

# Tomcat

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## Tomcat Versions

| Apache Tomcat Version | Servlet Spec | Jsp Spec | Web Socket Spec | JDK     |  |
|-----------------------|--------------|----------|-----------------|---------|--|
| Apache Tomcat 9.0.33  | 4.0          | 2.3      | 1.1             | JDK 8   |  |
| Apache Tomcat 8.5.53  | 3.1          | 2.3      | 1.1             | JDK 7   |  |
| Apache Tomcat 8.0.53  | 3.1          | 2.3      | 1.1             | JDK 7   |  |
| Apache Tomcat 7.0.103 | 3.0          | 2.2      | 1.1             | JDK 6   |  |
| Apache Tomcat 6.0.53  | 2.5          | 2.1      | -               | JDK 5   |  |
| Apache Tomcat 5.5.36  | 2.4          | 2.0      | -               | JDK 1.4 |  |
| Apache Tomcat 4.1.40  | 2.3          | 1.2      | -               | JDK 1.3 |  |
| Apache Tomcat 3.3.2   | 2.2          | 1.1      | -               | JDK 1.1 |  |

2020.02.24 CVE-2020-1938 Apache Tomcat (Ghostcat)  
( ), CVE-2020-1938

- 1.
2. server.xml, workers.properties

workers.properties

```
worker.list=loadbalancer

worker.loadbalancer.type=lb
worker.loadbalancer.balanced_workers=worker1,worker2
worker.loadbalancer.sticky_session=1

worker.worker1.type=ajp13
worker.worker1.host=127.0.0.1
worker.worker1.port=8020
worker.worker1.lbfactor=1
worker.worker1.secret=${random }
```

server.xml

```
<Connector protocol="AJP/1.3"
    secret="{random    }"
    address="127.0.0.1"
    port="8020"
    redirectPort="8443" />
```

가 '8009' ,

catalina.sh ( )

```
284
285 # Set UMASK unless it has been overridden
286 if [ -z "$UMASK" ]; then
287     UMASK="0027" --> 0022
288 fi
289 umask $UMASK
```

Tomcat root UMASK가 0022  
 0022 : Reading - 4, Writing - 2, Executing - 1, : 0777 - 0022 = 0755 ->  
 chmod 755 7: , 5: , 5:

가 가 was 가

{RSA\_WEB\_ROOT}/WEB-INF/web.xml 가, {TOMCAT\_ROOT}/conf/web.xml  
 가  
 <error-code> ( )  
 : 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 500,  
 501, 502, 503, 504, 505  
 JSP Context front (  
 {TOMCAT\_ROOT}/webapps/ROOT

\* HTTP

{TOMCAT\_ROOT}/conf/web.xml

```
<error-page>
    <error-code>401</error-code>
    <location>/error.jsp</location>
</error-page>
<error-page>
    <error-code>402</error-code>
    <location>/error.jsp</location>
</error-page>
.....
```

error.jsp

```

<%@ page language="java" contentType="text/html; charset=utf-8"%>
<!DOCTYPE HTML>
<html>

    <head>
        <meta http-equiv="Content-Type" content="text/html;
charset=UTF-8">
        <title>                                .</title>
        <style type="text/css">
            body { background-repeat: repeat-x; background-color: white;
font-family: "                ", "Segoe UI", "verdana", "arial"; margin: 0em; color:
#575757; }
                .mainContent { margin-top:80px; width: 700px; margin-left:
120px ; margin-right: auto ; }
                /* title { color: #2778ec; font-size: 30pt; font-weight:
300; vertical-align:bottom; margin-bottom: 20px; font-family: "                ",
"Segoe UI", "verdana"; position: relative; } */
                .title { color: #228b22; font-size: 30pt; font-weight: 300;
vertical-align:bottom; margin-bottom: 20px; font-family: "                ", "Segoe
UI", "verdana"; position: relative; }
                .errorExplanation { color: #000000; font-size: 12pt; font-
family: "                ", "Segoe UI", "verdana", "arial"; text-decoration: none; }
                .taskSection { margin-top: 20px; margin-bottom: 40px;
position: relative; }
                .tasks { color: #000000; font-family: "                ", "Segoe
UI", "verdana"; font-weight:200; font-size: 12pt; padding-top: 5px; }
                li { margin-top: 8px; }
                .diagnoseButton { outline: none; font-size: 9pt; }
                .webpageURL { direction:ltr; }
                .hidden { display:none; }
                /* a { color: #0066cc; font-family: "                ", "Segoe UI",
"verdana", "arial"; font-size: 11pt; text-decoration: none; } */
                a { color: #008000; font-family: "                ", "Segoe UI",
"verdana", "arial"; font-size: 11pt; text-decoration: none; }
                a:hover { text-decoration: underline; }
                .lineBottom { border-bottom: 1px solid; }
                .lineTop { border-top: 1px solid; }
                .r { text-align: right; }
                .l { text-align: left; }
        </style>
    </head>

    <body>
        <div id="contentContainer" class ="mainContent">
            <div id="mainTitle" class="title">
                .</div>
            <div class="taskSection" id="taskSection">
                <ul id="taskList" class="tasks">
                    <li id="task1">                <span id="webpage"
class="webpageURL"></span> (가)                .</li>
                    <li id="task2">                                .</li>
                </ul>
            </div>
        </div>
    </body>
</html>

```

```

        <li id="task3">
            <li id="task4">TLS      SSL
        </li>
    </ul>
    <ul id="cantDisplayTasks" class="tasks hidden">
        <li id="task1-1">가
        <li id="task1-2">
        <li id="task1-3">
    </ul>
    <ul id="notConnectedTasks" class="tasks hidden">
        <li id="task2-1">
        <li id="task2-2">가
        <li id="task2-3">가
        <li id="task2-4">
        <li id="task2-5">
    </ul>
</div>
<div class="lineTop 1"><a
href="http://<%=request.getServerName()%>" title="
">http://<%=request.getServerName()%></a></div>
<%= response.setStatus(404); %>
</div>
<script type="text/javascript">
    try { document.getElementById("webpage").innerHTML = location.href;
} catch(e) {}
</script>
</body>
</html>

```

```
1.          *.log
    1. crontab          30
2. catalina.out
    1. logrotate.d (
```

**\*.log**

```
crontab SHELL (${CATALINA_HOME}/bin/log delete.sh)
```

```
#!/bin/sh
#30      *.log, *.txt
cd ${CATALINA_HOME}
find ./logs -mtime +30 -name '*.log' -exec rm -f {} \;
```

```
find ./logs -mtime +30 -name '*.txt' -exec rm -f {} \;
```

crontab      or LogProc      actctl.sh

```
// 가
$> chmod +x ${CATALINA_HOME}/bin/log_delete.sh
//
$> crontab -l //
$> crontab -e //
0 5 * * * ${CATALINA_HOME}/bin/log_delete.sh #
```

logrotate

```
// /etc/logrotate.d          tomcat
$> cat /etc/logrotate.d/tomcat //

/usr/local/tomcat/*log { // *log          catalina.out 가
    copytruncate
    daily
    rotate 200
    compress
    missingok
    notifempty
    dateext
    dateformat .%Y-%m-%d
}

$> //
$> $logrotate -f /etc/logrotate.d/tomcat
$> //
$> $logrotate -d /etc/logrotate.d/tomcat
```

```
copytruncate :
daily :
compress : gzip
dateext :
missingok :
rotate 30 : 30
notifempty :
dateformat %Y-%m-%d
```

**catalina.out**

linux tomcat catalina.out

```
tomcat catalina.out
```

logrotate.d

Tomcat catalina.out

logrotate

```
/ linux tomcat catalina.out
```

<https://mycup.tistory.com/216>Tomcat

/ linux

```
(logrotate.d)]]
```

## https

```
> https          SSL
>      tomcat
> keystoreFile  keystorePass  가
```

```
<Connector port="8443"
protocol="org.apache.coyote.http11.Http11Protocol"
           maxThreads="150" SSLEnabled="true" scheme="https"
secure="true"
           clientAuth="false" sslProtocol="TLS" keystoreFile="
/sslcert.co.kr_xxxxx.jks      " keystorePass=".jks      "/>
```

[Tomcat] [apache-tomcat secretRequired](#)

(AJP Connector SSL, secret key, secret password)

```
'/'          ("" )      '/'
```

## Apache-tomcat

- [\[CentOS\] apache-tomcat](#) httpd 2.4.x, tomcat-connectors-1.2.46-src
- [\[CentOS7\]](#) (mod\_jk) &
- [Apache-Tomcat-7.0.100](#) server.xml AJP

## Linux

•

## Windows

/

[\[tomcat\]](#)

```
service.bat install
```

```
prompt
service.bat
```

```
sc delete
```

```
prompt
```

```
>
```

```
>
```

## Optimization, Tuning

- JAVA\_OPTS

```
JAVA_OPTS="-Djava.awt.headless=true -server -Xms512m -Xmx8192m -
XX:NewSize=256m -XX:MaxNewSize=256m -XX:PermSize=256m -XX:MaxPermSize=512m -
XX:+DisableExplicitGC"
```

```
-Xms: Heap
```

```
-Xmx: Heap
```

```
setenv.sh, setenv.bat
```

### Tomcat8 Heap memory size

```
setenv.bat
```

```
setenv.sh
```

```
export CATALINA_OPTS="$CATALINA_OPTS -Xms512m"
```

## Tip

- 
- [Tomcat](#)

## Troubleshooting

'Creation of SecureRandom instance for session ID generation using [SHA1PRNG] took'

```
: JAVA_OPTS="$JAVA_OPTS -Djava.security.egd=file:/dev/./urandom tomcat
/dev/random
```

(Apache Tomcat 8.5 → ApacheTomcat85)

tomcat7 the basedir environment variable is not defined tomcat7

CATALINA\_HOME, JAVA\_HOME

/etc/profile, ~/.bash\_profile, catalina.sh

80 (not root)

```
1~1024          root          bind가 가 .
iptables          8080
# iptables -t nat -A PREROUTING -p tcp --dport 80 -j REDIRECT --to-port 8080
```

TOMCAT ROOT가 80

"Catalina";

```
: Failed to start connector [Connector[AJP/1.3-8009]]
org.apache.catalina.LifecycleException: service.getName(): "Catalina";
    at
org.apache.catalina.connector.Connector.startInternal(Connector.java:1065)
    at org.apache.catalina.util.LifecycleBase.start(LifecycleBase.java:183)
    at
org.apache.catalina.core.StandardService.startInternal(StandardService.java:
460)
    at org.apache.catalina.util.LifecycleBase.start(LifecycleBase.java:183)
    at
org.apache.catalina.core.StandardServer.startInternal(StandardServer.java:74
4)
    at org.apache.catalina.util.LifecycleBase.start(LifecycleBase.java:183)
    at org.apache.catalina.startup.Catalina.start(Catalina.java:712)
    at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
    at
sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:57
)
    at
sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl
.java:43)
    at java.lang.reflect.Method.invoke(Method.java:606)
    at org.apache.catalina.startup.Bootstrap.start(Bootstrap.java:294)
    at org.apache.catalina.startup.Bootstrap.main(Bootstrap.java:428)
Caused by: java.lang.IllegalArgumentException: AJP
secretRequired="true"
    at
org.apache.coyote ajp.AbstractAjpProtocol.start(AbstractAjpProtocol.java:211
)
    at
org.apache.catalina.connector.Connector.startInternal(Connector.java:1058)
... 12 more
```

: server.xml Connector secretRequired="false" 가

```
<Connector secretRequired="false" connectionTimeout="20000" port="8080"
```

```
protocol="HTTP/1.1" redirectPort="8443"/>
```

Invalid byte tag in constant pool: 19  
:

```
Tomcat 9.0.x : 9.0.0.M18  
Tomcat 8.5.x : 8.5.12  
Tomcat 8.0.x : 8.0.42  
Tomcat 7.0.x : 7.0.76
```

<https://avaiable.tistory.com/261>

- [hot deploy](#)

## Ref

- [Apache Tomcat Versions](#)
- 
- [+ server.xml](#)

[tomcat](#)

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