Tomcat

Introduction

Tomcat or Apache Tomcat is a light weight, open source web container used to deploy and running the java based web applications, developed by Apache Software Foundation (ASF).

What is Webserver?

A Web server is a program that uses HTTP (Hypertext Transfer Protocol) protocol to serves web content (HTML and static content) to users.

What is Application Server?

An application server is a container upon which you can build and expose business logic and processes to client applications through various protocols including HTTP in a n-tier architecture.

Tomcat installation

Tomcat software will available as a zip file. So, we can unzip it and use as follows.

Step 1: Create the folder called **Apache** in any directory and Unzip apache software into that folder.

Step 2: Open the command prompt and execute the below commands.

>cd C:\DevOps\Apache\apache-tomcat-7.0.79\bin

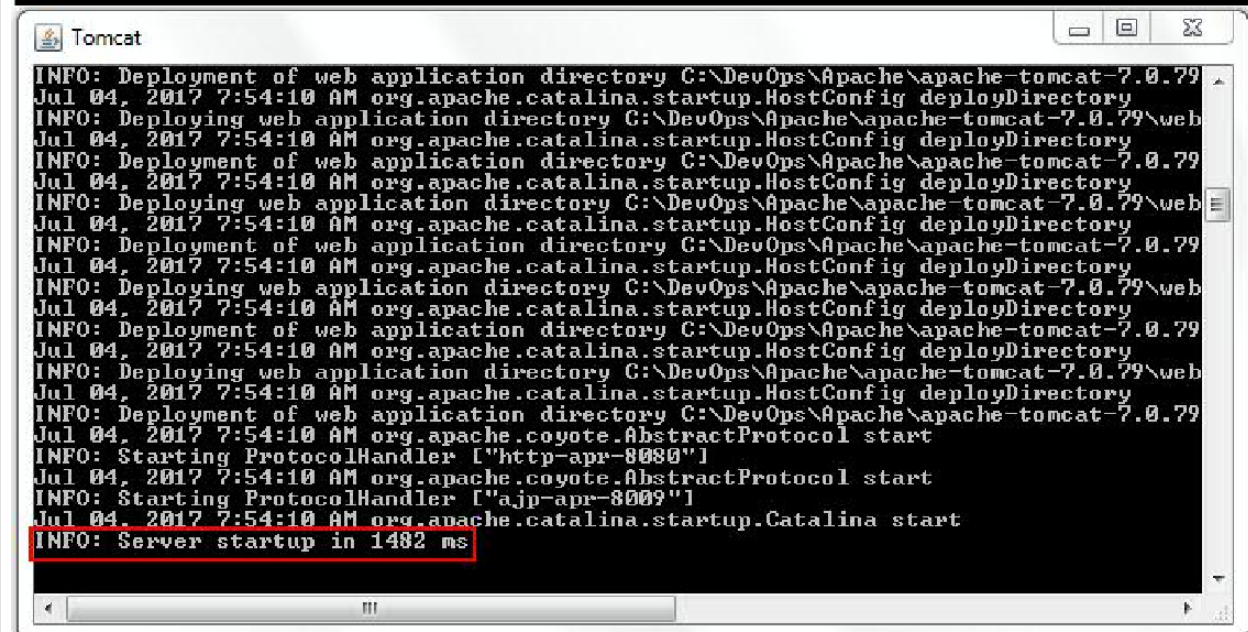>startup.bat (OR) > catalina.bat start ---> Starting the Tomcat server.

MAC/Linux:

startup.sh (OR) > catalina.sh start ---> Starting the Tomcat server.

```
C:\Users\IBM_ADMIN>cd C:\DevOps\Apache\apache-tomcat-7.0.79\bin

C:\DevOps\Apache\apache-tomcat-7.0.79\bin>startup.bat
```

Once you execute the startup.bat, you will see below screens.

```
C:\DevOps\Apache\apache-tomcat-7.0.79\bin>startup.bat
Using CATALINA_BASE:   "C:\DevOps\Apache\apache-tomcat-7.0.79"
Using CATALINA_HOME:   "C:\DevOps\Apache\apache-tomcat-7.0.79"
Using CATALINA_TMPDIR: "C:\DevOps\Apache\apache-tomcat-7.0.79\temp"
Using JRE_HOME:        "C:\Program Files\Java\jdk1.8.0_131"
Using CLASSPATH:       "C:\DevOps\Apache\apache-tomcat-7.0.79\bin\bootstrap.jar;C:\DevOps\Apache\apache-tomcat-7.0.79\bin\tomcat-juli.jar"
C:\DevOps\Apache\apache-tomcat-7.0.79\bin>
```

```
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INFO: Deployment of web application directory C:\DevOps\Apache\apache-tomcat-7.0.79
Jul 04, 2017 7:54:10 AM org.apache.catalina.startup.HostConfig deployDirectory
INFO: Deploying web application directory C:\DevOps\Apache\apache-tomcat-7.0.79\web
Jul 04, 2017 7:54:10 AM org.apache.catalina.startup.HostConfig deployDirectory
INFO: Deployment of web application directory C:\DevOps\Apache\apache-tomcat-7.0.79
Jul 04, 2017 7:54:10 AM org.apache.catalina.startup.HostConfig deployDirectory
INFO: Deploying web application directory C:\DevOps\Apache\apache-tomcat-7.0.79\web
Jul 04, 2017 7:54:10 AM org.apache.catalina.startup.HostConfig deployDirectory
INFO: Deployment of web application directory C:\DevOps\Apache\apache-tomcat-7.0.79
Jul 04, 2017 7:54:10 AM org.apache.catalina.startup.HostConfig deployDirectory
INFO: Deploying web application directory C:\DevOps\Apache\apache-tomcat-7.0.79\web
Jul 04, 2017 7:54:10 AM org.apache.catalina.startup.HostConfig deployDirectory
INFO: Deployment of web application directory C:\DevOps\Apache\apache-tomcat-7.0.79
Jul 04, 2017 7:54:10 AM org.apache.catalina.startup.HostConfig deployDirectory
INFO: Deploying web application directory C:\DevOps\Apache\apache-tomcat-7.0.79\web
Jul 04, 2017 7:54:10 AM org.apache.catalina.startup.HostConfig deployDirectory
INFO: Deployment of web application directory C:\DevOps\Apache\apache-tomcat-7.0.79
Jul 04, 2017 7:54:10 AM org.apache.coyote.AbstractProtocol start
INFO: Starting ProtocolHandler ["http-apr-8080"]
Jul 04, 2017 7:54:10 AM org.apache.coyote.AbstractProtocol start
INFO: Starting ProtocolHandler ["ajp-apr-8009"]
Jul 04, 2017 7:54:10 AM org.apache.catalina.startup.Catalina start
INFO: Server startup in 1482 ms
```

Tomcat server is started successfully.

Use the below URL and open in browser.

http://localhost:8080

Note: Tomcat by default will run in 8080 port number.

Tomcat Architecture and Configuration

Tomcat installation provides these directories:
bin: for Tomcat's binaries and startup scripts.
conf: global configuration applicable to all the webapps. The default installation provides:
    One Policy File: catalina.policy for specifying security policy.
    Two Properties Files: catalina.properties and logging.properties,
    Four Configuration XML Files: server.xml (Tomcat main configuration file), web.xml (global web application deployment descriptors), context.xml (global Tomcat-specific configuration options) and tomcat-users.xml (a database of user, password and role for authentication and access control). The conf also contain a sub-directory for each engine, e.g., Catalina, which in turn contains a sub-sub-directory for each of its hosts, e.g., localhost. You can place the host-specific context information (similar to context.xml, but named as webapp.xml for each webapp under the host).
lib: Keeps the JAR-file that are available to all webapps. The default installation include servlet-api.jar (Servlet), jasper.jar (JSP) and jasper-el.jar (EL). You may also keep the JAR files of external package here, such as MySQL JDBC driver (mysql-connector-java-5.1.{xx}-bin.jar) and JSTL (jstl.jar and standard.jar).
logs: contains the engine logfile Catalina.{yyyy-mm-dd}.log, host logfile localhost.{yyyy-mm-dd}.log, and other application logfiles such as manger and host-manager. The access log (created by the AccessLogValve) is also kept here.
webapps: the default appBase - web applications base directory of the host localhost.
work: contains the translated servlet source files and classes of JSP/JSF. Organized in hierarchy of engine name (Catalina), host name (localhost), webapp name, followed by the Java classes package structure.
temp: temporary files.

How to change the port number in Tomcat?
Go to the conf directory and open the server.xml and you will find below lines.
```
  <Connector port="8080" protocol="HTTP/1.1"
        connectionTimeout="20000"
        redirectPort="8443" />
```
Replace the 8080 with any number.

How to stop the tomcat server?
>cd C:\DevOps\Apache\apache-tomcat-7.0.79\bin
>shutdown.bat (OR) > catalina.bat stop
MAC/Linux:
shutdown.sh (OR) > catalina.sh stop

Install Tomcat in Linux
#cp /Users/BhaskarReddy/Desktop/DevOps/Softwares/Windows/Tomcat/apache-tomcat-7.0.78-windows-x64.zip /opt/
#unzip apache-tomcat-7.0.78-windows-x64.zip
#cd /opt/apache-tomcat-7.0.78/conf
vim tomcat-users.xml

Admin Console

Tomcat provides a web based administration console which can be started via the following link:

http://localhost:8080/manager/html

```
# The tomcat-users.xml file should look something like this:
        <tomcat-users>
        <!--
                <role rolename="tomcat"/>
                <role rolename="role1"/>
                <user username="tomcat" password="tomcat" roles="tomcat" />
                <user username="role1" password="tomcat" roles="role1" />
                <user username="both" password="tomcat" roles="tomcat,role1" />
        -->
```

<!-- **Note:** While copy pate above line you have to remove double quotes and type manually. -->
<user username="admin" password="admin" roles="manager-gui,admin-gui"/>
<user username="mithun" password="passw0rd" roles="manager-gui,admin-gui"/>

</tomcat-users>

Server Status & Manager App

To access the server status application and Manager app, tomcat 7 onwards below roles as introduced.
        manager-gui - allows access to the HTML GUI and the status pages
        manager-script - allows access to the text interface and the status pages
        manager-jmx - allows access to the JMX proxy and the status pages
        manager-status - allows access to the status pages only

If you provide add below line in tomcat-users.xml, we will get the access for below   apps(Buttons)
<user username="admin" password="passw0rd" roles="manager-gui"/>

Server Status   **http://localhost:8083/manager/status**

Manager App   **http://localhost:8083/manager/html**

If you provide add below line in tomcat-users.xml, we will get the access for below   apps(Buttons)
<user username="admin" password="passw0rd" roles="admin-gui"/>

Host Manager   **http://localhost:8083/host-manager/html**

Note: Users with the manager-gui role should not be granted either the manager-script or manager-jmx roles.

Host Manager

To access the host manager application, tomcat 7 onwards below roles as introduced.
    admin-gui - allows access to the HTML GUI
    admin-script - allows access to the text interface

Note: Users with the admin-gui role should not be granted the admin-script role.

Run the server as follows.
#cd /opt/apache-tomcat-7.0.78/bin
sh catalina.sh start
    (OR)
#sh-3.2# ./startup.sh
./startup.sh: Permission denied
chmod -R 777 *.sh
./startup.sh
Using CATALINA_BASE: /opt/apache-tomcat-7.0.78
Using CATALINA_HOME: /opt/apache-tomcat-7.0.78
Using CATALINA_TMPDIR: /opt/apache-tomcat-7.0.78/temp
Using JRE_HOME: /Library/Java/JavaVirtualMachines/jdk1.8.0_121.jdk/Contents/Home
Using CLASSPATH: /opt/apache-tomcat-7.0.78/bin/bootstrap.jar:/opt/apache-tomcat-7.0.78/bin/tomcat-juli.jar

Tomcat started.

Stop the server

./shutdown.sh (OR) sh catalina.sh stop

Deployment

Deploying the application in Tomcat server is nothing but, putting war file in Tomcat's webapps directly.
For every application deployment need to restart the tomcat server.
Once the server restart, tomcat starts it will unpack the war and make the application available.

References
http://tomcat.apache.org/tomcat-7.0-doc/setup.html ---> Installing Apache Tomcat

http://tomcat.apache.org/tomcat-7.0-doc/windows-service-howto.html --->Windows service HOW-TO