

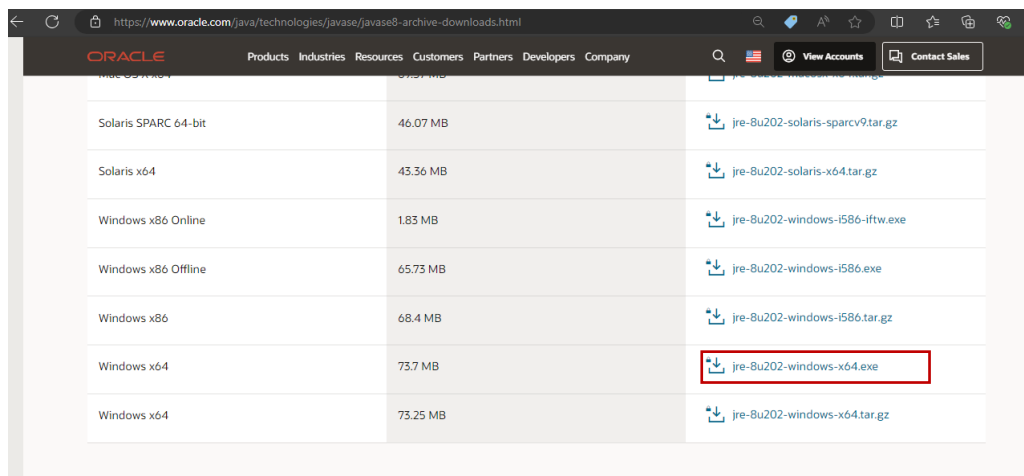
Windows-Based Docker Image with Configured Java, Python, and Tomcat for Sample WAR Deployment

REQUIREMENTS

- Windows host with Docker service installed.
- Base windows server core image.
- JAVA, PYTHON & TOMCAT Installation files.

DOWNLOAD JRE SETUP FILE & JDK SETUP FILE

- Go to the URL – [Java Archive Downloads - Java SE 8](https://www.oracle.com/java/technologies/javase/javase8-archive-downloads.html)
- Click on **jre8u202_windows-x64.exe** link to download the JRE file.



- Click on **jdk8u202_windows-x64.exe** link to download the JDK file.

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Linux x64	170.15 MB	 jdk-8u202-linux-x64.rpm
Linux x64	185.05 MB	 jdk-8u202-linux-x64.tar.gz
Mac OS X x64	249.15 MB	 jdk-8u202-macosx-x64.dmg
Solaris SPARC 64-bit (SVR4 package)	125.09 MB	 jdk-8u202-solaris-sparcv9.tar.Z
Solaris SPARC 64-bit	88.1 MB	 jdk-8u202-solaris-sparcv9.tar.gz
Solaris x64 (SVR4 package)	124.37 MB	 jdk-8u202-solaris-x64.tar.Z
Solaris x64	85.38 MB	 jdk-8u202-solaris-x64.tar.gz
Windows x86	201.64 MB	 jdk-8u202-windows-i586.exe
Windows x64	211.58 MB	 jdk-8u202-windows-x64.exe

DOWNLOAD PYTHON SETUP FILE

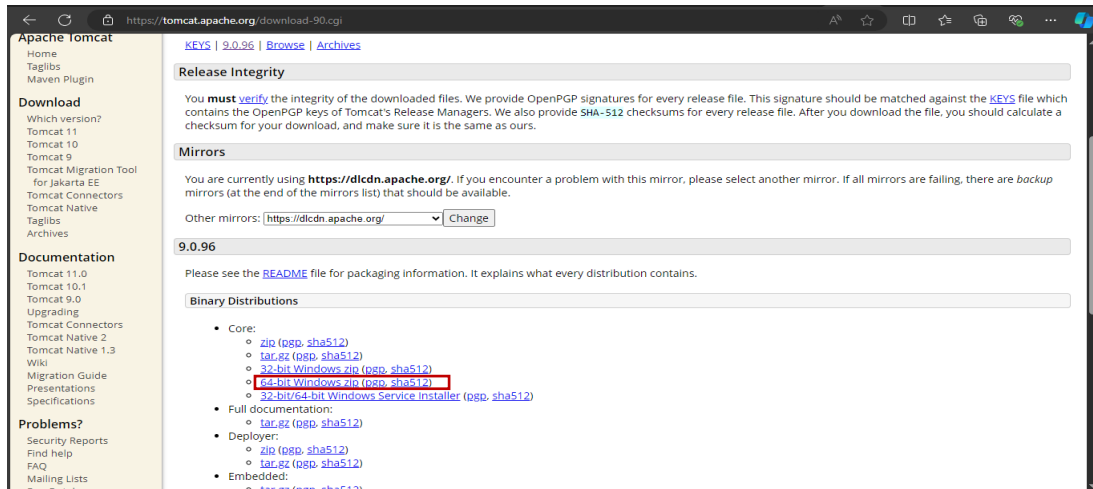
- Go to the URL – [Python Release Python 3.9.7 | Python.org](https://python.org/release/python-3.9.7/)

Full Changelog					
Files					
Version	Operating System	Description	MD5 Sum	File Size	GPG
Gzipped source tarball	Source release		5f463f30b1fdb545f156583630318b3	24.6 MB	SIG
XZ compressed source tarball	Source release		fd9b060b483bc01850a3f412eea1d954	18.2 MB	SIG
macOS 64-bit Intel installer	macOS	for macOS 10.9 and later	ce8c2f885f26b09536857610644260d4	28.6 MB	SIG
macOS 64-bit universal2 installer	macOS	for macOS 10.9 and later, including macOS 11 Big Sur on Apple Silicon (experimental)	825067610b16b03ec814630df1b65193	36.4 MB	SIG
Windows installer (64-bit)	Windows	Recommended	cc3eabc1f9d6c703d1d2a4e7c041bc1d	27.6 MB	SIG
Windows installer (32-bit)	Windows		0d949bdfdbd0c8c66107a980a95efd85	26.5 MB	SIG
Windows help file	Windows		b92a78506ccf258d5ad0d98c341fc5d1	8.8 MB	SIG
Windows embeddable package (64-bit)	Windows		67e19ff32b3ef62a40bccd50e33b0f53	8.1 MB	SIG
Windows embeddable package (32-bit)	Windows		6d12e3e0f942830de8466a83d30a45fb	7.3 MB	SIG

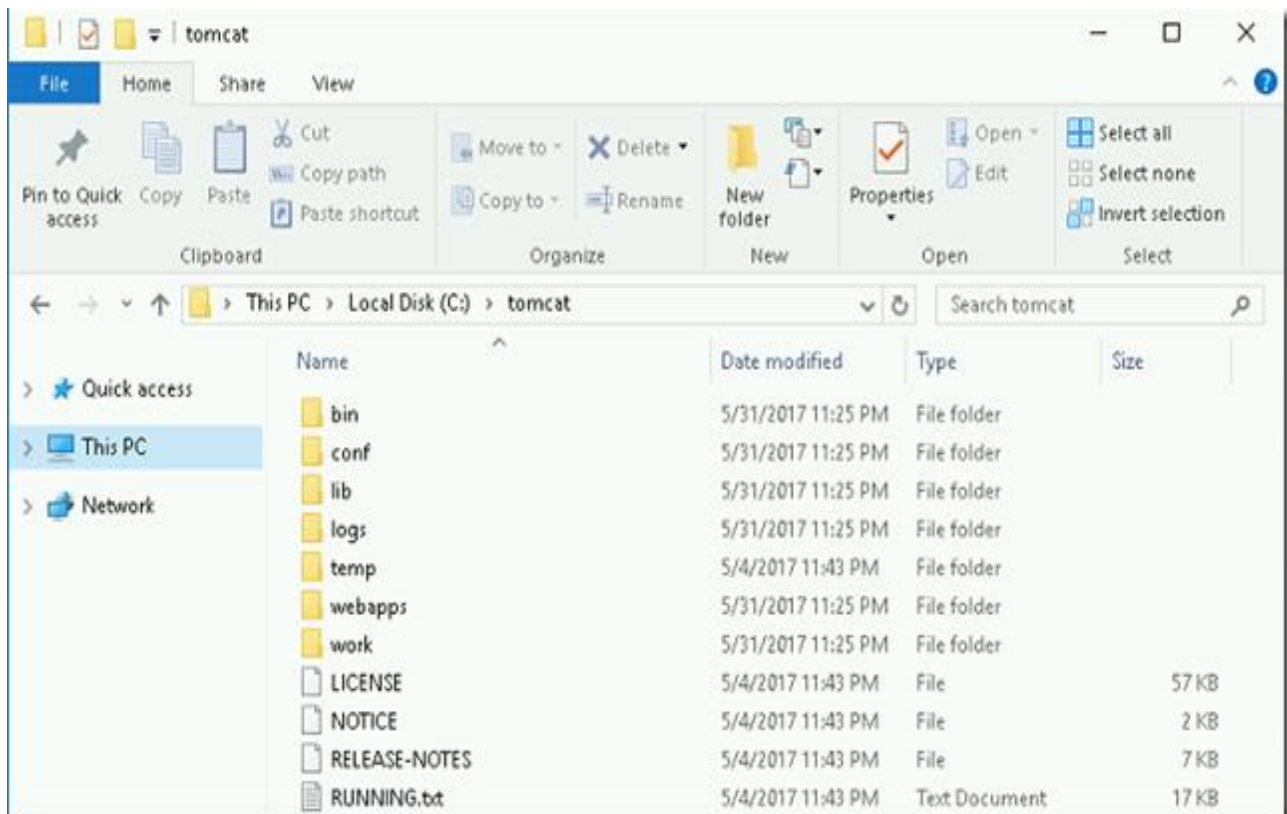
- Click on Windows-installer (64bit) link to download the JRE file.

DOWNLOAD AND CUSTOMIZE TOMCAT

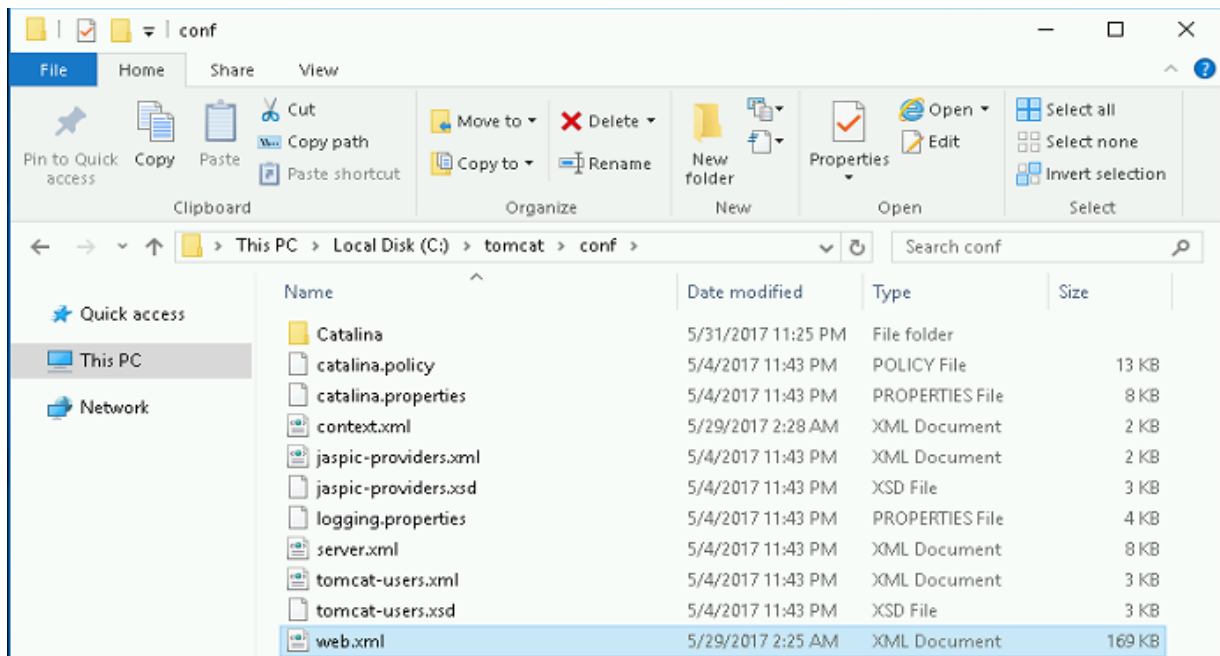
- Go to the URL <https://tomcat.apache.org/download-90.cgi>
- Click on **64-bit Windows zip** link to download the 64-bit version of tomcat.



- Extract the downloaded ZIP file **apache-tomcat-9.0.0.M21-windows-x64.zip** to a folder named **tomcat**



- Go to **tomcat\conf** folder and open **web.xml** file in notepad.

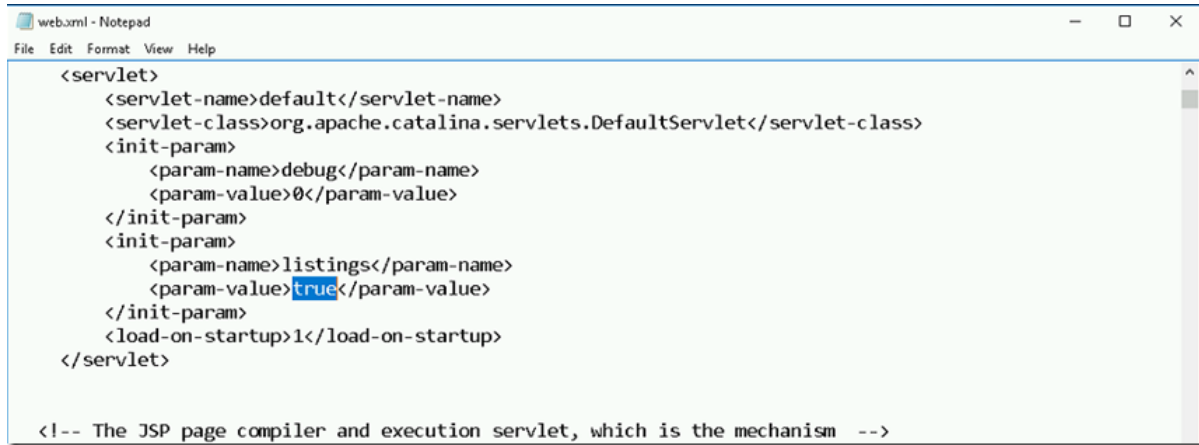


```
web.xml - Notepad
File Edit Format View Help
<?xml version="1.0" encoding="UTF-8"?>
<!--
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contributor license agreements.  See the NOTICE file distributed with
this work for additional information regarding copyright ownership.
The ASF licenses this file to You under the Apache License, Version 2.0
(the "License"); you may not use this file except in compliance with
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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.
-->
<web-app xmlns="http://xmlns.jcp.org/xml/ns/javaee"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/javaee
    http://xmlns.jcp.org/xml/ns/javaee/web-app_4_0.xsd"
```

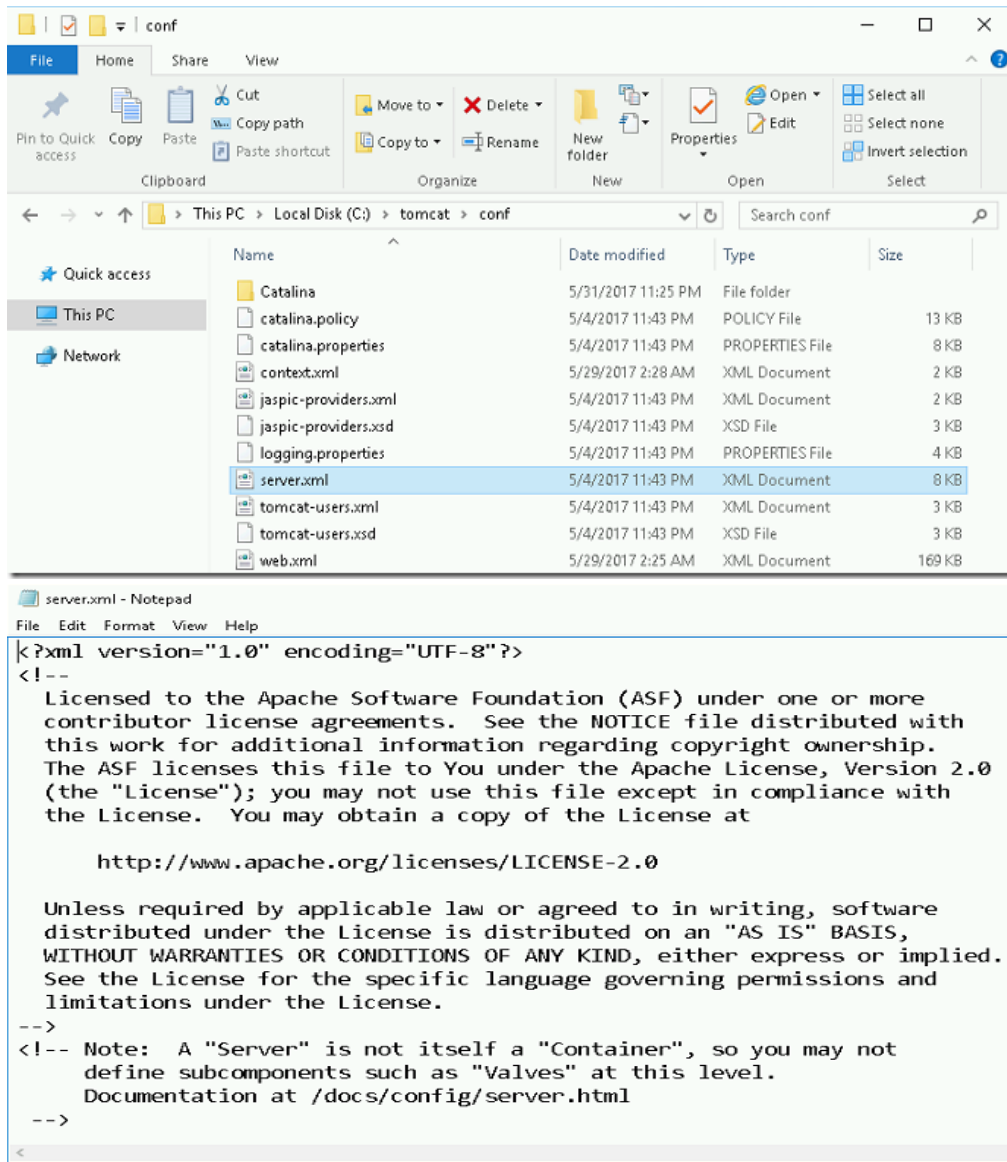
- To enable the directory listing, change the “**listings**” value from **false** to **true**



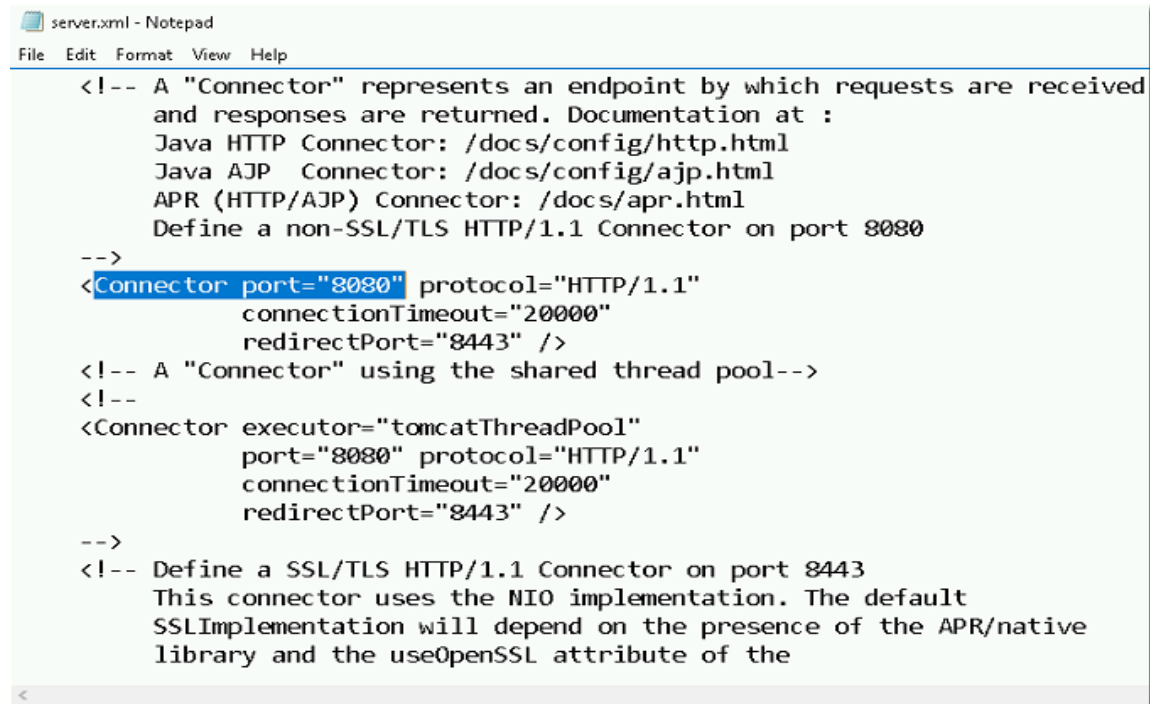
```
<?xml version="1.0" encoding="UTF-8"?>
<servlet>
  <servlet-name>default</servlet-name>
  <servlet-class>org.apache.catalina.servlets.DefaultServlet</servlet-class>
  <init-param>
    <param-name>debug</param-name>
    <param-value>0</param-value>
  </init-param>
  <init-param>
    <param-name>listings</param-name>
    <param-value>true</param-value>
  </init-param>
  <load-on-startup>1</load-on-startup>
</servlet>

<!-- The JSP page compiler and execution servlet, which is the mechanism -->
```

- Go to **tomcat\conf** folder and open **server.xml** file in notepad.



- To change the TCP Port, locate the word **connector port** and change the port number for your environment.
- Change the **connector port** number to any number between **1024** and **65535**.



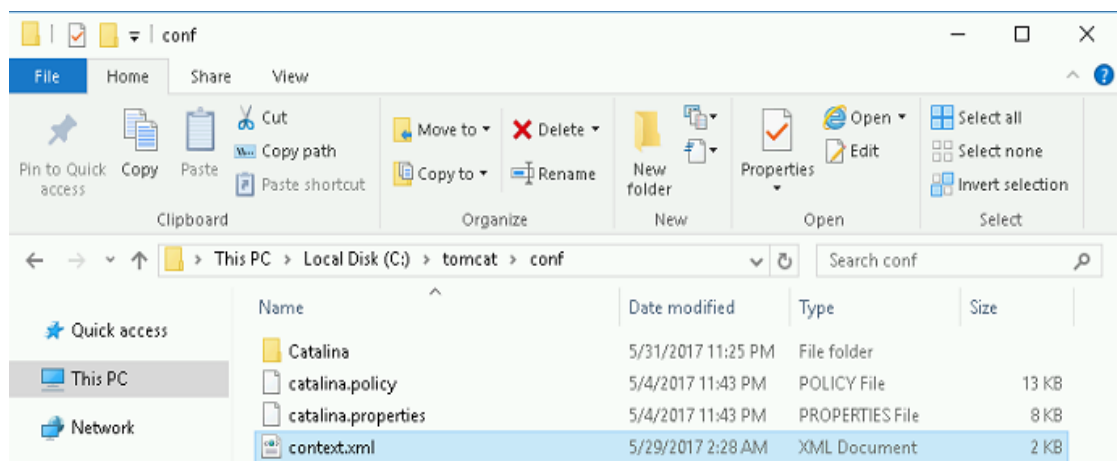
server.xml - Notepad

File Edit Format View Help

```
<!-- 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="8080" 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 a 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
```

Note: In this demo, we are using the default port for tomcat is 8080

- Go to **tomcat \ conf ** folder and open **context.xml** file in notepad.




```
context.xml - Notepad
File Edit Format View Help
<?xml version="1.0" encoding="UTF-8"?>
<!--
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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

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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.
-->
```

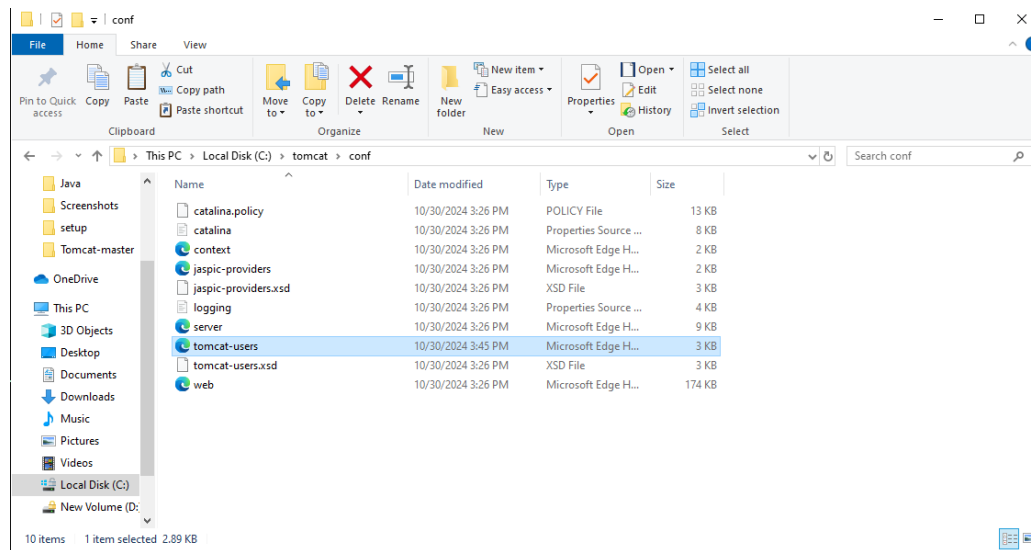
- To Enable automatic-reload after code changes, add **<Context reloadable="true">** in the context.xml file

```
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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.
-->
<!-- The contents of this file will be loaded for each web application -->
<Context reloadable="true">

    <!-- Default set of monitored resources. If one of these changes, the    -->
    <!-- web application will be reloaded.                                   -->
    <WatchedResource>WEB-INF/web.xml</WatchedResource>
    <WatchedResource>${catalina.base}/conf/web.xml</WatchedResource>

    <!-- Uncomment this to disable session persistence across Tomcat restarts -->
    <!--
    <Manager pathname="" />
    -->
</Context>
```

- Go to **tomcat \ conf ** folder and open **tomcat-users.xml** file in notepad.



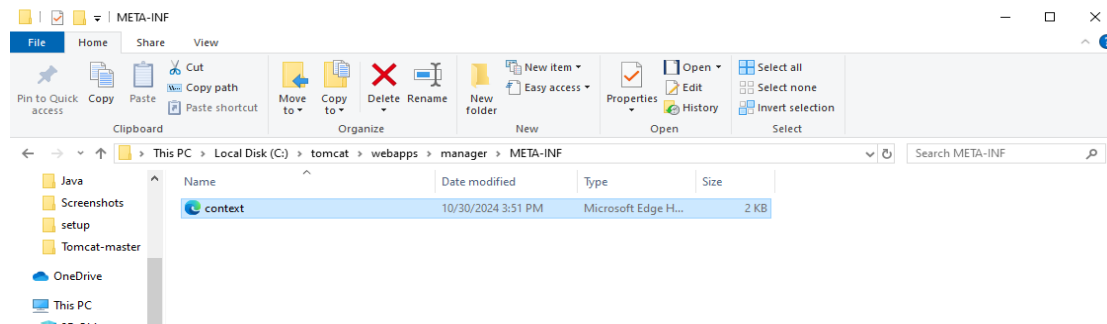
- **To Define Users and Roles:** Add user accounts with appropriate roles (e.g., `manager-gui` and `manager-script`) in `tomcat-users.xml`. This setup grants access to users for managing applications and performing administrative tasks.

```

*New Text Document - Notepad
File Edit Format View Help
<!--
<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"/>
<user username="tomcat" password="tomcat" roles="manager-gui, manager-script"/>
</tomcat-users>
Ln 56, Col 1 100% Windows (CRLF) UTF-8

```

- Go to `tomcat\webapps\manager\META-INF` folder and open `Context.xml` file in notepad.



- By default, Tomcat limits access to the Manager app to the local machine for security reasons. To allow access from outside the container, you'll need to modify the context.xml file for the Manager app.
- Open context.xml and comment out or remove the following <Valve> element:

```

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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="127\.0\.0\.1|::1|0:0:0:0:0:0:0:1" />
  <Manager sessionAttributeValueClassNameFilter="java\.lang\.(?:Boolean|Integer|Long|Number|string)|org\.apache\.catalina\
</Context>

```

- This valve restricts access to 127.0.0.1 (localhost). Commenting it out removes this restriction and allows access from other IPs.

PREPARING ENVIRONMENT FOR BUILDING IMAGE

```
C:\Java
|
|— setup
|   |— jdk-8u202-windows-x64.exe    # JDK installer
|   |— jre-8u202-windows-x64.exe    # JRE installer
|   |— jre.cfg                      # Configuration file for JRE installation
|   |— jre.cmd                      # Command to install JRE with jre.cfg
|   |— jdk.cmd                      # Command to install JDK silently
|   |— Environmentvariable.ps1      # Environment variable script for Java and Python paths
|   |— python-3.9.7-amd64.exe       # Python installer
|   |— py.cmd                       # Command to install Python with python.cfg
|   |— python.cfg                   # Configuration file for Python installation
|   |— tomcat                       # Tomcat directory with Tomcat files
|   |— sample.war                   # WAR file to deploy in Tomcat
|— Dockerfile
```

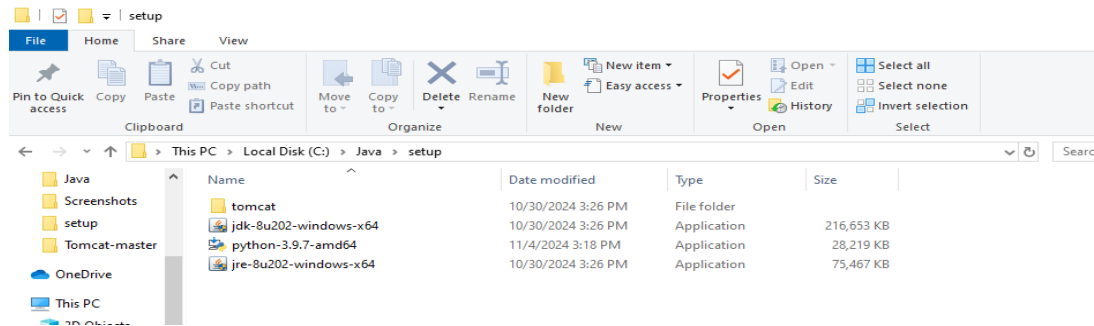
- Create a folder named **Java** under c:\ drive using below command:

New-Item -type Directory -name java -path c:

- Create a subfolder named **setup** under **C:\java** using below command:

New-Item -Type Directory -Name setup -path c:\java

- Copy the download **JRE, JDK, Python & tomcat** files to **C:\java\setup** folder.



- Create a new files named **jre.cfg & python.cfg** in **C: \java \setup** folder.
- Add the below content on **jre.cfg & python.cfg** file and save it.

INSTALL_SILENT=Enable

SPONSORS=Disable

NOSTARTMENU=Enable

REBOOT=Disable

EULA=Disable

AUTO_UPDATE=Disable

STATIC=Enable

- Create a new file named **jre.cmd** and add the below content and save it.

pushd %~dp0

start /wait jre-8u202-windows-x64.exe INSTALLCFG=%~dp0jre.cfg

- Create a new file named **jdk.cmd** and paste the below content and save it.

pushd %~dp0

start /wait jdk-8u131-windows-x64.exe INSTALLCFG=%~dp0jre.cfg

- Create a new file named **py.cmd** and paste the below content and save it.

pushd %~dp0

start /wait python-3.9.7-amd64.exe /quiet InstallAllUsers=1

PrependPath=1

Popd

- Create a new file named **Environmentvariable.ps1** under **C:\java\setup** folder and add the below content and save it

```
# EnvironmentalVariable.ps1
[System.Environment]::SetEnvironmentVariable("JAVA_HOME", "C:\Program
Files\Java\jdk1.8.0_202", [System.EnvironmentVariableTarget]::Machine)
[System.Environment]::SetEnvironmentVariable("JRE_HOME", "C:\Program
Files\Java\jre1.8.0_202", [System.EnvironmentVariableTarget]::Machine)
[System.Environment]::SetEnvironmentVariable("PATH",
"$env:JAVA_HOME\bin;$env:JRE_HOME\bin;$env:PATH",
[System.EnvironmentVariableTarget]::Machine)

# Set PYTHON_HOME
[System.Environment]::SetEnvironmentVariable("PYTHON_HOME", "C:\Program
Files\Python39", [System.EnvironmentVariableTarget]::Machine)
# Update PATH to include Python binaries
$newPath = "$env:PYTHON_HOME;$env:PYTHON_HOME\Scripts;$existingPath"
[System.Environment]::SetEnvironmentVariable("PATH", $newPath,
[System.EnvironmentVariableTarget]::Machine)
```

- Create a new file named **tomcat-service.bat** and paste the below content and save it.

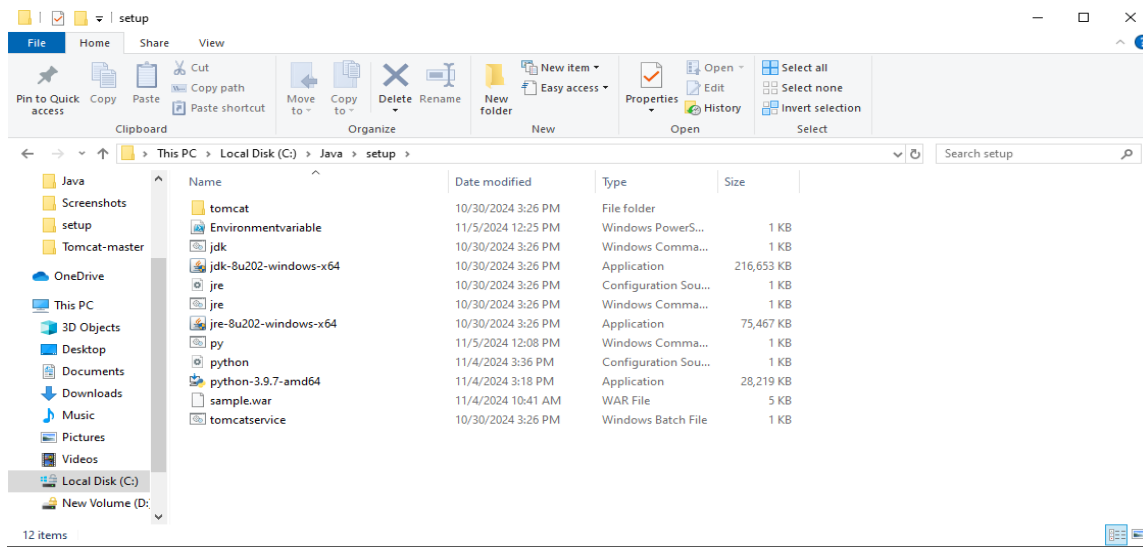
cd|

cd .|tomcat|bin|

.|service.bat install

- Download sample.war file and place it in C:\Java\setup\ folder

- The overall file structure of **setup** folder has shown below.



Open the **dockerfile** in notepad and paste the below contents and save :

```
# Use Windows Server Core as the base image
FROM mcr.microsoft.com/windows/servercore:ltsc2016

# Set up work directory
WORKDIR C:/java

# Copy all installation files from local 'setup' folder to container
ADD ./setup C:/java/setup

# Install JRE, JDK, and Python using the silent installation methods
RUN powershell -Command "Start-Process -FilePath 'C:\\java\\setup\\jre.cmd' -
NoNewWindow -Wait; \
    Start-Process -FilePath 'C:\\java\\setup\\jdk.cmd' -NoNewWindow -Wait; \
    Start-Process -FilePath 'C:\\java\\setup\\py.cmd' -NoNewWindow -Wait"

# Execute the PowerShell script to set environment variable
RUN powershell -ExecutionPolicy Bypass -File
C:/java/setup/Environmentvariable.ps1

# Copy Tomcat files directly with Docker COPY command
COPY ./setup/tomcat C:/tomcat

# Copy the sample.war file to Tomcat's webapps directory
COPY ./setup/sample.war C:/tomcat/webapps/

# Alternative method using cmd array syntax for Docker RUN
RUN ["cmd", "/c", "C:/java/setup/tomcat-service.bat"]

# Use the full path to sc.exe
RUN C:/Windows/System32/sc.exe config tomcat9 obj=LocalSystem start=auto

# Expose Tomcat port
EXPOSE 8080

# Start Command Prompt and keep container running
CMD ["cmd", "/k"]
```


BUILDING THE IMAGE:

Open the PowerShell window and execute the command below to build the image:

- **docker build -t tomcat c:\java**

It will take a few minutes to complete the building process.

VERIFYING THE INSTALLATION:

- Verify the images using **docker images** command.

Launch a new container using the command below.

- **docker run -it --name Windows-Container -p 80:8080 tomcat**

Once the container has been created verify the tomcat service status using the command below in container's PowerShell:

- **Get-Service tomcat9**

Open Tomcat Homepage

- In your browser, go to http://<container_host_ip>:8080 to view the Tomcat homepage.

Log in to Manager App

- Click **Manager App** on the homepage.
- Enter Username: tomcat and Password: tomcat.

Check sample.war Deployment


- Scroll to **Applications** in the Manager App.
- Find sample in the list and click it to open the deployed app.

← ↻ ⚠ Not secure | 192.168.12.96:8080

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Apache Tomcat/9.0.96

If you're seeing this, you've successfully installed Tomcat. Congratulations!



Recommended Reading:
[Security Considerations How-To](#)
[Manager Application How-To](#)
[Clustering/Session Replication How-To](#)

Server Status
Manager App
Host Manager

Developer Quick Start

[Tomcat Setup](#) [Realms & AAA](#) [Examples](#) [Servlet Specifications](#)
[First Web Application](#) [JDBC DataSources](#) [Tomcat Versions](#)

Managing Tomcat

For security, access to the [manager.webapp](#) is restricted. Users are defined in:

`$CATALINA_HOME/conf/tomcat-users.xml`

In Tomcat 9.0 access to the manager application is split between different users.
[Read more...](#)

[Release Notes](#)
[Changelog](#)

Documentation

[Tomcat 9.0 Documentation](#)
[Tomcat 9.0 Configuration](#)
[Tomcat Wiki](#)

Find additional important configuration information in:

`$CATALINA_HOME/RUNNING.txt`

Developers may be interested in:

[Tomcat 9.0 Bug Database](#)

Getting Help

FAQ and Mailing Lists

The following mailing lists are available:



[tomcat-announce](#)
Important announcements, releases, security vulnerability notifications. (Low volume).

[tomcat-users](#)
User support and discussion

[tomcat-dev](#)
Developer support and discussion

[tomcat-doc](#)
Documentation

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Tomcat Web Application Manager

Message: OK

Manager			
List Applications	HTML Manager Help	Manager Help	Server Status

Applications					
Path	Version	Display Name	Running	Sessions	Commands
/	None specified	Welcome to Tomcat	true	0	Start Stop Reload Undeploy Expire sessions with idle x 30 minutes
/docs	None specified	Tomcat Documentation	true	0	Start Stop Reload Undeploy Expire sessions with idle x 30 minutes
/examples	None specified	Servlet and JSP Examples	true	0	Start Stop Reload Undeploy Expire sessions with idle x 30 minutes
/host-manager	None specified	Tomcat Host Manager Application	true	0	Start Stop Reload Undeploy Expire sessions with idle x 30 minutes
/manager	None specified	Tomcat Manager Application	true	1	Start Stop Reload Undeploy Expire sessions with idle x 30 minutes
sample	None specified	Hello, World Application	true	0	Start Stop Reload Undeploy Expire sessions with idle x 30 minutes

← ↻ ⚠ Not secure | 192.168.12.96:8080/sample/



Sample "Hello, World" Application

This is the home page for a sample application used to illustrate the source directory organization of a web application utilizing the principles outlined in the Application Developer's Guide.

To prove that they work, you can execute either of the following links:

- To a [JSP page](#).
- To a [servlet](#).