4. WAS 서버 구축

WAS 서버 컨테이너 생성

```
docker run --privileged -d --name WASSVR -p 8080:8080 --net mynet --ip 192.168.119.118 std_setting_os_img /sbin/init
```

잘 생성되었는지 확인

```
docker inspect -f '{{range .NetworkSettings.Networks}}{{.IPAddress}}{{end}}' WASSVR
```

```
Hong-YoonKi@Hong-YoonKi-MacBookAir ~ % docker run --privileged -d --name WASSVR -p 8080:8080 --net mynet --ip 192.168.119.118 std_setting_os_img /sbin/init
da2d98182168825bf1263b5606864e667ce3746aa962d956525486754a865315
Hong-YoonKi@Hong-YoonKi-MacBookAir ~ % docker ps
CONTAINER ID   IMAGE              COMMAND        CREATED         STATUS         PORTS                                                  NAMES
da2d98182168   std_setting_os_img   "/sbin/init"   4 seconds ago   Up 3 seconds   1520/tcp, 0.0.0.0:8080->8080/tcp, :::8080->8080/tcp   WASSVR
Hong-YoonKi@Hong-YoonKi-MacBookAir ~ % docker inspect -f '{{range .NetworkSettings.Networks}}{{.IPAddress}}{{end}}' WASSVR
192.168.119.118
```

잘 설치 된것 확인 가능

Tomcat 10.1.8 설치

Tomcat 10.1.8 다운로드

```
wget https://dlcdn.apache.org/tomcat/tomcat-10/v10.1.8/bin/apache-tomcat-10.1.8.tar.gz -O /tmp/tomcat-10.tar.gz
```

```
[root@da2d98182168 /]# wget https://dlcdn.apache.org/tomcat/tomcat-10/v10.1.8/bin/apache-tomcat-10.1.8.tar.gz -O /tmp/tomcat-10.tar.gz
--2023-05-06 06:34:14--  https://dlcdn.apache.org/tomcat/tomcat-10/v10.1.8/bin/apache-tomcat-10.1.8.tar.gz
Resolving dlcdn.apache.org (dlcdn.apache.org)... 151.101.2.132
Connecting to dlcdn.apache.org (dlcdn.apache.org)|151.101.2.132|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 12088035 (12M) [application/x-gzip]
Saving to: '/tmp/tomcat-10.tar.gz'

100%[======================================>] 12,088,035  8.12MB/s   in 1.4s

2023-05-06 06:34:16 (8.12 MB/s) - '/tmp/tomcat-10.tar.gz' saved [12088035/12088035]

[root@da2d98182168 /]# cd tmp
[root@da2d98182168 tmp]# ls
hsperfdata_root  ks-script-DrRL8A  tomcat-10.tar.gz  yum.log
```

Tomcat 유저 생성

```
useradd -m -d /opt/tomcat -U -s /bin/false tomcat
```

```
[root@c1032298b66c /]# mkdir -p /u01/app/oracle/product/19.3.0/dbhome_1
[root@c1032298b66c /]#
[root@c1032298b66c /]# ls
anaconda-post.log  bin  dev  etc  home  lib  lib64  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  u01  usr  var
```

압축해제 : 경로 /opt/tomcat

```
sudo -u tomcat tar -xzvf /tmp/tomcat-10.tar.gz  --strip-components=1 -C /opt/tomcat
```

```
apache-tomcat-10.1.8/bin/setclasspath.sh
apache-tomcat-10.1.8/bin/shutdown.sh
apache-tomcat-10.1.8/bin/startup.sh
apache-tomcat-10.1.8/bin/tool-wrapper.sh
apache-tomcat-10.1.8/bin/version.sh
[root@da2d98182168 tmp]# cd /opt/tomcat
[root@da2d98182168 tomcat]# ls
bin             CONTRIBUTING.md  logs        RELEASE-NOTES  webapps
BUILDING.txt    lib              NOTICE      RUNNING.txt    work
conf            LICENSE          README.md   temp
```

$JAVA_HOME 설정

$JAVA_HOME 확인

```
echo $JAVA_HOME
```

```
[root@da2d98182168 etc]# echo $JAVA_HOME
```

JVM 버전 설정

```
sudo update-alternatives --config java
```

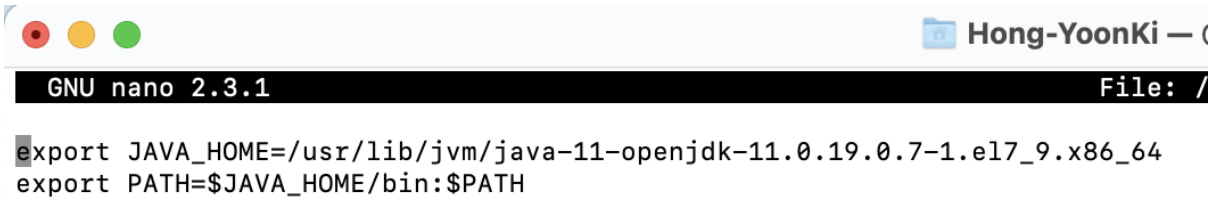
```
[root@da2d98182168 etc]# sudo update-alternatives --config java

There is 1 program that provides 'java'.

  Selection    Command
-----------------------------------------------
*+ 1           java-11-openjdk.x86_64 (/usr/lib/jvm/java-11-openjdk-11.0.19.0.7-1.el7_9.x86_64/bin/java)

Enter to keep the current selection[+], or type selection number:
```

java.sh 파일 변경

파일 열기

```
nano /etc/profile.d/java.sh
```

```
# 파일 내부에 적용
export JAVA_HOME=/usr/lib/jvm/java-11-openjdk-11.0.19.0.7-1.el7_9.x86_64
export PATH=$JAVA_HOME/bin:$PATH
```



변경 사항 적용

```
source /etc/profile.d/java.sh
```

확인

```
[root@da2d98182168 etc]# echo $JAVA_HOME
/usr/lib/jvm/java-11-openjdk-11.0.19.0.7-1.el9_1.x86_64
```

Tomcat service 등록

tomcat.sevice 파일 수정

파일 열기

```
nano /etc/systemd/system/tomcat.service
```

파일 내용을 다음과 같이 변경

```
[Unit]
Description=Apache Tomcat
After=network.target

[Service]
Type=forking

User=tomcat
Group=tomcat

Environment=JAVA_HOME=/usr/lib/jvm/java-11-openjdk-11.0.19.0.7-1.el7_9.x86_64
Environment=CATALINA_PID=/opt/tomcat/tomcat.pid
Environment=CATALINA_HOME=/opt/tomcat
Environment=CATALINA_BASE=/opt/tomcat
Environment="CATALINA_OPTS=-Xms512M -Xmx1024M -server -XX:+UseParallelGC"

ExecStart=/opt/tomcat/bin/startup.sh
ExecStop=/opt/tomcat/bin/shutdown.sh

ExecReload=/bin/kill $MAINPID
RemainAfterExit=yes

[Install]
WantedBy=multi-user.target
```

서비스 적용

서비스 데몬 reload

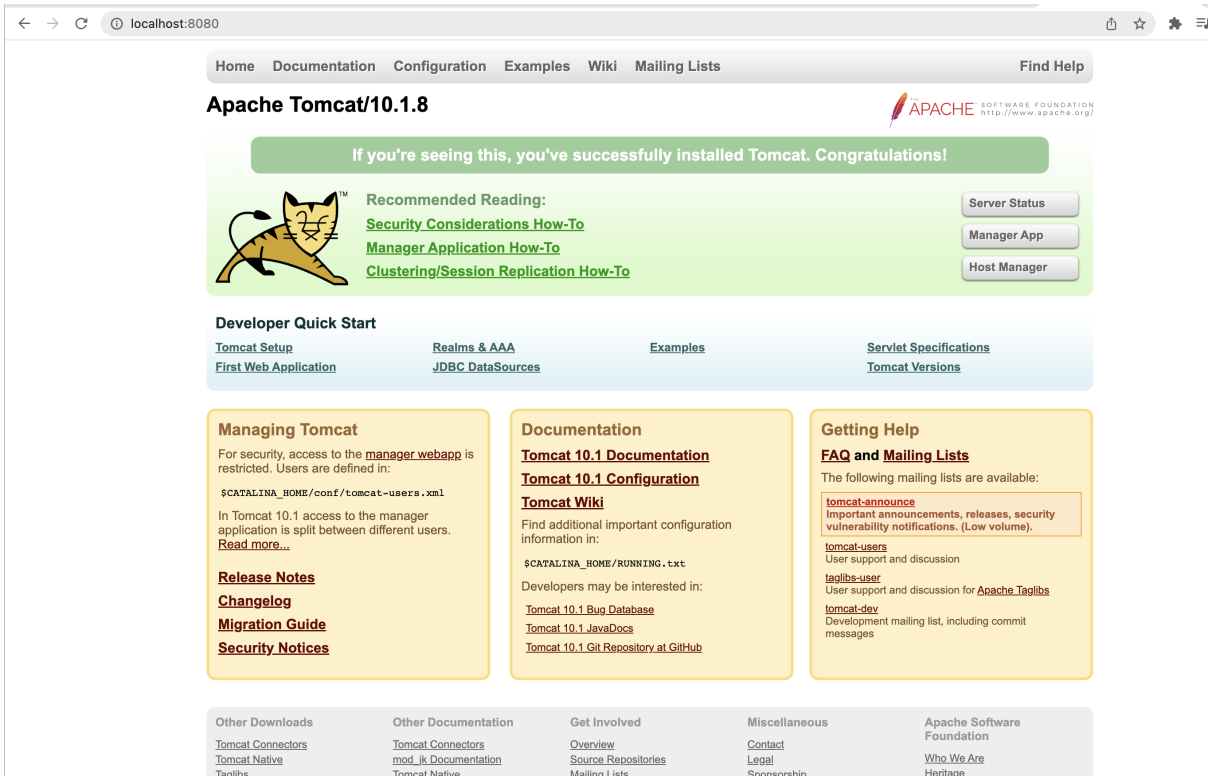
```
sudo systemctl daemon-reload
```

tomcat start 및 enable

```
sudo systemctl start tomcat
sudo systemctl enable tomcat
```

```
finishing deferred symbolic links:
  /u01/app/oracle/product/19.3.0/dbhome_1/bin/lbuilder -> ../nls/lbuilder/lbuilder
  /u01/app/oracle/product/19.3.0/dbhome_1/lib/libocci.so -> libocci.so.19.1
  /u01/app/oracle/product/19.3.0/dbhome_1/lib/libagtsh.so -> libagtsh.so.1.0
  /u01/app/oracle/product/19.3.0/dbhome_1/lib/libodm19.so -> libodmd19.so
  /u01/app/oracle/product/19.3.0/dbhome_1/lib/libclntsh.so -> libclntsh.so.19.1
  /u01/app/oracle/product/19.3.0/dbhome_1/lib/libjavavm19.a -> ../javavm/jdk/jdk8/lib/libjavavm19.a
  /u01/app/oracle/product/19.3.0/dbhome_1/javavm/lib/jce.jar -> ../../javavm/jdk/jdk8/lib/jce.jar
  /u01/app/oracle/product/19.3.0/dbhome_1/lib/libocci.so.18.1 -> libocci.so
  /u01/app/oracle/product/19.3.0/dbhome_1/lib/libclntshcore.so -> libclntshcore.so.19.1
  /u01/app/oracle/product/19.3.0/dbhome_1/jdk/bin/ControlPanel -> jcontrol
  /u01/app/oracle/product/19.3.0/dbhome_1/javavm/admin/cbp.jar -> ../../javavm/jdk/jdk8/admin/cbp.jar
  /u01/app/oracle/product/19.3.0/dbhome_1/lib/libclntsh.so.10.1 -> libclntsh.so
  /u01/app/oracle/product/19.3.0/dbhome_1/lib/libclntsh.so.11.1 -> libclntsh.so
  /u01/app/oracle/product/19.3.0/dbhome_1/lib/libclntsh.so.12.1 -> libclntsh.so
  /u01/app/oracle/product/19.3.0/dbhome_1/lib/libclntsh.so.18.1 -> libclntsh.so
  /u01/app/oracle/product/19.3.0/dbhome_1/precomp/public/SQLCA.H -> sqlca.h
  /u01/app/oracle/product/19.3.0/dbhome_1/precomp/public/SQLDA.H -> sqlda.h
  /u01/app/oracle/product/19.3.0/dbhome_1/precomp/public/ORACA.H -> oraca.h
  /u01/app/oracle/product/19.3.0/dbhome_1/precomp/public/SQLCA.COB -> sqlca.cob
  /u01/app/oracle/product/19.3.0/dbhome_1/precomp/public/ORACA.COB -> oraca.cob
  /u01/app/oracle/product/19.3.0/dbhome_1/javavm/admin/classes.bin -> ../../javavm/jdk/jdk8/admin/classes.bin
  /u01/app/oracle/product/19.3.0/dbhome_1/javavm/admin/libjtcjt.so -> ../../javavm/jdk/jdk8/admin/libjtcjt.so
  /u01/app/oracle/product/19.3.0/dbhome_1/jdk/jre/bin/ControlPanel -> jcontrol
  /u01/app/oracle/product/19.3.0/dbhome_1/javavm/admin/lfclasses.bin -> ../../javavm/jdk/jdk8/admin/lfclasses.bin
  /u01/app/oracle/product/19.3.0/dbhome_1/javavm/lib/security/cacerts -> ../../../javavm/jdk/jdk8/lib/security/cacerts
  /u01/app/oracle/product/19.3.0/dbhome_1/javavm/lib/sunjce_provider.jar -> ../../javavm/jdk/jdk8/lib/sunjce_provider.jar
  /u01/app/oracle/product/19.3.0/dbhome_1/javavm/lib/security/README.txt -> ../../../javavm/jdk/jdk8/lib/security/README.txt
  /u01/app/oracle/product/19.3.0/dbhome_1/javavm/lib/security/java.security -> ../../../javavm/jdk/jdk8/lib/security/java.security
  /u01/app/oracle/product/19.3.0/dbhome_1/jdk/jre/lib/amd64/server/libjsig.so -> ../libjsig.so
[root@c1032298b66c home]# passwd oracle
Changing password for user oracle.
New password:
BAD PASSWORD: The password is shorter than 7 characters
Retype new password:
passwd: all authentication tokens updated successfully.
[root@c1032298b66c home]# cd /u01/app/oracle/product/19.3.0/dbhome_1/
[root@c1032298b66c dbhome_1]# ls
addnode     clone  cv       deinstall    drdaas   hs             javavm  ldap  network  OPatch   ords  perl     R          root.sh        schagent.conf  sqlj      suptools  wwg
apex        crs    data     demo         dv       install        jdbc    lib   nls      opmn     oss   plsql    racg       root.sh.old    sdk            sqlpatch  ucp       xdk
assistants  css    dbjava   diagnostics  env.ora  instantclient  jdk     md    odbc     oracore  oui   precomp  rdbms      root.sh.old.1  slax           sqlplus   usm
bin         ctx    dbs      dmu          has      inventory      jlib    mgw   olap     ord      owm   QOPatch  relnotes   runInstaller   sqldeveloper   srvm      utl
[root@c1032298b66c dbhome_1]#
```

톰캣 작동 확인



jsp 파일 업로드 및 작동 확인

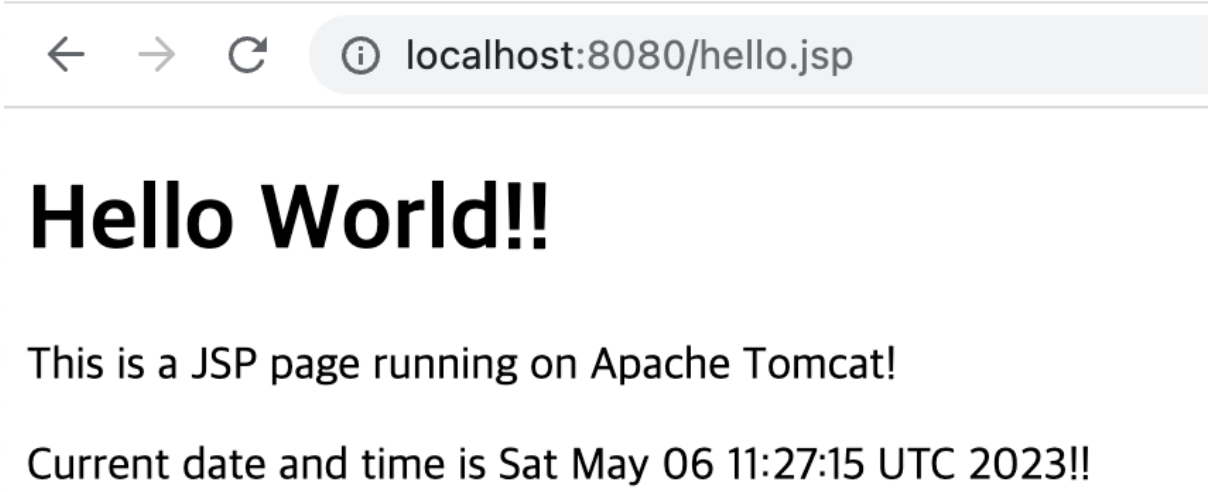
jsp 파일이 정상적으로 작동하는지 확인하자.

```
# name : hello.jsp
<!DOCTYPE html>
<html>
<head>
  <title>Hello World!!</title>
</head>
<body>
  <h1>Hello World!!</h1>
```

```
  <p>This is a JSP page running on Apache Tomcat!</p>
  <p>Current date and time is <%= new java.util.Date() %>!!</p>
</body>
</html>
```

```
docker cp hello.jsp WASSVR:/opt/tomcat/webapps/ROOT/
```

```
[root@da2d98182168 ROOT]# ls
asf-logo-wide.svg  bg-nav.png     hello.jsp  RELEASE-NOTES.txt  WEB-INF
bg-button.png      bg-upper.png   index.jsp  tomcat.css
bg-middle.png      favicon.ico    jdbcTest   tomcat.svg
```



정상 작동한다.

로컬에서 docs/ page 접근 허용

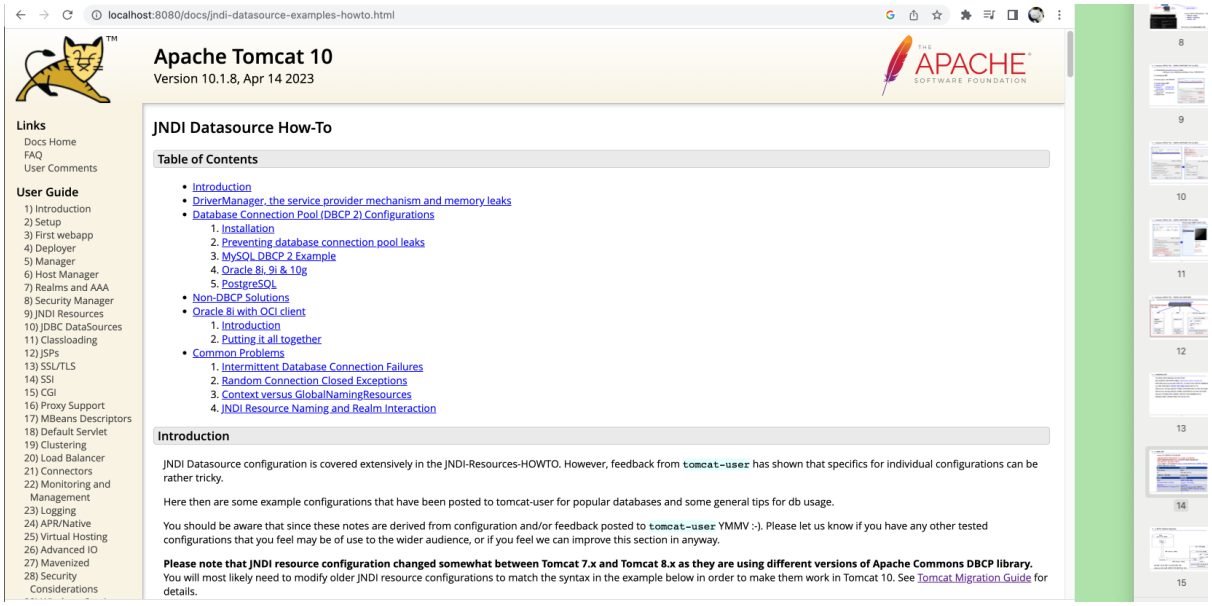
```
nano /opt/tomcat/webapps/docs/META-INF/context.xml
```

접근 ip value 주석처리

```
<!--
 <Valve className="org.apache.catalina.valves.RemoteAddrValve"
        allow="127\.\d+\.\d+\.\d+|::1|0:0:0:0:0:0:0:1" />
-->
```

수정 사항 적용

```
sudo systemctl daemon-reload
sudo systemctl start tomcat
```



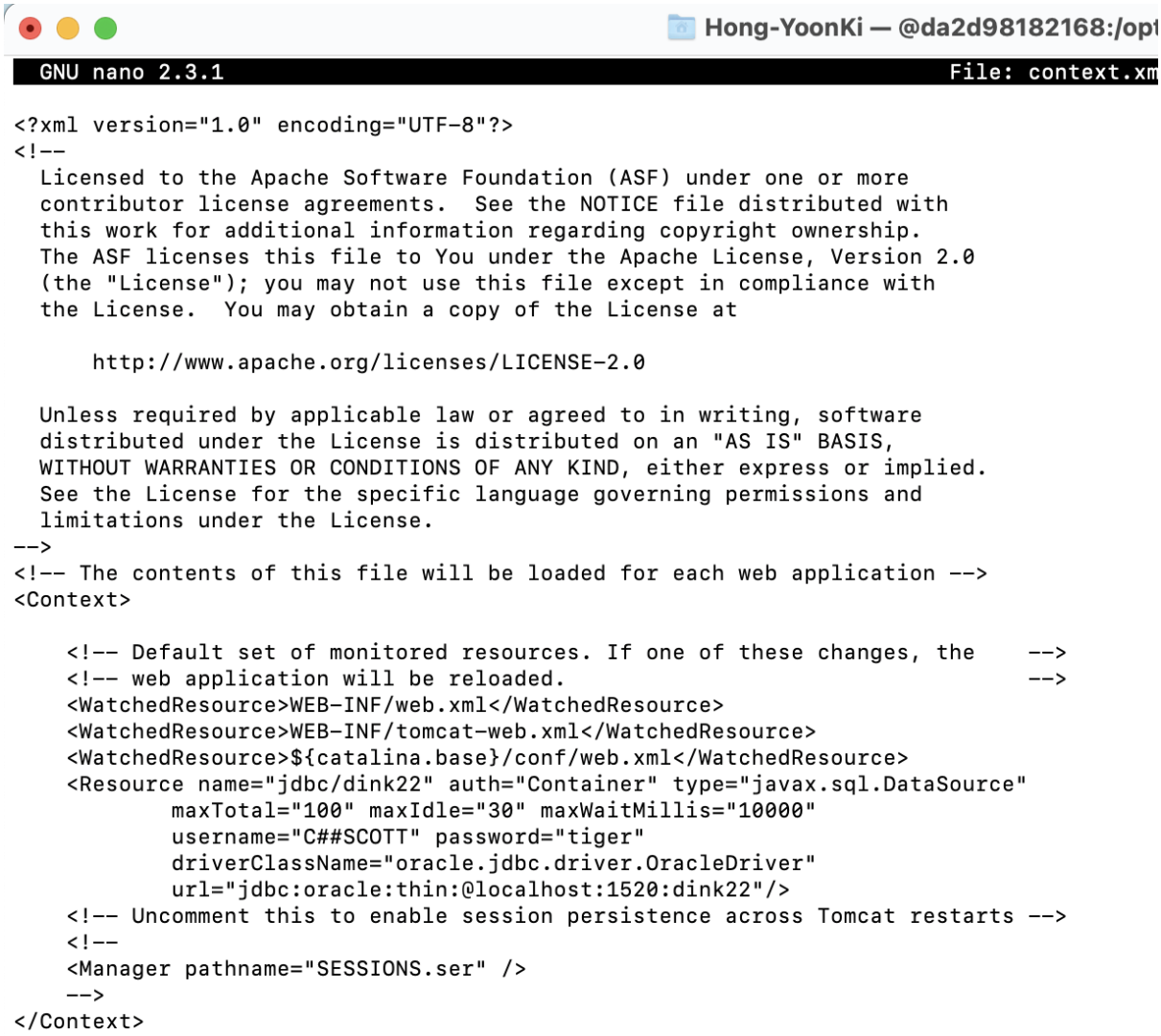
DB 연동방법이 나와있다.

context.xml 변경

```
<Resource name="jdbc/dink22" auth="Container" type="javax.sql.DataSource"
          maxTotal="100" maxIdle="30" maxWaitMillis="10000"
          username="C##SCOTT" password="tiger"
          driverClassName="oracle.jdbc.driver.OracleDriver"
          url="jdbc:oracle:thin:@localhost:1520:dink22"/>
```

`<Resource>`: 데이터베이스 연결에 대한 정보를 정의하는 요소

`jdbc/dink22` 데이터 소스를 설정




```
<?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.
-->
<!-- The contents of this file will be loaded for each web application -->
<Context>

    <!-- Default set of monitored resources. If one of these changes, the    -->
    <!-- web application will be reloaded.                                   -->
    <WatchedResource>WEB-INF/web.xml</WatchedResource>
    <WatchedResource>WEB-INF/tomcat-web.xml</WatchedResource>
    <WatchedResource>${catalina.base}/conf/web.xml</WatchedResource>
    <Resource name="jdbc/dink22" auth="Container" type="javax.sql.DataSource"
            maxTotal="100" maxIdle="30" maxWaitMillis="10000"
            username="C##SCOTT" password="tiger"
            driverClassName="oracle.jdbc.driver.OracleDriver"
            url="jdbc:oracle:thin:@localhost:1520:dink22"/>
    <!-- Uncomment this to enable session persistence across Tomcat restarts -->
    <!--
    <Manager pathname="SESSIONS.ser" />
    -->
</Context>
```

변경사항 반영

```
sudo systemctl daemon-reload
sudo systemctl start tomcat
sudo systemctl enable tomcat
```

로컬에서 manager page 접근 허용

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

접근 ip value 주석처리

```
<!--
 <Valve className="org.apache.catalina.valves.RemoteAddrValve"
        allow="127\.\d+\.\d+\.\d+|::1|0:0:0:0:0:0:0:1" />
-->
```

tomcat-users.xml 수정

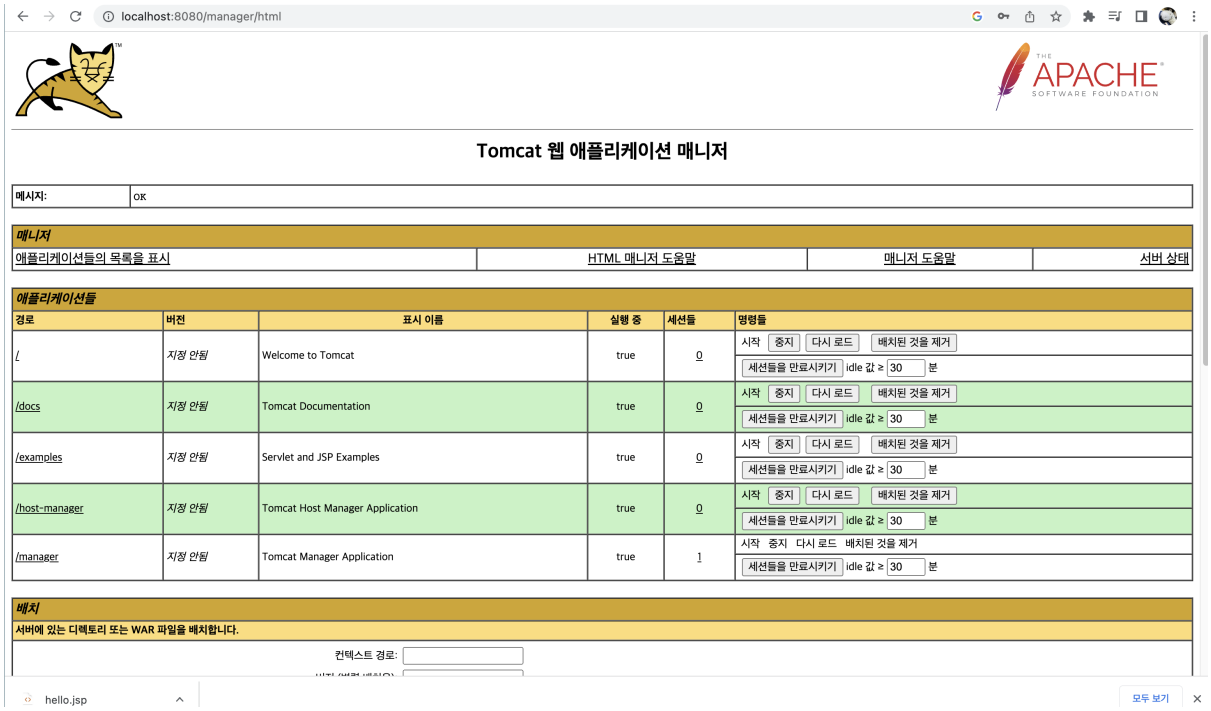
```
nano /opt/tomcat/conf/tomcat-users.xml
```

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

위의 계정과 권한을 추가한다.

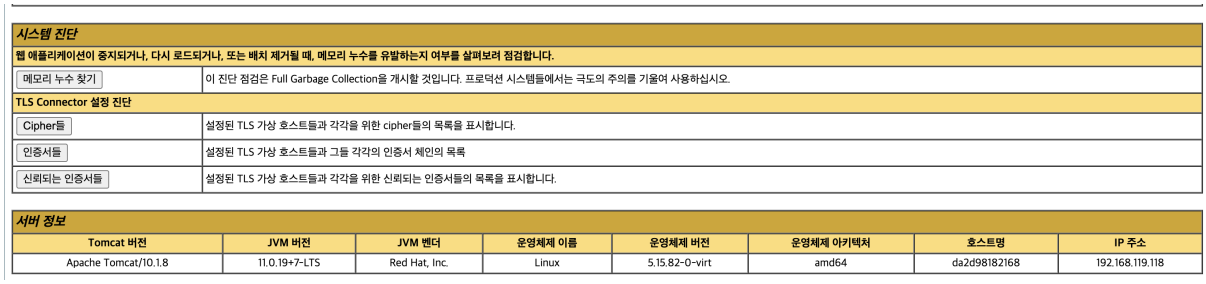
변경사항 반영

```
sudo systemctl daemon-reload
sudo systemctl start tomcat
sudo systemctl enable tomcat
```

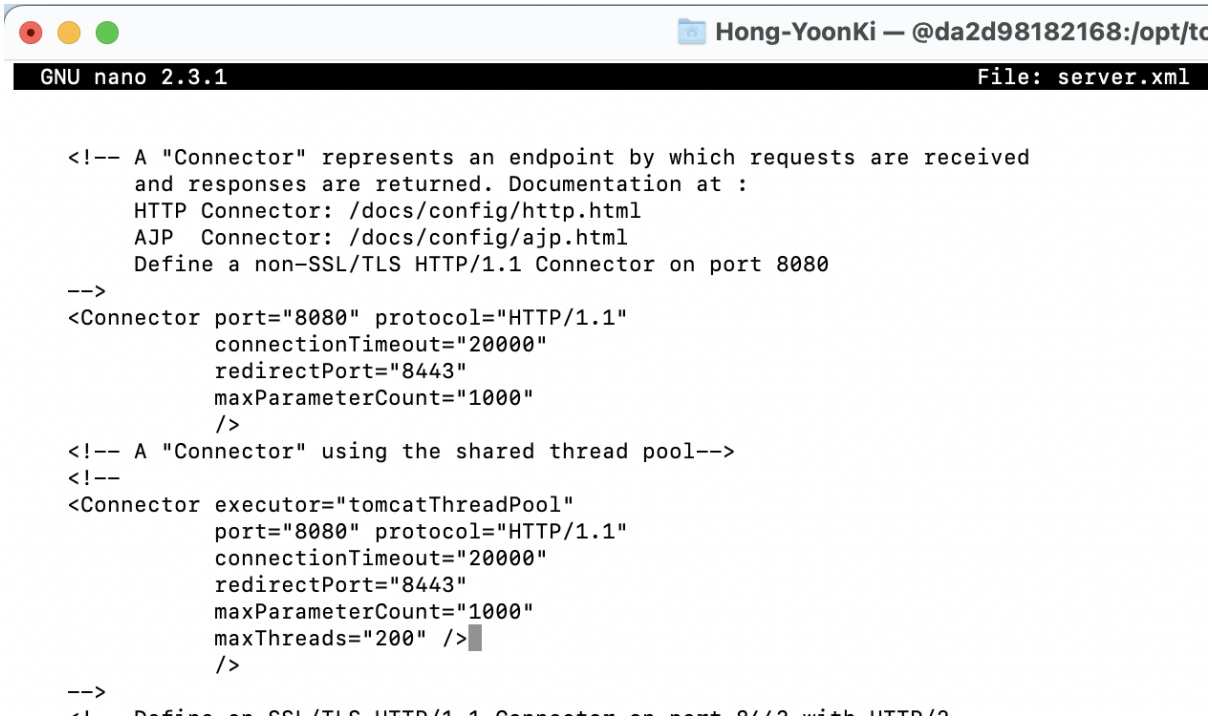


접근 가능

tomcat 서버의 정보를 알수 있다.



최대 request 수 설정

/opt/tomcat/conf/server.xml을 수정

```
maxThreads="200"
```