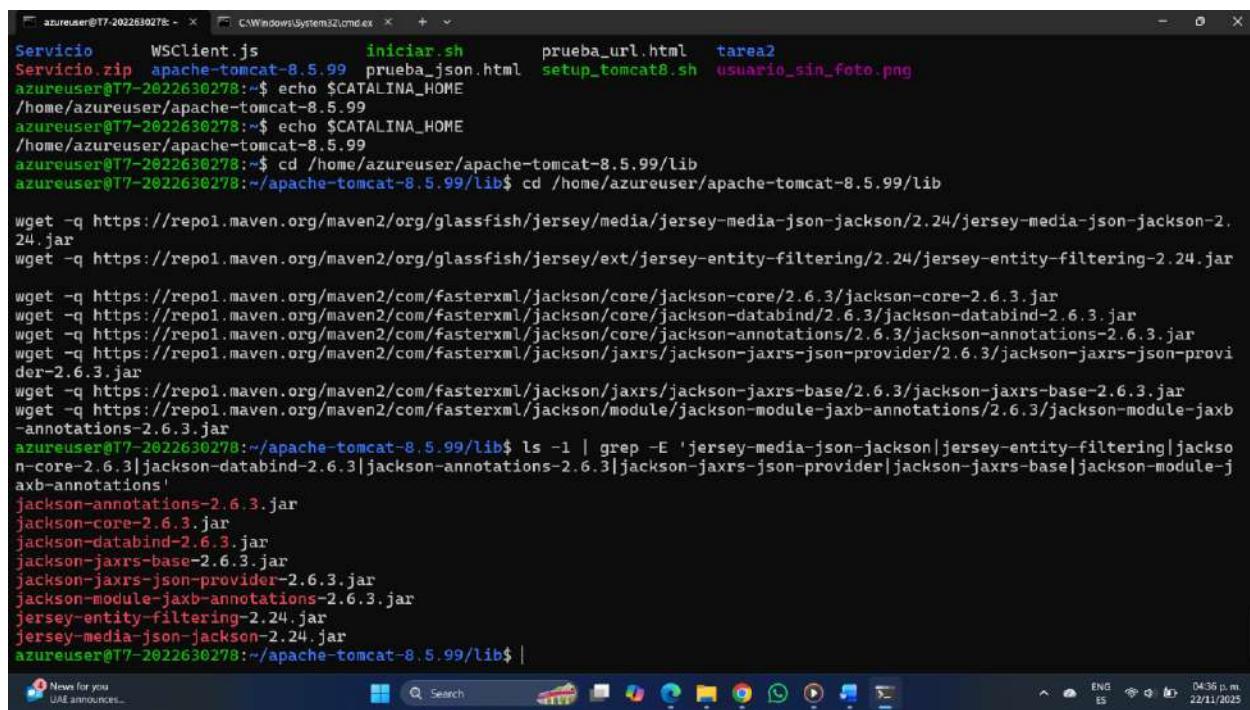


A continuación, se presentan los pasos del procedimiento completo para realizar la descarga directa de las librerías Jackson/Jersey dentro de la VM, usando la ruta de Tomcat:

CATALINA\_HOME = /home/azureuser/apache-tomcat-8.5.99

1. Ubicarse en el directorio de librerías de Tomcat
2. Descargar directamente las 8 librerías solicitadas
3. Verificar que llegaron

Debe listar los 8 nombres.



```
azur&lt;user@T7-2022630278: ~ / apache-tomcat-8.5.99/lib &gt;
Servicio WSClient.js iniciar.sh prueba_url.html tarea2
Servicio.zip apache-tomcat-8.5.99 prueba_json.html setup_tomcat8.sh usuario_sin_foto.png
azur&lt;user@T7-2022630278: ~$ echo $CATALINA_HOME
/home/azureuser/apache-tomcat-8.5.99
azur&lt;user@T7-2022630278: ~$ echo $CATALINA_HOME
/home/azureuser/apache-tomcat-8.5.99
azur&lt;user@T7-2022630278: ~$ cd /home/azureuser/apache-tomcat-8.5.99/lib
azur&lt;user@T7-2022630278: ~/apache-tomcat-8.5.99/lib$ cd /home/azureuser/apache-tomcat-8.5.99/lib
wget -q https://repo1.maven.org/maven2/org/glassfish/jersey/media/jersey-media-json-jackson/2.24/jersey-media-json-jackson-2.24.jar
wget -q https://repo1.maven.org/maven2/org/glassfish/jersey/ext/jersey-entity-filtering/2.24/jersey-entity-filtering-2.24.jar
wget -q https://repo1.maven.org/maven2/com/fasterxml/jackson/core/jackson-core/2.6.3/jackson-core-2.6.3.jar
wget -q https://repo1.maven.org/maven2/com/fasterxml/jackson/core/jackson-databind/2.6.3/jackson-databind-2.6.3.jar
wget -q https://repo1.maven.org/maven2/com/fasterxml/jackson/core/jackson-annotations/2.6.3/jackson-annotations-2.6.3.jar
wget -q https://repo1.maven.org/maven2/com/fasterxml/jackson/jaxrs/jackson-jaxrs-json-provider/2.6.3/jackson-jaxrs-json-provider-2.6.3.jar
wget -q https://repo1.maven.org/maven2/com/fasterxml/jackson/jaxrs/jackson-jaxrs-base/2.6.3/jackson-jaxrs-base-2.6.3.jar
wget -q https://repo1.maven.org/maven2/com/fasterxml/jackson/module/jackson-module-jaxb-annotations/2.6.3/jackson-module-jaxb-annotations-2.6.3.jar
azur&lt;user@T7-2022630278: ~/apache-tomcat-8.5.99/lib$ ls -l | grep -E 'jersey-media-json-jackson|jersey-entity-filtering|jackson-core-2.6.3|jackson-databind-2.6.3|jackson-annotations-2.6.3|jackson-jaxrs-json-provider|jackson-jaxrs-base|jackson-module-jaxb-annotations|jackson-annotations-2.6.3.jar|jackson-core-2.6.3.jar|jackson-databind-2.6.3.jar|jackson-jaxrs-base-2.6.3.jar|jackson-jaxrs-json-provider-2.6.3.jar|jackson-module-jaxb-annotations-2.6.3.jar|jersey-entity-filtering-2.24.jar|jersey-media-json-jackson-2.24.jar'
azur&lt;user@T7-2022630278: ~/apache-tomcat-8.5.99/lib$ |
```

Imagen 21: Listado de archivos JAR dentro de \$CATALINA\_HOME/lib.

## 8.5 Limpieza y despliegue base

### 8.5.1 Limpieza del despliegue antiguo del servicio

El servicio se despliega como aplicación web estándar: carpeta Servicio/ y/o archivo Servicio.war dentro de webapps.

Se eliminan los restos previos para evitar clases obsoletas:

Se revisa que ya no exista:

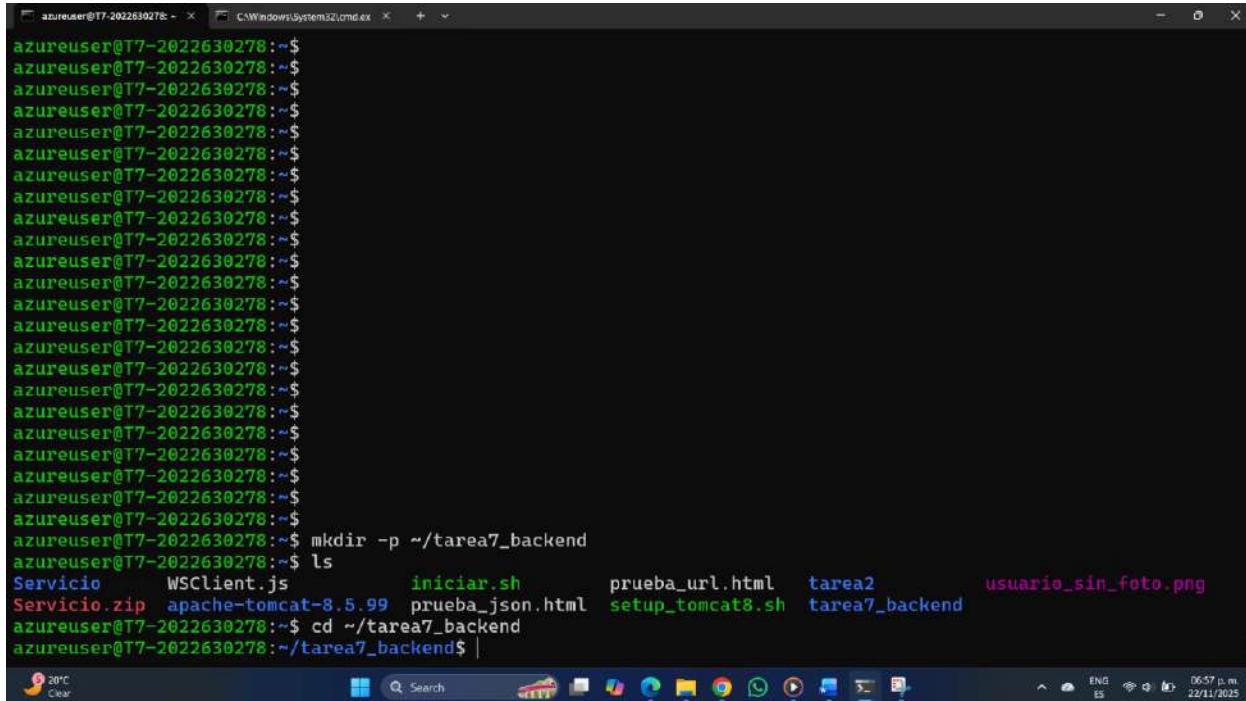
```
azuser@T7-2022630278:~$ C:\Windows\System32\cmd.exe
openjdk version "1.8.0_462"
OpenJDK Runtime Environment (build 1.8.0_462-b08-ga~us1~0ubuntu2~24.04.2-b08)
OpenJDK 64-Bit Server VM (build 25.462-b08, mixed mode)
azuser@T7-2022630278:~$ ls -ld /home/azureuser/apache-tomcat-8.5.99
drwxr-xr-x 9 azuser azuser 4096 Oct 21 16:13 /home/azureuser/apache-tomcat-8.5.99
azuser@T7-2022630278:~$ ls /home/azureuser/apache-tomcat-8.5.99/webapps
ROOT Servicio Servicio.war
azuser@T7-2022630278:~$ ps -ef | grep tomcat
azuser+ 3172 1 0 Nov22 pts/0 00:00:21 /usr/bin/java -Djava.util.logging.config.file=/home/azureuser/apache-tomcat-8.5.99/conf/logging.properties -Djava.util.logging.manager=org.apache.juli.ClassLoaderLogManager -Djdk.tls.ephemeralDHKeysize=2048 -Djava.protocol.handler.pkgs=org.apache.catalina.webresources -Dorg.apache.catalina.security.SecurityListener.UMASK=0027 -Dignore.endorsed.dirs= -classpath /home/azureuser/apache-tomcat-8.5.99/bin/bootstrap.jar:/home/azureuser/apache-tomcat-8.5.99/bin/tomcat-juli.jar -Dcatalina.base=/home/azureuser/apache-tomcat-8.5.99 -Dcatalina.home=/home/azureuser/apache-tomcat-8.5.99 -Djava.io.tmpdir=/home/azureuser/apache-tomcat-8.5.99/temp org.apache.catalina.startup.Bootstrap start
azuser+ 4247 3115 0 00:49 pts/0 00:00:00 grep --color=auto tomcat
azuser@T7-2022630278:~$ rm -rf /home/azureuser/apache-tomcat-8.5.99/webapps/Servicio
azuser@T7-2022630278:~$ rm -f /home/azureuser/apache-tomcat-8.5.99/webapps/Servicio.war
azuser@T7-2022630278:~$ 
azuser@T7-2022630278:~$ ls /home/azureuser/apache-tomcat-8.5.99/webapps | grep Servicio || echo "Servicio eliminado correctamente"
Servicio eliminado correctamente
azuser@T7-2022630278:~$
```

### **8.5.2 Preparar directorio de trabajo para compilar**

Crea un directorio de trabajo fuera de webapps (para no mezclar fuentes con despliegue). Por ejemplo:

```
mkdir -p ~/tarea7_backend
```

```
cd ~/tarea7_backend
```



```
azureuser@T7-2022630278:~$ mkdir -p ~/tarea7_backend
azureuser@T7-2022630278:~$ ls
Servicio  WSClient.js      iniciar.sh    prueba_url.html  tarea2      usuario_sin_foto.png
Servicio.zip apache-tomcat-8.5.99  prueba_json.html  setup_tomcat8.sh  tarea7_backend
azureuser@T7-2022630278:~$ cd ~/tarea7_backend
azureuser@T7-2022630278:~/tarea7_backend$ |
```

Se copia o sube por SFTP el archivo Servicio.zip aquí. No se pone dentro de webapps, porque se compila primero y sólo el WAR final se copia a webapps.

```

C:\Users\ivan-\Documents\GitHub\Sistemas-Distribuidos\Tarea\Tarea_7>sftp azureuser@4.248.144.161
azureuser@4.248.144.161's password:
Connected to 4.248.144.161.
sftp> cd tarea7_backend
sftp> put Servicio.zip
Uploading Servicio.zip to /home/azureuser/tarea7_backend/Servicio.zip
Servicio.zip
Servicio.zip
% 6809 15.7KB/s 00:00
sftp> put prueba.html
Uploading prueba.html to /home/azureuser/tarea7_backend/prueba.html
prueba.html
sftp> put WSClient.js
Uploading WSClient.js to /home/azureuser/tarea7_backend/WSClient.js
WSClient.js
sftp> put usuario_sin_foto.png
Uploading usuario_sin_foto.png to /home/azureuser/tarea7_backend/usuario_sin_foto.png
usuario_sin_foto.png
sftp> ls -l
-rw----- 1 azureuser azureuser 6809 Nov 22 19:01 Servicio.zip
-rw----- 1 azureuser azureuser 3692 Nov 22 19:01 WSClient.js
-rw----- 1 azureuser azureuser 11520 Nov 22 19:01 prueba.html
drwx----- 1 azureuser azureuser 4096 Nov 22 18:56 uploads
-rw----- 1 azureuser azureuser 1662 Nov 22 19:01 usuario_sin_foto.png
sftp> bye

C:\Users\ivan-\Documents\GitHub\Sistemas-Distribuidos\Tarea\Tarea_7>
C:\Users\ivan-\Documents\GitHub\Sistemas-Distribuidos\Tarea\Tarea_7>
C:\Users\ivan-\Documents\GitHub\Sistemas-Distribuidos\Tarea\Tarea_7>
C:\Users\ivan-\Documents\GitHub\Sistemas-Distribuidos\Tarea\Tarea_7>
C:\Users\ivan-\Documents\GitHub\Sistemas-Distribuidos\Tarea\Tarea_7>
C:\Users\ivan-\Documents\GitHub\Sistemas-Distribuidos\Tarea\Tarea_7>

```

Se descomprime Servicio.zip y se verifica :

```

azureuser@T7-2022630278:~$ mkdir -p ~/tarea7_backend
azureuser@T7-2022630278:~$ ls
Servicio  WSClient.js      iniciar.sh    prueba_url.html  tarea2      usuario_sin_foto.png
Servicio.zip apache-tomcat-8.5.99  prueba_json.html  setup_tomcat8.sh  tarea7_backend
azureuser@T7-2022630278:~$ cd ~/tarea7_backend
azureuser@T7-2022630278:~/tarea7_backend$ ls
Servicio.zip  WSClient.js  prueba.html  uploads  usuario_sin_foto.png
azureuser@T7-2022630278:~/tarea7_backend$ unzip Servicio.zip
Archive: Servicio.zip
  creating: Servicio/
  inflating: Servicio/compila.bat
  inflating: Servicio/compila.sh
  creating: Servicio/META-INF/
  inflating: Servicio/META-INF/context.xml
  creating: Servicio/servicio/
  inflating: Servicio/servicio/servicio.java
  inflating: Servicio/servicio/Usuario.java
  inflating: Servicio/servicio/HuboError.java
  creating: Servicio/WEB-INF/
  creating: Servicio/WEB-INF/classes/
  creating: Servicio/WEB-INF/classes/servicio/
  inflating: Servicio/WEB-INF/web.xml
azureuser@T7-2022630278:~/tarea7_backend$ ls
Servicio  Servicio.zip  WSClient.js  prueba.html  uploads  usuario_sin_foto.png
azureuser@T7-2022630278:~/tarea7_backend$ ls Servicio
META-INF  WEB-INF  compila.bat  compila.sh  servicio
azureuser@T7-2022630278:~/tarea7_backend$ 
azureuser@T7-2022630278:~/tarea7_backend$ 

```

### 8.5.3 Configurar context.xml (conexión a MySQL)

Se edita el archivo con: nano Servicio/META-INF/context.xml

```
azreuser@T7-2022630278: ~ C:\Windows\System32\cmd.exe + - x
Memory usage: 69% IPv4 address for eth0: 172.16.0.4
Swap usage: 0%
* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s just raised the bar for easy, resilient and secure K8s cluster deployment.
https://ubuntu.com/engage/secure-kubernetes-at-the-edge
Expanded Security Maintenance for Applications is not enabled.
50 updates can be applied immediately.
29 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

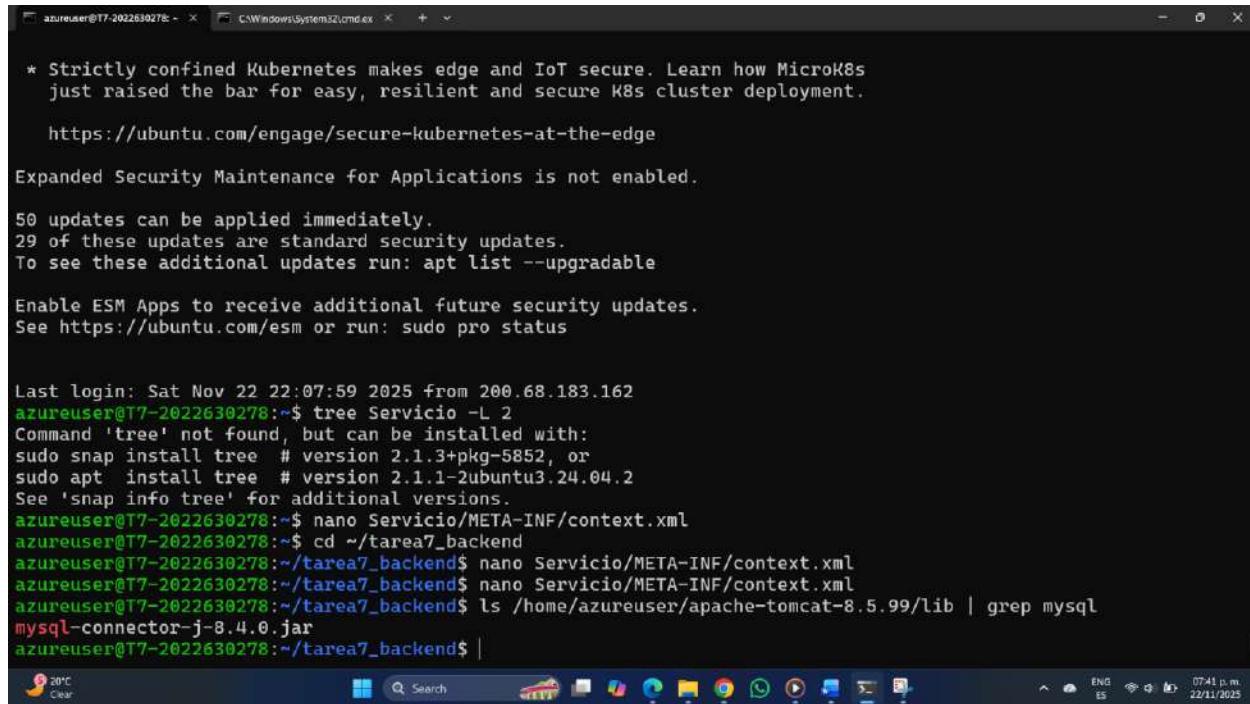
Last login: Sat Nov 22 22:07:59 2025 from 200.68.183.162
azureuser@T7-2022630278:~$ tree Servicio -L 2
Command 'tree' not found, but can be installed with:
sudo snap install tree # version 2.1.3+pkg-5852, or
sudo apt install tree # version 2.1.1-2ubuntu3.24.04.2
See 'snap info tree' for additional versions.
azureuser@T7-2022630278:~$ nano Servicio/META-INF/context.xml
azureuser@T7-2022630278:~$ cd ~/tarea7_backend
azureuser@T7-2022630278:~/tarea7_backend$ nano Servicio/META-INF/context.xml
azureuser@T7-2022630278:~/tarea7_backend$ nano Servicio/META-INF/context.xml
azureuser@T7-2022630278:~/tarea7_backend$ |
```

Nos Asegúramos de colocar el usuario y password de MySQL:

```
azreuser@T7-2022630278: ~ C:\Windows\System32\cmd.exe + - x
GNU nano 7.2 Servicio/META-INF/context.xml
<Context>
  <Resource name="jdbc/datasource_Servicio" auth="Container" type="javax.sql.DataSource"
    maxActive="100" maxIdle="30" maxWait="10000"
    username="x" password=""
    driverClassName="com.mysql.cj.jdbc.Driver"
    url="jdbc:mysql://localhost/servicio_web?serverTimezone=UTC"/>
</Context>
```

Se verifica que el driver mysql-connector esté dentro de CATALINA\_HOME/lib:

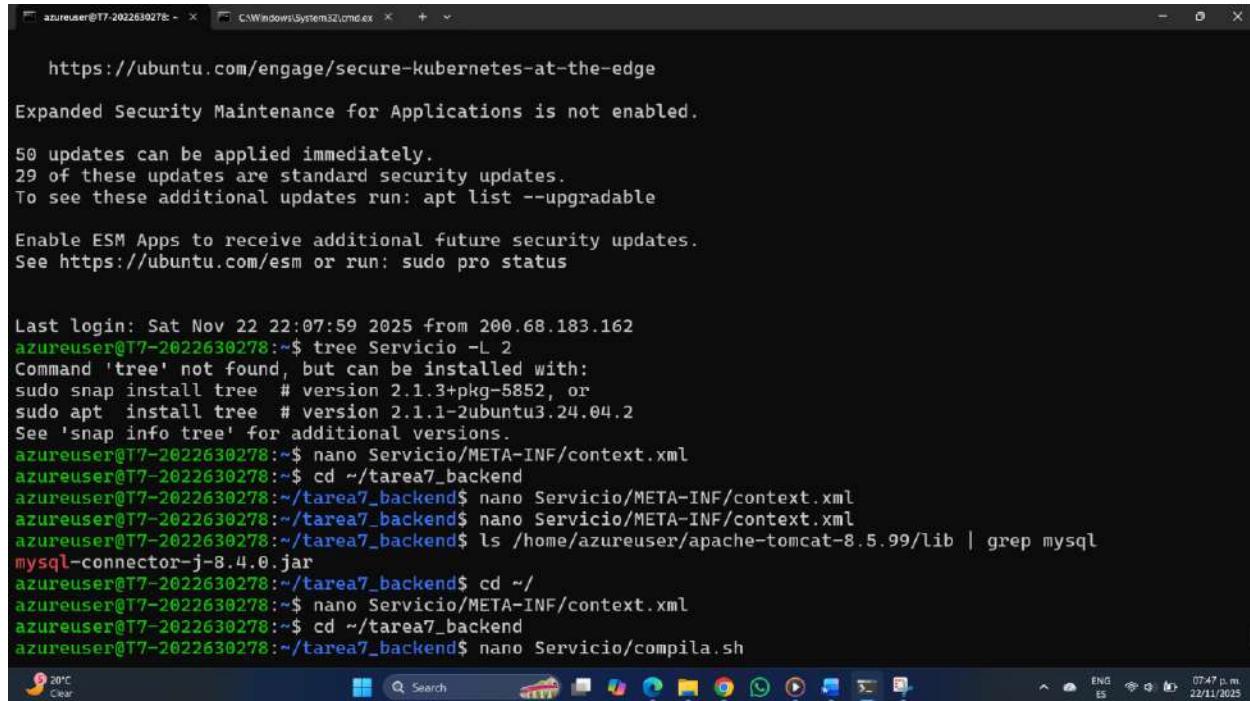
```
ls /home/azureuser/apache-tomcat-8.5.99/lib | grep mysql
```



```
* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s just raised the bar for easy, resilient and secure K8s cluster deployment.  
https://ubuntu.com/engage/secure-kubernetes-at-the-edge  
  
Expanded Security Maintenance for Applications is not enabled.  
  
50 updates can be applied immediately.  
29 of these updates are standard security updates.  
To see these additional updates run: apt list --upgradable  
  
Enable ESM Apps to receive additional future security updates.  
See https://ubuntu.com/esm or run: sudo pro status  
  
Last login: Sat Nov 22 22:07:59 2025 from 200.68.183.162  
azureuser@T7-2022630278:~$ tree Servicio -L 2  
Command 'tree' not found, but can be installed with:  
sudo snap install tree # version 2.1.3+pkg-5852, or  
sudo apt install tree # version 2.1.1-2ubuntu3.24.04.2  
See 'snap info tree' for additional versions.  
azureuser@T7-2022630278:~$ nano Servicio/META-INF/context.xml  
azureuser@T7-2022630278:~/tarea7_backend$ nano Servicio/META-INF/context.xml  
azureuser@T7-2022630278:~/tarea7_backend$ nano Servicio/META-INF/context.xml  
azureuser@T7-2022630278:~/tarea7_backend$ ls /home/azureuser/apache-tomcat-8.5.99/lib | grep mysql  
mysql-connector-j-8.4.0.jar  
azureuser@T7-2022630278:~/tarea7_backend$ |
```

## 8.5.4 Configurar compila.sh

Se edito el script compila.sh: nano Servicio/compila.sh



```
https://ubuntu.com/engage/secure-kubernetes-at-the-edge  
  
Expanded Security Maintenance for Applications is not enabled.  
  
50 updates can be applied immediately.  
29 of these updates are standard security updates.  
To see these additional updates run: apt list --upgradable  
  
Enable ESM Apps to receive additional future security updates.  
See https://ubuntu.com/esm or run: sudo pro status  
  
Last login: Sat Nov 22 22:07:59 2025 from 200.68.183.162  
azureuser@T7-2022630278:~$ tree Servicio -L 2  
Command 'tree' not found, but can be installed with:  
sudo snap install tree # version 2.1.3+pkg-5852, or  
sudo apt install tree # version 2.1.1-2ubuntu3.24.04.2  
See 'snap info tree' for additional versions.  
azureuser@T7-2022630278:~$ nano Servicio/META-INF/context.xml  
azureuser@T7-2022630278:~/tarea7_backend$ nano Servicio/META-INF/context.xml  
azureuser@T7-2022630278:~/tarea7_backend$ nano Servicio/META-INF/context.xml  
azureuser@T7-2022630278:~/tarea7_backend$ ls /home/azureuser/apache-tomcat-8.5.99/lib | grep mysql  
mysql-connector-j-8.4.0.jar  
azureuser@T7-2022630278:~/tarea7_backend$ cd ~/  
azureuser@T7-2022630278:~$ nano Servicio/META-INF/context.xml  
azureuser@T7-2022630278:~$ cd ~/tarea7_backend  
azureuser@T7-2022630278:~/tarea7_backend$ nano Servicio/compila.sh
```

Reemplaza la línea CATALINA\_HOME:

The screenshot shows a Windows terminal window titled "azreuser@T7-2022630278: ~ C:\Windows\System32\cmd.exe". Inside the terminal, a file named "compila.sh" is being edited in the nano text editor. The script contains commands to set environment variables, compile Java code, package it into a WAR file, and copy it to the Tomcat webapps directory. 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. At the bottom, there's a toolbar with icons for search, file operations, and system status.

```
GNU nano 7.2                                         Servicio/compila.sh
#Definir y descomentar a siguiente variable de entorno:
export CATALINA_HOME=/home/azureuser/apache-tomcat-8.5.99
javac -cp "$CATALINA_HOME/lib/*:" servicio/Servicio.java
rm WEB-INF/classes/servicio/*
cp servicio/*.class WEB-INF/classes/servicio/.
jar cvf Servicio.war WEB-INF META-INF
rm -rf $CATALINA_HOME/webapps/Servicio.war $CATALINA_HOME/webapps/Servicio
cp Servicio.war $CATALINA_HOME/webapps/
```

Se regresa al directorio del servicio y se da permisos de ejecución al script:

```
cd ~/tarea7_backend/Servicio
```

```
chmod +x compila.sh
```

The screenshot shows a Windows terminal window titled "azreuser@T7-2022630278: ~ C:\Windows\System32\cmd.exe". The user has navigated back to the "Servicio" directory and run the "compila.sh" script. The output shows the script executing various commands to build the Java application and copy it to the Tomcat webapps directory. The terminal window interface is similar to the one in the previous screenshot, with a menu bar, toolbar, and system status indicators at the bottom.

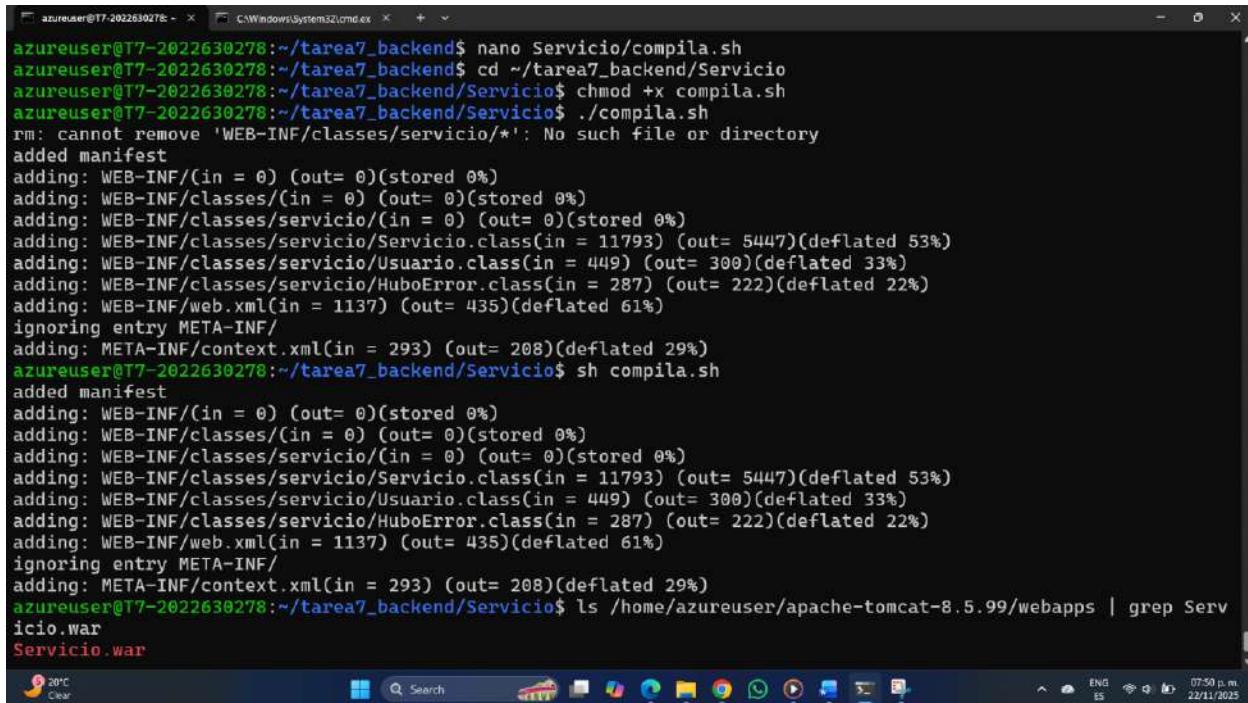
```
Last login: Sat Nov 22 22:07:59 2025 from 200.68.183.162
azreuser@T7-2022630278:~$ tree Servicio -L 2
Command 'tree' not found, but can be installed with:
sudo snap install tree  # version 2.1.3+pkg-5852, or
sudo apt install tree  # version 2.1.1-2ubuntu3.24.04.2
See 'snap info tree' for additional versions.
azreuser@T7-2022630278:~$ nano Servicio/META-INF/context.xml
azreuser@T7-2022630278:~$ cd ~/tarea7_backend
azreuser@T7-2022630278:~/tarea7_backend$ nano Servicio/META-INF/context.xml
azreuser@T7-2022630278:~/tarea7_backend$ nano Servicio/META-INF/context.xml
azreuser@T7-2022630278:~/tarea7_backend$ ls /home/azureuser/apache-tomcat-8.5.99/lib | grep mysql
mysql-connector-j-8.4.6.jar
azreuser@T7-2022630278:~/tarea7_backend$ cd ~/
azreuser@T7-2022630278:~$ nano Servicio/META-INF/context.xml
azreuser@T7-2022630278:~$ cd ~/tarea7_backend
azreuser@T7-2022630278:~/tarea7_backend$ nano Servicio/compila.sh
azreuser@T7-2022630278:~/tarea7_backend$ cd ~/
azreuser@T7-2022630278:~$ cd ~/tarea7_backend/Servicio
azreuser@T7-2022630278:~/tarea7_backend/Servicio$ ls
META-INF WEB-INF compila.bat compila.sh servicio
azreuser@T7-2022630278:~/tarea7_backend/Servicio$ echo CATALINA_HOME
CATALINA_HOME
azreuser@T7-2022630278:~/tarea7_backend/Servicio$ cd ~/tarea7_backend
azreuser@T7-2022630278:~/tarea7_backend$ nano Servicio/compila.sh
azreuser@T7-2022630278:~/tarea7_backend$ cd ~/tarea7_backend/Servicio
azreuser@T7-2022630278:~/tarea7_backend/Servicio$ chmod +x compila.sh
azreuser@T7-2022630278:~/tarea7_backend/Servicio$ |
```

## 8.5.5 Compilar el servicio

Se ejecuto:

```
./compila.sh
```

```
sh compila.sh
```



```
azureuser@T7-2022630278:~/tarea7_backend$ nano Servicio/compila.sh
azureuser@T7-2022630278:~/tarea7_backend$ cd ~/tarea7_backend/Servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ chmod +x compila.sh
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ./compila.sh
rm: cannot remove 'WEB-INF/classes/servicio/*': No such file or directory
added manifest
adding: WEB-INF/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/Servicio.class(in = 11793) (out= 5447)(deflated 53%)
adding: WEB-INF/classes/servicio/Usuario.class(in = 449) (out= 300)(deflated 33%)
adding: WEB-INF/classes/servicio/HuboError.class(in = 287) (out= 222)(deflated 22%)
adding: WEB-INF/web.xml(in = 1137) (out= 435)(deflated 61%)
ignoring entry META-INF/
adding: META-INF/context.xml(in = 293) (out= 208)(deflated 29%)
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ sh compila.sh
added manifest
adding: WEB-INF/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/Servicio.class(in = 11793) (out= 5447)(deflated 53%)
adding: WEB-INF/classes/servicio/Usuario.class(in = 449) (out= 300)(deflated 33%)
adding: WEB-INF/classes/servicio/HuboError.class(in = 287) (out= 222)(deflated 22%)
adding: WEB-INF/web.xml(in = 1137) (out= 435)(deflated 61%)
ignoring entry META-INF/
adding: META-INF/context.xml(in = 293) (out= 208)(deflated 29%)
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ls /home/azureuser/apache-tomcat-8.5.99/webapps | grep Servicio.war
Servicio.war
```

Se comprobó que el WAR fue copiado y Tomcat debería auto-desplegarlo en segundos (crear carpeta Servicio). Se verifica:

```
ls /home/azureuser/apache-tomcat-8.5.99/webapps | grep Servicio.war
```

```

azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ls -l /home/azureuser/apache-tomcat-8.5.99/webapps
total 12
drwxrwxr-x 2 azureuser azureuser 4096 Oct 21 16:40 ROOT
-rw-rw-r-- 1 azureuser azureuser 8038 Nov 23 01:49 Servicio.war
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cd ~/tarea7_backend/Servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ls
META-INF Servicio.war WEB-INF compila.bat compila.sh servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cd ~/tarea7_backend/Servicio/Servicio
bash: cd: /home/azureuser/tarea7_backend/Servicio/Servicio: No such file or directory
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cd ~/tarea7_backend/Servicio/servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ ls
HuboError.class HuboError.java Servicio.class Servicio.java Usuario.class Usuario.java
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ cd ~/tarea7_backend/Servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ chmod +x compila.sh
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ./compila.sh
added manifest
adding: WEB-INF/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/Servicio.class(in = 11793) (out= 5447)(deflated 53%)
adding: WEB-INF/classes/servicio/Usuario.class(in = 449) (out= 300)(deflated 33%)
adding: WEB-INF/classes/servicio/HuboError.class(in = 287) (out= 222)(deflated 22%)
adding: WEB-INF/web.xml(in = 1137) (out= 435)(deflated 61%)
ignoring entry META-INF/
adding: META-INF/context.xml(in = 293) (out= 208)(deflated 29%)
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ls -l /home/azureuser/apache-tomcat-8.5.99/webapps/Servicio.war
-rw-rw-r-- 1 azureuser azureuser 8038 Nov 23 01:54 /home/azureuser/apache-tomcat-8.5.99/webapps/Servicio.war
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ 

```

`ls /home/azureuser/apache-tomcat-8.5.99/webapps/Servicio`

```

azureuser@T7-2022630278:~/tarea7_backend/Servicio$ at java.net.AbstractPlainSocketImpl.doConnect(AbstractPlainSocketImpl.java:350)
at java.net.AbstractPlainSocketImpl.connectToAddress(AbstractPlainSocketImpl.java:206)
at java.net.AbstractPlainSocketImpl.connect(AbstractPlainSocketImpl.java:188)
at java.net.SocksSocketImpl.connect(SocksSocketImpl.java:392)
at java.net.Socket.connect(Socket.java:607)
at java.net.Socket.connect(Socket.java:556)
at java.net.Socket.<init>(Socket.java:452)
at java.net.Socket.<init>(Socket.java:229)
at org.apache.catalina.startup.Catalina.stopServer(Catalina.java:471)
at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
at sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:62)
at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43)
at java.lang.reflect.Method.invoke(Method.java:498)
at org.apache.catalina.startup.Bootstrap.stopServer(Bootstrap.java:393)
at org.apache.catalina.startup.Bootstrap.main(Bootstrap.java:481)

azureuser@T7-2022630278:~/tarea7_backend/Servicio$ sleep 5
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ /home/azureuser/apache-tomcat-8.5.99/bin/startup.sh
Using CATALINA_BASE:   /home/azureuser/apache-tomcat-8.5.99
Using CATALINA_HOME:  /home/azureuser/apache-tomcat-8.5.99
Using CATALINA_TMPDIR: /home/azureuser/apache-tomcat-8.5.99/temp
Using JRE_HOME:        /usr
Using CLASSPATH:       /home/azureuser/apache-tomcat-8.5.99/bin/bootstrap.jar:/home/azureuser/apache-tomcat-8.5.99/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Tomcat started.
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ls /home/azureuser/apache-tomcat-8.5.99/webapps/Servicio
META-INF WEB-INF
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ 

```

## 8.5.6 Copiar archivos front-end (prueba.html, WSClient.js, usuario\_sin\_foto.png)

Los archivos están pensados para estar en ROOT (la app que responde en /):

Destino:

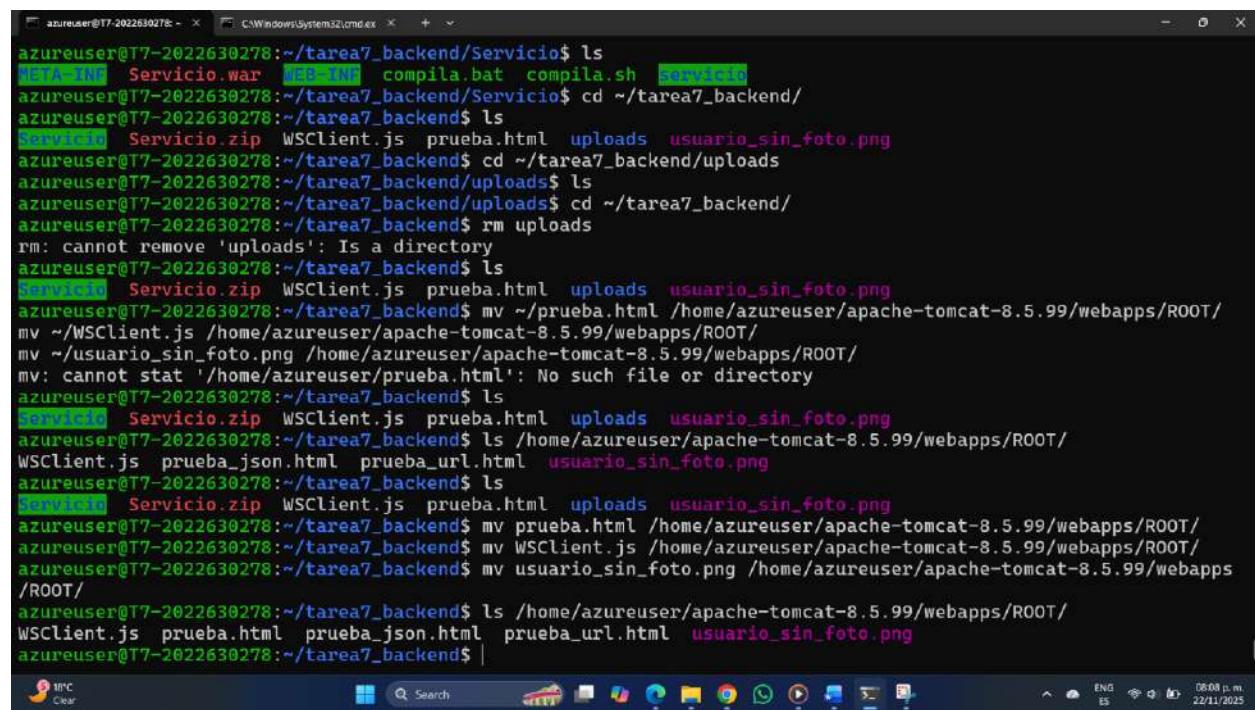
/home/azureuser/apache-tomcat-8.5.99/webapps/ROOT/

Se subieron los archivos vía SFTP a otro directorio, entonces dentro de la VM se ejecuto:

```
mv prueba.html /home/azureuser/apache-tomcat-8.5.99/webapps/ROOT/
```

```
mv WSClient.js /home/azureuser/apache-tomcat-8.5.99/webapps/ROOT/
```

```
mv usuario_sin_foto.png /home/azureuser/apache-tomcat-8.5.99/webapps/ROOT/
```



```
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ls
META-INF Servicio.war WEB-INF compila.bat compila.sh servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cd ~/tarea7_backend/
azureuser@T7-2022630278:~/tarea7_backend$ ls
Servicio Servicio.zip WSClient.js prueba.html uploads usuario_sin_foto.png
azureuser@T7-2022630278:~/tarea7_backend$ cd ~/tarea7_backend/uploads
azureuser@T7-2022630278:~/tarea7_backend/uploads$ ls
azureuser@T7-2022630278:~/tarea7_backend/uploads$ cd ~/tarea7_backend/
azureuser@T7-2022630278:~/tarea7_backend$ rm uploads
rm: cannot remove 'uploads': Is a directory
azureuser@T7-2022630278:~/tarea7_backend$ ls
Servicio Servicio.zip WSClient.js prueba.html uploads usuario_sin_foto.png
azureuser@T7-2022630278:~/tarea7_backend$ mv ~/prueba.html /home/azureuser/apache-tomcat-8.5.99/webapps/ROOT/
mv ~/WSClient.js /home/azureuser/apache-tomcat-8.5.99/webapps/ROOT/
mv ~/usuario_sin_foto.png /home/azureuser/apache-tomcat-8.5.99/webapps/ROOT/
mv: cannot stat '/home/azureuser/prueba.html': No such file or directory
azureuser@T7-2022630278:~/tarea7_backend$ ls
Servicio Servicio.zip WSClient.js prueba.html uploads usuario_sin_foto.png
azureuser@T7-2022630278:~/tarea7_backend$ ls /home/azureuser/apache-tomcat-8.5.99/webapps/ROOT/
WSClient.js prueba_json.html prueba_url.html usuario_sin_foto.png
azureuser@T7-2022630278:~/tarea7_backend$ ls
Servicio Servicio.zip WSClient.js prueba.html uploads usuario_sin_foto.png
azureuser@T7-2022630278:~/tarea7_backend$ mv prueba.html /home/azureuser/apache-tomcat-8.5.99/webapps/ROOT/
azureuser@T7-2022630278:~/tarea7_backend$ mv WSClient.js /home/azureuser/apache-tomcat-8.5.99/webapps/ROOT/
azureuser@T7-2022630278:~/tarea7_backend$ mv usuario_sin_foto.png /home/azureuser/apache-tomcat-8.5.99/webapps/ROOT/
azureuser@T7-2022630278:~/tarea7_backend$ ls /home/azureuser/apache-tomcat-8.5.99/webapps/ROOT/
WSClient.js prueba.html prueba_json.html prueba_url.html usuario_sin_foto.png
azureuser@T7-2022630278:~/tarea7_backend$ |
```

Imagen 24: Explorador/terminal mostrando archivos en webapps/ROOT.

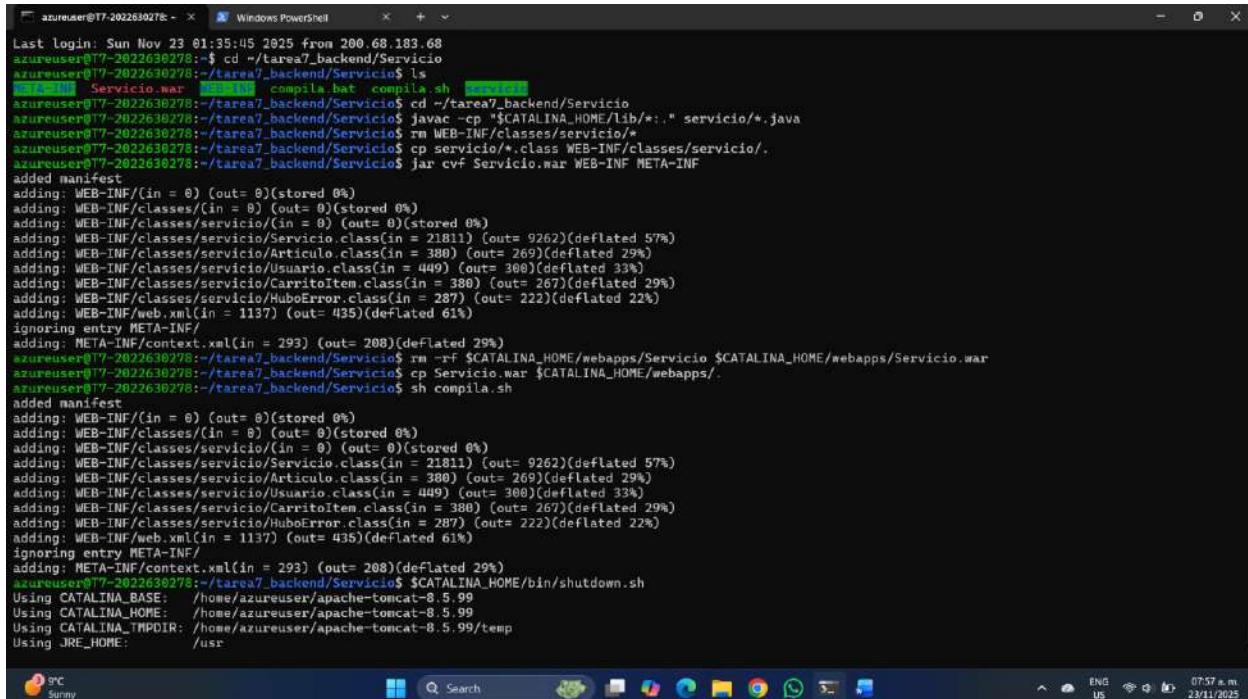
### 8.5.7 8. (Opcional) Reiniciar Tomcat si hubo cambios críticos

Si el WAR se desplegó correctamente normalmente no hace falta, pero si cambiaste libs en lib/, sí conviene reiniciar.

```
/home/azureuser/apache-tomcat-8.5.99/bin/shutdown.sh
```

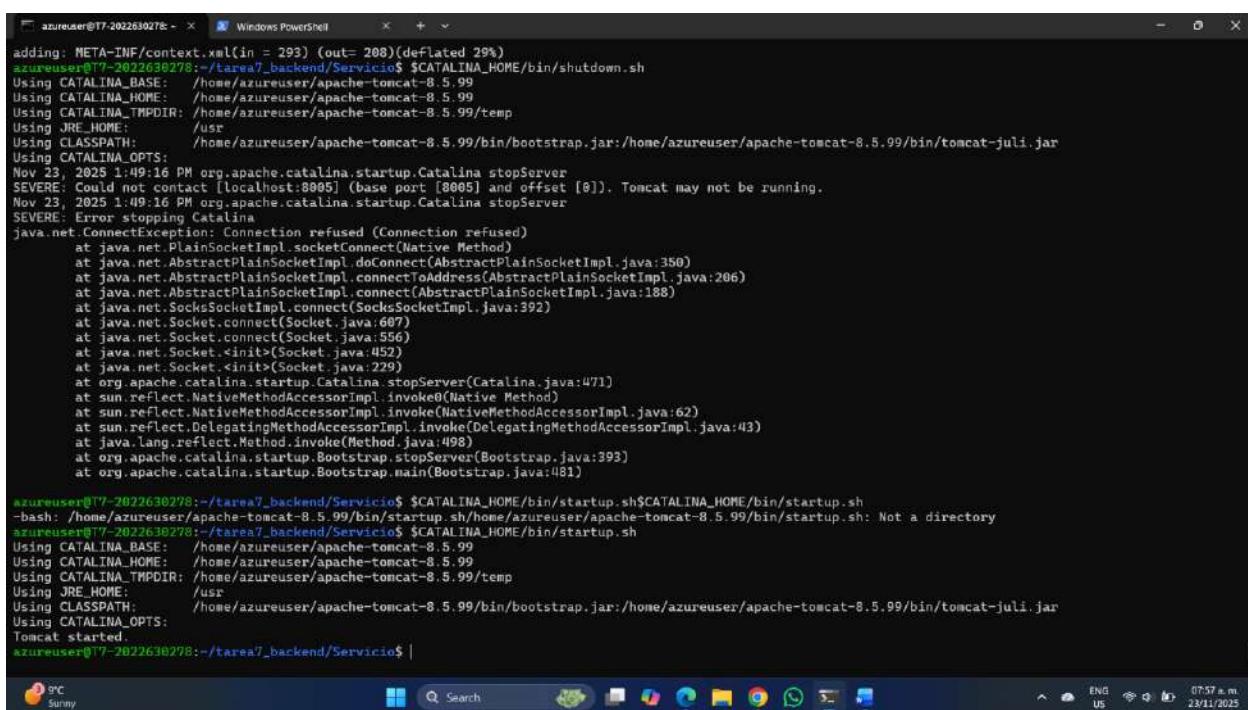
```
sleep 5
```

/home/azureuser/apache-tomcat-8.5.99/bin/startup.sh



```
Last login: Sun Nov 23 01:35:45 2025 from 200.68.183.68
azureuser@T7-2022630278:~$ cd ~/tarea7_backend/Servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ls
  Servicio.war  build.sh  compile.bat  compile.sh  service
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cd ~/tarea7_backend/Servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ javac -cp "$CATALINA_HOME/lib/*.*" servicio/*.java
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ rm WEB-INF/classes/servicio/*
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cp servicio/*.class WEB-INF/classes/servicio/.
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ jar cvf Servicio.war WEB-INF META-INF
added manifest
adding: WEB-INF/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/(in = 0) (outs 0)(stored 0%)
adding: WEB-INF/classes/servicio/Servicio.class(in = 21811) (out= 9262)(deflated 57%)
adding: WEB-INF/classes/servicio/Articulo.class(in = 388) (out= 269)(deflated 29%)
adding: WEB-INF/classes/servicio/Usuario.class(in = 449) (outs 300)(deflated 33%)
adding: WEB-INF/classes/servicio/CarritoItem.class(in = 388) (out= 267)(deflated 29%)
adding: WEB-INF/classes/servicio/HuboError.class(in = 287) (out= 222)(deflated 22%)
adding: WEB-INF/web.xml(in = 1137) (out= 455)(deflated 61%)
ignoring entry META-INF/
adding: META-INF/context.xml(in = 293) (out= 208)(deflated 29%)
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ rm -rf $CATALINA_HOME/webapps/Servicio $CATALINA_HOME/webapps/Servicio.war
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cp Servicio.war $CATALINA_HOME/webapps/
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ sh compile.sh
added manifest
adding: WEB-INF/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/Servicio.class(in = 21811) (out= 9262)(deflated 57%)
adding: WEB-INF/classes/servicio/Articulo.class(in = 388) (out= 269)(deflated 29%)
adding: WEB-INF/classes/servicio/Usuario.class(in = 449) (outs 300)(deflated 33%)
adding: WEB-INF/classes/servicio/CarritoItem.class(in = 388) (out= 267)(deflated 29%)
adding: WEB-INF/classes/servicio/HuboError.class(in = 287) (out= 222)(deflated 22%)
adding: WEB-INF/web.xml(in = 1137) (out= 455)(deflated 61%)
ignoring entry META-INF/
adding: META-INF/context.xml(in = 293) (out= 208)(deflated 29%)
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ $CATALINA_HOME/bin/shutdown.sh
Using CATALINA_BASE:  /home/azureuser/apache-tomcat-8.5.99
Using CATALINA_HOME:  /home/azureuser/apache-tomcat-8.5.99
Using CATALINA_TMPDIR: /home/azureuser/apache-tomcat-8.5.99/temp
Using JRE_HOME:        /usr
Using CLASSPATH:       /home/azureuser/apache-tomcat-8.5.99/bin/bootstrap.jar:/home/azureuser/apache-tomcat-8.5.99/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Nov 23, 2025 1:49:16 PM org.apache.catalina.startup.Catalina stopServer
SEVERE: Could not contact [localhost:8005] (base port [8005] and offset [0]). Tomcat may not be running.
Nov 23, 2025 1:49:16 PM org.apache.catalina.startup.Catalina stopServer
SEVERE: Error stopping Catalina
java.net.ConnectException: Connection refused (Connection refused)
    at java.net.PlainSocketImpl.socketConnect(Native Method)
    at java.net.AbstractPlainSocketImpl.doConnect(AbstractPlainSocketImpl.java:350)
    at java.net.AbstractPlainSocketImpl.connectToAddress(AbstractPlainSocketImpl.java:206)
    at java.net.AbstractPlainSocketImpl.connect(AbstractPlainSocketImpl.java:188)
    at java.net.SocksSocketImpl.connect(SocksSocketImpl.java:392)
    at java.net.Socket.connect(Socket.java:607)
    at java.net.Socket.connect(Socket.java:556)
    at java.net.Socket.<init>(Socket.java:452)
    at java.net.Socket.<init>(Socket.java:229)
    at org.apache.catalina.startup.Catalina.stopServer(Catalina.java:471)
    at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
    at sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:62)
    at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43)
    at java.lang.reflect.Method.invoke(Method.java:498)
    at org.apache.catalina.startup.Bootstrap.stopServer(Bootstrap.java:393)
    at org.apache.catalina.startup.Bootstrap.main(Bootstrap.java:481)

azureuser@T7-2022630278:~/tarea7_backend/Servicio$ $CATALINA_HOME/bin/startup.sh$CATALINA_HOME/bin/startup.sh
-bash: /home/azureuser/apache-tomcat-8.5.99/bin/startup.sh: home/azureuser/apache-tomcat-8.5.99/bin/startup.sh: Not a directory
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ $CATALINA_HOME/bin/startup.sh
Using CATALINA_BASE:  /home/azureuser/apache-tomcat-8.5.99
Using CATALINA_HOME:  /home/azureuser/apache-tomcat-8.5.99
Using CATALINA_TMPDIR: /home/azureuser/apache-tomcat-8.5.99/temp
Using JRE_HOME:        /usr
Using CLASSPATH:       /home/azureuser/apache-tomcat-8.5.99/bin/bootstrap.jar:/home/azureuser/apache-tomcat-8.5.99/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Tomcat started.
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ |
```

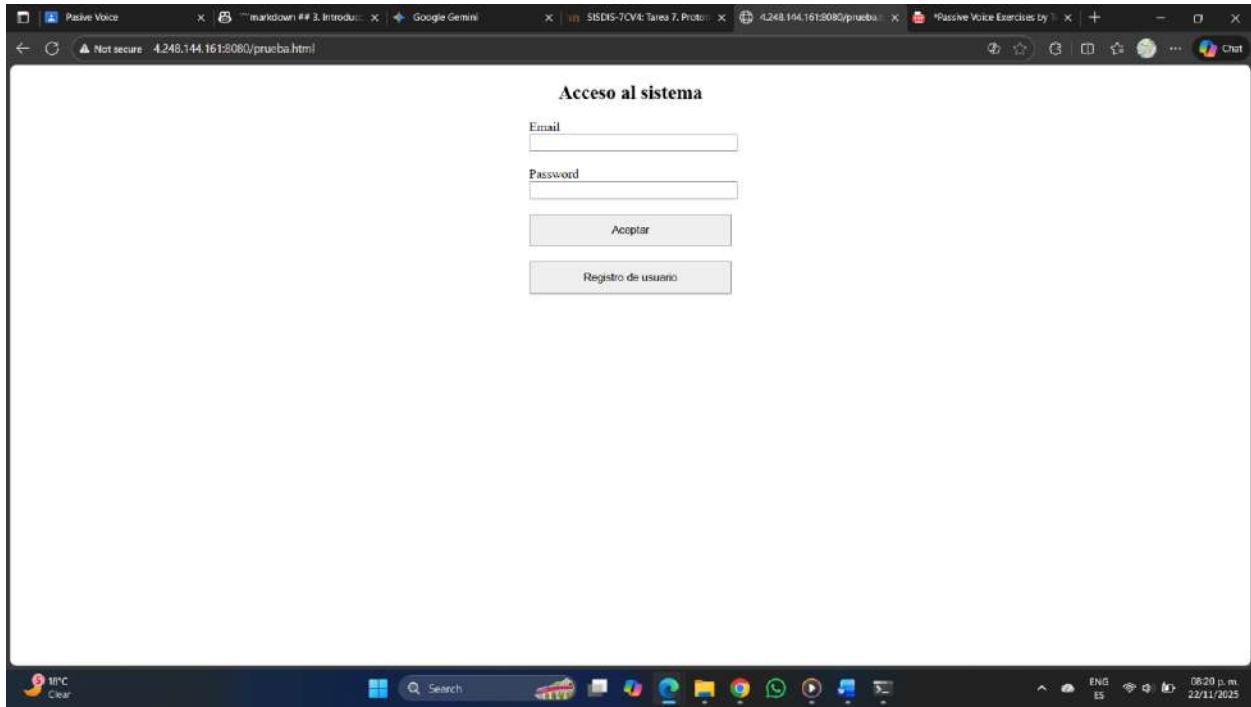


```
adding: META-INF/context.xml(in = 293) (out= 208)(deflated 29%)
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ $CATALINA_HOME/bin/startup.sh$CATALINA_HOME/bin/startup.sh
Using CATALINA_BASE:  /home/azureuser/apache-tomcat-8.5.99
Using CATALINA_HOME:  /home/azureuser/apache-tomcat-8.5.99
Using CATALINA_TMPDIR: /home/azureuser/apache-tomcat-8.5.99/temp
Using JRE_HOME:        /usr
Using CLASSPATH:       /home/azureuser/apache-tomcat-8.5.99/bin/bootstrap.jar:/home/azureuser/apache-tomcat-8.5.99/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Tomcat started.
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ |
```

## 8.5.8 Probar acceso desde navegador

URL base (suponiendo que la IP pública de tu VM es, por ejemplo, 20.30.40.50):

<http://20.30.40.50:8080/prueba.html>

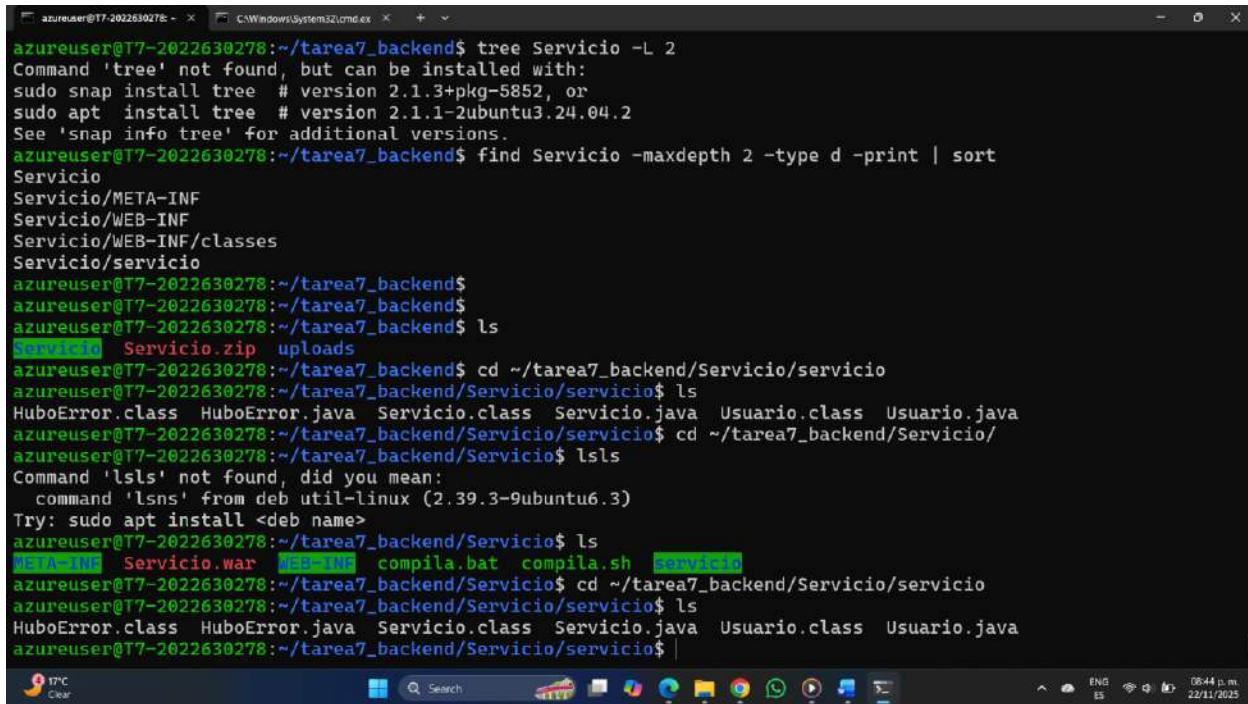


## 8.6 Modificación/Actualización de Servicio.java

Se integran los nuevos endpoints y POJOs (Tarea 7). Acciones:

1. Nos movimos a la carpeta Servicio usando:

```
cd ~/tarea7_backend/Servicio/servicio
```



```
azureuser@T7-2022630278:~/tarea7_backend$ tree Servicio -L 2
Command 'tree' not found, but can be installed with:
sudo snap install tree # version 2.1.3+pkg-5852, or
sudo apt install tree # version 2.1.1-2ubuntu3.24.04.2
See 'snap info tree' for additional versions.
azureuser@T7-2022630278:~/tarea7_backend$ find Servicio -maxdepth 2 -type d -print | sort
Servicio
Servicio/META-INF
Servicio/WEB-INF
Servicio/WEB-INF/classes
Servicio/servicio
azureuser@T7-2022630278:~/tarea7_backend$ 
azureuser@T7-2022630278:~/tarea7_backend$ 
azureuser@T7-2022630278:~/tarea7_backend$ ls
Servicio Servicio.zip uploads
azureuser@T7-2022630278:~/tarea7_backend$ cd ~/tarea7_backend/Servicio/servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ ls
HuboError.class HuboError.java Servicio.class Servicio.java Usuario.class Usuario.java
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ cd ~/tarea7_backend/Servicio/
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ls
Command 'lsls' not found, did you mean:
  command 'lsns' from deb util-linux (2.39.3-9ubuntu6.3)
Try: sudo apt install <deb name>
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ls
META-INF Servicio.war WEB-INF compila.bat compila.sh servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cd ~/tarea7_backend/Servicio/servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ ls
HuboError.class HuboError.java Servicio.class Servicio.java Usuario.class Usuario.java
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$
```

Trabajaremos DENTRO de Servicio/, agregando nuevos .java en Servicio/servicio/.

2. Archivos nuevos que debes crear (POJOs) Necesitamos dos clases nuevas para el dominio del e-commerce:
  - Articulo.java: representa artículos del stock (con foto como byte[]])

A screenshot of a Windows desktop environment. In the foreground, a terminal window titled 'Articulo.java \*' is open, displaying Java code for a 'Articulo' class. The code includes fields for id\_articulo, nombre, descripcion, precio, cantidad, and foto, along with a constructor and a brace at the end. Below the terminal is a standard Windows taskbar with icons for Start, Search, File Explorer, Edge, and other applications. The system tray shows the date (22/11/2025), time (08:48 p.m.), battery level (17%), and network status.

```
GNU nano 7.2
package servicio;

public class Articulo {
    public Integer id_articulo;
    public String nombre;
    public String descripcion;
    public Double precio;
    public Integer cantidad;
    public byte[] foto;
}

^G Help      ^O Write Out   ^W Where Is   ^K Cut        ^T Execute   ^C Location   M-U Undo
^X Exit      ^R Read File   ^\ Replace    ^U Paste     ^J Justify   ^/ Go To Line M-E Redo
Clear
```

**Imagen 35: Editor mostrando el código de Articulo.java.**

- CarritoItem.java: representa un renglón del carrito con costo (cantidad x precio)

```

azreuser@T7-2022630278: ~ C:\Windows\System32\cmd.exe
GNU nano 7.2
CarritoItem.java
package servicio;

public class CarritoItem {
    public Integer id_articulo;
    public String nombre;
    public Double precio;
    public Integer cantidad;
    public byte[] foto;
    public Double costo; // cantidad * precio
}

[ Read 10 lines ]
^G Help      ^O Write Out   ^W Where Is   [ Read 10 lines ]
^X Exit      ^R Read File   ^\ Replace     ^K Cut          ^T Execute
                                         ^U Paste        ^J Justify     ^C Location
                                         ^/ Go To Line   M-U Undo
                                         M-E Redo
IPC Clear
azreuser@T7-2022630278: ~ C:\Windows\System32\cmd.exe
Servicio/META-INF
Servicio/WEB-INF
Servicio/WEB-INF/classes
Servicio/servicio
azureuser@T7-2022630278:~/tarea7_backend$ azureuser@T7-2022630278:~/tarea7_backend$ azureuser@T7-2022630278:~/tarea7_backend$ ls
Servicio Servicio.zip uploads
azureuser@T7-2022630278:~/tarea7_backend$ cd ~/tarea7_backend/Servicio/servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ ls
HuboError.class HuboError.java Servicio.class Servicio.java Usuario.class Usuario.java
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ cd ~/tarea7_backend/Servicio/
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ls
Command 'lsls' not found, did you mean:
  command 'lsls' from deb util-linux (2.39.3-9ubuntu6.3)
Try: sudo apt install <deb name>
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ls
META-INF Servicio.war WEB-INF compila.bat compila.sh servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cd ~/tarea7_backend/Servicio/servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ ls

azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ nano CarritoItem.java
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ nano CarritoItem.java
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ nano Articulo.java
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ ls
Articulo.java HuboError.class Servicio.class Usuario.class
CarritoItem.java HuboError.java Servicio.java Usuario.java
azureuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ |
IPC Clear

```

Imagen 36: Editor mostrando el código de CarritoItem.java.

3. Cambiamos en Servicio.java:

- Ajustar login para devolver id\_usuario además de token (el front-end lo usará).
- Añadir endpoints de back-end requeridos:
  - alta\_articulo (POST, JSON)
  - consulta\_articulos (GET)
  - compra\_articulo (POST, JSON, con transacción)
  - elimina\_articulo\_carrito\_compra (DELETE, con transacción)
  - elimina\_carrito\_compra (DELETE, con transacción)
  - modifica\_carrito\_compra (PUT, con transacción)
  - consulta\_carrito\_compra (GET) para que el front-end liste los artículos y total

```
azuser@T7-2022630278: ~ C:\Windows\System32\cmd.exe + - x
Servicio/WEB-INF
Servicio/WEB-INF/classes
Servicio/servicio
Servicio/servicio
azuser@T7-2022630278:~/tarea7_backend$ azuser@T7-2022630278:~/tarea7_backend$ azuser@T7-2022630278:~/tarea7_backend$ ls
Servicio Servicio.zip uploads
azuser@T7-2022630278:~/tarea7_backend$ cd ~/tarea7_backend/Servicio/servicio
azuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ ls
HuboError.class HuboError.java Servicio.class Servicio.java Usuario.class Usuario.java
azuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ cd ~/tarea7_backend/Servicio/
azuser@T7-2022630278:~/tarea7_backend/Servicio$ lsls
Command 'lsls' not found, did you mean:
  command 'lsns' from deb util-linux (2.39.3-9ubuntu6.3)
Try: sudo apt install <deb name>
azuser@T7-2022630278:~/tarea7_backend/Servicio$ ls
META-INF Servicio.war WEB-INF compila.bat compila.sh servicio
azuser@T7-2022630278:~/tarea7_backend/Servicio$ cd ~/tarea7_backend/Servicio/servicio
azuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ ls

azuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ nano CarritoItem.java
azuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ nano CarritoItem.java
azuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ nano Articulo.java
azuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ ls
Articulo.java HuboError.class Servicio.class Usuario.class
CarritoItem.java HuboError.java Servicio.java Usuario.java
azuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ nano Servicio.java
azuser@T7-2022630278:~/tarea7_backend/Servicio/servicio$ |
```

```
azuser@T7-2022830278: ~ C:\Windows\System32\cmd.exe + Servicio.java *
GNU nano 7.2
/*
  Servicio.java
  Servicio web REST
  Carlos Pineda Guerrero, 2025
*/
package servicio;

import javax.ws.rs.GET;
import javax.ws.rs.POST;
import javax.ws.rs.PUT;
import javax.ws.rs.DELETE;
import javax.ws.rs.Path;
import javax.ws.rs.Consumes;
import javax.ws.rs.Produces;
import javax.ws.rs.core.MediaType;
import javax.ws.rs.QueryParam;
import javax.ws.rs.core.Response;
import javax.ws.rs.core.Application;

import java.sql.*;
import javax.sql.DataSource;
import javax.naming.Context;
import javax.naming.InitialContext;
```

Imagen 22: Editor mostrando parte final de Servicio.java con nuevos métodos.

## 8.7 Scripts de compilación (compila.sh y compila.bat)

### 4. Ajustes de compilación: compila.sh y dependencias

- Asegúramos tener en \$CATALINA\_HOME/lib:
  - mysql-connector-j (com.mysql.cj.jdbc.Driver)
  - jersey-container-servlet (o jersey-servlet), jersey-core/servidor según tu Tarea 2
  - Los jars que te pidieron para Jackson/Jersey JSON:
    - jersey-media-json-jackson-2.24.jar
    - jersey-entity-filtering-2.24.jar
    - jackson-core-2.6.3.jar
    - jackson-databind-2.6.3.jar
    - jackson-annotations-2.6.3.jar
    - jackson-jaxrs-json-provider-2.6.3.jar
    - jackson-jaxrs-base-2.6.3.jar
    - jackson-module-jaxb-annotations-2.6.3.jar
- Editamos Servicio/compila.sh para compilar todos los .java del paquete servicio

Definimos la ruta de Tomcat (ajustar según instalación) y compilamos (incluye todas las clases del paquete servicio)

```
echo $CATALINA_HOME
```

```
javac -cp "$CATALINA_HOME/lib/*:." servicio/*.java
```

Limpiamos y copiamos las clases compiladas:

```
rm WEB-INF/classes/servicio/*
```

```
cp servicio/*.class WEB-INF/classes/servicio/.
```

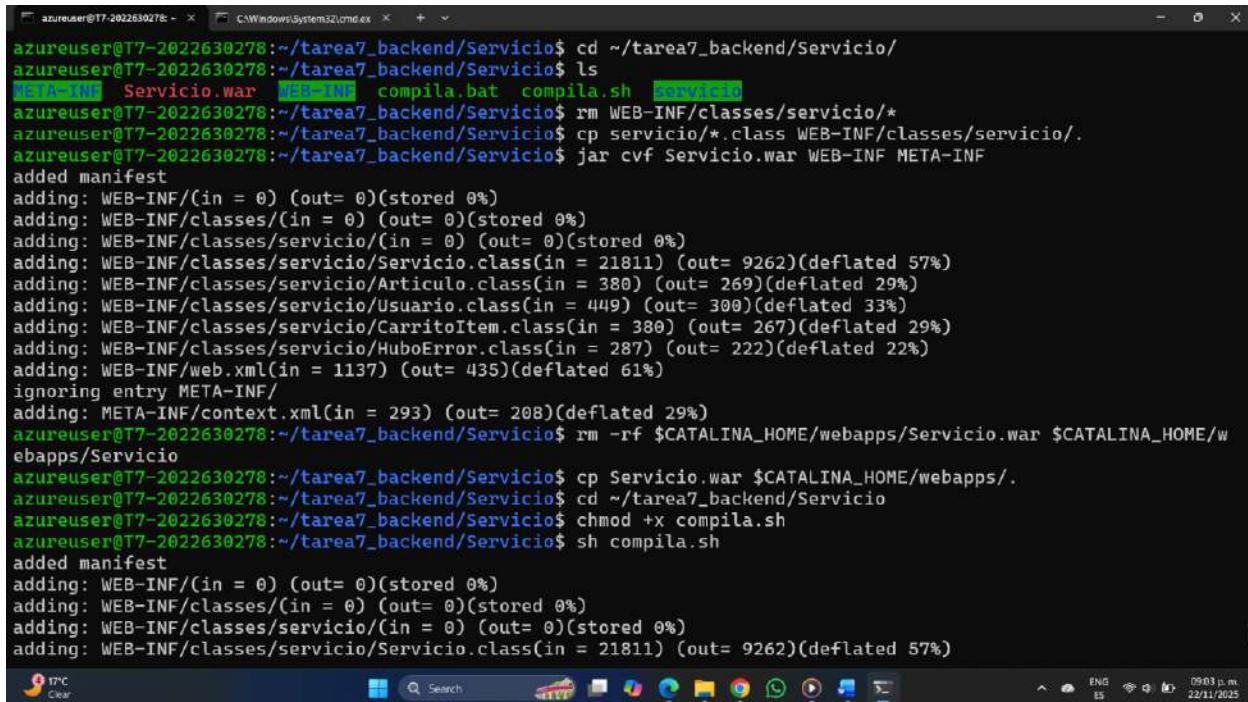
## Empaquetamos WAR:

```
jar cvf Servicio.war WEB-INF META-INF
```

## Desplegamos:

```
rm -rf $CATALINA_HOME/webapps/Servicio.war $CATALINA_HOME/webapps/Servicio
```

```
cp Servicio.war $CATALINA_HOME/webapps/.
```



```
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cd ~/tarea7_backend/Servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ ls
META-INF Servicio.war WEB-INF compila.bat compila.sh servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ rm WEB-INF/classes/servicio/*
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cp servicio/*.class WEB-INF/classes/servicio/
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ jar cvf Servicio.war WEB-INF META-INF
added manifest
adding: WEB-INF/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/Servicio.class(in = 21811) (out= 9262)(deflated 57%)
adding: WEB-INF/classes/servicio/Articulo.class(in = 380) (out= 269)(deflated 29%)
adding: WEB-INF/classes/servicio/Usuario.class(in = 449) (out= 300)(deflated 33%)
adding: WEB-INF/classes/servicio/CarritoItem.class(in = 380) (out= 267)(deflated 29%)
adding: WEB-INF/classes/servicio/HuboError.class(in = 287) (out= 222)(deflated 22%)
adding: WEB-INF/web.xml(in = 1137) (out= 435)(deflated 61%)
ignoring entry META-INF/
adding: META-INF/context.xml(in = 293) (out= 208)(deflated 29%)
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ rm -rf $CATALINA_HOME/webapps/Servicio.war $CATALINA_HOME/webapps/Servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cp Servicio.war $CATALINA_HOME/webapps/..
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ cd ~/tarea7_backend/Servicio
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ chmod +x compila.sh
azureuser@T7-2022630278:~/tarea7_backend/Servicio$ sh compila.sh
added manifest
adding: WEB-INF/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio/Servicio.class(in = 21811) (out= 9262)(deflated 57%)
```

Imagen 23: Consola mostrando ejecución exitosa de compila.sh (o compila.bat).

- Damos permisos de ejecución y compila:
  - cd ~/tarea7\_backend/Servicio
  - chmod +x compila.sh
  - sh compila.sh
- Tomcat redeploya automáticamente el WAR copiado; si no, reinicia:
  - \$CATALINA\_HOME/bin/shutdown.sh
  - \$CATALINA\_HOME/bin/startup.sh