICE       RUNNING.txt    work
conf        LICENSE        README.md    temp
[root@tomcat tomcat]# cd bin
[root@tomcat bin]# ls
bootstrap.jar          configtest.sh      startup.sh
catalina.bat          daemon.sh          tomcat-juli.jar
catalina.sh           digest.bat         tomcat-native.tar.gz
catalina-tasks.xml    digest.sh          tool-wrapper.bat
ciphers.bat           setclasspath.bat  tool-wrapper.sh
ciphers.sh            setclasspath.sh   version.bat
commons-daemon.jar    shutdown.bat       version.sh
commons-daemon-native.tar.gz
configtest.bat        shutdown.sh
[root@tomcat bin]#
```

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The ones we are interested in right now are `startup.sh` and `shutdown.sh` (sh short for shell). `startup.sh` is to start our tomcat server. `shutdown.sh` shuts it down. Start up your tomcat server with `./startup.sh` while in the bin directory.

The screenshot shows a MobaXterm terminal window with the title bar '34.207.179.11 (ec2-user)'. The window has a menu bar (Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help) and a toolbar with icons for Session, Servers, Tools, Games, Sessions, View, Split, MultExec, Tunneling, Packages, Settings, Help, X server, and Exit. On the left, there is a 'Quick connect...' search bar and a sidebar with 'Sessions', 'Tools', 'Macros', and 'Sftp' tabs. The 'Sessions' tab is active, showing a list of sessions with columns for Name, .., .ssh, .bash_logout, .bash_profile, and .bashrc. The main terminal area shows the following commands and output:

```
[root@tomcat tomcat]# ls
bin          CONTRIBUTING.md  logs          RELEASE-NOTES  webapps
BUILDING.txt lib              NOTICE       RUNNING.txt    work
conf         LICENSE         README.md    temp
[root@tomcat tomcat]# cd bin
[root@tomcat bin]# ls
bootstrap.jar          configtest.sh      startup.sh
catalina.bat          daemon.sh          tomcat-juli.jar
catalina.sh           digest.bat        tomcat-native.tar.gz
catalina-tasks.xml    digest.sh         tool-wrapper.bat
ciphers.bat           setclasspath.bat  tool-wrapper.sh
ciphers.sh            setclasspath.sh   version.bat
commons-daemon.jar    shutdown.bat      version.sh
commons-daemon-native.tar.gz shutdown.sh
configtest.bat        startup.bat
[root@tomcat bin]# ./startup.sh
Using CATALINA_BASE:   /opt/tomcat
Using CATALINA_HOME:   /opt/tomcat
Using CATALINA_TMPDIR: /opt/tomcat/temp
Using JRE_HOME:        /usr/lib/jvm/jre
Using CLASSPATH:       /opt/tomcat/bin/bootstrap.jar:/opt/tomcat/bin/tomcat-juli.jar
Tomcat started.
[root@tomcat bin]#
```

At the bottom of the terminal window, there is a message: 'UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: <https://mobaxterm.mobatek.net>'.

We will now access our Tomcat server from the browser. Copy the instance IPv4 Public IP and paste into a internet tab. Tomcat will also using the port number 8080 which was enabled by our previous security group.



When you try to log in by clicking “Manager App” it will not allow you because “By default the Manager is only accessible from a browser running on the same machine as Tomcat. If you wish to modify this restriction, you’ll need to edit the Manager’s context.xml file.”

Not to worry. This is exactly what we are going to be doing next.

The screenshot shows a MobaXterm terminal window with two tabs. The active tab is titled '3. 34.207.179.11 (ec2-user)'. The terminal output shows the following commands and results:

```
[root@tomcat tomcat]# cd bin
[root@tomcat bin]# ls
bootstrap.jar          configtest.sh          startup.sh
catalina.bat           daemon.sh              tomcat-juli.jar
catalina.sh            digest.bat             tomcat-native.tar.gz
catalina-tasks.xml     digest.sh              tool-wrapper.bat
ciphers.bat            setclasspath.bat      tool-wrapper.sh
ciphers.sh             setclasspath.sh        version.bat
commons-daemon.jar     shutdown.bat           version.sh
commons-daemon-native.tar.gz shutdown.sh
configtest.bat         startup.bat

[root@tomcat bin]# ./startup.sh
Using CATALINA_BASE:   /opt/tomcat
Using CATALINA_HOME:   /opt/tomcat
Using CATALINA_TMPDIR: /opt/tomcat/temp
Using JRE_HOME:         /usr/lib/jvm/jre
Using CLASSPATH:        /opt/tomcat/bin/bootstrap.jar:/opt/tomcat/bin/tomcat-juli.jar
Tomcat started.

[root@tomcat bin]# find / -name context.xml
/opt/tomcat/webapps/host-manager/META-INF/context.xml
/opt/tomcat/webapps/manager/META-INF/context.xml
/opt/tomcat/conf/context.xml
[root@tomcat bin]#
```

The left sidebar of MobaXterm shows a file explorer for the remote host, displaying the directory structure of /home/ec2-user/. It includes files like .ssh, .bash_logout, .bash_profile, and .bashrc. At the bottom, there are checkboxes for 'Remote monitoring' and 'Follow terminal folder'.

At the bottom of the terminal window, a message reads: "UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: <https://mobaxterm.mobatek.net>"

We only need the bottom 2 files as those are the ones under webapp with manager accessibility.

/opt/tomcat/webapps/host-manager/META-INF/context.xml

/opt/tomcat/webapps/manager/META-INF/context.xml

Next we will edit them */opt/tomcat/webapps/host-manager/META-INF/context.xml* first.

The screenshot shows a MobaXterm terminal window with the title bar '34.207.179.11 (ec2-user)'. The menu bar includes Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, and Help. The toolbar contains icons for Session, Servers, Tools, Games, Sessions, View, Split, MultiExec, Tunneling, Packages, Settings, Help, X server, and Exit. A 'Quick connect...' search bar is at the top left. On the left sidebar, there are sections for Sessions, Tools, Macros, and Sftp. The main terminal area displays the contents of a file, likely context.xml, with the following text:

```
?xml version="1.0" encoding="UTF-8"?>
<!--
Licensed to the Apache Software Foundation (ASF) under one or more
contributor license agreements.  See the NOTICE file distributed with
this work for additional information regarding copyright ownership.
The ASF licenses this file to You under the Apache License, Version 2.0
(the "License"); you may not use this file except in compliance with
the License.  You may obtain a copy of the License at

    http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.
-->
<Context antiResourceLocking="false" privileged="true" >
  <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|string)|org\.apache\.catalina\.filters\.CsrfPreventionFilter\$LruCac
he(?:\$1)?|java\.util\.(?:Linked)?HashMap"/>
"/opt/tomcat/webapps/host-manager/META-INF/context.xml" [noel] 22L, 1222C
```

At the bottom of the terminal window, there is a message: 'UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: <https://mobaxterm.mobatek.net>'.

We need to edit the line starting with value class name. It is allowing the IP address which starts with 127 and so on. It is a loop address that only allows our local system. We want outside accessibility so we will be commenting this line out. I will be showing below how to comment out in tomcat.

```
?xml version="1.0" encoding="UTF-8"?>
<!--
Licensed to the Apache Software Foundation (ASF) under one or more
contributor license agreements. See the NOTICE file distributed with
this work for additional information regarding copyright ownership.
The ASF licenses this file to You under the Apache License, Version 2.0
(the "License"); you may not use this file except in compliance with
the License. You may obtain a copy of the License at

    http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.
-->
<Context antiResourceLocking="false" privileged="true" >
  <!-- <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|string)|org\.apache\.catalina\.filters\.CsrfPreventionFilter\$LruCac
he(?:\$1)?|java\.util\.(?:Linked)?HashMap"/>
"/opt/tomcat/webapps/host-manager/META-INF/context.xml" 22L, 1231C
```

As highlighted above. Those are what were used the comment out that section of the file. We need to do the something for the `/opt/tomcat/webapps/manager/META-INF/context.xml` file

When making modifications in tomcat. We will need to `./shutdown.sh` then restart the service with `./startup.sh` to ensure the changes take effect as displayed below.

The screenshot shows a MobaXterm window with a terminal session on a remote host (34.207.179.11, ec2-user). The terminal displays the following commands and output:

```
/opt/tomcat/webapps/host-manager/META-INF/context.xml
/opt/tomcat/webapps/manager/META-INF/context.xml
/opt/tomcat/conf/context.xml
[root@tomcat bin]# ^C
[root@tomcat bin]# vi /opt/tomcat/webapps/host-manager/META-INF/context.xml
[root@tomcat bin]# vi /opt/tomcat/webapps/manager/META-INF/context.xml
[root@tomcat bin]# vi /opt/tomcat/webapps/manager/META-INF/context.xml
[root@tomcat bin]# ./shutdown.sh
Using CATALINA_BASE:   /opt/tomcat
Using CATALINA_HOME:   /opt/tomcat
Using CATALINA_TMPDIR: /opt/tomcat/temp
Using JRE_HOME:        /usr/lib/jvm/jre
Using CLASSPATH:       /opt/tomcat/bin/bootstrap.jar:/opt/tomcat/bin/tomcat-juli.jar
[root@tomcat bin]# ./startup.sh
Using CATALINA_BASE:   /opt/tomcat
Using CATALINA_HOME:   /opt/tomcat
Using CATALINA_TMPDIR: /opt/tomcat/temp
Using JRE_HOME:        /usr/lib/jvm/jre
Using CLASSPATH:       /opt/tomcat/bin/bootstrap.jar:/opt/tomcat/bin/tomcat-juli.jar
Tomcat started.
[root@tomcat bin]#
```

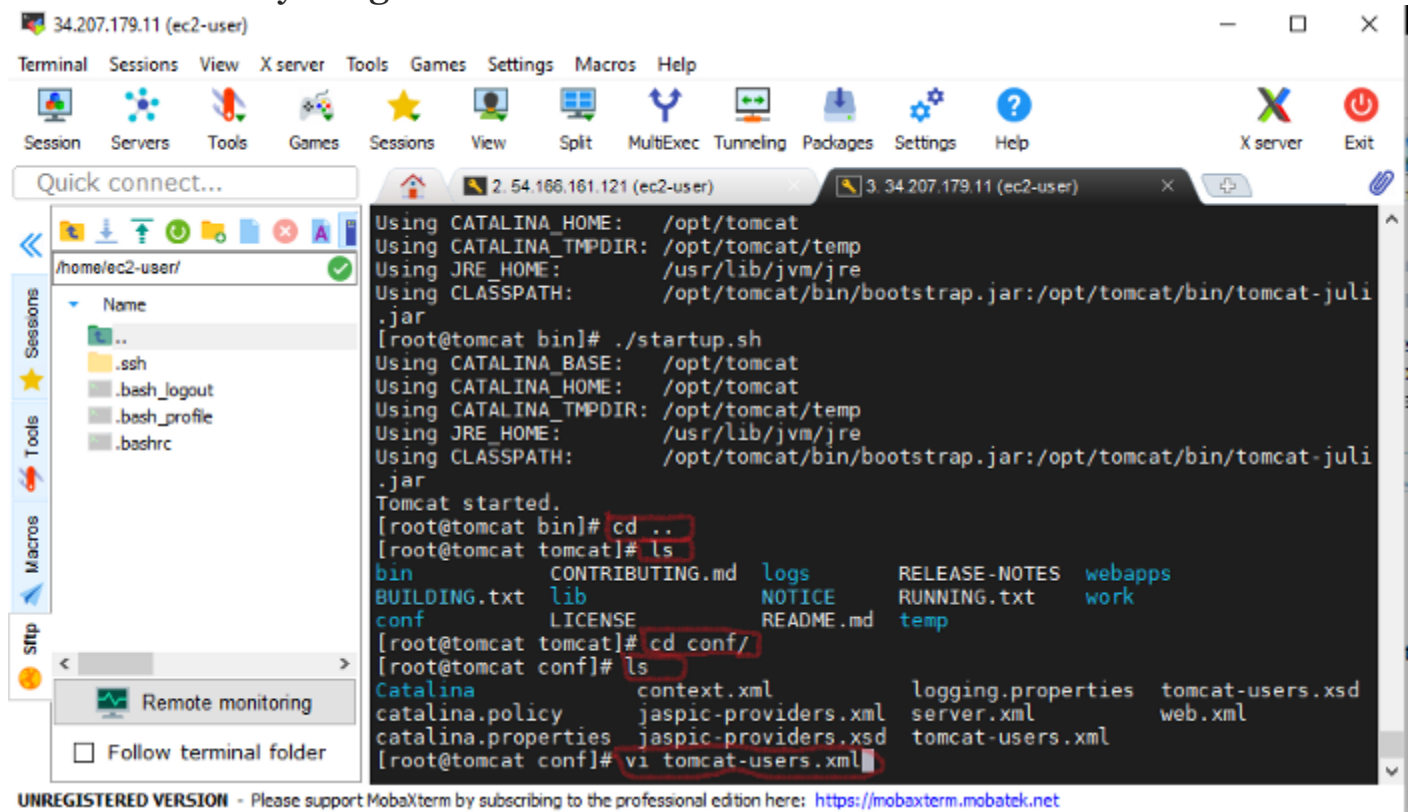
The MobaXterm interface includes a top menu bar (Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help), a toolbar with icons for Session, Servers, Tools, Games, Sessions, View, Split, MultiExec, Tunneling, Packages, Settings, Help, X server, and Exit. A left sidebar shows a file explorer for /home/ec2-user/ with files like .ssh, .bash_logout, .bash_profile, and .bashrc. A bottom status bar indicates "UNREGISTERED VERSION" and provides a link to the professional edition.

You can now refresh your tomcat tab in your internet browser and you should see a sign in page after clicking manager app requesting a username and password.

This can be found in the github notes — <https://github.com/Hussain147/TomcatInstallation.git> but they will need to be added into our tomcat files first.

To explain, in the first section of role and rolename we are adding roles that allow managers and users to perform functions on tomcat. “role rolename=”manager-gui”/> is to allow us to log in to to the gui (graphical user interface — internet tab), “manager script” to help us execute some scripts, “manager jmx” for Java management extensions.

As you can see user “developer” is a part of the manager role name of script which allows them to execute the scripts or copy files from the other server. user “admin” is a part of all manager roles” which allows them to do everything.



The screenshot shows the MobaXterm interface with a terminal window. The terminal output shows the following commands and results:

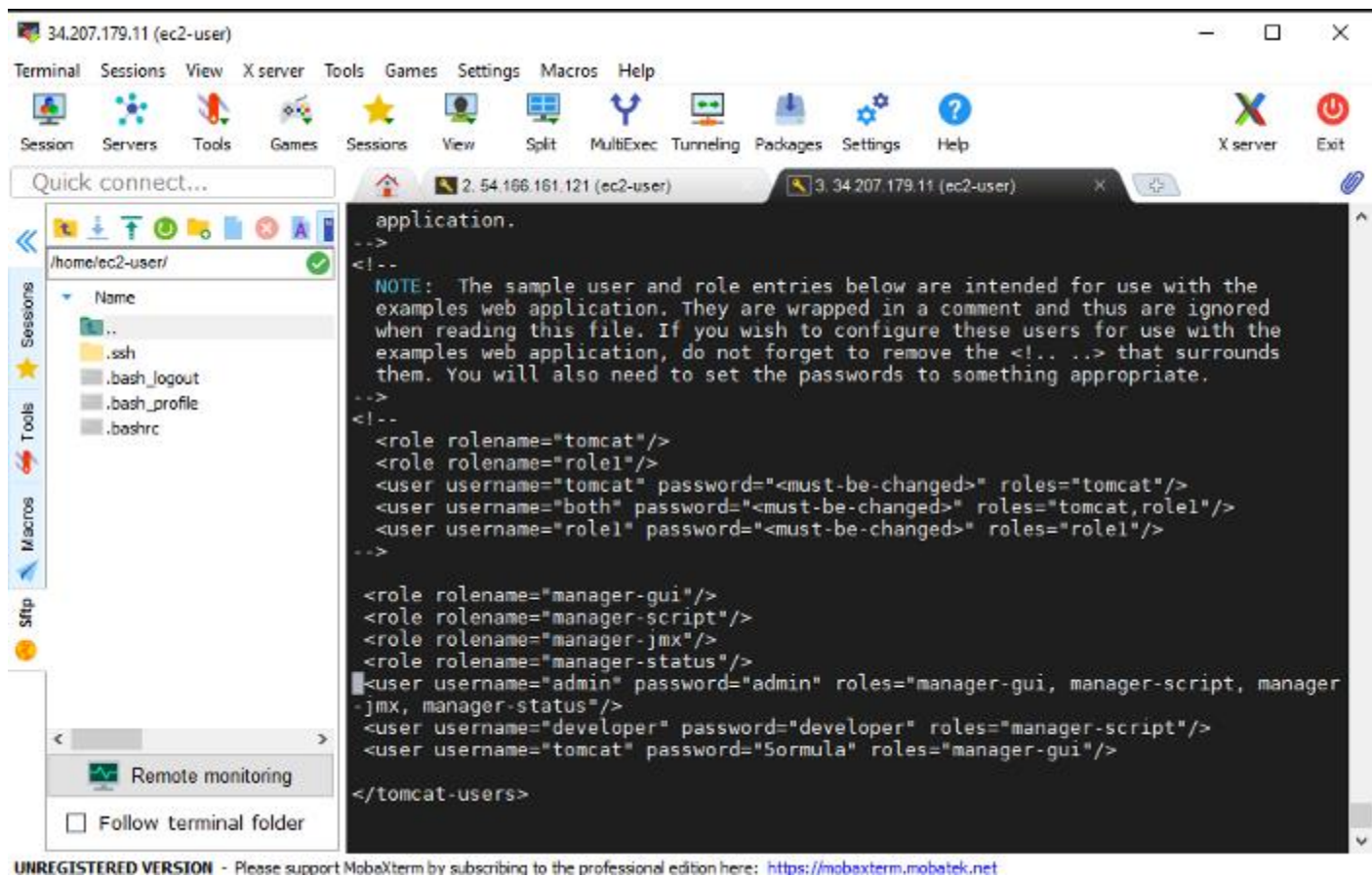
```
Using CATALINA_HOME: /opt/tomcat
Using CATALINA_TMPDIR: /opt/tomcat/temp
Using JRE_HOME: /usr/lib/jvm/jre
Using CLASSPATH: /opt/tomcat/bin/bootstrap.jar:/opt/tomcat/bin/tomcat-juli.jar
[root@tomcat bin]# ./startup.sh
Using CATALINA_BASE: /opt/tomcat
Using CATALINA_HOME: /opt/tomcat
Using CATALINA_TMPDIR: /opt/tomcat/temp
Using JRE_HOME: /usr/lib/jvm/jre
Using CLASSPATH: /opt/tomcat/bin/bootstrap.jar:/opt/tomcat/bin/tomcat-juli.jar
Tomcat started.
[root@tomcat bin]# cd ..
[root@tomcat tomcat]# ls
bin          CONTRIBUTING.md  logs          RELEASE-NOTES  webapps
BUILDING.txt lib              NOTICE       RUNNING.txt    work
conf         LICENSE         README.md    temp
[root@tomcat tomcat]# cd conf/
[root@tomcat conf]# ls
Catalina      context.xml      logging.properties  tomcat-users.xsd
catalina.policy  jaspic-providers.xml  server.xml           web.xml
catalina.properties  jaspic-providers.xsd  tomcat-users.xml
[root@tomcat conf]# vi tomcat-users.xml
```

The left sidebar shows the file explorer for the remote host, with the following files listed:

- ..
- .ssh
- .bash_logout
- .bash_profile
- .bashrc

The bottom status bar indicates: UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: <https://mobaxterm.mobatek.net>

Update users information in the tomcat-users.xml file go to tomcat home directory and add below users to conf/tomcat-user.xml file



You can now copy the information below in the role and users section saving and then quitting.

```
<role rolename="manager-gui"/>
```

```
<role rolename="manager-script"/>
```

```
<role rolename="manager-jmx"/>
```

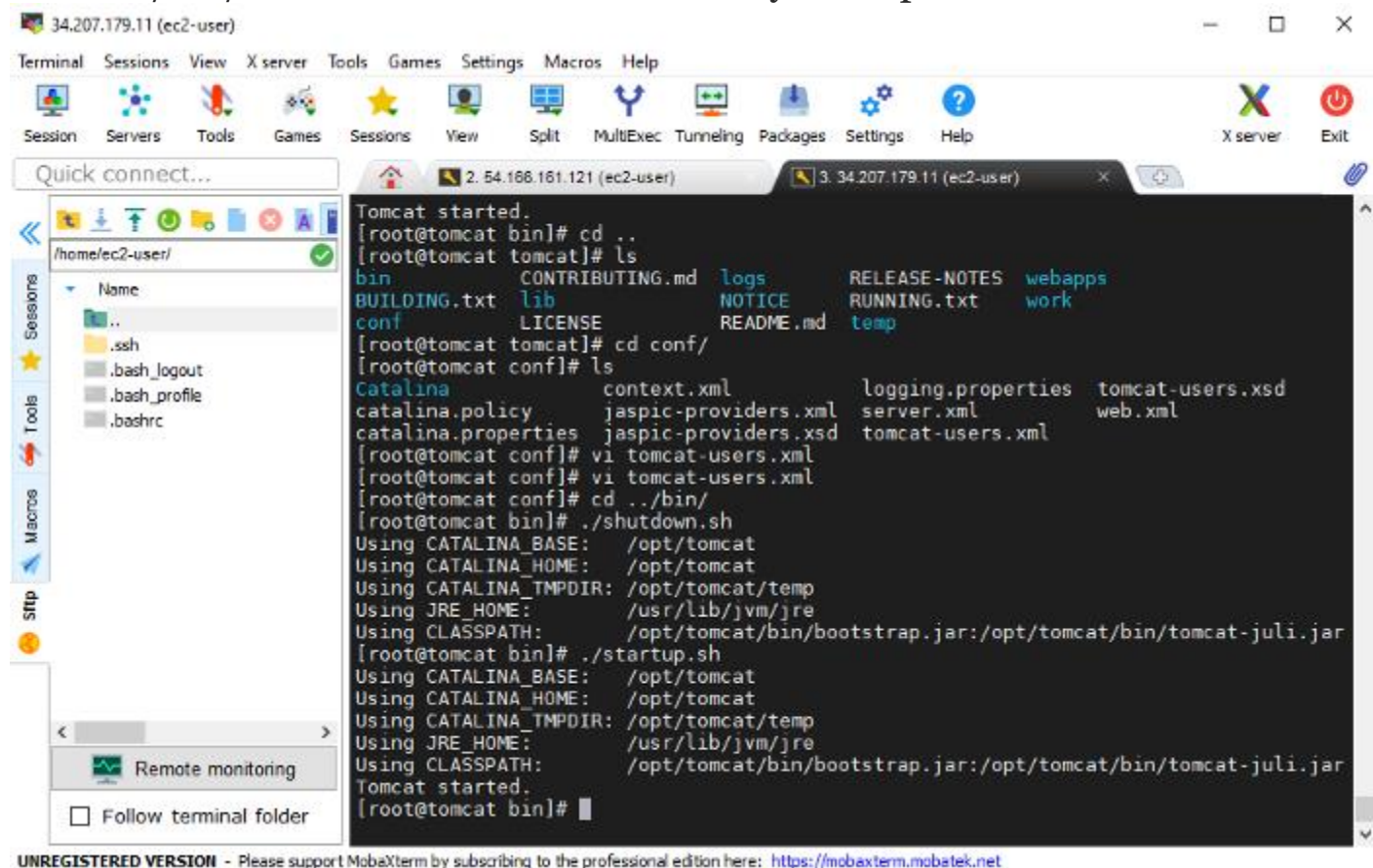
```
<role rolename="manager-status"/>
```

```
<user username="admin" password="admin" roles="manager-gui,
manager-script, manager-jmx, manager-status"/>
```

```
<user username="developer" password="developer" roles="manager-
script"/>
```

```
<user username="tomcat" password="secret" roles="manager-gui"/>
```

To ensure this has been saved we need to refresh the server. Go back with `cd../bin/` and then shutdown followed by startup as shown below.

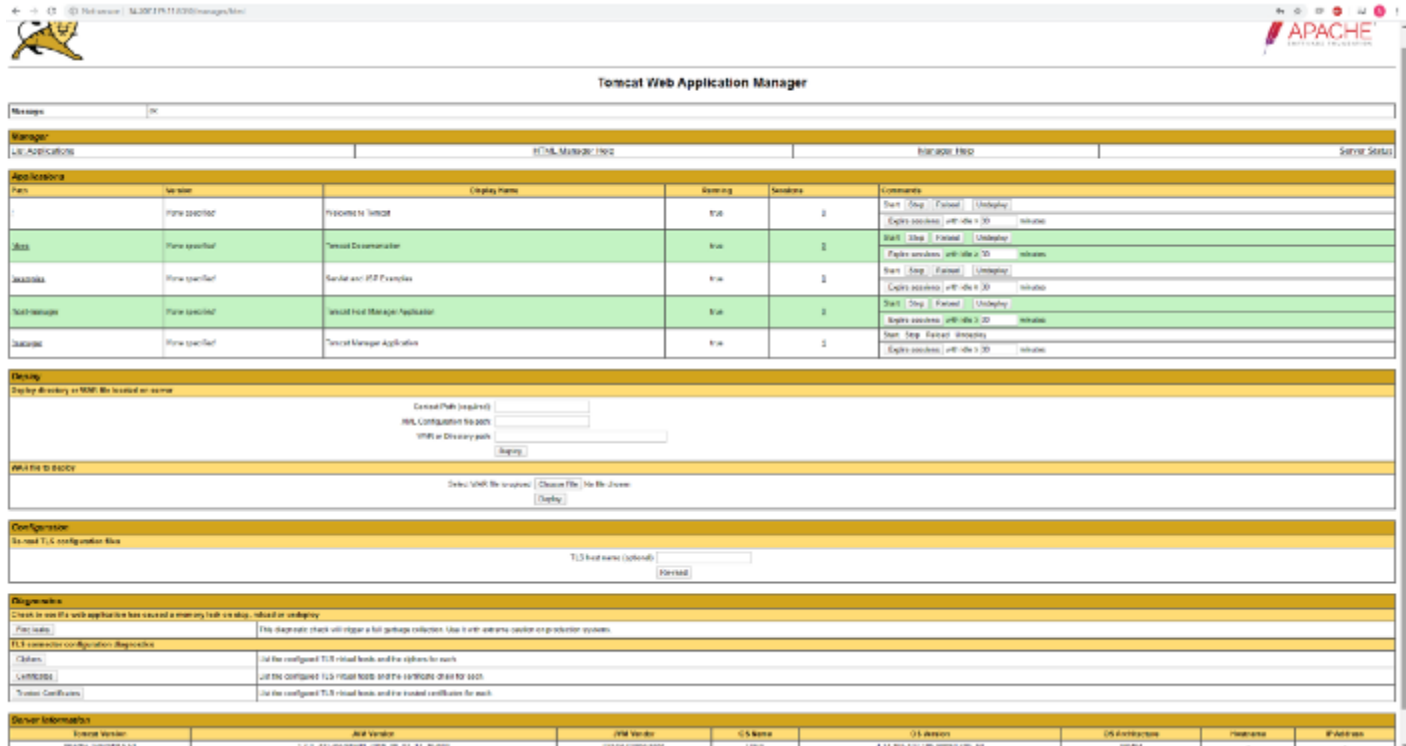


The screenshot shows a MobaXterm window with a terminal session. The terminal output is as follows:

```
Tomcat started.
[root@tomcat bin]# cd ..
[root@tomcat tomcat]# ls
bin      CONTRIBUTING.md  logs      RELEASE-NOTES  webapps
BUILDING.txt  lib             NOTICE   RUNNING.txt    work
conf     LICENSE        README.md temp
[root@tomcat tomcat]# cd conf/
[root@tomcat conf]# ls
Catalina               context.xml          logging.properties  tomcat-users.xsd
catalina.policy        jaspic-providers.xml  server.xml           web.xml
catalina.properties   jaspic-providers.xsd  tomcat-users.xml
[root@tomcat conf]# vi tomcat-users.xml
[root@tomcat conf]# vi tomcat-users.xml
[root@tomcat conf]# cd ../bin/
[root@tomcat bin]# ./shutdown.sh
Using CATALINA_BASE:   /opt/tomcat
Using CATALINA_HOME:   /opt/tomcat
Using CATALINA_TMPDIR: /opt/tomcat/temp
Using JRE_HOME:        /usr/lib/jvm/jre
Using CLASSPATH:       /opt/tomcat/bin/bootstrap.jar:/opt/tomcat/bin/tomcat-juli.jar
[root@tomcat bin]# ./startup.sh
Using CATALINA_BASE:   /opt/tomcat
Using CATALINA_HOME:   /opt/tomcat
Using CATALINA_TMPDIR: /opt/tomcat/temp
Using JRE_HOME:        /usr/lib/jvm/jre
Using CLASSPATH:       /opt/tomcat/bin/bootstrap.jar:/opt/tomcat/bin/tomcat-juli.jar
Tomcat started.
[root@tomcat bin]#
```

At the bottom of the window, there is a message: **UNREGISTERED VERSION** - Please support MobaXterm by subscribing to the professional edition here: <https://mobaxterm.mobatek.net>

Now we can restart our web Tomcat page and enter the details tomcat followed by 50formula. If you have changed certain details feel free to enter it as so. The result should be below,



The screenshot shows the Tomcat Web Application Manager interface. At the top, there's a navigation bar with 'Manager' and 'Server Status' tabs. The main content area is divided into several sections:

- Applications:** A table listing installed applications. The table has columns: Path, Version, Deploy Name, Running, Sessions, and Comments. The applications listed are:

Path	Version	Deploy Name	Running	Sessions	Comments
/	9.0.56.0	Tomcat	Yes	0	Start Stop Reload Undeploy Deploy Edit Delete Info
/app	None specified	Tomcat Demo Application	Yes	0	Start Stop Reload Undeploy Deploy Edit Delete Info
/app2	None specified	Tomcat Demo Application	Yes	0	Start Stop Reload Undeploy Deploy Edit Delete Info
/app3	None specified	Tomcat Demo Application	Yes	0	Start Stop Reload Undeploy Deploy Edit Delete Info
/app4	None specified	Tomcat Demo Application	Yes	0	Start Stop Reload Undeploy Deploy Edit Delete Info
- Deploy:** A section for deploying a new application. It includes a text input for 'Context Path (required)' and a 'Deploy' button.
- Configuration:** A section for configuring the application. It includes a text input for 'JSP Root Name (optional)' and a 'Reload' button.
- Deployment:** A section for deployment. It includes a text input for 'Deploy Path' and a 'Deploy' button.
- Server Information:** A table showing server details. The table has columns: Server Name, JSP Version, JSP Path, JSP Root Name, JSP Root Path, JSP Root URL, JSP Root Scheme, JSP Root Protocol, JSP Root Host, JSP Root Port, JSP Root Context, JSP Root Path, JSP Root URL, JSP Root Scheme, JSP Root Protocol, JSP Root Host, JSP Root Port, JSP Root Context.

Deploying war file on Tomcat VM using Jenkins

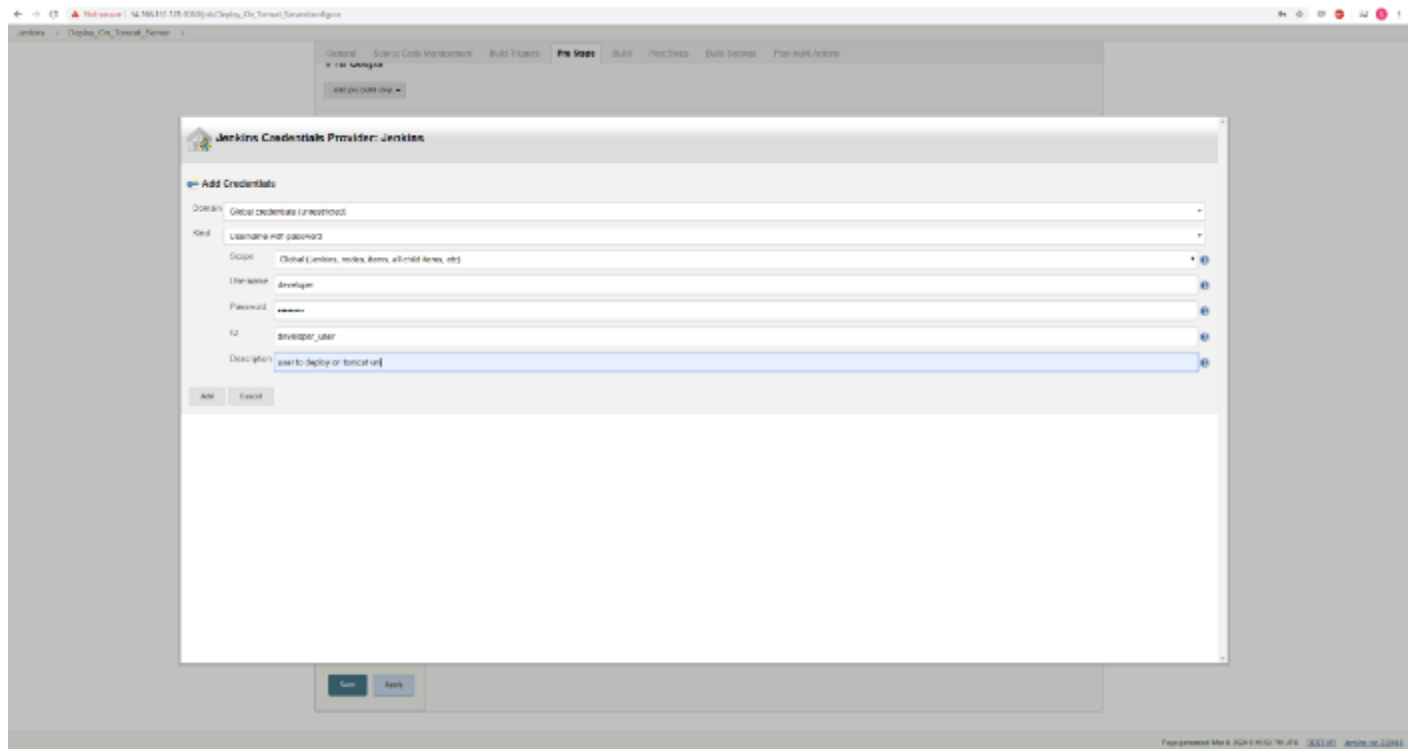
While both of our servers are still running we will need to go to the Jenkins server and select manage jenkins > manage plugins. In the available section we will need to search for “deploy to” and select “deploy to container”.

Once installed. Go back to Jenkins home page. we are going to create a new job called. Deploy_On_Tomcat_Server. This will be a maven project. Description will be “Deploy on VM”. Select Git in Source Code Management. We will then provide the github repository

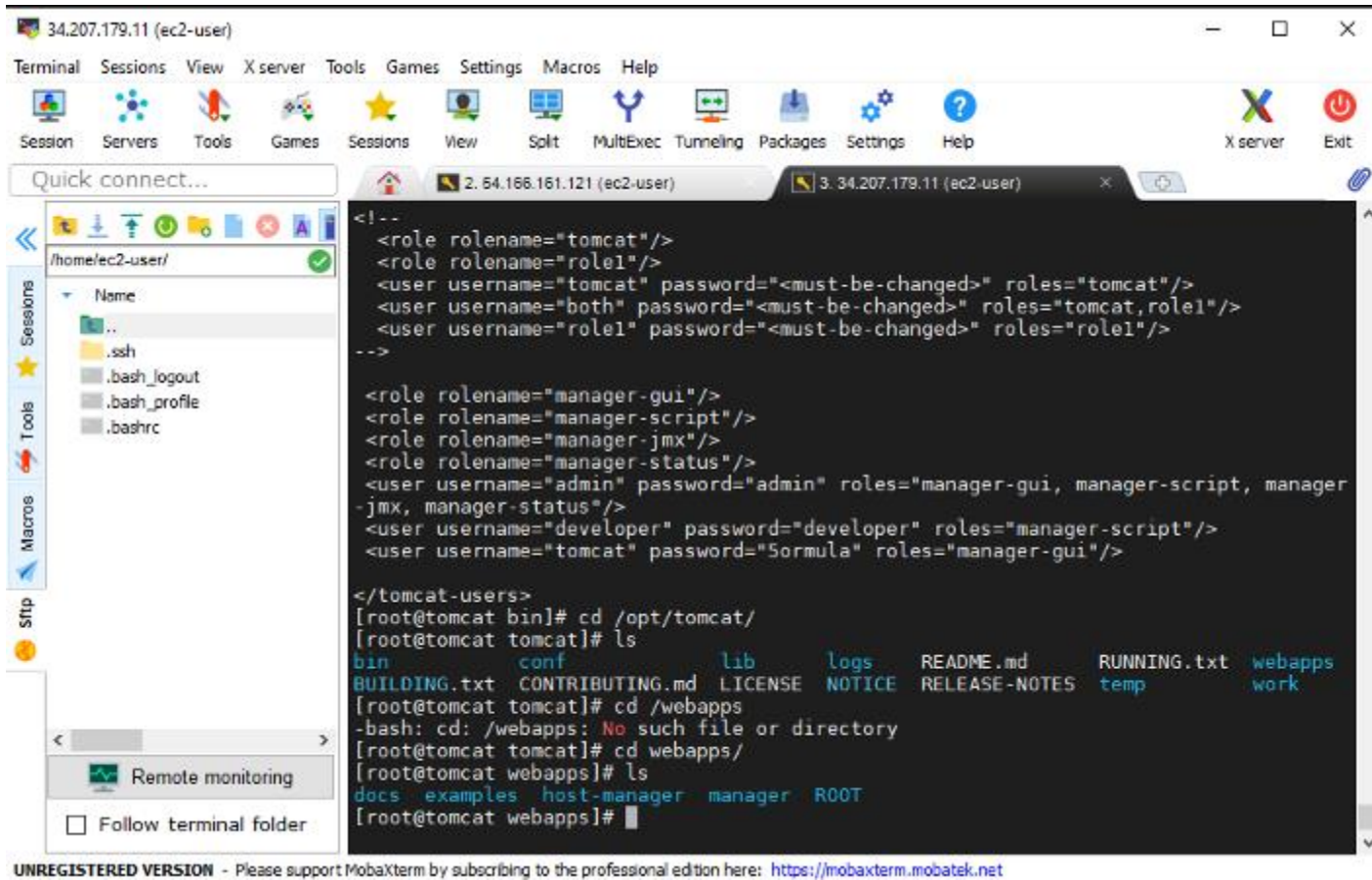
URL. <https://github.com/Hussain147/mavenproject.git> — Credential are not necessary. Scroll down to Goals and Options and type in as previously used “clean install package” . On Post-build actions select “Deploy war/ear to a container”

The image displays two screenshots of the Jenkins configuration interface. The top screenshot shows the 'Build Steps' configuration for a job named 'Deploy_On_Tomcat_Server'. The 'Build Steps' section is active, showing a step named 'Invoke top-level Maven targets'. The 'Maven Version' is set to 'Maven', and the 'Goals' are 'clean install package'. The bottom screenshot shows the 'Post-build Actions' configuration for the same job. The 'Post-build Actions' section is active, showing a step named 'Deploy war/ear to a container'. The 'WAR/EAR files' are set to '**/*.war', the 'Context path' is empty, and the 'Containers' section shows 'Tomcat 8.x Remote' selected. The 'Credentials' are set to 'developer/tomcat', and the 'Tomcat URL' is 'http://34.204.176.49:8090'.

For the credentials i added the same credentials we initially created above. This can be found with search `cat /opt/tomcat/conf/tomcat-users.xml` on your tomcat terminal



Now we have created the job deploy on tomcat server. Whenever this job is executed it is going to copy WARfile on the tomcat server when doing that it authenticates by using developer details.



This is what we are currently accessing on the browser and this is where our recently built WAR file will be copied into.

I will now build it in the Jenkins environment and refresh the tomcat terminal by typing `ls -l` (while still in the webapps directory)

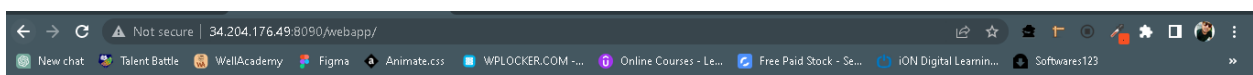
The screenshot shows the MobaXterm interface with a terminal window connected to 34.207.179.11 (ec2-user). The terminal displays the following XML configuration for Tomcat:

```
<role rolename="manager-script"/>
<role rolename="manager-jmx"/>
<role rolename="manager-status"/>
<user username="admin" password="admin" roles="manager-gui, manager-script, manager-jmx, manager-status"/>
<user username="developer" password="developer" roles="manager-script"/>
<user username="tomcat" password="Sormula" roles="manager-gui"/>

</tomcat-users>
[root@tomcat bin]# cd /opt/tomcat/
[root@tomcat tomcat]# ls
bin          conf          lib          logs         README.md    RUNNING.txt  webapps
BUILDING.txt CONTRIBUTING.md LICENSE      NOTICE      RELEASE-NOTES temp         work
[root@tomcat tomcat]# cd /webapps/
-bash: cd: /webapps: No such file or directory
[root@tomcat tomcat]# cd webapps/
[root@tomcat webapps]# ls
docs  examples  host-manager  manager  ROOT
[root@tomcat webapps]# ls -l
total 28
drwxr-x--- 16 root root 4096 Mar  8 16:34 docs
drwxr-x---  6 root root 4096 Mar  8 16:34 examples
drwxr-x---  5 root root 4096 Mar  8 16:34 host-manager
drwxr-x---  5 root root 4096 Mar  8 16:34 manager
drwxr-x---  3 root root 4096 Mar  8 16:34 ROOT
drwxr-x---  4 root root 4096 Mar  8 18:46 webapp
-rw-r----- 1 root root 2531 Mar  8 18:46 webapp.war
[root@tomcat webapps]#
```

The terminal output shows the directory listing for /webapps, with the file webapp.war highlighted in yellow. The MobaXterm interface also shows a sidebar with various tools and a top menu bar.

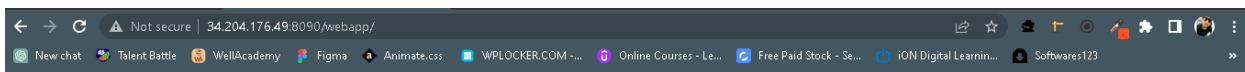
To access this application you will need to type the WAR file into your browser tab. Tomcat server IP followed by :8080(Port Number which you assigned, In my case I took 8090) followed by webapp



Hello, Welcome to Hussain's Simple DevOps Project !!

To automate a rebuild of this when changes are made in github for example. Please follow below.

Go back on onto the job in the jenkins server and select configure. Scroll down to build triggers and select Poll SCM. Poll SCM periodically polls the SCM to check whether changes were made (i.e. new commits) and builds the project if new commits where pushed since the last build, whereas build periodically builds the project periodically even if nothing has changed. In this case the repository is the github link previously used.



Hello, Welcome to Hussain's Simple DevOps Project !!

Congratulations on completing the CICD Project with Tomcat, Jenkins & Github

I hope you've enjoyed it so far. Keep Learning...

The format * * * * * is specifying that a new build should be looked for every minute, every hour, every day, every week, every month. if you want to execute once every day, maybe every 10 hours the format would be — 00 10 * * *

I think it is now fair to say that we have set up a continous integration and continous deployment pipeline using Git, Jenkins, Maven and Tomcat Server.

~~~THANK YOU~~~