# Tomcat

- description :
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- lastupdate : 2020-03-09

## 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" />
```

> '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                    UMASK    0022
> 0022                    : Reading - 4, Writing - 2, Executing - 1,          : 0777 - 0022 = 0755 –>
> chmod 755                    7:              ,          5:                    ,          5:

was

> {RSA_WEB_ROOT}/WEB-INF/web.xml                ,                    {TOMCAT_ROOT}/conf/web.xml
>
> <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> (  )                        .</li>
                        <li id="task2">                              .</li>
                        <li id="task3">                              .</li>
                        <li id="task4">TLS    SSL
   .     >          >      >      >                    .</li>
                  </ul>
                  <ul id="cantDisplayTasks" class="tasks hidden">
                        <li id="task1-1">                        .</li>
                        <li id="task1-2">                          .</li>
                        <li id="task1-3">                          .</li>
                  </ul>
                  <ul id="notConnectedTasks" class="tasks hidden">
                        <li id="task2-1">
     .</li>
                        <li id="task2-2">                            .</li>
                        <li id="task2-3">                            .</li>
                        <li id="task2-4">
  .</li>
                        <li id="task2-5">                      .</li>
                  </ul>
               </div>
               <div class="lineTop l"><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

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

logrotate

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

/usr/local/tomcat/*log { // *log      catalina.out
    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                        / linux tomcat catalina.out                        / linux
tomcat catalina.out](#)
[Tomcat            (logrotate.d)](#)
[logrotate.d](#)
[Tomcat            catalina.out](#)

logrotate

# https

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

```
    <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 Connecter 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, Tunning

- 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](#)
  - [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                bind          .
iptables                        8080
# iptables -t nat -A PREROUTING -p tcp --dport 80 -j REDIRECT --to-port 8080
```

TOMCAT       ROOT                          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"

```
    <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

… . … ( context.xml
)

```
<?xml version="1.0" encoding="UTF-8"?>

<Context>
    <WatchedResource>WEB-INF/web.xml</WatchedResource>
    <WatchedResource>WEB-INF/tomcat-web.xml</WatchedResource>
    <WatchedResource>${catalina.base}/conf/web.xml</WatchedResource>

    <Resources chahingAllowed="true" cacheMaxSize="1000000"/>

</Context>
```

( TOMCAT )

# Ref

- Apache Tomcat Versions
- 
- + server.xml

tomcat