Apache Tomcat
Web Server

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Apache Tomcat

- ➔ **Apache Tomcat is a web server**
- ➔ **Tomcat is used to run Java Web Applications**
- ➔ **Tomcat is free & open-source software**
- ➔ **Tomcat developed by Apache Organization**
- ➔ **Tomcat developed by using 'Java' programming language**
- ➔ **Tomcat server runs on 8080 port by default (we can change that port in server.xml file)**

Download Apache Tomcat in Windows Machine

We can download Apache tomcat server from official website

URL : https://tomcat.apache.org/download-90.cgi

9.0.65

Please see the README file for packaging information. It explains what every distribution contains.

Binary Distributions

- Core:
  - zip (pgp, sha512)
  - tar.gz (pgp, sha512)
  - 32-bit Windows zip (pgp, sha512)
  - 64-bit Windows zip (pgp, sha512)
  - 32-bit/64-bit Windows Service Installer (pgp, sha512)
- Full documentation:
  - tar.gz (pgp, sha512)
- Deployer:
  - zip (pgp, sha512)
  - tar.gz (pgp, sha512)
- Embedded:
  - tar.gz (pgp, sha512)
  - zip (pgp, sha512)

- ➔ **Download Apache Tomcat zip file and extract it (we can see below folder structure)**

This PC > Downloads > apache-tomcat-9.0.65 (1) > apache-tomcat-9.0.65

Name	Date modified	Type	Size
bin	27	File folder	
conf	27	File folder	
lib	27	File folder	
logs	27	File folder	
temp	27	File folder	
webapps	27	File folder	
work	27	File folder	
BUILDING.txt	14	Text Document	20 KB
CONTRIBUTING.md	14	Markdown Source File	7 KB
LICENSE	14	File	56 KB
NOTICE	14	File	3 KB
README.md	14	Markdown Source File	4 KB
RELEASE-NOTES	14	File	7 KB
RUNNING.txt	14	Text Document	17 KB

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Directories and Files

These are some of the key tomcat directories:

- **/bin** - Startup, shutdown, and other scripts. The `*.sh` files (for Unix systems) are functional duplicates of the `*.bat` files (for Windows systems). Since the Win32 command-line lacks certain functionality, there are some additional files in here.
- **/conf** - Configuration files and related DTDs. The most important file in here is server.xml. It is the main configuration file for the container.
- **/logs** - Log files are here by default.
- **/webapps** - This is where your webapps go.

Apache Tomcat Setup in Linux Machine

➔ **To run Apache Tomcat Server first we need to install Java**

➔ **Download Apache Tomcat using 'wget' command**
   (Apache URL we can get from Apache website)

wget https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.65/bin/apache-tomcat-9.0.65.tar.gz

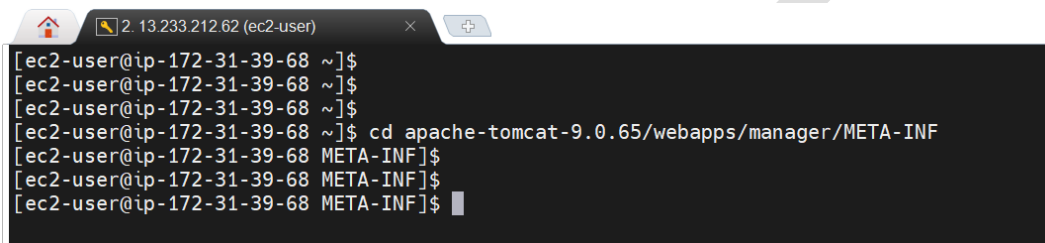➔ **Extract Apache Tomcat tar file using tar command**

   $ **tar apache-tomcat-9.0.65.tar.gz**

```
[ec2-user@ip-172-31-39-68 ~]$ clear
[ec2-user@ip-172-31-39-68 ~]$
[ec2-user@ip-172-31-39-68 ~]$
[ec2-user@ip-172-31-39-68 ~]$ tar -xvf apache-tomcat-9.0.65.tar.gz
apache-tomcat-9.0.65/conf/
apache-tomcat-9.0.65/conf/catalina.policy
apache-tomcat-9.0.65/conf/catalina.properties
apache-tomcat-9.0.65/conf/context.xml
apache-tomcat-9.0.65/conf/jaspic-providers.xml
apache-tomcat-9.0.65/conf/jaspic-providers.xsd
apache-tomcat-9.0.65/conf/logging.properties
apache-tomcat-9.0.65/conf/server.xml
apache-tomcat-9.0.65/conf/tomcat-users.xml
apache-tomcat-9.0.65/conf/tomcat-users.xsd
apache-tomcat-9.0.65/conf/web.xml
apache-tomcat-9.0.65/bin/
apache-tomcat-9.0.65/lib/
apache-tomcat-9.0.65/logs/
apache-tomcat-9.0.65/temp/
apache-tomcat-9.0.65/webapps/
apache-tomcat-9.0.65/webapps/ROOT/
apache-tomcat-9.0.65/webapps/ROOT/WEB-INF/
apache-tomcat-9.0.65/webapps/docs/
apache-tomcat-9.0.65/webapps/docs/WEB-INF/
apache-tomcat-9.0.65/webapps/docs/annotationapi/
apache-tomcat-9.0.65/webapps/docs/api/
apache-tomcat-9.0.65/webapps/docs/appdev/
apache-tomcat-9.0.65/webapps/docs/appdev/sample/
```

➔ **We can see Apache Tomcat files using ls command like below**

```
[ec2-user@ip-172-31-39-68 ~]$
[ec2-user@ip-172-31-39-68 ~]$ cd apache-tomcat-9.0.65/
[ec2-user@ip-172-31-39-68 apache-tomcat-9.0.65]$ ls -l
total 128
drwxr-x--- 2 ec2-user ec2-user  4096 Aug 27 06:41 bin
-rw-r----- 1 ec2-user ec2-user 19992 Jul 14 12:28 BUILDING.txt
drwx------ 2 ec2-user ec2-user   238 Jul 14 12:28 conf
-rw-r----- 1 ec2-user ec2-user  6210 Jul 14 12:28 CONTRIBUTING.md
drwxr-x--- 2 ec2-user ec2-user  4096 Aug 27 06:41 lib
-rw-r----- 1 ec2-user ec2-user 57092 Jul 14 12:28 LICENSE
drwxr-x--- 2 ec2-user ec2-user     6 Jul 14 12:28 logs
-rw-r----- 1 ec2-user ec2-user  2333 Jul 14 12:28 NOTICE
-rw-r----- 1 ec2-user ec2-user  3398 Jul 14 12:28 README.md
-rw-r----- 1 ec2-user ec2-user  6901 Jul 14 12:28 RELEASE-NOTES
-rw-r----- 1 ec2-user ec2-user 16505 Jul 14 12:28 RUNNING.txt
drwxr-x--- 2 ec2-user ec2-user    30 Aug 27 06:41 temp
drwxr-x--- 7 ec2-user ec2-user    81 Jul 14 12:28 webapps
drwxr-x--- 2 ec2-user ec2-user     6 Jul 14 12:28 work
[ec2-user@ip-172-31-39-68 apache-tomcat-9.0.65]$
```
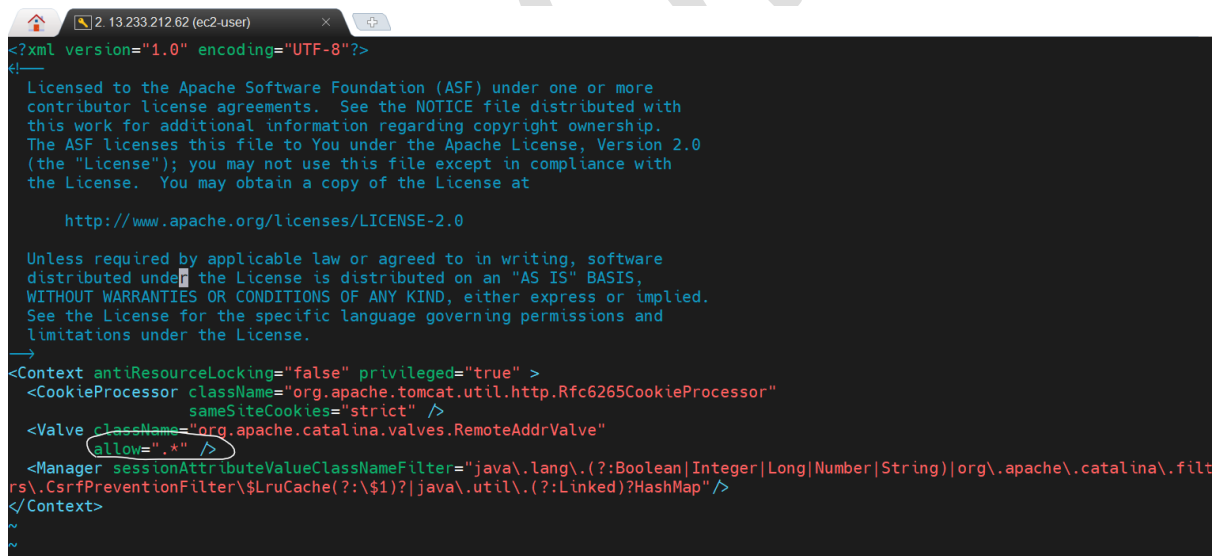
➔ **To deploy applications into Tomcat server we will use Host Manager**

➔ **By default, the Host 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 Host Manager's context.xml file.**

File Location: <tomcat-folder>/webapps/manager/META-INF/context.xml

```
[ec2-user@ip-172-31-39-68 ~]$
[ec2-user@ip-172-31-39-68 ~]$
[ec2-user@ip-172-31-39-68 ~]$
[ec2-user@ip-172-31-39-68 ~]$ cd apache-tomcat-9.0.65/webapps/manager/META-INF
[ec2-user@ip-172-31-39-68 META-INF]$
[ec2-user@ip-172-31-39-68 META-INF]$
[ec2-user@ip-172-31-39-68 META-INF]$
```

➔ **In Manager context.xml file, change <Valve> section like below (allow attribute value changed)**
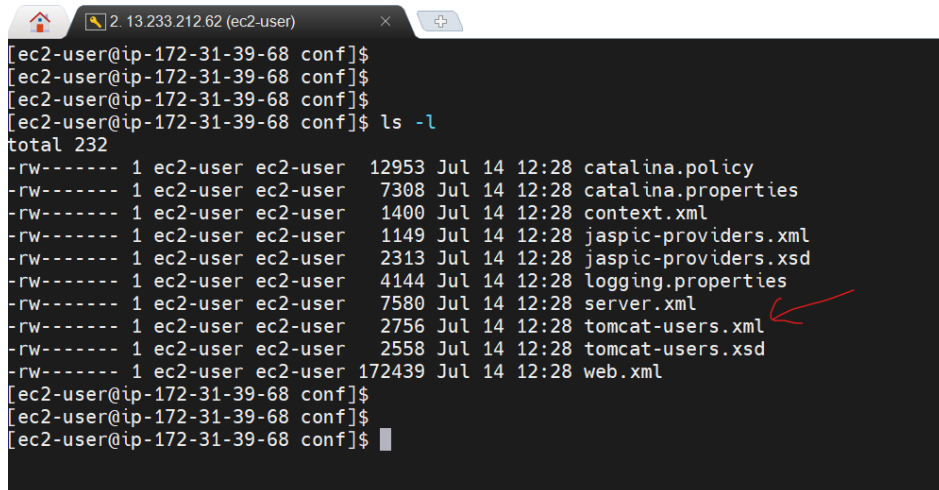
```xml
<?xml version="1.0" encoding="UTF-8"?>
<!--
  Licensed to the Apache Software Foundation (ASF) under one or more
  contributor license agreements.  See the NOTICE file distributed with
  this work for additional information regarding copyright ownership.
  The ASF licenses this file to You under the Apache License, Version 2.0
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      http://www.apache.org/licenses/LICENSE-2.0

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  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" >
  <CookieProcessor className="org.apache.tomcat.util.http.Rfc6265CookieProcessor"
                   sameSiteCookies="strict" />
  <Valve className="org.apache.catalina.valves.RemoteAddrValve"
         allow=".*" />
  <Manager sessionAttributeValueClassNameFilter="java\.lang\.(?:Boolean|Integer|Long|Number|String)|org\.apache\.catalina\.filt
rs\.CsrfPreventionFilter\$LruCache(?:\$1)?|java\.util\.(?:Linked)?HashMap"/>
</Context>
~
~
~
```

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Adding Users in Tomcat Server

➔ **We need to add users in tomcat server to perform admin activities**

File Location: <tomcat-folder>/conf/tomact-users.xml

```
[ec2-user@ip-172-31-39-68 conf]$
[ec2-user@ip-172-31-39-68 conf]$
[ec2-user@ip-172-31-39-68 conf]$
[ec2-user@ip-172-31-39-68 conf]$ ls -l
total 232
-rw------- 1 ec2-user ec2-user  12953 Jul 14 12:28 catalina.policy
-rw------- 1 ec2-user ec2-user   7308 Jul 14 12:28 catalina.properties
-rw------- 1 ec2-user ec2-user   1400 Jul 14 12:28 context.xml
-rw------- 1 ec2-user ec2-user   1149 Jul 14 12:28 jaspic-providers.xml
-rw------- 1 ec2-user ec2-user   2313 Jul 14 12:28 jaspic-providers.xsd
-rw------- 1 ec2-user ec2-user   4144 Jul 14 12:28 logging.properties
-rw------- 1 ec2-user ec2-user   7580 Jul 14 12:28 server.xml
-rw------- 1 ec2-user ec2-user   2756 Jul 14 12:28 tomcat-users.xml
-rw------- 1 ec2-user ec2-user   2558 Jul 14 12:28 tomcat-users.xsd
-rw------- 1 ec2-user ec2-user 172439 Jul 14 12:28 web.xml
[ec2-user@ip-172-31-39-68 conf]$
[ec2-user@ip-172-31-39-68 conf]$
[ec2-user@ip-172-31-39-68 conf]$
```

➔ **Add below Roles and Users in tomcat-users.xml file**

<role rolename="manager-gui" />

<role rolename="manager-script" />

<role rolename="admin-gui" />

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

<user username="admin" password="admin" roles="manager-gui,admin-gui,manager-script"/>
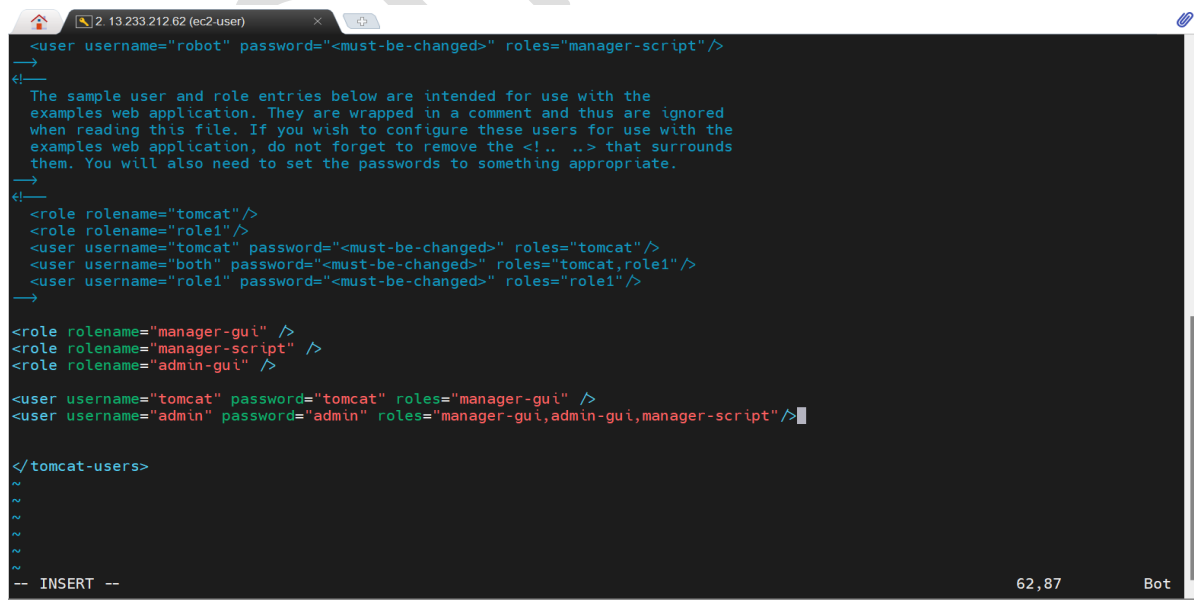
```
<user username="robot" password="<must-be-changed>" roles="manager-script"/>
-->
<!--
  The sample user and role entries below are intended for use with the
  examples web application. They are wrapped in a comment and thus are ignored
  when reading this file. If you wish to configure these users 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="admin-gui" />

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

</tomcat-users>
~
~
~
~
~
~
~
-- INSERT --                                                     62,87            Bot
```

➔ **After adding users, go to bin directory and start the Tomcat server**

➔ **Start the tomcat server using 'sh startup.sh' command**

➔ **Once Tomcat Server started, we can access Tomcat Server admin console using EC2 Instance Public IP**

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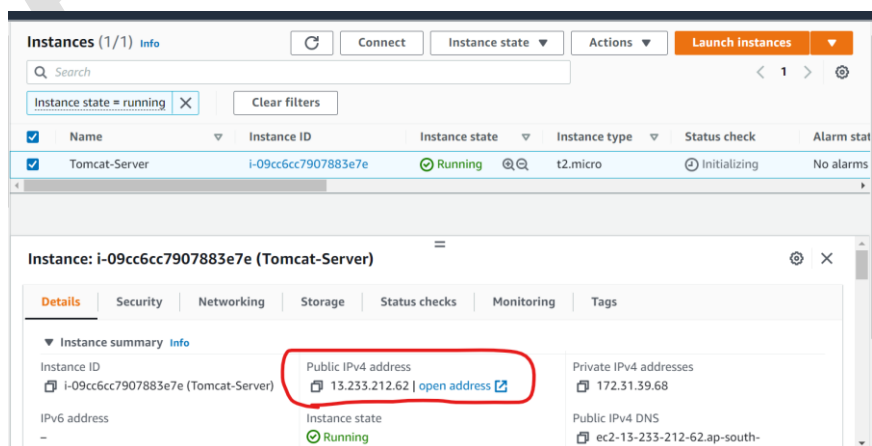
➔ **Make 8080 port number is enabled in your EC2 Instance Security Group**

➔ **We can access Tomcat Server in our Browser like below**

➔ **Click on Host Manager to deploy the application (It will ask credentials, enter the credentials which we have configured in 'tomcat-users.xml' file)**

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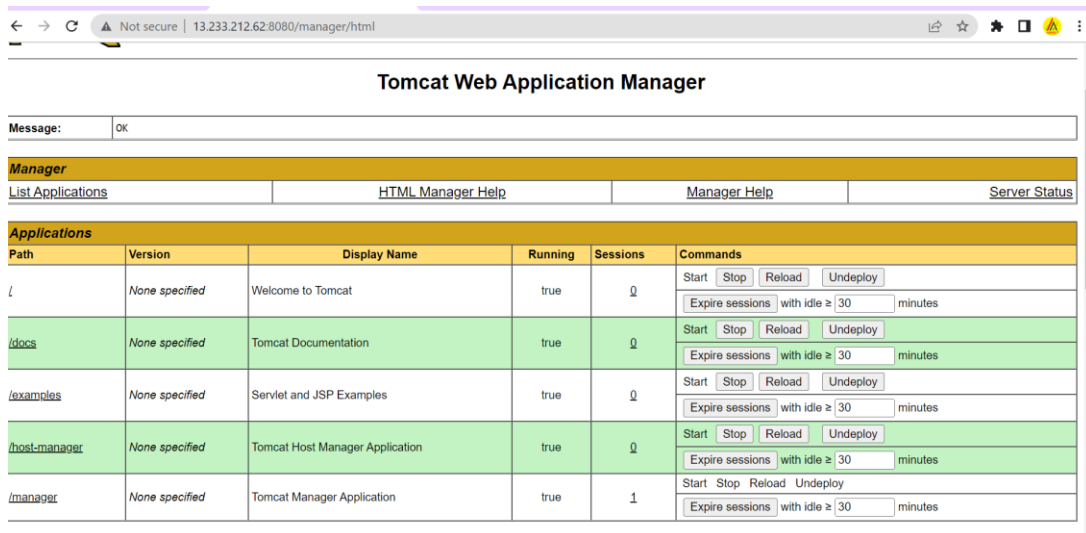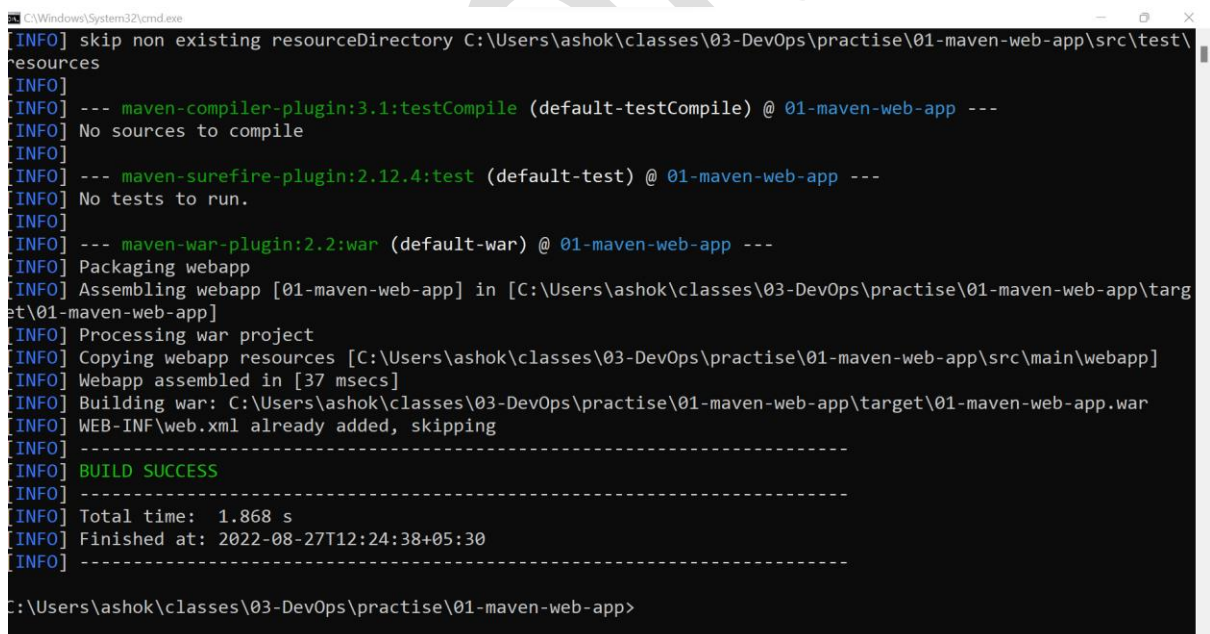
➔ **After Login Success we can see below List of Applications Running in Tomcat (these are default applications)**

➔ **Go to maven web application and package that application as war file (war file will be created in target folder)**

➔ **We can deploy Maven Web Application 'war' file into Tomcat Server from Host Manager Console**

➔ **Choose War file and click on 'Deploy' button**

➔ **We can see our application which got deployed in Tomcat Server**

➔ **Click on Application name (It will open like below)**

Note: in project 'index.jsp' we can modify web page content

File Location: <project-folder>/src/main/webapp/index.jsp
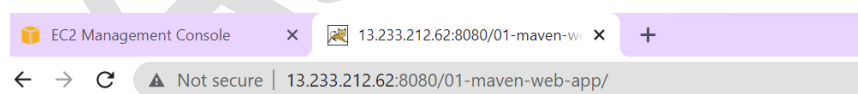
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➔ **We can change Tomcat Server port in 'server.xml file**

File Location : <apache-tomcat-folder>/conf

```
total 232
drwxr-x--- 3 ec2-user ec2-user     23 Aug 27 06:51 Catalina
-rw------- 1 ec2-user ec2-user  12953 Jul 14 12:28 catalina.policy
-rw------- 1 ec2-user ec2-user   7308 Jul 14 12:28 catalina.properties
-rw------- 1 ec2-user ec2-user   1400 Jul 14 12:28 context.xml
-rw------- 1 ec2-user ec2-user   1149 Jul 14 12:28 jaspic-providers.xml
-rw------- 1 ec2-user ec2-user   2313 Jul 14 12:28 jaspic-providers.xsd
-rw------- 1 ec2-user ec2-user   4144 Jul 14 12:28 logging.properties
-rw------- 1 ec2-user ec2-user   7580 Jul 14 12:28 server.xml         ⬅
-rw------- 1 ec2-user ec2-user   3009 Aug 27 06:59 tomcat-users.xml
-rw------- 1 ec2-user ec2-user   2558 Jul 14 12:28 tomcat-users.xsd
-rw------- 1 ec2-user ec2-user 172439 Jul 14 12:28 web.xml
[ec2-user@ip-172-31-39-68 conf]$
```

➔ **Edit Connector Port like below (Enable this port in Security Group to access Tomcat Server)**

```
2. 13.233.212.62 (ec2-user)
<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" />
    -->
    <!-- Define an SSL/TLS HTTP/1.1 Connector on port 8443
         This connector uses the NIO implementation. The default
         SSLImplementation will depend on the presence of the APR/native
         library and the useOpenSSL attribute of the AprLifecycleListener.
         Either JSSE or OpenSSL style configuration may be used regardless of
         the SSLImplementation selected. JSSE style configuration is used below.
-- INSERT --                                                66,26          37%
```

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