

Tarea UD3

Despregamento de Aplicacíons Web

24/25

SERVIDOR DE APLICACIONES – APACHE TOMCAT

Índice.

Sumario

1. Funcionamiento de Tomcat en Windows con XAMPP.....	3
2. Instalación, configuración y funcionamiento de Tomcat en Linux.....	4
3. Securización.....	5
4. Integración con un IDE.....	6
5. Cuestiones.....	7

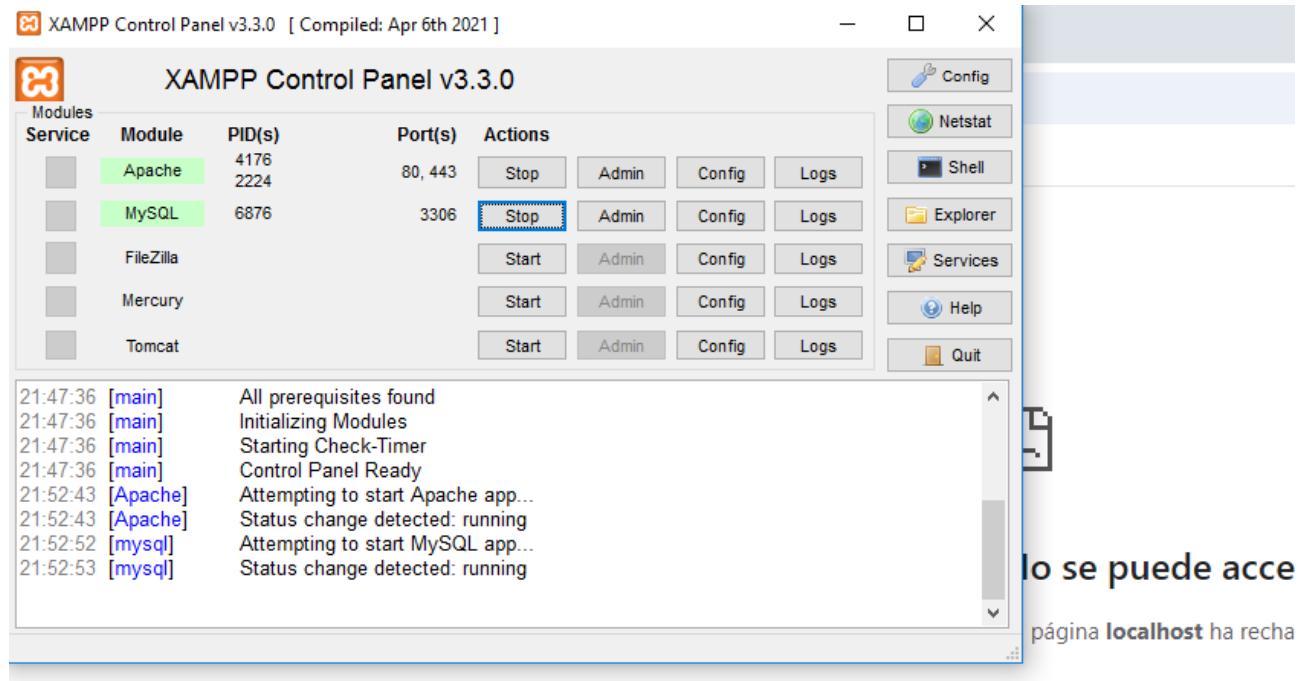
1. Funcionamiento de Tomcat en Windows con XAMPP

Se te facilita una máquina Windows, que ya viene con un Xampp operativo. Se te pide.

a. Arranque y configuración inicial

Configura para que arranque, y se pueda acceder a su página principal

Iniciamos apache y mysql



Lo se puede acce

página **localhost** ha recha

Prueba a:

- Comprobar la conexió

SERVIDOR DE APLICACIONES – APACHE TOMCAT

Verificar que apache esta funcionando:

Welcome to XAMPP for Windows 8.0.10

You have successfully installed XAMPP on this system! Now you can start using Apache, MariaDB, PHP and other components. You can find more info in the FAQs section or check the HOW-TO Guides for getting started with PHP applications.

XAMPP is meant only for development purposes. It has certain configuration settings that make it easy to develop locally but that are insecure if you want to have your installation accessible to others. If you want have your XAMPP accessible from the internet, make sure you understand the implications and you checked the FAQs to learn how to protect your site. Alternatively you can use WAMP, MAMP or LAMP which are similar packages which are more suitable for production.

Start the XAMPP Control Panel to check the server status.

Community

XAMPP has been around for more than 10 years – there is a huge community behind it. You can get involved by joining our Forums, adding yourself to the Mailing List, and liking us on Facebook, following our exploits on Twitter, or adding us to your Google+ circles.

Contribute to XAMPP translation at translate.apachefriends.org.

Can you help translate XAMPP for other community members? We need your help to translate XAMPP into different languages. We have set up a site, translate.apachefriends.org, where users can contribute translations.

Iniciar Tomcat en XAMPP

XAMPP Control Panel v3.3.0 [Compiled: Apr 6th 2021]

Service	Module	PID(s)	Port(s)	Actions
	Apache	3668 6004	80, 443	Stop Admin Config Logs
	MySQL	5984	3306	Stop Admin Config Logs
	FileZilla			Start Admin Config Logs
	Mercury			Start Admin Config Logs
	Tomcat	5084	8080, 8080, 49800, 49803, 49804	Stop Admin Config Logs

18:21:39 [main] Starting Check-Timer
18:21:39 [main] Control Panel Ready
18:21:45 [Apache] Attempting to start Apache app...
18:21:45 [Apache] Status change detected: running
18:21:45 [mysql] Attempting to start MySQL app...
18:21:46 [mysql] Status change detected: running
18:24:53 [Tomcat] Attempting to start Tomcat app...
18:24:57 [Tomcat] Status change detected: running

Developer Quick Start

[Tomcat Setup](#) [First Web Application](#) [Realms & AAA](#) [JDBC Data Sources](#) [Examples](#) [Servlet](#) [Tomcat](#)

Managing Tomcat
For security, access to the [manager webapp](#) is restricted. Users are defined in: [\\$CATALINA_HOME/conf/tomcat-users.xml](#)
In Tomcat 8.5 access to the manager application is split between different users. [Read more...](#)

[Release Notes](#)

Documentation

[Tomcat 8.5 Documentation](#) [Tomcat 8.5 Configuration](#) [Tomcat Wiki](#)
Find additional important configuration information in: [\\$CATALINA_HOME/RUNNING.txt](#)
Developers may be interested in: [tomcat-announcements](#) [Important announcement archive](#) [tomcat-users](#) User support and [taglibs-user](#)

Getting Help

FAQ and Mail
The following mailing lists are available:
[tomcat-announce](#) [Important announcement archive](#) [tomcat-users](#) User support and [taglibs-user](#)

Nombre y apellidos:

4 / 42

SERVIDOR DE APLICACIONES – APACHE TOMCAT

Comprobar <http://localhost:8080>

The screenshot shows a web browser window with the URL localhost:8080 in the address bar. The page content is the Apache Tomcat 8.5.70 homepage. At the top, there's a green banner with the text "If you're seeing this, you've successfully installed Tomcat. Congratulations!" and a cartoon cat icon. Below the banner, there are links to "Recommended Reading" such as "Security Considerations How-To", "Manager Application How-To", and "Clustering/Session Replication How-To". The main menu includes "Home", "Documentation", "Configuration", "Examples", "Wiki", and "Mailing Lists". On the right side, there are buttons for "Server Status", "Manager App", and "Host Manager". The "Documentation" section contains links to "Tomcat 8.5 Documentation", "Tomcat 8.5 Configuration", and "Tomcat Wiki". The "Getting Help" section lists "FAQ and Mailing Lists" with links to "tomcat-admin-user", "tomcat-users", "tomcat-dev", and "tomcat-docs". The "Developer Quick Start" section provides information on managing Tomcat, including a note about security access to the manager webapp and a link to the configuration file `$CATALINA_HOME/conf/tomcat-users.xml`. It also lists "Release Notes", "Changelog", "Migration Guide", and "Security Notices".

SERVIDOR DE APLICACIONES – APACHE TOMCAT

b. Acceso a opciones de gestión y administración

Configúralo para que pueda acceder a server status, Manager App y Host Manager

Pistas:

[Guide to Tomcat Manager Application](#) | Baeldung

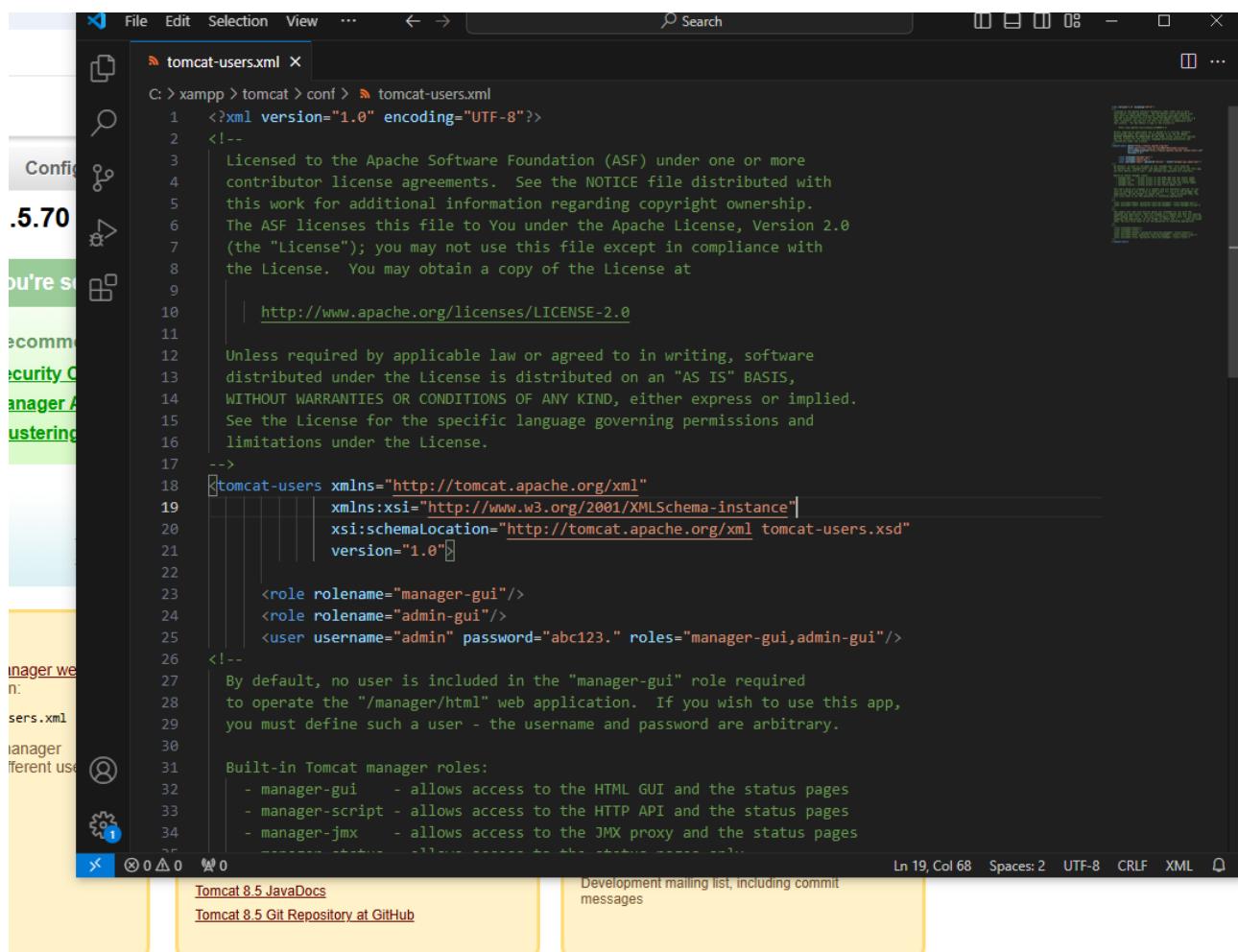
Editar el archivo tomcat-users.xml

- Ir a C:\xampp\tomcat\conf\tomcat-users.xml en un editor de texto (como VSC).

Agregar roles y usuarios

- Añade las siguientes líneas dentro de las etiquetas <tomcat-users> para habilitar el acceso a las herramientas de administración:

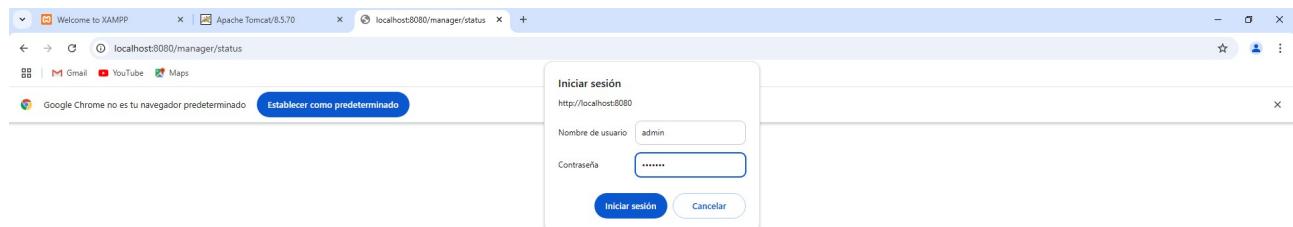
```
<role rolename="manager-gui"/>
<role rolename="admin-gui"/>
<user username="admin" password="abc123." roles="manager-gui,admin-gui"/>
```



SERVIDOR DE APLICACIONES – APACHE TOMCAT

Acceder a las aplicaciones de administración

- Abrimos el navegador y prueba las siguientes rutas para acceder a las herramientas de administración:
 - **Server Status:** <http://localhost:8080/manager/status>



localhost:8080/manager/status

Google Chrome no es tu navegador predeterminado Establecer como predeterminado

The APACHE SOFTWARE FOUNDATION

Estado de Servidor

Gestor	Listar Aplicaciones	Ayuda HTML de Gestor	Ayuda de Gestor	Estado Completo de Servidor				
Información de Servidor	Versión de Tomcat Apache Tomcat/8.5.70	Versión JVM 1.8.0_261-b12	Vendedor JVM Oracle Corporation	Nombre del SO Windows 10	Versión de SO 10.0	Arquitectura de SO amd64	NombreDeMaquina base	Dirección IP 10.0.2.15

JVM

Memoria disponible: 67.11 MB Total Memory: 113.00 MB Max Memory: 1820.50 MB

Pool de Memoria	Type	Initial	Total	Maximum	Used
PS Eden Space	Heap memory	32.50 MB	32.50 MB	672.50 MB	30.89 MB (4%)
PS Old Gen	Heap memory	85.50 MB	75.50 MB	1365.50 MB	14.99 MB (1%)
PS Survivor Space	Heap memory	5.00 MB	5.00 MB	5.00 MB	0.00 MB (0%)
Code Cache	Non-heap memory	2.43 MB	9.37 MB	240.00 MB	8.91 MB (3%)
Compressed Class Space	Non-heap memory	0.00 MB	2.67 MB	1024.00 MB	2.47 MB (0%)
Metaspace	Non-heap memory	0.00 MB	24.92 MB	-0.00 MB	24.34 MB

"http-nio-8080"

Max threads: 200 Current thread count: 10 Current threads busy: 1 Keep alive sockets count: 1
Max processing time: 987 ms Tiempo de procesamiento: 1.741 s Request count: 11 Error count: 2 Bytes received: 0.00 MB Bytes sent: 0.07 MB

Stage	Time	Bytes Sent	Bytes Recv	Client (Forwarded)	Client (Actual)	VHost	Solicitud
R	?	?	?	?	?	?	GET /manager/status HTTP/1.1
S	36 ms	0 KB	0 KB	0.0.0.0.0.0.1	0.0.0.0.0.0.1	localhost	

SERVIDOR DE APLICACIONES – APACHE TOMCAT

- Manager App: <http://localhost:8080/manager/html>

The screenshot shows the Apache Tomcat Manager application running in Google Chrome. The title bar reads "Welcome to XAMPP" and "Apache Tomcat/8.5.70". The main content area is titled "Gestor de Aplicaciones Web de Tomcat". It displays a table of applications:

Ruta	Versión	Nombre a Mostrar	Ejecutándose	Sesiones	Comandos
/	Ninguno especificado	Welcome to Tomcat	true	0	Arrancar Parar Recargar Replegar Expirar sesiones sin trabajar > 30 minutos
/docs	Ninguno especificado	Tomcat Documentation	true	0	Arrancar Parar Recargar Replegar Expirar sesiones sin trabajar > 30 minutos
/examples	Ninguno especificado	Servlet and JSP Examples	true	0	Arrancar Parar Recargar Replegar Expirar sesiones sin trabajar > 30 minutos
/host-manager	Ninguno especificado	Tomcat Host Manager Application	true	0	Arrancar Parar Recargar Replegar Expirar sesiones sin trabajar > 30 minutos
/manager	Ninguno especificado	Tomcat Manager Application	true	1	Arrancar Parar Recargar Replegar Expirar sesiones sin trabajar > 30 minutos

Below the table, there is a "Desplegar" section with a "Desplegar directorio o archivo WAR localizado en servidor" input field and a "Trayectoria de Contexto (opcional):" input field. The status bar at the bottom shows "18:41 11/11/2024".

- Host Manager: <http://localhost:8080/host-manager/html>
- Ingresa el nombre de usuario y contraseña que configuraste en el archivo `tomcat-users.xml`.

The screenshot shows the Apache Tomcat Host Manager application running in Google Chrome. The title bar reads "Welcome to XAMPP" and "Apache Tomcat/8.5.70". The main content area is titled "Gestor de Máquina Virtual de Tomcat". It displays a table of virtual hosts:

Nombre de Máquina	Aliases de Máquina	Comandos
localhost		Instalado Gestor de Máquinas - comandos desactivados

Below the table, there is a "Añadir Máquina Virtual" section with fields for "Nombre", "Aliases", "App base", and checkboxes for "AutoDeploy", "DeployOnStartup", "DeployXML", "UnpackWARs", "App de Gestor", and "CopyXML". There is also an "Añadir" button. The status bar at the bottom shows "18:42 11/11/2024".

Nombre y apellidos:

8 / 42

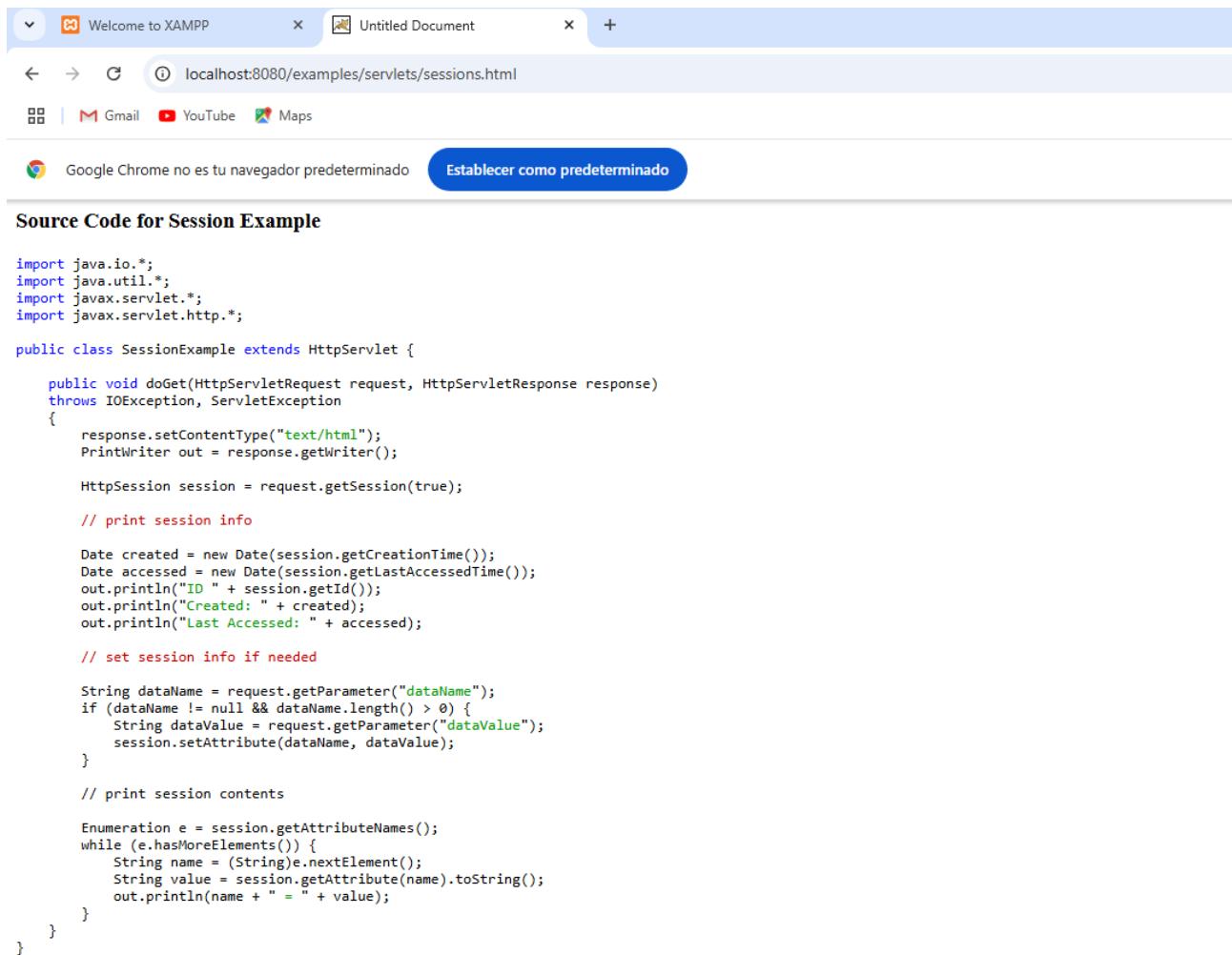
SERVIDOR DE APLICACIONES – APACHE TOMCAT

c. Ejemplos

Muestra su funcionamiento con alguno de los ejemplos disponibles

The screenshot shows a web page titled "Ejemplo de Sesiones". At the top, there is a message from Google Chrome stating "Google Chrome no es tu navegador predeterminado" with a "Establecer como predeterminado" button. Below this, the page displays session information: ID de Sesión: D9D1435D9E4F823816471B5397039567, Creado: Mon Nov 11 18:47:58 CET 2024, Ultimo Acceso: Mon Nov 11 18:48:42 CET 2024. It then lists session attributes: "Lo siguientes datos están en tu sesión:" followed by "unNombre = unValor". There are two input fields for session attributes: "Nombre del atributo de sesión:" and "Valor del atributo de sesión:", both currently empty. Below these fields is an "Enviar" button. Further down, there is a section for "GET based form:" with similar input fields and an "Enviar" button. At the bottom left, there is a link labeled "URL encoded".

SERVIDOR DE APLICACIONES – APACHE TOMCAT



```
import java.io.*;
import java.util.*;
import javax.servlet.*;
import javax.servlet.http.*;

public class SessionExample extends HttpServlet {

    public void doGet(HttpServletRequest request, HttpServletResponse response)
        throws IOException, ServletException
    {
        response.setContentType("text/html");
        PrintWriter out = response.getWriter();

        HttpSession session = request.getSession(true);

        // print session info

        Date created = new Date(session.getCreationTime());
        Date accessed = new Date(session.getLastAccessedTime());
        out.println("ID " + session.getId());
        out.println("Created: " + created);
        out.println("Last Accessed: " + accessed);

        // set session info if needed

        String dataName = request.getParameter("dataName");
        if (dataName != null && dataName.length() > 0) {
            String dataValue = request.getParameter("dataValue");
            session.setAttribute(dataName, dataValue);
        }

        // print session contents

        Enumeration e = session.getAttributeNames();
        while (e.hasMoreElements()) {
            String name = (String)e.nextElement();
            String value = session.getAttribute(name).toString();
            out.println(name + " = " + value);
        }
    }
}
```

SERVIDOR DE APLICACIONES – APACHE TOMCAT

d. Despliega tu propia aplicación web

Despliega un fichero Sample.war, y comprueba que puedes acceder a la aplicación

Pistas:

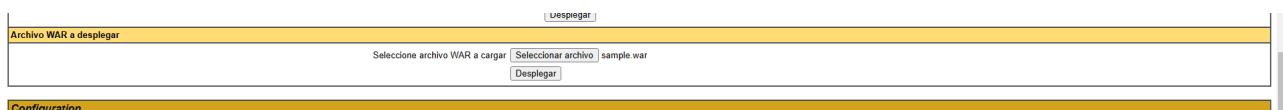
[Apache Tomcat 11 \(11.0.0-M16\) - Tomcat Web Application Deployment](#)

[How to Deploy a WAR File to Tomcat | Baeldung](#)

[Tomcat Manager y su configuración - Arquitectura Java](#)

Desplegar el archivo WAR

→ **A través de la Manager App:** Abre <http://localhost:8080/manager/html>, iniciamos sesión y utilizamos la opción para cargar y desplegar aplicaciones web.



Y muestra el mensaje de “ok” una vez desplegado



E iríamos a <http://localhost:8080/Sample> para ver que se desplego correctamente:

SERVIDOR DE APLICACIONES – APACHE TOMCAT

e. Cambia el puerto donde escucha Tomcat

Pista:

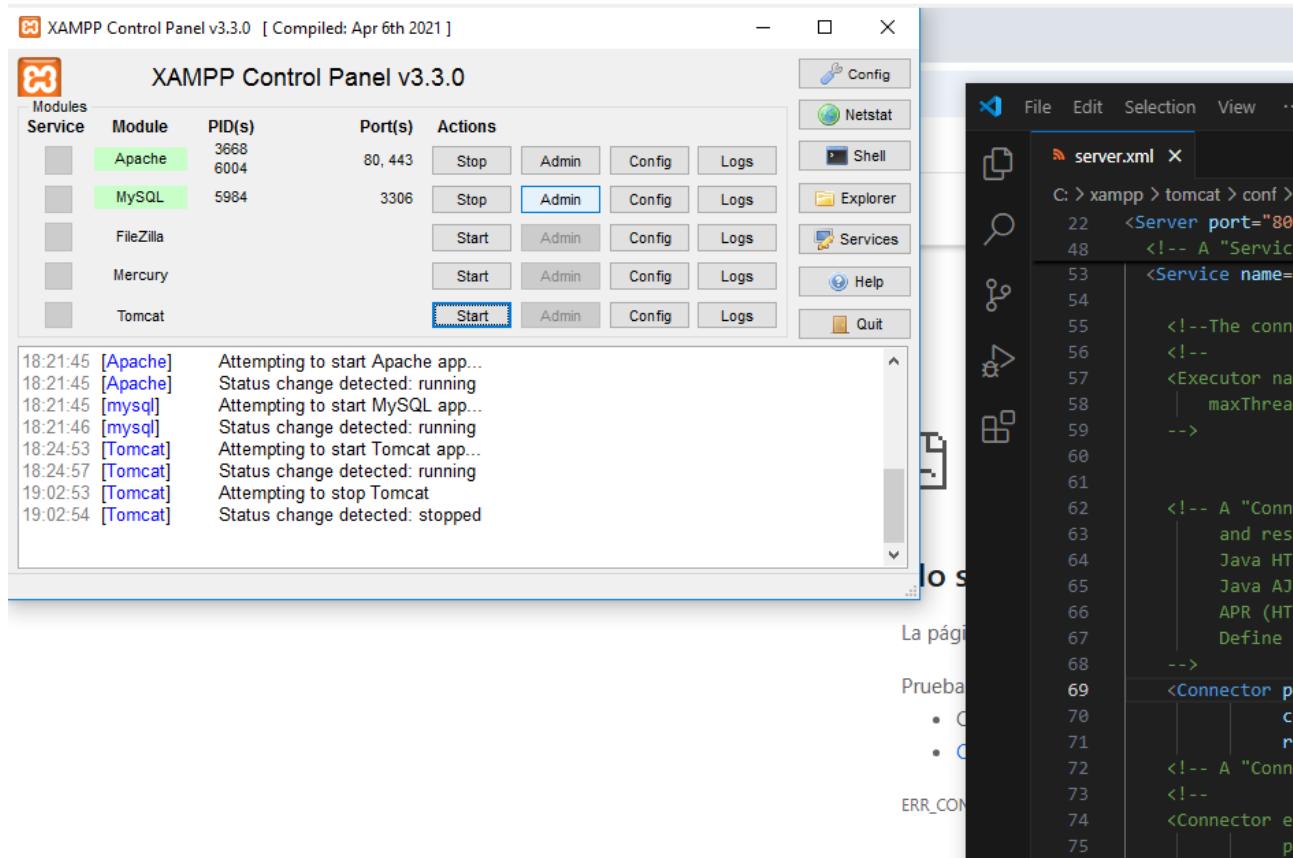
[Change the Default Port of the Tomcat Server \(microfocus.com\)](#)

Navegamos a C:\xampp\tomcat\conf y abrimos server.xml :

```
C:\ > xampp > tomcat > conf > server.xml
22   <Server port="8005" shutdown="SHUTDOWN">
48     <!-- A "Service" is a collection of one or more "Connectors" that share
53     <Service name="Catalina">
54
55       <!--The connectors can use a shared executor, you can define one or more named thread pools-->
56       <!--
57       <Executor name="tomcatThreadPool" namePrefix="catalina-exec-"
58         |   maxThreads="150" minSpareThreads="4"/>
59       -->
60
61
62       <!-- A "Connector" represents an endpoint by which requests are received
63           and responses are returned. Documentation at :
64           Java HTTP Connector: /docs/config/http.html
65           Java AJP Connector: /docs/config/ajp.html
66           APR (HTTP/AJP) Connector: /docs/apr.html
67           Define a non-SSL/TLS HTTP/1.1 Connector on port 8080
68       -->
69       <Connector port="8081" protocol="HTTP/1.1"
70         connectionTimeout="20000"
71         redirectPort="8443" />
72
73       <!-- A "Connector" using the shared thread pool-->
74       <!--
75       <Connector executor="tomcatThreadPool"
76         port="8080" protocol="HTTP/1.1"
77         connectionTimeout="20000"
78         redirectPort="8443" />
79
80       <!-- Define an SSL/TLS HTTP/1.1 Connector on port 8443
81           This connector uses the NIO implementation. The default
82           SSLImplementation will depend on the presence of the APR/native
83           library and the useOpenSSL attribute of the
84           AprLifecycleListener.
85           Either JSSE or OpenSSL style configuration may be used regardless of
```

SERVIDOR DE APLICACIONES – APACHE TOMCAT

Reiniciamos Tomcat



Y comprobamos en el nuevo puerto:

SERVIDOR DE APLICACIONES – APACHE TOMCAT

The screenshot shows a browser window for Apache Tomcat/8.5.70 at localhost:8081. The title bar says "Apache Tomcat/8.5.70 /manager". The page content is titled "Apache Tomcat8.5.70" and features a green banner stating "If you're seeing this, you've successfully installed Tomcat. Congratulations!". Below the banner is a cartoon cat icon and a list of recommended readings: "Security Considerations How-To", "Manager Application How-To", and "Clustering/Session Replication How-To". To the right are links for "Server Status", "Manager App", and "Host Manager". The top navigation bar includes links for Home, Documentation, Configuration, Examples, Wiki, and Mailing Lists, along with a "Find Help" search bar. The bottom navigation bar has sections for Developer Quick Start, Documentation, and Getting Help.

Developer Quick Start

[Tomcat Setup](#) [Realms & AAA](#) [Examples](#) [Servlet Specifications](#)
[First Web Application](#) [JDBC Data Sources](#) [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 8.5 access to the manager application is split between different users.
[Read more...](#)

Release Notes
[Changelog](#)
[Migration Guide](#)
[Security Notices](#)

Documentation
[Tomcat 8.5 Documentation](#)
[Tomcat 8.5 Configuration](#)
[Tomcat Wiki](#)
Find additional important configuration information in:
`$CATALINA_HOME/ RUNNING.txt`
Developers may be interested in:
[Tomcat 8.5 Bug Database](#)
[Tomcat 8.5 JavaDocs](#)
[Tomcat 8.5 Git Repository at GitHub](#)

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
taglibs-user
User support and discussion for [Apache Taglibs](#)
tomcat-dev
Development mailing list, including commit messages

2. Instalación, configuración y funcionamiento de Tomcat en Linux

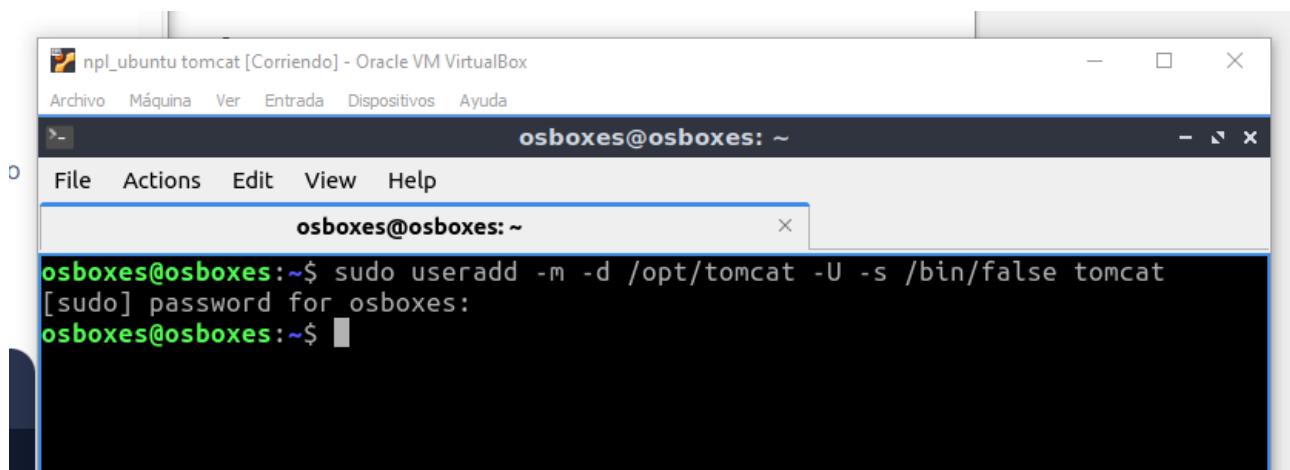
a) Instala y realiza configuración para que pueda acceder a server status, Manager App y Host Manager

Pista:

[How To Install Apache Tomcat 10 on Ubuntu 20.04 | DigitalOcean](#)

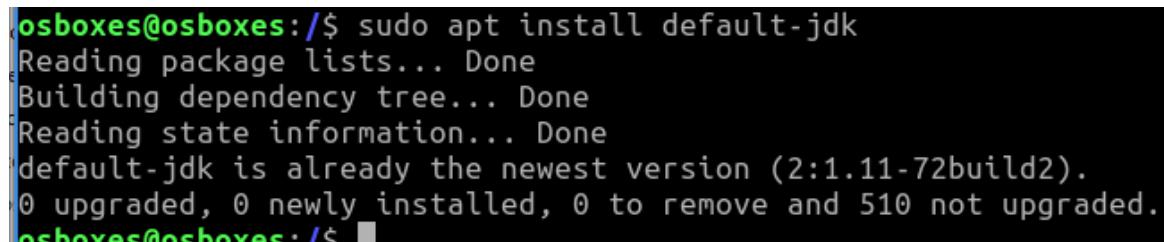
Instalar Apache Tomcat en Ubuntu 20.04

1-Creamos el usuario:



npl_ubuntu tomcat [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
osboxes@osboxes: ~
File Actions Edit View Help
osboxes@osboxes: ~
osboxes@osboxes:~\$ sudo useradd -m -d /opt/tomcat -U -s /bin/false tomcat
[sudo] password for osboxes:
osboxes@osboxes:~\$

2-Instalamos Java



```
osboxes@osboxes:/$ sudo apt install default-jdk  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
default-jdk is already the newest version (2:1.11-72build2).  
0 upgraded, 0 newly installed, 0 to remove and 510 not upgraded.  
osboxes@osboxes:/$
```

SERVIDOR DE APLICACIONES – APACHE TOMCAT

3-Comprobamos la versión de java

```
osboxes@osboxes:/$ java -version
openjdk version "11.0.25" 2024-10-15
OpenJDK Runtime Environment (build 11.0.25+9-post-Ubuntu-1ubuntu122.04)
OpenJDK 64-Bit Server VM (build 11.0.25+9-post-Ubuntu-1ubuntu122.04, mixed mode, sharing)
osboxes@osboxes:/$
```

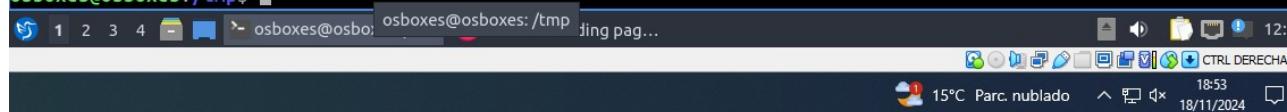
4-Descargamos el directorio desde la carpeta /tmp

```
wget https://dlcdn.apache.org/tomcat/tomcat-10/v10.0.20/bin/apache-tomcat-10.0.20.tar.gz
```

```
osboxes@osboxes:/tmp$ wget https://dlcdn.apache.org/tomcat/tomcat-10/v10.1.33/bin/apache-tomcat-10.1.33.tar.gz
--2024-11-18 12:54:01-- https://dlcdn.apache.org/tomcat/tomcat-10/v10.1.33/bin/apache-tomcat-10.1.33.tar.gz
Resolving dlcdn.apache.org (dlcdn.apache.org)... 151.101.2.132, 2a04:4e42::644
Connecting to dlcdn.apache.org (dlcdn.apache.org)|151.101.2.132|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 13678161 (13M) [application/x-gzip]
Saving to: 'apache-tomcat-10.1.33.tar.gz'

apache-tomcat-10.1.33.tar.g 100%[=====] 13.04M 10.9MB/s in 1.2s
2024-11-18 12:54:03 (10.9 MB/s) - 'apache-tomcat-10.1.33.tar.gz' saved [13678161/13678161]

osboxes@osboxes:/tmp$
```

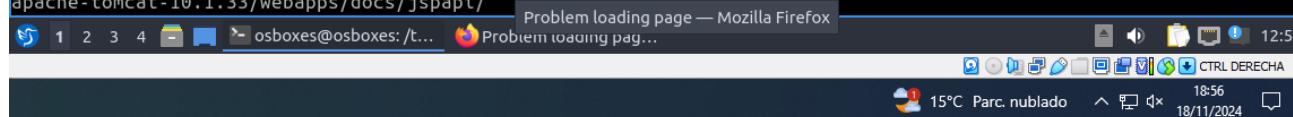


SERVIDOR DE APLICACIONES – APACHE TOMCAT

5-Extraemos el archivo:

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

```
osboxes@osboxes:/tmp$ sudo tar xzvf apache-tomcat-10*tar.gz -C /opt/tomcat --strip-components=1
apache-tomcat-10.1.33/conf/
apache-tomcat-10.1.33/conf/catalina.policy
apache-tomcat-10.1.33/conf/catalina.properties
apache-tomcat-10.1.33/conf/context.xml
apache-tomcat-10.1.33/conf/jaspic-providers.xml
apache-tomcat-10.1.33/conf/jaspic-providers.xsd
apache-tomcat-10.1.33/conf/logging.properties
apache-tomcat-10.1.33/conf/server.xml
apache-tomcat-10.1.33/conf/tomcat-users.xml
apache-tomcat-10.1.33/conf/tomcat-users.xsd
apache-tomcat-10.1.33/conf/web.xml
apache-tomcat-10.1.33/bin/
apache-tomcat-10.1.33/lib/
apache-tomcat-10.1.33/logs/
apache-tomcat-10.1.33/temp/
apache-tomcat-10.1.33/webapps/
apache-tomcat-10.1.33/webapps/ROOT/
apache-tomcat-10.1.33/webapps/ROOT/WEB-INF/
apache-tomcat-10.1.33/webapps/docs/
apache-tomcat-10.1.33/webapps/docs/META-INF/
apache-tomcat-10.1.33/webapps/docs/WEB-INF/
apache-tomcat-10.1.33/webapps/docs/WEB-INF/jsp/
apache-tomcat-10.1.33/webapps/docs/annotationapi/
apache-tomcat-10.1.33/webapps/docs/api/
apache-tomcat-10.1.33/webapps/docs/appdev/
apache-tomcat-10.1.33/webapps/docs/appdev/sample/
apache-tomcat-10.1.33/webapps/docs/appdev/sample/docs/
apache-tomcat-10.1.33/webapps/docs/appdev/sample/src/
apache-tomcat-10.1.33/webapps/docs/appdev/sample/src/mypackage/
apache-tomcat-10.1.33/webapps/docs/appdev/sample/web/
apache-tomcat-10.1.33/webapps/docs/appdev/sample/web/WEB-INF/
apache-tomcat-10.1.33/webapps/docs/appdev/sample/web/images/
apache-tomcat-10.1.33/webapps/docs/architecture/
apache-tomcat-10.1.33/webapps/docs/architecture/requestProcess/
apache-tomcat-10.1.33/webapps/docs/architecture/startup/
apache-tomcat-10.1.33/webapps/docs/config/
apache-tomcat-10.1.33/webapps/docs/elapi/
apache-tomcat-10.1.33/webapps/docs/images/
apache-tomcat-10.1.33/webapps/docs/images/fonts/
apache-tomcat-10.1.33/webapps/docs/jaspicapi/
apache-tomcat-10.1.33/webapps/docs/jspapi/
```

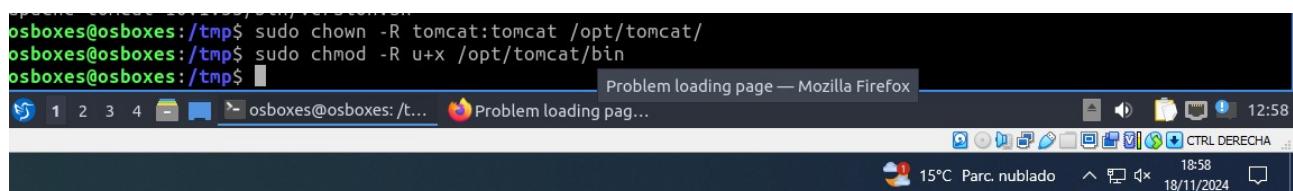


6-Otorgamos permisos

```
sudo chown -R tomcat:tomcat /opt/tomcat/
```

```
sudo chmod -R u+x /opt/tomcat/bin
```

```
osboxes@osboxes:/tmp$ sudo chown -R tomcat:tomcat /opt/tomcat/
osboxes@osboxes:/tmp$ sudo chmod -R u+x /opt/tomcat/bin
osboxes@osboxes:/tmp$ Problem loading page — Mozilla Firefox
```

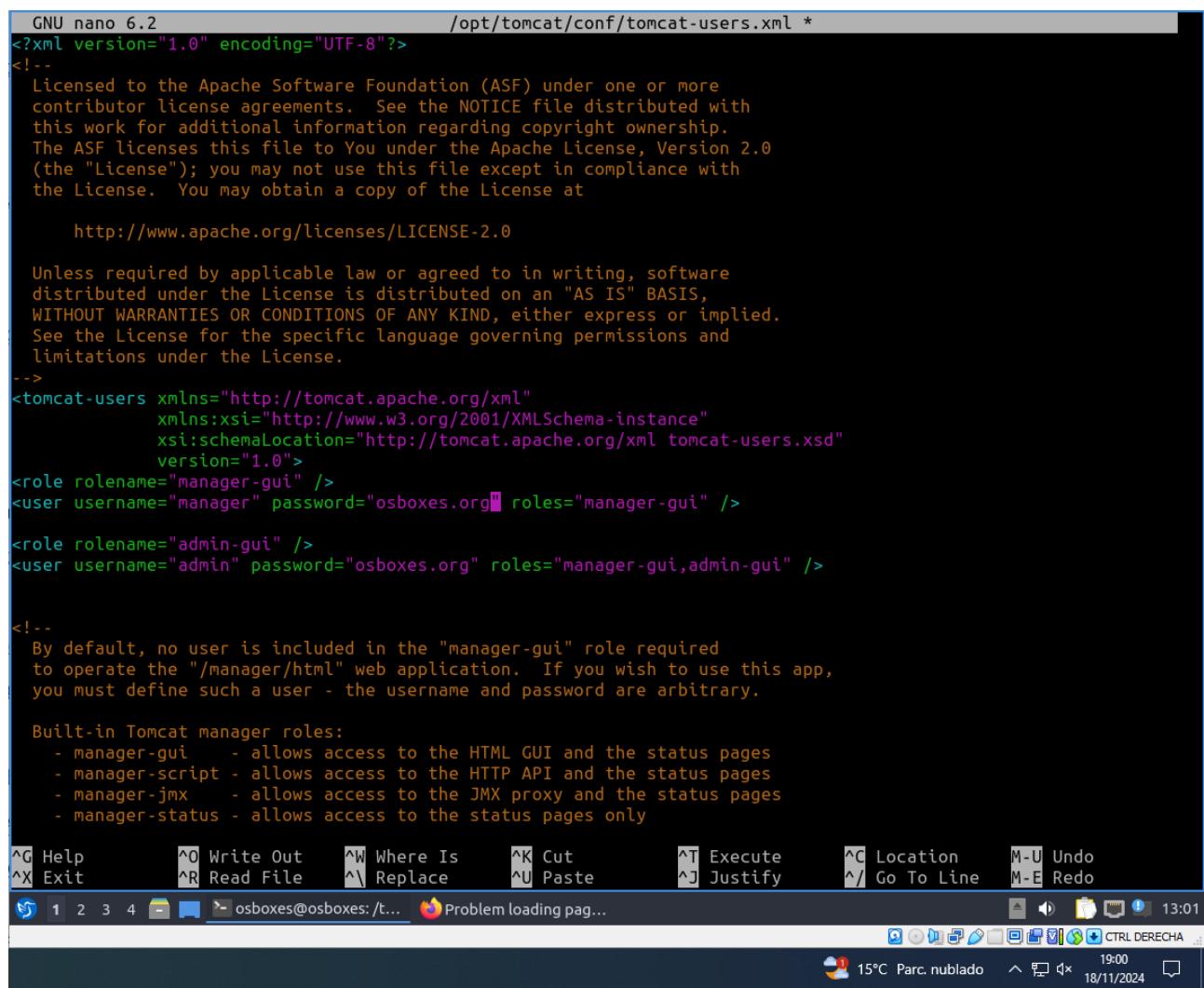


SERVIDOR DE APLICACIONES – APACHE TOMCAT

7-Abrimos : sudo nano /opt/tomcat/conf/tomcat-users.xml

y le pegamos:

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



```
GNU nano 6.2          /opt/tomcat/conf/tomcat-users.xml *  
<?xml version="1.0" encoding="UTF-8"?>  
<!--  
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 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.  
-->  
<tomcat-users xmlns="http://tomcat.apache.org/xml"  
               xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"  
               xsi:schemaLocation="http://tomcat.apache.org/xml tomcat-users.xsd"  
               version="1.0">  
<role rolename="manager-gui" />  
<user username="manager" password="osboxes.org" roles="manager-gui" />  
  
<role rolename="admin-gui" />  
<user username="admin" password="osboxes.org" roles="manager-gui,admin-gui" />  
  
<!--  
 By default, no user is included in the "manager-gui" role required  
 to operate the "/manager/html" web application. If you wish to use this app,  
 you must define such a user - the username and password are arbitrary.  
  
 Built-in Tomcat manager roles:  
 - manager-gui      - allows access to the HTML GUI and the status pages  
 - manager-script   - allows access to the HTTP API 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  
-->
```

SERVIDOR DE APLICACIONES – APACHE TOMCAT

8-Eliminar restriccion del administrador:

entramos aqui

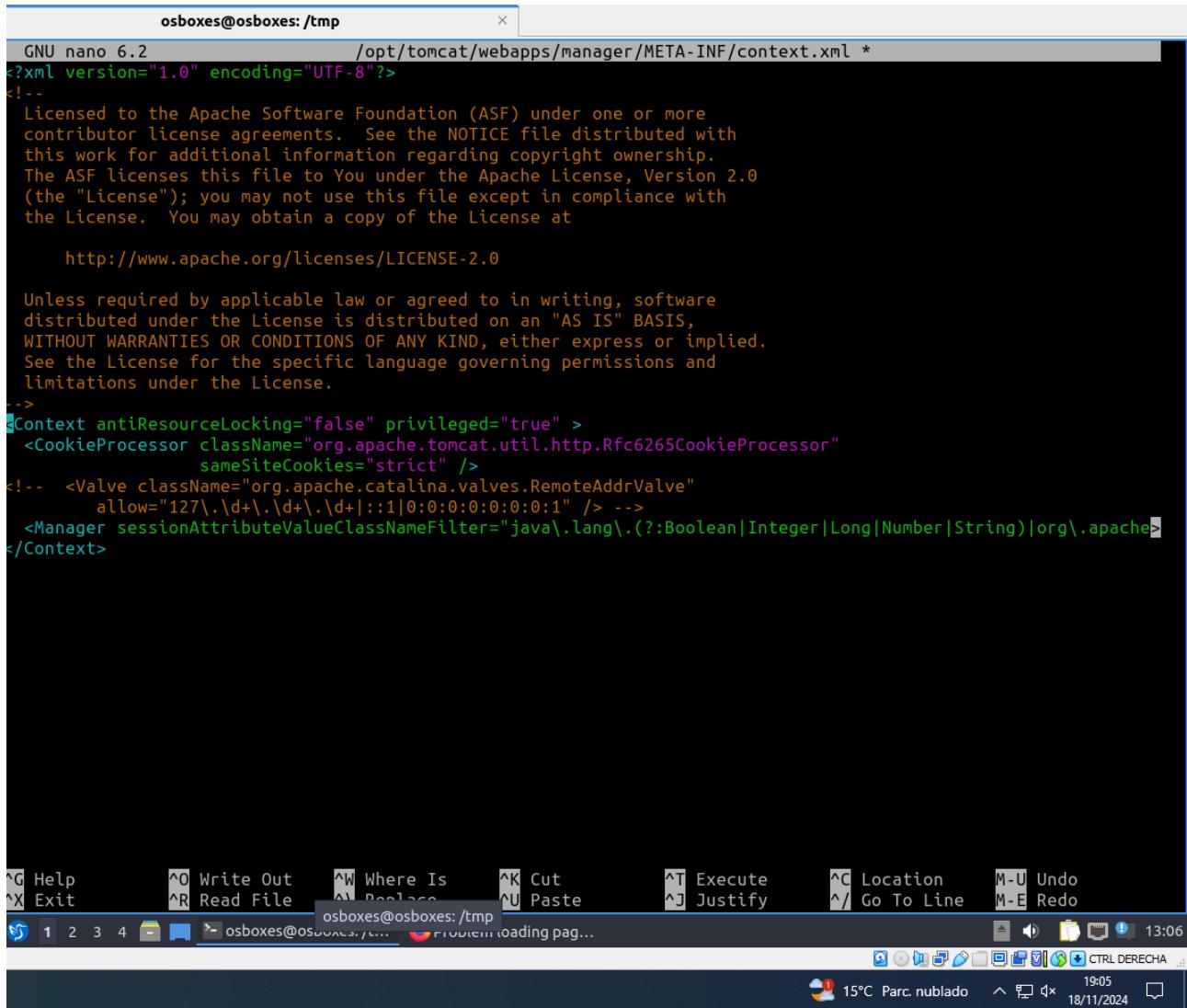
sudo nano /opt/tomcat/webapps/manager/META-INF/context.xml

Y pegamos:

...

```
<Context antiResourceLocking="false" privileged="true" >
    <CookieProcessor className="org.apache.tomcat.util.http.Rfc6265CookieProcessor"
        sameSiteCookies="strict" />
    <!-- <Valve className="org.apache.catalina.valves.RemoteAddrValve"
        allow="127\\.\\d+\\.\\d+\\.\\d+|::1|0:0:0:0:0:0:1" /> -->
    <Manager sessionAttributeValueClassNameFilter="java\\.lang\\.(?:Boolean|Integer|Long|Number|
String)|org\\.apache\\.catalina\\.filters\\.Csr">
</Context>
```

SERVIDOR DE APLICACIONES – APACHE TOMCAT



The screenshot shows a terminal window titled "osboxes@osboxes: /tmp". The file "/opt/tomcat/webapps/manager/META-INF/context.xml" is open in the nano editor. The content of the file is as follows:

```
GNU nano 6.2          /opt/tomcat/webapps/manager/META-INF/context.xml *
<?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
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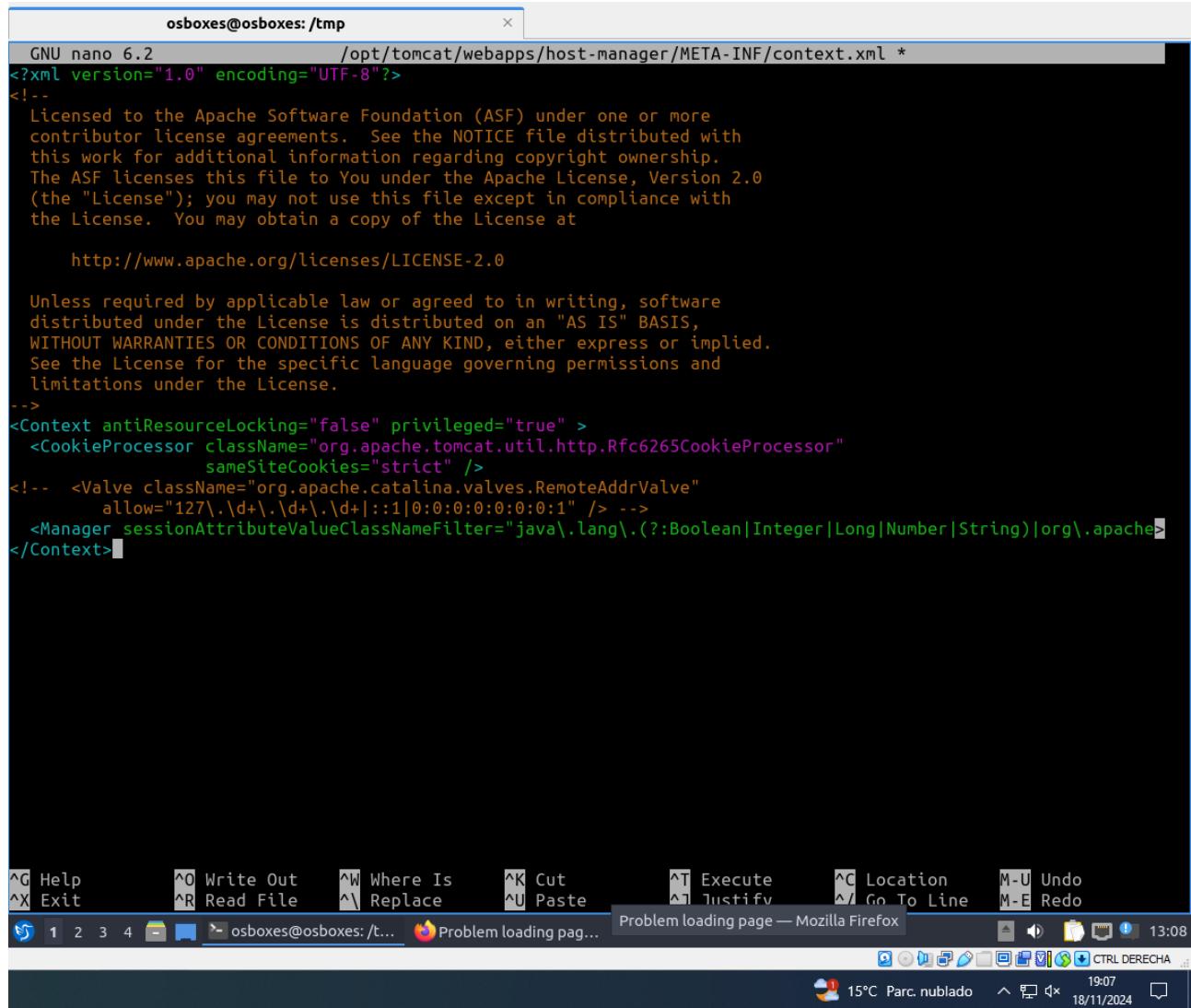
Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.
-->
<Context antiResourceLocking="false" privileged="true" >
  <CookieProcessor className="org.apache.tomcat.util.http.Rfc6265CookieProcessor"
    sameSiteCookies="strict" />
<!--  <Valve className="org.apache.catalina.valves.RemoteAddrValve"
    allow="127\.\d+\.\d+\.\d+|::1|0:0:0:0:0:1" /> -->
  <Manager sessionAttributeValueClassNameFilter="java\.lang\.(?:Boolean|Integer|Long|Number|String)|org\.apache\.catalina\.session\.JvmRouteAttributeFilter" />
</Context>
```

The terminal window includes a menu bar with options like Help, Exit, Write Out, Read File, Where Is, Replace, Cut, Paste, Execute, Justify, Location, Go To Line, Undo, and Redo. The bottom status bar shows the command prompt "osboxes@osboxes: /tmp", the date and time "13:06", and system icons.

SERVIDOR DE APLICACIONES – APACHE TOMCAT

9-Ahora los mismo en el host manager:

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



```
osboxes@osboxes:/tmp          x
GNU nano 6.2                  /opt/tomcat/webapps/host-manager/META-INF/context.xml *
<?xml version="1.0" encoding="UTF-8"?>
<!--
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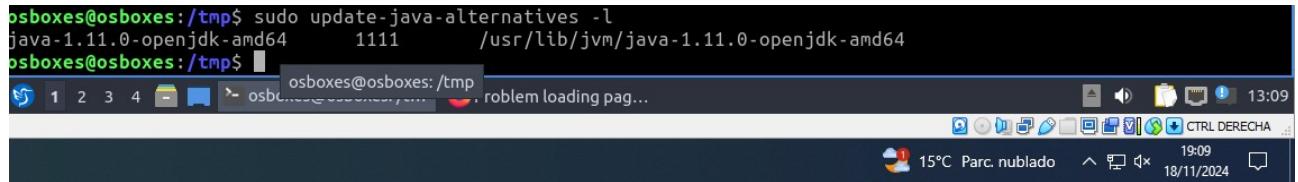
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distributed under the License is distributed on an "AS IS" BASIS,
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limitations under the License.
-->
<Context antiResourceLocking="false" privileged="true" >
  <CookieProcessor className="org.apache.tomcat.util.http.Rfc6265CookieProcessor"
    sameSiteCookies="strict" />
<!--  <Valve className="org.apache.catalina.valves.RemoteAddrValve"
    allow="127\\.\\d+\\.\\d+\\.\\d+|::1|0:0:0:0:0:1" /> -->
  <Manager sessionAttributeValueClassNameFilter="java\\.lang\\.\\{Boolean|Integer|Long|Number|String\\}|org\\.apache\\.\\{Tomcat|Util\\}" />
</Context>
```

^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo
^X Exit ^R Read File ^A Replace ^U Paste ^L Justifyv ^I Go To Line M-E Redo
Firefox - Problem loading page — Mozilla Firefox 13:08
CTRL DERECHA
15°C Parc. nublado 19:07 18/11/2024

SERVIDOR DE APLICACIONES – APACHE TOMCAT

10-Creacion systemd



```
osboxes@osboxes:/tmp$ sudo update-java-alternatives -l
java-1.11.0-openjdk-amd64      1111      /usr/lib/jvm/java-1.11.0-openjdk-amd64
osboxes@osboxes:/tmp$
```

The screenshot shows a terminal window with the command 'sudo update-java-alternatives -l' run. The output lists 'java-1.11.0-openjdk-amd64' as the current alternative with ID 1111. The path '/usr/lib/jvm/java-1.11.0-openjdk-amd64' is also shown. Below the terminal is a desktop environment interface with various icons and status indicators.

SERVIDOR DE APLICACIONES – APACHE TOMCAT

11-Almacenar el tomcatservicio en un archivo llamado tomcat.service, en /etc/systemd/system. Crea el archivo para editararlo ejecutando

→ sudo nano /etc/systemd/system/tomcat.service

Le añadimos lo siguiente:

[Unit]

Description=Tomcat

After=network.target

[Service]

Type=forking

User=tomcat

Group=tomcat

Environment="JAVA_HOME=/usr/lib/jvm/java-1.11.0-openjdk-amd64"

Environment="JAVA_OPTS=-Djava.security.egd=file:///dev/urandom"

Environment="CATALINA_BASE=/opt/tomcat"

Environment="CATALINA_HOME=/opt/tomcat"

Environment="CATALINA_PID=/opt/tomcat/temp/tomcat.pid"

Environment="CATALINA_OPTS=-Xms512M -Xmx1024M -server -XX:+UseParallelGC"

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

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

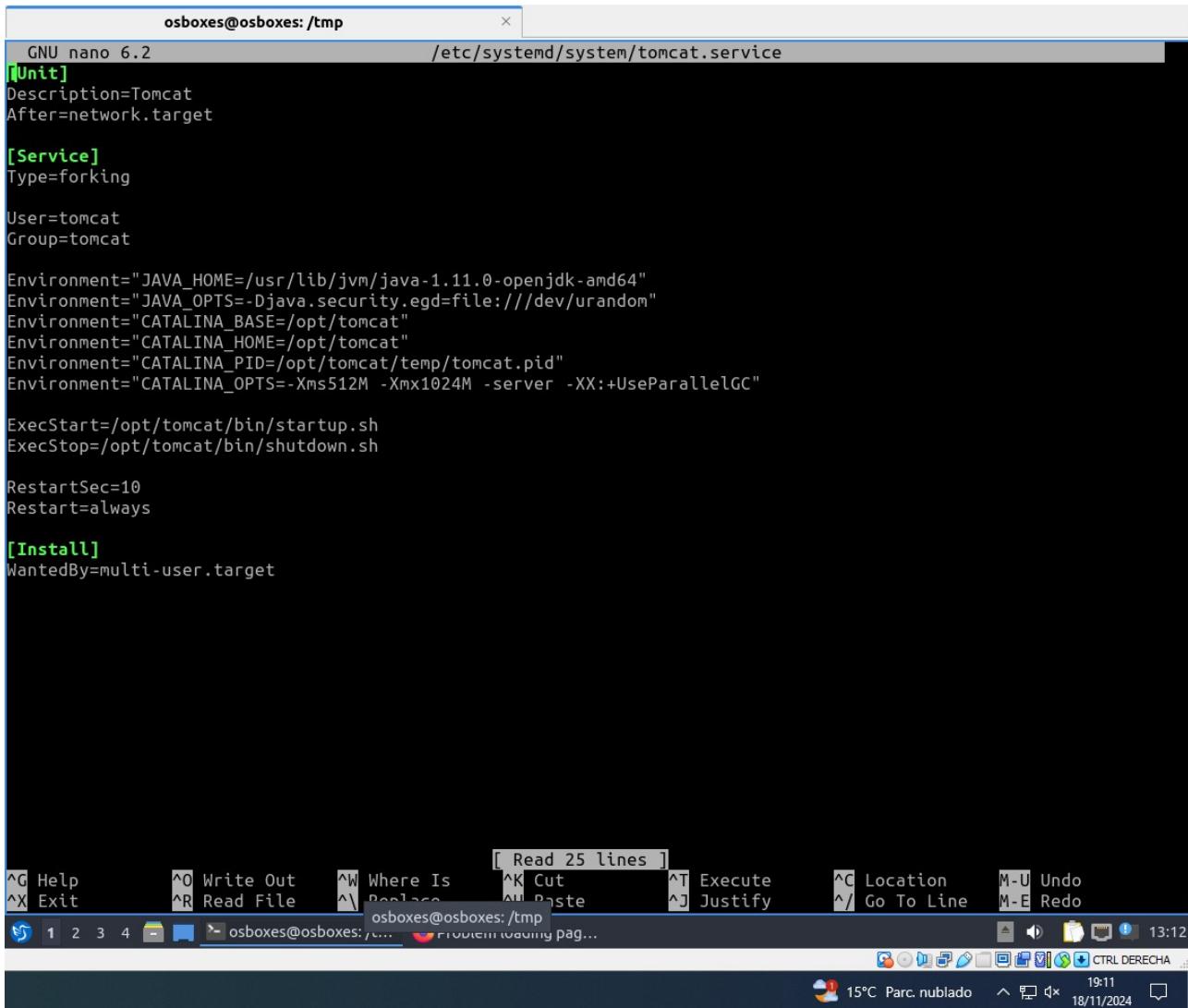
RestartSec=10

Restart=always

[Install]

WantedBy=multi-user.target

SERVIDOR DE APLICACIONES – APACHE TOMCAT



```
osboxes@osboxes: /tmp
GNU nano 6.2                               /etc/systemd/system/tomcat.service
[Unit]
Description=Tomcat
After=network.target

[Service]
Type=forking
User=tomcat
Group=tomcat

Environment="JAVA_HOME=/usr/lib/jvm/java-1.11.0-openjdk-amd64"
Environment="JAVA_OPTS=-Djava.security.egd=file:///dev/urandom"
Environment="CATALINA_BASE=/opt/tomcat"
Environment="CATALINA_HOME=/opt/tomcat"
Environment="CATALINA_PID=/opt/tomcat/temp/tomcat.pid"
Environment="CATALINA_OPTS=-Xms512M -Xmx1024M -server -XX:+UseParallelGC"

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

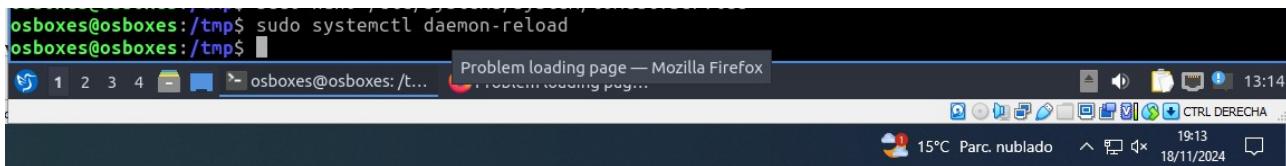
RestartSec=10
Restart=always

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

12-Comprobamos tomcat:

Recargamos systemd:

```
sudo systemctl daemon-reload
```



```
osboxes@osboxes: /tmp$ sudo systemctl daemon-reload
osboxes@osboxes: /tmp$
```

SERVIDOR DE APLICACIONES – APACHE TOMCAT

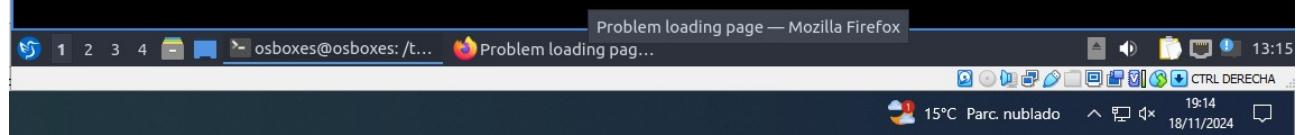
Iniciamos y miramos status de tomcat:

```
sudo systemctl start tomcat
```

```
sudo systemctl status tomcat
```

```
osboxes@osboxes:/tmp$ sudo systemctl start tomcat
osboxes@osboxes:/tmp$ sudo systemctl status tomcat
● tomcat.service - Tomcat
   Loaded: loaded (/etc/systemd/system/tomcat.service; disabled; vendor preset: enabled)
   Active: active (running) since Mon 2024-11-18 13:15:07 EST; 5s ago
     Process: 6160 ExecStart=/opt/tomcat/bin/startup.sh (code=exited, status=0/SUCCESS)
   Main PID: 6167 (java)
      Tasks: 30 (limit: 12802)
        Memory: 128.4M
          CPU: 5.444S
        CGroup: /system.slice/tomcat.service
                   └─6167 /usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -Djava.util.logging.config.file=/opt/tomcat>

Nov 18 13:15:07 osboxes systemd[1]: Starting Tomcat...
Nov 18 13:15:07 osboxes startup.sh[6160]: Tomcat started.
Nov 18 13:15:07 osboxes systemd[1]: Started Tomcat.
lines 1-14/14 (END)
```



SERVIDOR DE APLICACIONES – APACHE TOMCAT

The screenshot shows the Apache Tomcat 10.1.33 homepage. At the top, the browser title bar reads "Apache Tomcat/10.1.33 — Mozilla Firefox". The address bar shows "localhost:8080". The main content area features a green banner with the text "If you're seeing this, you've successfully installed Tomcat. Congratulations!". Below the banner is a cartoon cat icon and a list of "Recommended Reading" links: "Security Considerations How-To", "Manager Application How-To", and "Clustering/Session Replication How-To". To the right of the banner are three buttons: "Server Status", "Manager App", and "Host Manager". The page is divided into several sections: "Developer Quick Start" (with links to "Tomcat Setup", "First Web Application", "Realms & AAA", "JDBC DataSources", "Examples", "Servlet Specifications", and "Tomcat Versions"); "Managing Tomcat" (with links to "Release Notes", "Changelog", "Migration Guide", and "Security Notices"); "Documentation" (with links to "Tomcat 10.1 Documentation", "Tomcat 10.1 Configuration", and "Tomcat Wiki"); and "Getting Help" (with links to "FAQ and Mailing Lists" and information about mailing lists like "tomcat-announce", "tomcat-users", "taglibs-user", and "tomcat-dev"). The bottom of the screenshot shows the Mac OS X desktop environment.

b. Despliega tu propia aplicación web

Despliega un fichero Sample.war, y comprueba que puedes acceder a la aplicación

Pistas:

[Apache Tomcat 11 \(11.0.0-M16\) - Tomcat Web Application Deployment](#)

[How to Deploy a WAR File to Tomcat | Baeldung](#)

Preparar el archivo WAR

- Asegúrate de tener el archivo Sample.war listo para ser desplegado.

Nombre y apellidos:

26 / 42

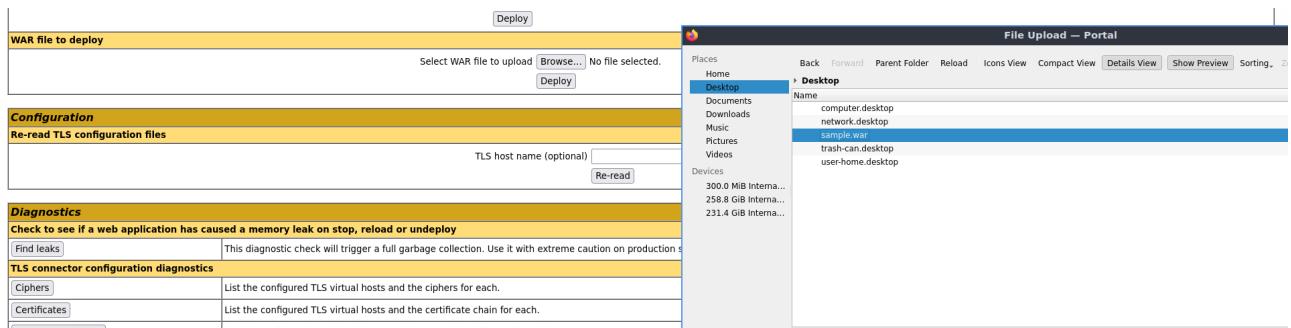
SERVIDOR DE APLICACIONES – APACHE TOMCAT

- **Desplegar el archivo WAR en Tomcat**
- Puedes subir el archivo WAR a través de la **Manager App** o simplemente colocarlo en la carpeta `webapps` de Tomcat para que se despliegue automáticamente:

```
cp /ruta/de/tu/Sample.war /opt/tomcat/webapps/
```

- **Acceder a la aplicación desplegada**

- Despues de unos momentos, Tomcat desplegará automáticamente la aplicación.
- Accede a la aplicación en el navegador con la URL `http://localhost:8080/Sample/`.



The screenshot shows the Apache Tomcat Manager App interface. At the top, it says 'Welcome to Firefox' and '127.0.0.1:8080/manager/html/upload;jsessionid=B9B2B19124307B68F7438BD166E7FCCA?org.apache.catalina.filters.CSRF_NONCE=A551A4DD92EC2B214A3'. Below that is a navigation bar with tabs for 'Manager', 'List Applications', 'HTML Manager Help', and 'Manager Help'. The main area has a title 'Applications' with a table:

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

Below the table is a 'Deploy' section with fields for 'Deploy directory or WAR file located on server':

- Context Path:
- Version (for parallel deployment):
- XML Configuration file path:

SERVIDOR DE APLICACIONES – APACHE TOMCAT



3. Securización

Configura para que el acceso sea seguro mediante certificados SSL, accediendo por HTTPS

Pistas:

[A Step-By-Step Guide to Apache Tomcat with SSL Configuration | by Kayathiri Mahendrakumaran | Analytics Vidhya | Medium](#)

[Instalación del certificado SSL en el servidor Apache Tomcat \(sslmarket.es\)](#)

[Apache Tomcat 9 \(9.0.85\) - SSL/TLS Configuration How-To](#)

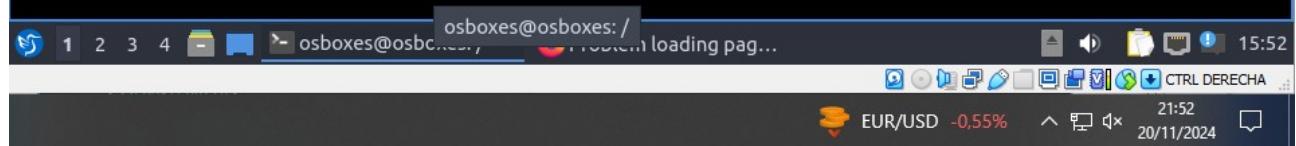
SERVIDOR DE APLICACIONES – APACHE TOMCAT

1-Crear o Obtener Certificado SSL

Crear un certificado

```
sudo keytool -genkey -alias bruno -keyalg RSA -keystore /etc/ssl/bruno.keystore
```

```
osboxes@osboxes:/$ sudo keytool -genkey -alias bruno -keyalg RSA -keystore /etc/ssl/bruno.keystore
Enter keystore password:
Keystore password is too short - must be at least 6 characters
Enter keystore password:
Re-enter new password:
What is your first and last name?
[Unknown]: bruno
What is the name of your organizational unit?
[Unknown]: bruno
What is the name of your organization?
[Unknown]: bruno
What is the name of your City or Locality?
[Unknown]: bruno
What is the name of your State or Province?
[Unknown]: bruno
What is the two-letter country code for this unit?
[Unknown]: bruno
Is CN=bruno, OU=bruno, O=bruno, L=bruno, ST=bruno, C=bruno correct?
[no]:
```

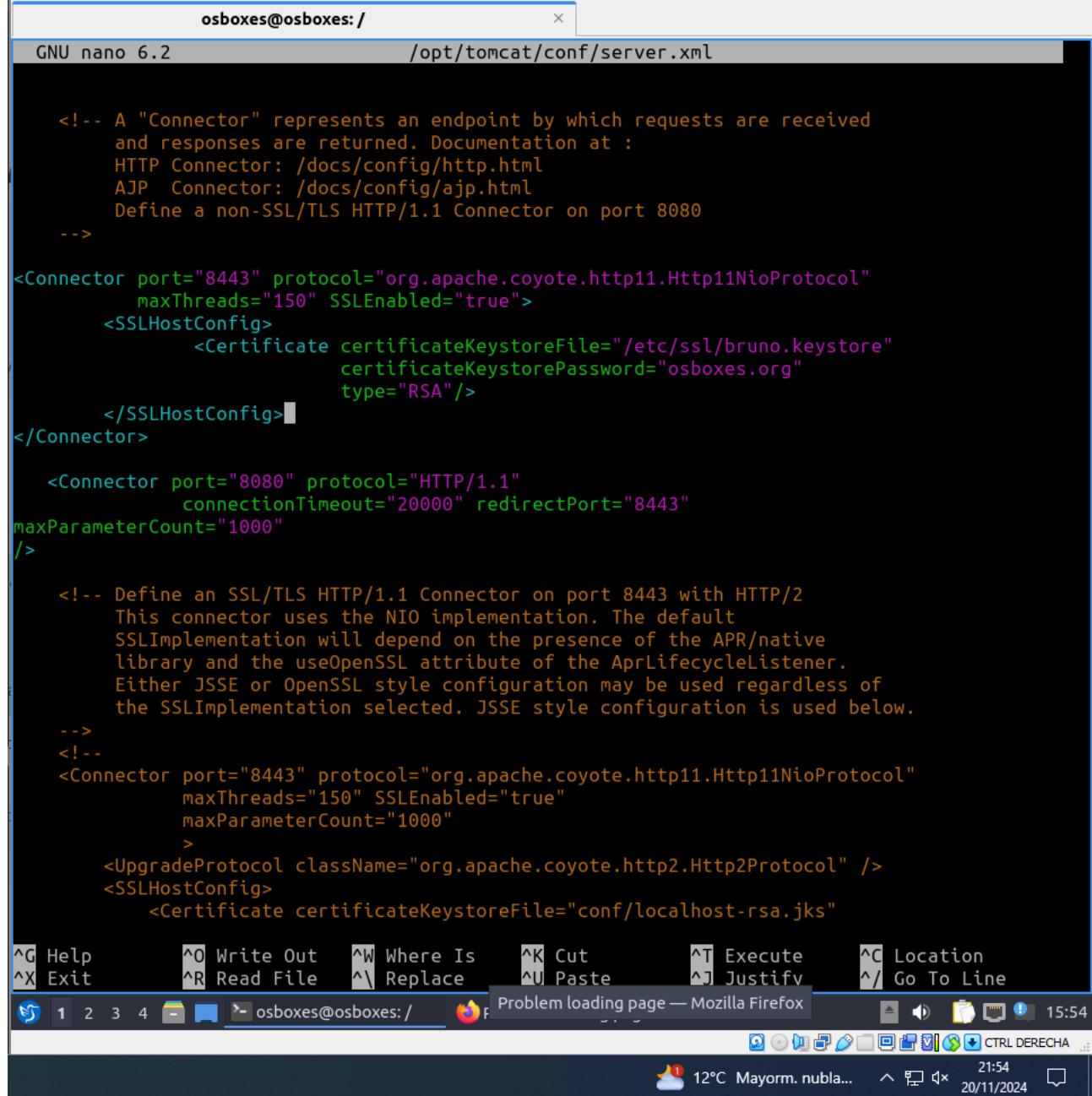


SERVIDOR DE APLICACIONES – APACHE TOMCAT

2-Configurar Tomcat para usar el certificado SSL

Iremos a “ sudo nano /opt/tomcat/conf/server.xml ”

y escribiremos:



```
osboxes@osboxes: /opt/tomcat/conf/server.xml
GNU nano 6.2

<!-- A "Connector" represents an endpoint by which requests are received
     and responses are returned. Documentation at :
     HTTP Connector: /docs/config/http.html
     AJP Connector: /docs/config/ajp.html
     Define a non-SSL/TLS HTTP/1.1 Connector on port 8080
-->

<Connector port="8443" protocol="org.apache.coyote.http11.Http11NioProtocol"
           maxThreads="150" SSLEnabled="true">
    <SSLHostConfig>
        <Certificate certificateKeystoreFile="/etc/ssl/bruno.keystore"
                      certificateKeystorePassword="osboxes.org"
                      type="RSA"/>
    </SSLHostConfig>
</Connector>

<Connector port="8080" protocol="HTTP/1.1"
           connectionTimeout="20000" redirectPort="8443"
maxParameterCount="1000"
/>

<!-- Define an SSL/TLS HTTP/1.1 Connector on port 8443 with HTTP/2
     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 AprLifecycleListener.
     Either JSSE or OpenSSL style configuration may be used regardless of
     the SSLImplementation selected. JSSE style configuration is used below.
-->
<!--
<Connector port="8443" protocol="org.apache.coyote.http11.Http11NioProtocol"
           maxThreads="150" SSLEnabled="true"
           maxParameterCount="1000"
           >
    <UpgradeProtocol className="org.apache.coyote.http2.Http2Protocol" />
    <SSLHostConfig>
        <Certificate certificateKeystoreFile="conf/localhost-rsa.jks"
```

SERVIDOR DE APLICACIONES – APACHE TOMCAT

```
<Connector port="8443" protocol="org.apache.coyote.http11.Http11NioProtocol"  
maxThreads="150" SSLEnabled="true">  
<SSLHostConfig>  
<Certificate certificateKeystoreFile="/etc/ssl/tomcat.keystore"  
certificateKeystorePassword="tu_contraseña_del_keystore"  
type="RSA"/>  
</SSLHostConfig>  
</Connector>
```

SERVIDOR DE APLICACIONES – APACHE TOMCAT

3-Abrir el puerto HTTPS en el Firewall

Usando UFW escribiremos los siguientes comandos:

```
sudo ufw allow 8443
```

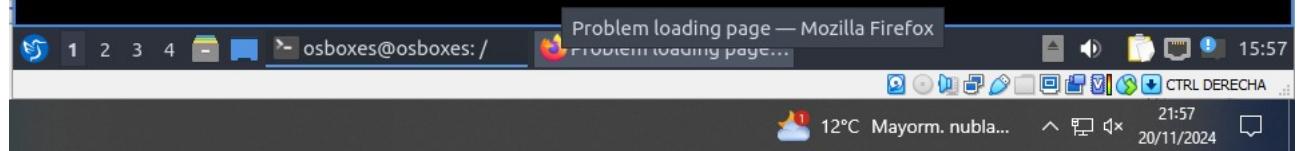
```
sudo ufw reload
```

```
sudo ufw enable
```

```
sudo ufw reload
```

```
sudo systemctl restart tomcat
```

```
osboxes@osboxes:/$ sudo nano /opt/tomcat/conf/server.xml
osboxes@osboxes:/$ sudo ufw allow 8443
Skipping adding existing rule
Skipping adding existing rule (v6)
osboxes@osboxes:/$ sudo ufw reload
Firewall reloaded
osboxes@osboxes:/$ sudo ufw enable
Firewall is active and enabled on system startup
osboxes@osboxes:/$ sudo ufw reload
Firewall reloaded
osboxes@osboxes:/$ sudo systemctl restart tomcat
osboxes@osboxes:/$ █
```



SERVIDOR DE APLICACIONES – APACHE TOMCAT

4-Acceder a la aplicación por HTTPS

<https://localhost:8443/>

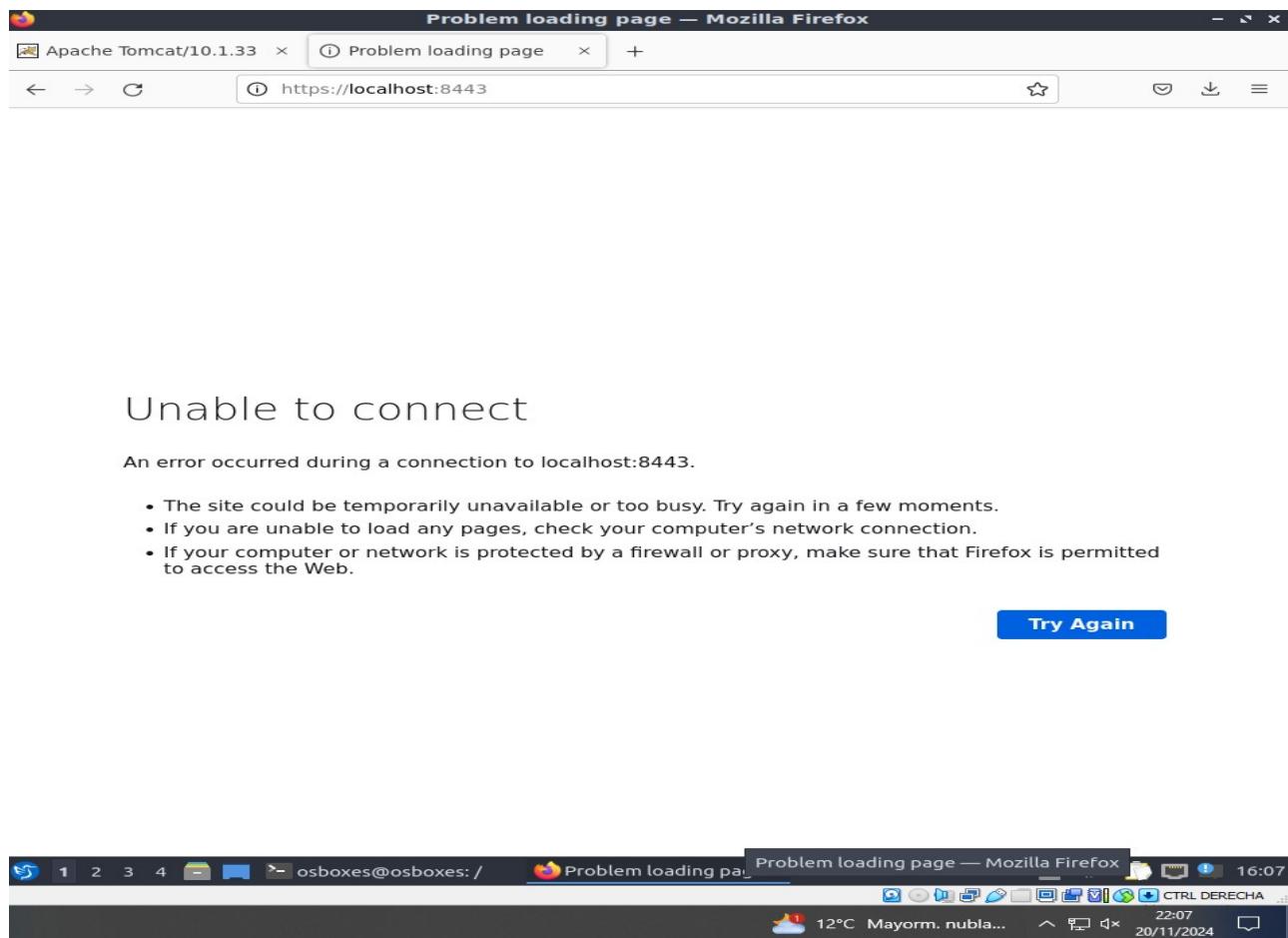
Le cambié el puerto varias veces, volví a hacerlo de cero buscando otras maneras de hacerlo como con la guia:

https://help.ivanti.com/wl/help/es_es/ava/6.1/Avalanche/Install/CertificateTomcat.html

0

<https://geekflare.com/es/tomcat-ssl-guide/>

Y sigue dando me el siguiente error:



4. Integración con un IDE

Raliza la integración de Tomcat con un IDE de tu elección (IntelliJ IDEA, Eclipse, Netbeans, Visual Studio Code,...)

Pistas:

[How to Deploy a WAR File to Tomcat | Baeldung](#)

[Visual Studio Code Tomcat y su configuración - Arquitectura Java](#)

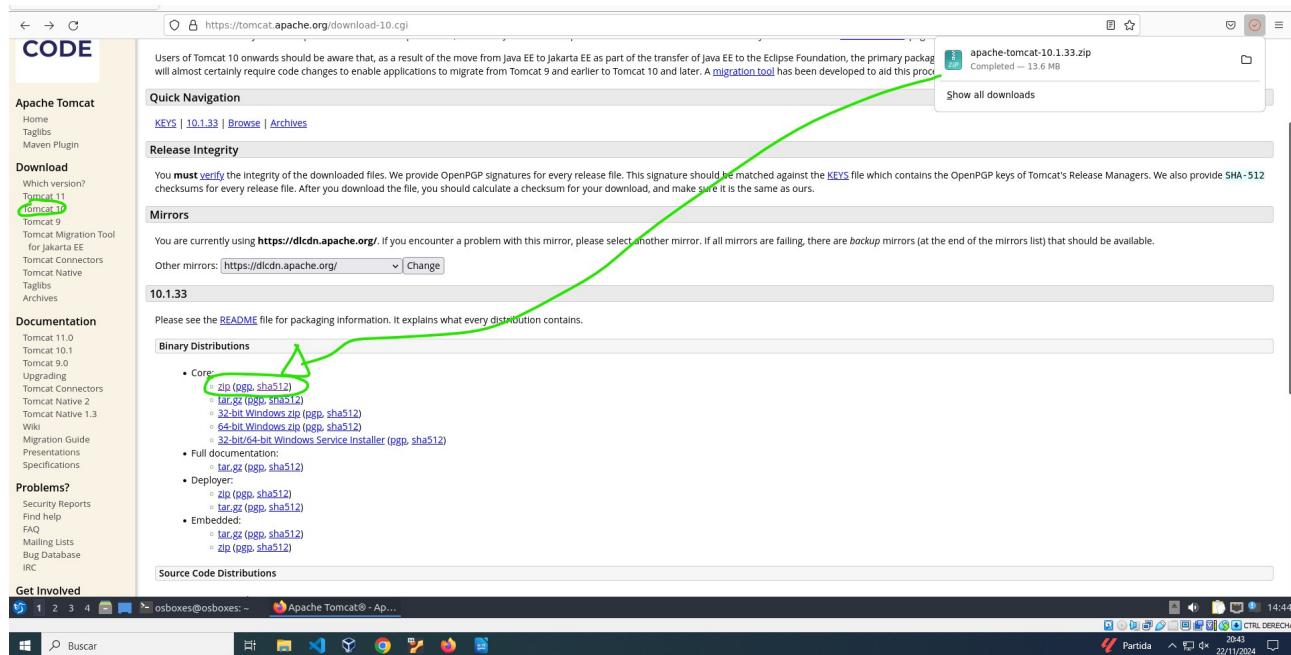
[Instalación de Tomcat y configuración con Visual Studio Code - YouTube](#)

[\(Microsoft Word - Cap\355tulo 6. Eclipse con el plug-in de TOMCAT.doc\) \(us.es\)](#)

[Cómo configurar Eclipse y Apache Tomcat para desarrollar aplicaciones Java Web - YouTube](#)

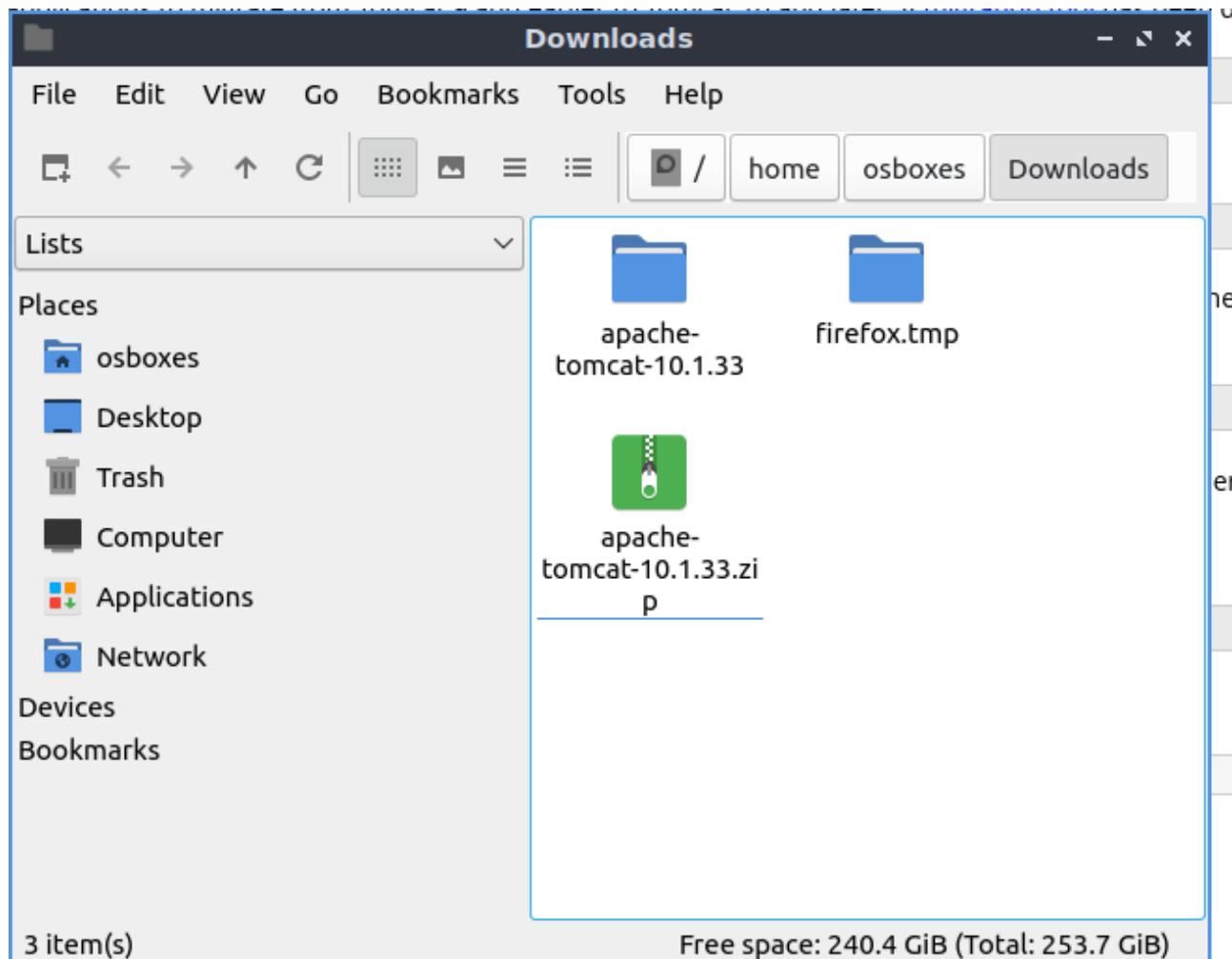
[AGREGAR EL SERVIDOR TOMCAT 9 A NETBEANS – VIDEOLCLOUD \(wordpress.com\)](#)

[Instalar y configurar Apache Tomcat 9 en NetBeans - YouTube](#)

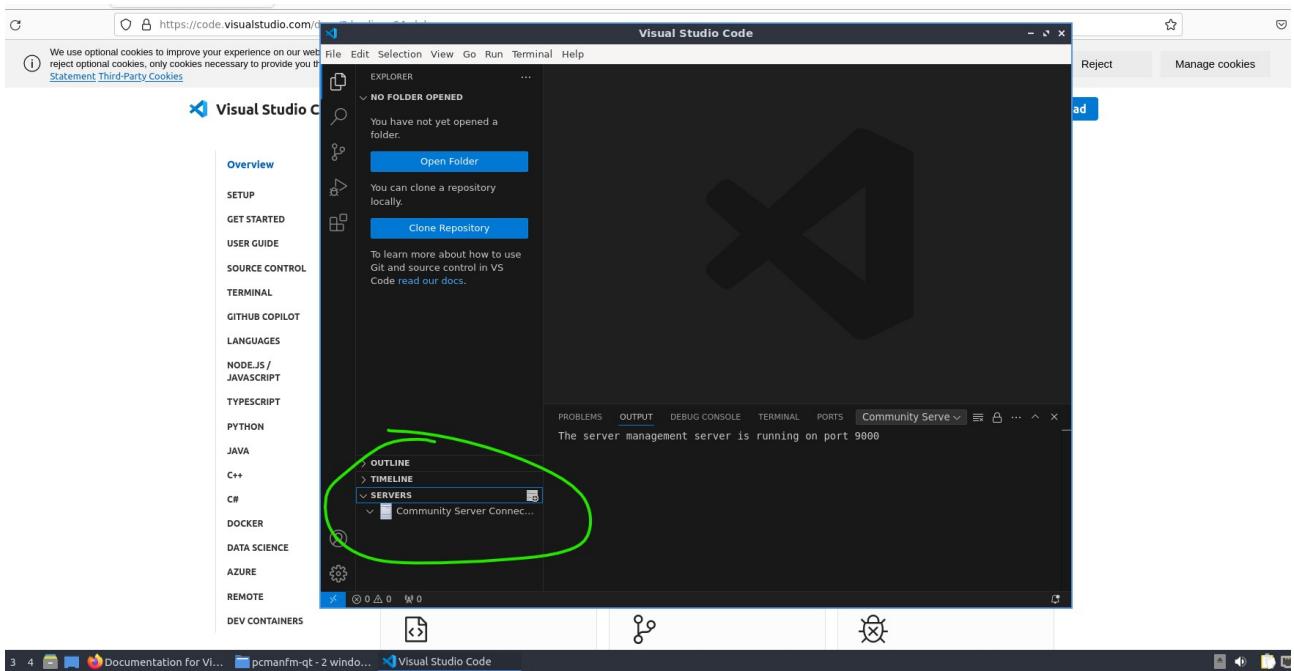
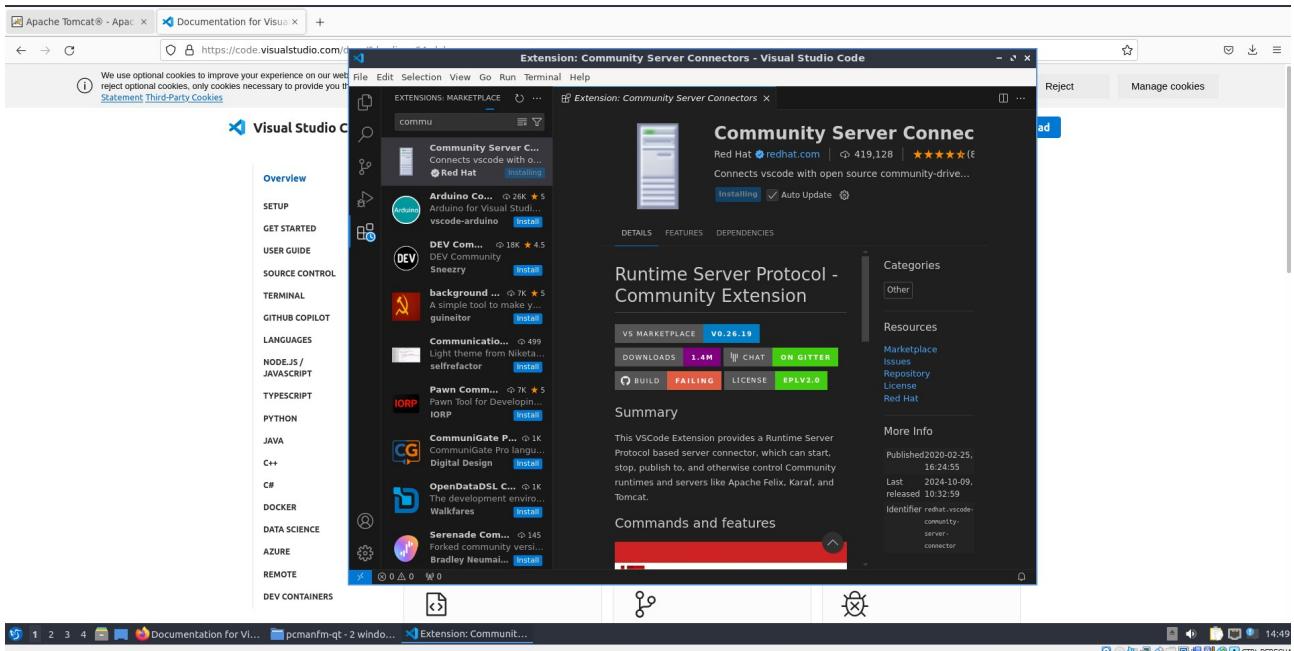


SERVIDOR DE APLICACIONES – APACHE TOMCAT

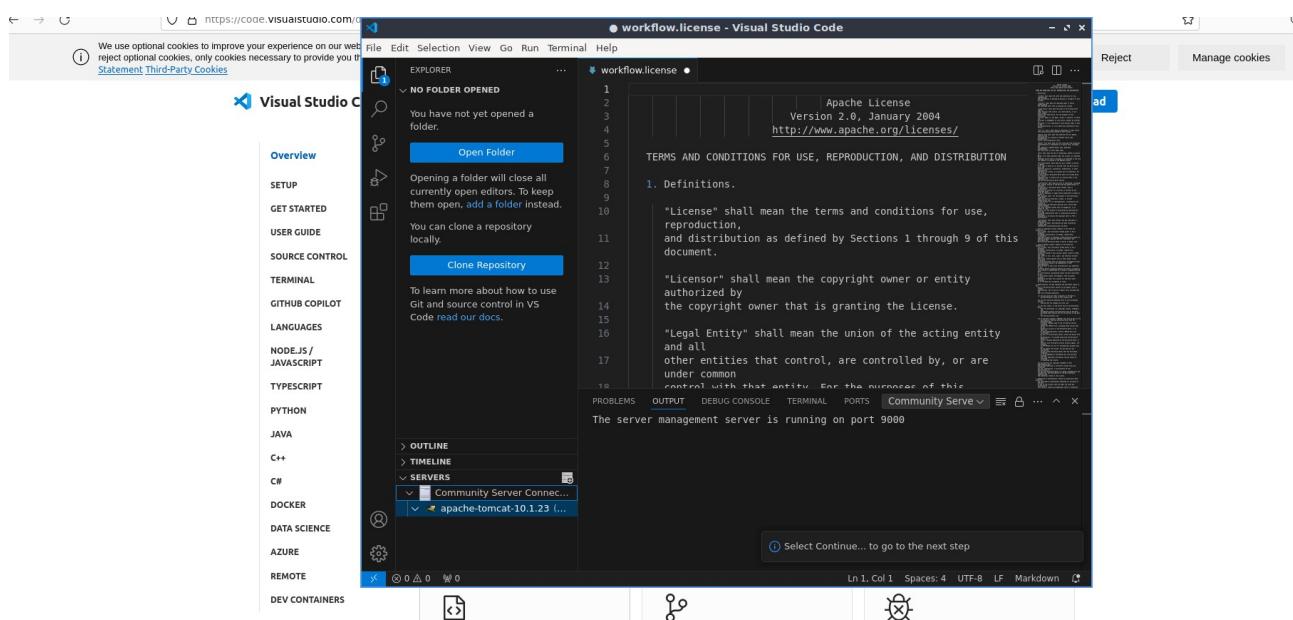
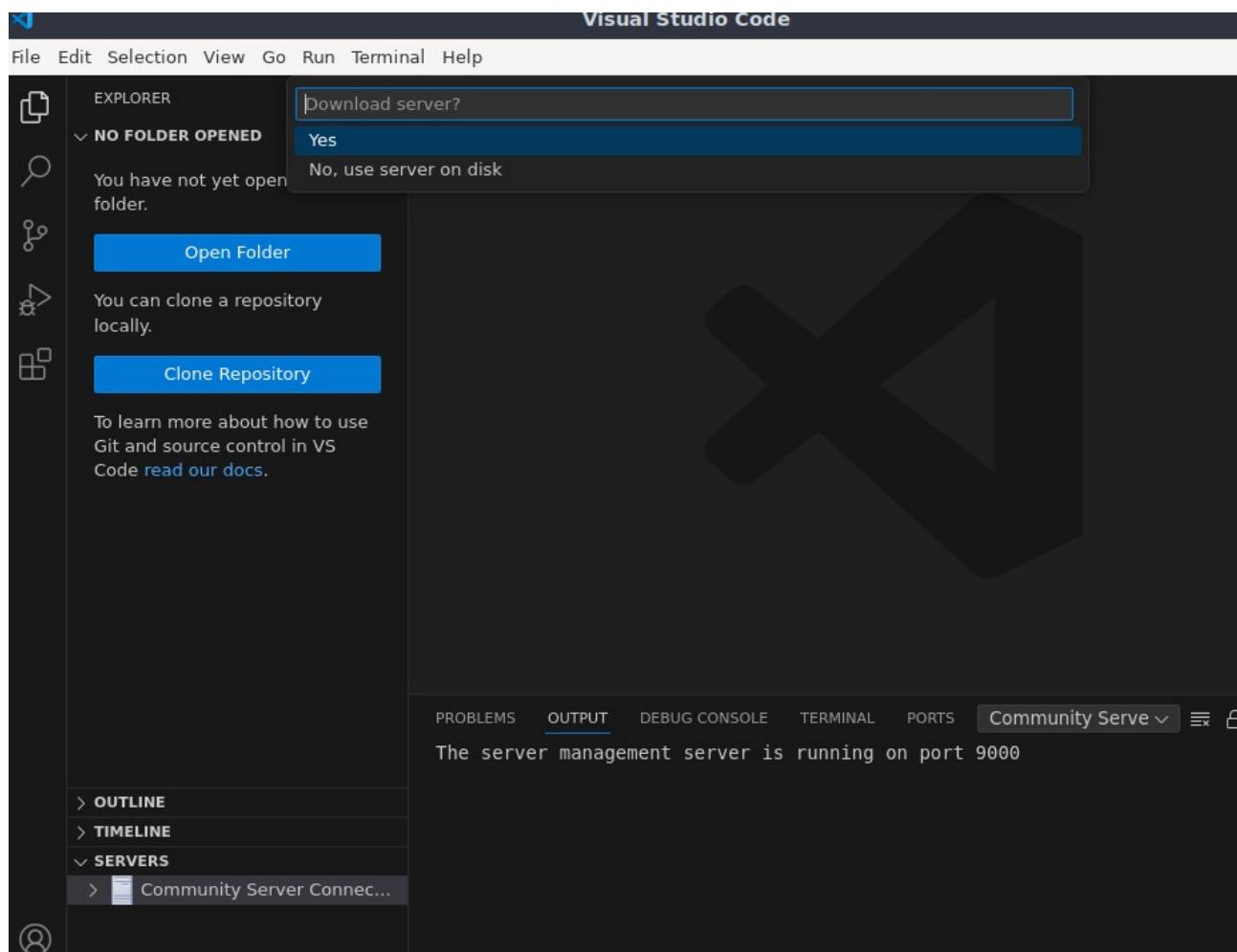
Extraemos:



SERVIDOR DE APLICACIONES – APACHE TOMCAT



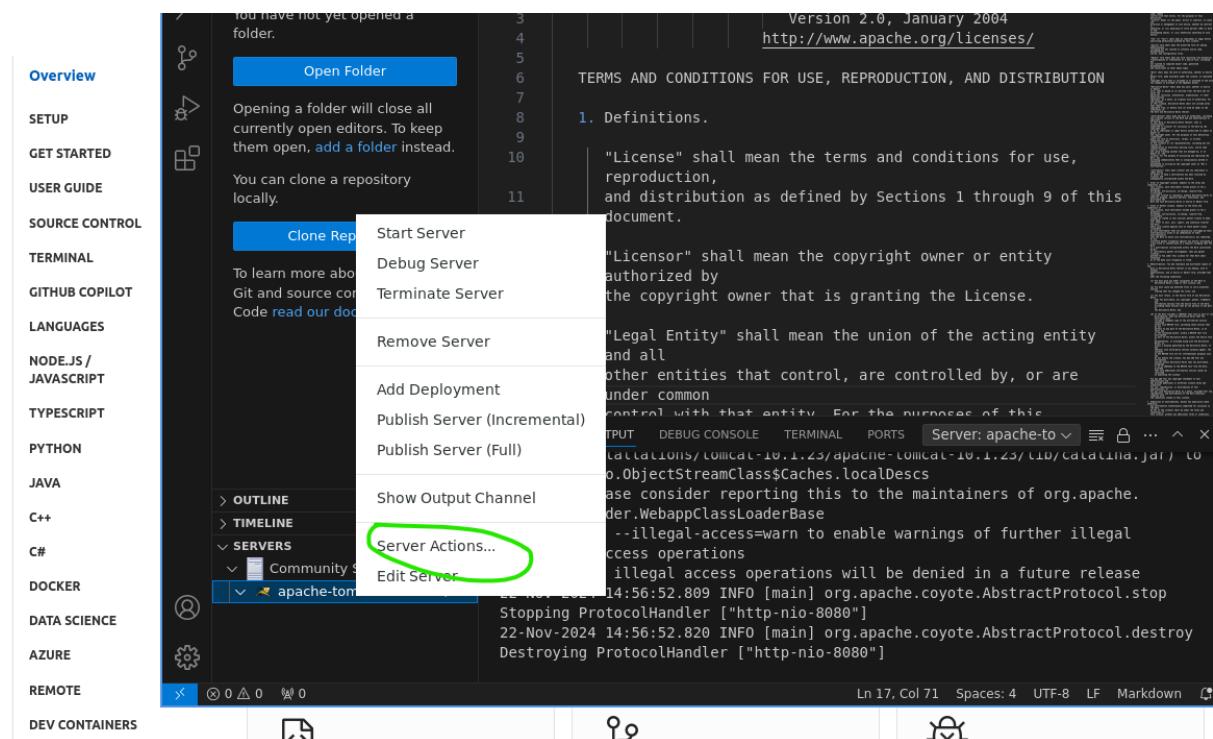
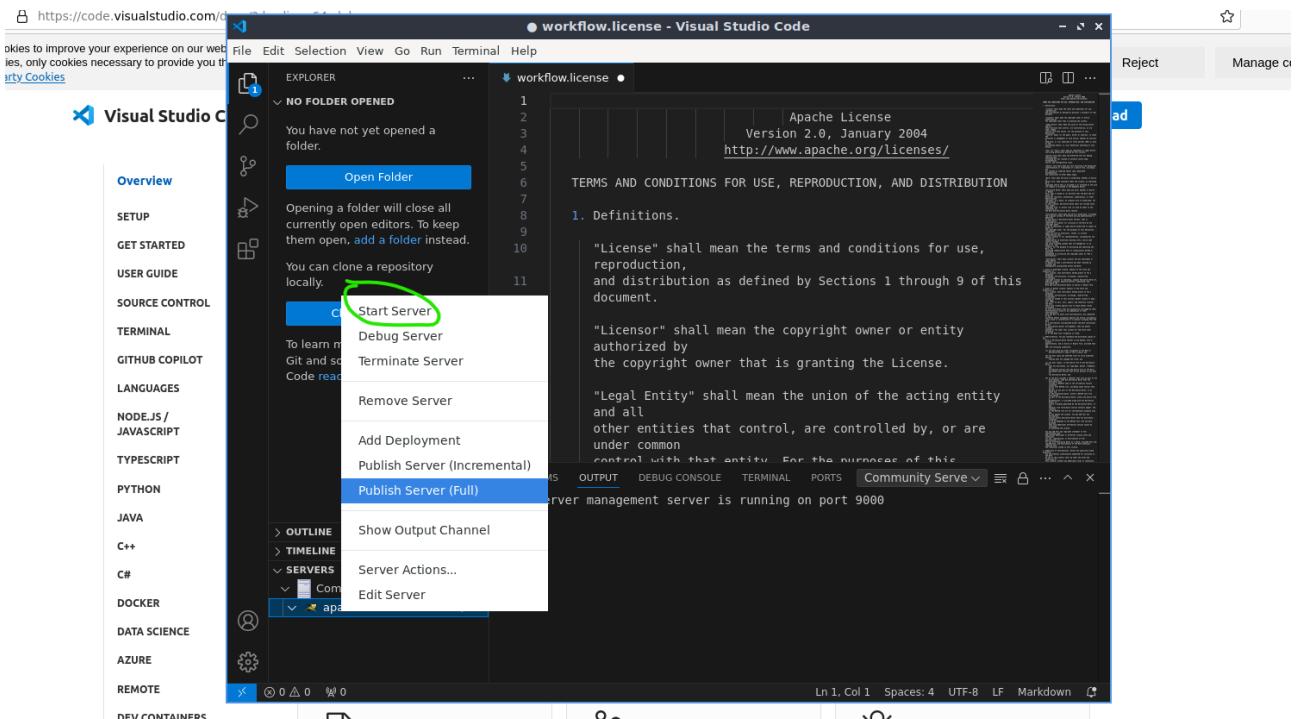
SERVIDOR DE APLICACIONES – APACHE TOMCAT



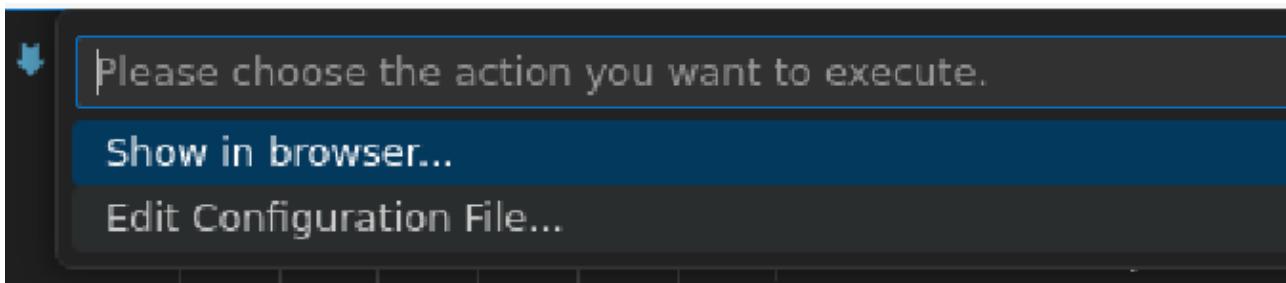
Nombre y apellidos:

37 / 42

SERVIDOR DE APLICACIONES – APACHE TOMCAT



SERVIDOR DE APLICACIONES – APACHE TOMCAT



localhost:8080

Home Documentation Configuration Examples Wiki Mailing Lists Find Help

Apache Tomcat/10.1.23

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

[Release Notes](#) [Changelog](#) [Migration Guide](#) [Security Notices](#)

Documentation
[Tomcat 10.1 Documentation](#) [Tomcat 10.1 Configuration](#) [Tomcat Wiki](#)
Find additional important configuration information in:
`$CATALINA_HOME/RUNNING.txt`
Developers may be interested in:
[Tomcat 10.1 Bug Database](#) [Tomcat 10.1 JavaDocs](#) [Tomcat 10.1 GitHub Repository at GitHub](#)

Getting Help
[FAQ and Mailing Lists](#)
The following mailing lists are available:
tomcat-announce
Important announcements, releases, security vulnerability notifications. (Low volume).
tomcat-user
User support and discussion
tomcat-dev
User support and discussion for [Apache Tomcat](#)
tomcat-dev
Development mailing list, including commit messages

Other Downloads
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5. Cuestiones

a) ¿Qué versión de Apache Tomcat instalarás dependiendo de tu versión de Java?

- Tomcat 10.0.x y posteriores: Compatible con Java 11 y versiones superiores.
- Tomcat 9.0.x: Compatible con Java 8 y versiones superiores.
- Tomcat 8.5.x: Compatible con Java 7 y versiones superiores.
- Tomcat 7.0.x: Compatible con Java 6 y versiones superiores.

a.1) Y para la versión 8?

Para Java 8, la versión más recomendada de Apache Tomcat es la 9.0.x, aunque también es compatible con Tomcat 8.5.x si necesitas mantener compatibilidad con aplicaciones o entornos específicos

a.2) Y para la versión 21?

Para Java 21 (que es una versión más reciente), deberías optar por Tomcat 10.1.x o superiores, ya que las versiones más nuevas de Tomcat se adaptan mejor a las características y mejoras de las versiones más recientes de Java.

b) ¿Qué otros servidores de aplicaciones hay en el mercado? ¿Cuáles son software libre y cuáles productos comerciales?

Software Libre:

1. Apache Tomcat: Un contenedor de servlets y JSP ampliamente utilizado.
2. Jetty: Un servidor web y contenedor de servlets de Eclipse.
3. JBoss/WildFly: Un servidor de aplicaciones Java EE desarrollado por Red Hat.
4. GlassFish: Un servidor de aplicaciones Java EE de Oracle, ahora gestionado por Eclipse Foundation como Eclipse GlassFish.

Productos Comerciales:

1. IBM WebSphere: Un servidor de aplicaciones Java EE de IBM.
2. Oracle WebLogic: Un servidor de aplicaciones Java EE de Oracle.
3. SAP NetWeaver: Un servidor de aplicaciones que es parte de la plataforma tecnológica de SAP.
4. Red Hat JBoss EAP: La versión comercial del servidor de aplicaciones JBoss, con soporte de Red Hat.

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c) Una de las cuestiones a tener en cuenta es el rendimiento de las aplicaciones. ¿Sabrías indicar alguna herramienta para pruebas de carga?

1. Apache JMeter: Una herramienta de software libre diseñada para pruebas de carga y rendimiento.
2. Gatling: Una herramienta de pruebas de carga basada en Scala que se utiliza para simular cargas de usuarios y medir el rendimiento.
3. LoadRunner: Una herramienta comercial de Micro Focus que ofrece una amplia gama de capacidades de prueba de rendimiento.
4. BlazeMeter: Una plataforma de pruebas de rendimiento basada en la nube que es compatible con Apache JMeter y otras herramientas de prueba.

d) Otra de las cuestiones a tener en cuenta es la monitorización del servidor de aplicaciones. ¿Sabrías indicarme alguna herramienta para monitorizar tomcat u otro servidor de aplicaciones? ¿Qué indicadores puede interesar monitorizar?

Herramientas de Monitorización:

1. Prometheus con Grafana: Prometheus es una herramienta de monitoreo y alerta de código abierto, y Grafana es una plataforma de análisis y monitoreo que puede visualizar datos de Prometheus.
2. New Relic: Una solución comercial que ofrece monitoreo de aplicaciones en tiempo real.
3. Dynatrace: Una herramienta comercial que proporciona monitoreo de rendimiento de aplicaciones, infraestructuras y experiencia del usuario.
4. Zabbix: Una herramienta de monitoreo de red y aplicaciones de código abierto.

Indicadores a Monitorizar:

1. Uso de CPU: Monitorear el uso de la CPU para asegurarse de que no esté sobrecargada.
2. Uso de Memoria: Verificar el uso de la memoria heap y no-heap para detectar posibles fugas de memoria.
3. Tiempo de Respuesta: Medir el tiempo de respuesta de las aplicaciones para asegurar que cumplen con los niveles de servicio.
4. Tasa de Errores: Monitorear la cantidad de errores que se producen para detectar problemas en las aplicaciones.

SERVIDOR DE APLICACIONES – APACHE TOMCAT

5. Número de Sesiones Activas: Observar el número de sesiones activas para comprender la carga en el servidor.
6. Conexiones JDBC: Monitorear las conexiones a la base de datos para asegurarse de que no hay cuellos de botella.
7. Utilización de Hilos: Verificar la utilización de hilos en el pool de hilos para evitar la saturación del servidor.

Pistas:

[Apache Tomcat monitoring and integration with Zabbix](#)

[Apache Tomcat Monitoring Guide & 5 Best Tools for 2024 \(comparitech.com\)](#)

[Apache Tomcat - Nagios Exchange](#)

[JMeter vs Other Performance Testing Tools | automateNow](#)

[List of application servers - Wikipedia](#)

[List of application servers - Wikipedia \(aimultiple.com\)](#)

[WebLogic Server | Oracle España](#)

[WebSphere Application Server | IBM](#)

[WildFly](#)