



Instituto Politécnico Nacional



Escuela Superior de Cómputo

Desarrollo de Sistemas Distribuidos

*Tarea 6. Implementación de un servicio web estilo
REST para Tomcat*

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08 de mayo de 2023

Desarrollo

Creación de máquina virtual de Ubuntu Server en Azure

Para realizar esta práctica es necesario crear una máquina virtual de Ubuntu Server en nuestro portal de Azure y a continuación explicaremos los pasos para este proceso:

1. Entramos al portal de Azure y vamos al apartado de “Máquinas Virtuales”.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes tabs for 'Aplicaciones', 'Google Académico', 'Seguridad', 'https://s2.mexside...', 'm4gm-learning', 'Dashboard | Tinker...', 'Library Genesis', 'RegExr: Learn, Build...', and 'Generador de refer...'. The user is signed in as 'klopezs1602@alumno.i... INSTITUTO POLITECNICO NACIONAL'. The main title is 'Create a resource'. On the left, there's a sidebar with 'Get Started', 'Recently created', and a 'Categories' section listing various services like AI + Machine Learning, Analytics, Blockchain, Compute, Containers, Databases, Developer Tools, DevOps, Identity, Integration, and Internet of Things. The central area has a search bar 'Search services and marketplace' and two tabs: 'Azure services' (selected) and 'Marketplace products'. Below these are four resource cards: 'Virtual machine' (with 'Create', 'View resources', and '...'), 'Web App' (with 'Create', 'View resources', and '...'), 'SQL Database' (with 'Create', 'View resources', and '...'), 'Function App' (with 'Create', 'View resources', and '...'), 'Key Vault' (with 'Create', 'View resources', and '...'), and 'Data Factory' (with 'Create', 'View resources', and '...'). At the bottom right, there are buttons for 'Give feedback', language ('ESP LAA'), and date ('11:28 5/5/2023').

2. Seleccionamos el grupo de recursos o creamos uno nuevo, escribimos el nombre de nuestra máquina virtual y seleccionamos la opción de Ubuntu Server 20.04 LTS, elegimos 1 Gb para la memoria RAM de nuestra máquina.

The screenshot shows the Microsoft Azure portal with the URL portal.azure.com/#create/Microsoft.VirtualMachine. The page title is "Create a virtual machine". The top navigation bar includes links for "Aplicaciones", "Google Académico", "Seguridad", "https://s2.mexside...", "m4gm-learning", "Dashboard | Tinker...", "Library Genesis", "RegExr: Learn, Build...", "Generador de refer...", and a user profile for "klopezs1602@alumno.i... INSTITUTO POLITÉCNICO NACIONAL". The main content area shows the "Create a virtual machine" wizard on the "Basics" tab. A message at the top states: "Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)". Below this, a note says: "This subscription may not be eligible to deploy VMs of certain sizes in certain regions." The "Project details" section allows selecting a subscription ("Azure for Students") and a resource group ("(New) ESCOM" or "Create new"). The "Instance details" section is currently active, showing fields for "Virtual machine name" (T6-2020630205), "Region" ((US) East US), "Availability options" (No infrastructure redundancy required), "Security type" (Standard), "Image" (Ubuntu Server 20.04 LTS - x64 Gen2), "VM architecture" (x64 selected), "Run with Azure Spot discount" (unchecked), and "Size" (Standard_B1s - 1 vcpu, 1 GiB memory (\$7.59/month)). Navigation buttons include "Review + create", "< Previous", "Next : Disks >", and "Give feedback". The bottom status bar shows "ESP LAA" and the date "5/5/2023 11:29".

This screenshot continues the "Create a virtual machine" wizard on the "Basics" tab. The configuration has been updated from the previous screenshot. The "Virtual machine name" is now "T6-2020630205", "Region" is "(US) East US", "Image" is "Ubuntu Server 20.04 LTS - x64 Gen2", "VM architecture" is "x64", and "Size" is "Standard_B1s - 1 vcpu, 1 GiB memory (\$7.59/month)". The other settings remain the same as in the first screenshot. The bottom status bar shows "ESP LAA" and the date "5/5/2023 11:31".

3. Ingresamos el usuario y la contraseña para ingresar posteriormente. Seleccionamos el puerto de entrada por el que accederemos a la máquina virtual, en este caso el de SSH.

Create a virtual machine

Administrator account

Authentication type: Password

Username: kubuntu

Password: XXXXXXXX

Confirm password: XXXXXXXX

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports: Allow selected ports

Select inbound ports: SSH (22)

Review + create < Previous Next : Disks > Give feedback

4. Seleccionamos como almacenamiento un HDD estándar

Create a virtual machine

VM disk encryption

Azure disk storage encryption automatically encrypts your data stored on Azure managed disks (OS and data disks) at rest by default when persisting it to the cloud.

Encryption at host: Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

OS disk

OS disk size: Default size (30 GiB)

OS disk type: Standard HDD (locally-redundant storage)

The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM:

Key management: Platform-managed key

Review + create < Previous Next : Networking > Give feedback

5. Desactivamos el diagnóstico de inicio.

The screenshot shows the Microsoft Azure portal with the URL portal.azure.com/#create/Microsoft.VirtualMachine. The page title is "Create a virtual machine". The "Monitoring" tab is selected. The "Configure monitoring options for your VM" section includes sections for "Alerts" (checkbox for "Enable recommended alert rules") and "Diagnostics". Under "Boot diagnostics", the "Disable" option is selected. Under "Enable OS guest diagnostics", there is a checkbox. At the bottom, there are "Review + create" and "Next : Advanced >" buttons.

6. Nos aseguramos de que todo se haya configurado correctamente y creamos la máquina virtual

The screenshot shows the Microsoft Azure portal with the URL portal.azure.com/#create/Microsoft.VirtualMachine. The page title is "Create a virtual machine". A green bar at the top indicates "Validation passed". The "Basics" section displays the following configuration:

| Setting | Value |
|----------------------|---------------------------------------|
| Subscription | Azure for Students |
| Resource group | (new) ESCOM |
| Virtual machine name | T6-2020630205 |
| Region | East US |
| Availability options | No infrastructure redundancy required |
| Security type | Standard |
| Image | Ubuntu Server 20.04 LTS - Gen2 |
| VM architecture | x64 |
| Size | Standard B1s (1 vcpu, 1 GiB memory) |
| Authentication type | Password |
| Username | kubuntu |
| Public inbound ports | SSH |
| Azure Spot | No |

At the bottom, there are "Create", "Previous", "Next >", and "Download a template for automation" buttons.

7. Esperamos a que nuestra máquina termine de crearse.

CreateVm-canonical.0001-com-ubuntu-server-focal-2-20230505112833 | Overview

Deployment is in progress

Deployment name: CreateVm-canonical.0001-com-ubuntu-server-focal-2-20230505112833 Start time: 5/5/2023, 11:33:55 AM
Subscription: Azure for Students Correlation ID: 477062b3-4e86-4656-ae41-9e6f38
Resource group: ESCOM

Deployment details

| Resource | Type | Status | Operation details |
|--------------------|------------------------------|---------|-----------------------------------|
| T6-2020630205-vnet | Microsoft.Network/virtual... | Created | Operation details |
| T6-2020630205-ip | Microsoft.Network/public... | Created | Operation details |
| T6-2020630205-nsg | Microsoft.Network/networ... | OK | Operation details |

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8. Una vez creada, probamos la conexión.

CreateVm-canonical.0001-com-ubuntu-server-focal-2-20230505112833 | Overview

Your deployment is complete

Deployment name: CreateVm-canonical.0001-com-ubuntu-server-focal-2-20230505112833 Start time: 5/5/2023, 11:33:55 AM
Subscription: Azure for Students Correlation ID: 477062b3-4e86-4656-ae41-9e6f38
Resource group: ESCOM

Deployment details

Next steps

- Setup auto-shutdown Recommended
- Monitor VM health, performance and network dependencies Recommended
- Run a script inside the virtual machine Recommended

[Go to resource](#) [Create another VM](#)

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```

* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage

System information disabled due to load higher than 1.0

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

kubuntu@T6-2020630205:~$ 

```

Operating system: Linux
Publisher: canonical
Offer: 0001-com.ubuntu:server:focal
Public IP address (IPv6): -
Private IP address: 10.0.0.4

9. Para realizar la implementación debemos crear una regla de puerto de entrada para abrir el puerto 8080 de TCP.

Add inbound security rule - Microsoft Azure

Add inbound security rule
T6-2020630205-nsg

| Source | Any |
|---------------------------|--------------------------------------|
| Source port ranges * | * |
| Destination | Any |
| Service | Custom |
| Destination port ranges * | 8080 |
| Protocol | <input checked="" type="radio"/> TCP |

Inbound port rules

| Priority | Name | Port | Protocol |
|----------|----------------------|------|----------|
| 300 | SSH | 22 | TCP |
| 65000 | AllowVnetInBound | Any | Any |
| 65001 | AllowAzureLoadBal... | Any | Any |
| 65500 | DenyAllInBound | Any | Any |

Add Cancel Give feedback

Implementación

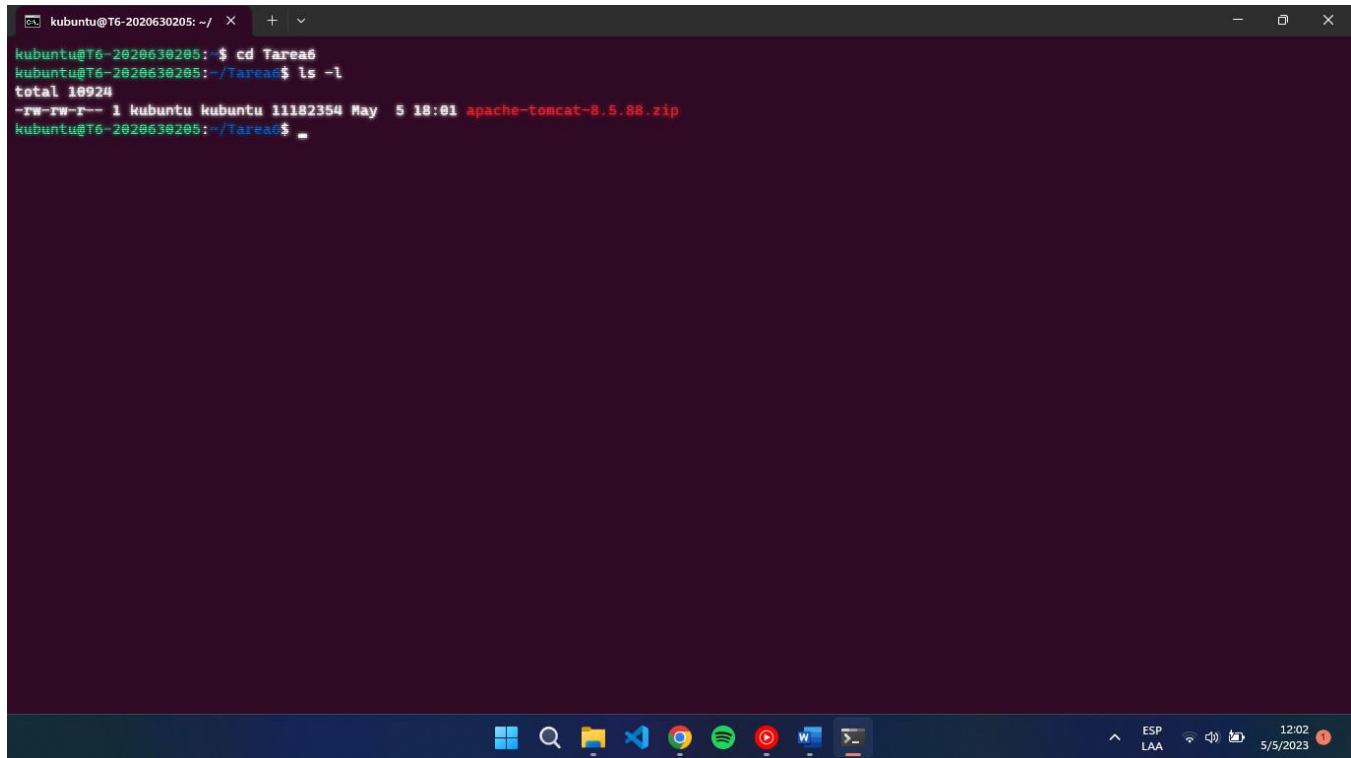
Instalamos el JDK de Java 8

```
After this operation, 259 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://azure.archive.ubuntu.com/ubuntu focal-updates/main amd64 distro-info-data all 0.43ubuntu1.13 [4836 B]
Get:2 http://azure.archive.ubuntu.com/ubuntu focal-updates/main amd64 git-man all 1:2.25.1-1ubuntu3.11 [887 kB]
Get:3 http://azure.archive.ubuntu.com/ubuntu focal-updates/main amd64 git amd64 1:2.25.1-1ubuntu3.11 [4605 kB]
Fetched 5496 kB in 0s (44.8 MB/s)
(Reading database ... 58706 files and directories currently installed.)
Preparing to unpack .../distro-info-data_0.43ubuntu1.13_all.deb ...
Unpacking distro-info-data (0.43ubuntu1.13) over (0.43ubuntu1.12) ...
Preparing to unpack .../git-man_1%3a2.25.1-1ubuntu3.11_all.deb ...
Unpacking git-man (1:2.25.1-1ubuntu3.11) over (1:2.25.1-1ubuntu3.10) ...
Preparing to unpack .../git_1%3a2.25.1-1ubuntu3.11_amd64.deb ...
Unpacking git (1:2.25.1-1ubuntu3.11) over (1:2.25.1-1ubuntu3.10) ...
Setting up distro-info-data (0.43ubuntu1.13) ...
Setting up git-man (1:2.25.1-1ubuntu3.11) ...
Setting up git (1:2.25.1-1ubuntu3.11) ...
Processing triggers for man-db (2.9.1-1) ...
kubuntu@T6-2020630205: $ sudo apt install openjdk-8-jdk-headless
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ca-certificates-java fontconfig-config fonts-dejavu-core java-common libavahi-client3 libavahi-common-data libavahi-common3 libcups2
  libfontconfig1 libjpeg-turbo8 libjpeg8 liblcms2-2 libpcssl1e libxi6 libxrender1 libxtst6 openjdk-8-jre-headless x11-common
Suggested packages:
  default-jre cups-common liblcms2-utils pcscd openjdk-8-demo openjdk-8-source libnss-mdns fonts-dejavu-extra fonts-ipafont-gothic
  fonts-ipafont-mincho fonts-wqy-microhei fonts-wqy-zenhei fonts-indic
The following NEW packages will be installed:
  ca-certificates-java fontconfig-config fonts-dejavu-core java-common libavahi-client3 libavahi-common-data libavahi-common3 libcups2
  libfontconfig1 libjpeg-turbo8 libjpeg8 liblcms2-2 libpcssl1e libxi6 libxrender1 libxtst6 openjdk-8-jdk-headless openjdk-8-jre-headless
  x11-common
0 upgraded, 19 newly installed, 0 to remove and 0 not upgraded.
Need to get 38.4 MB of archives.
After this operation, 158 kB of additional disk space will be used.
Do you want to continue? [Y/n] _
```

Descargamos Tomcat8 desde el link proporcionado

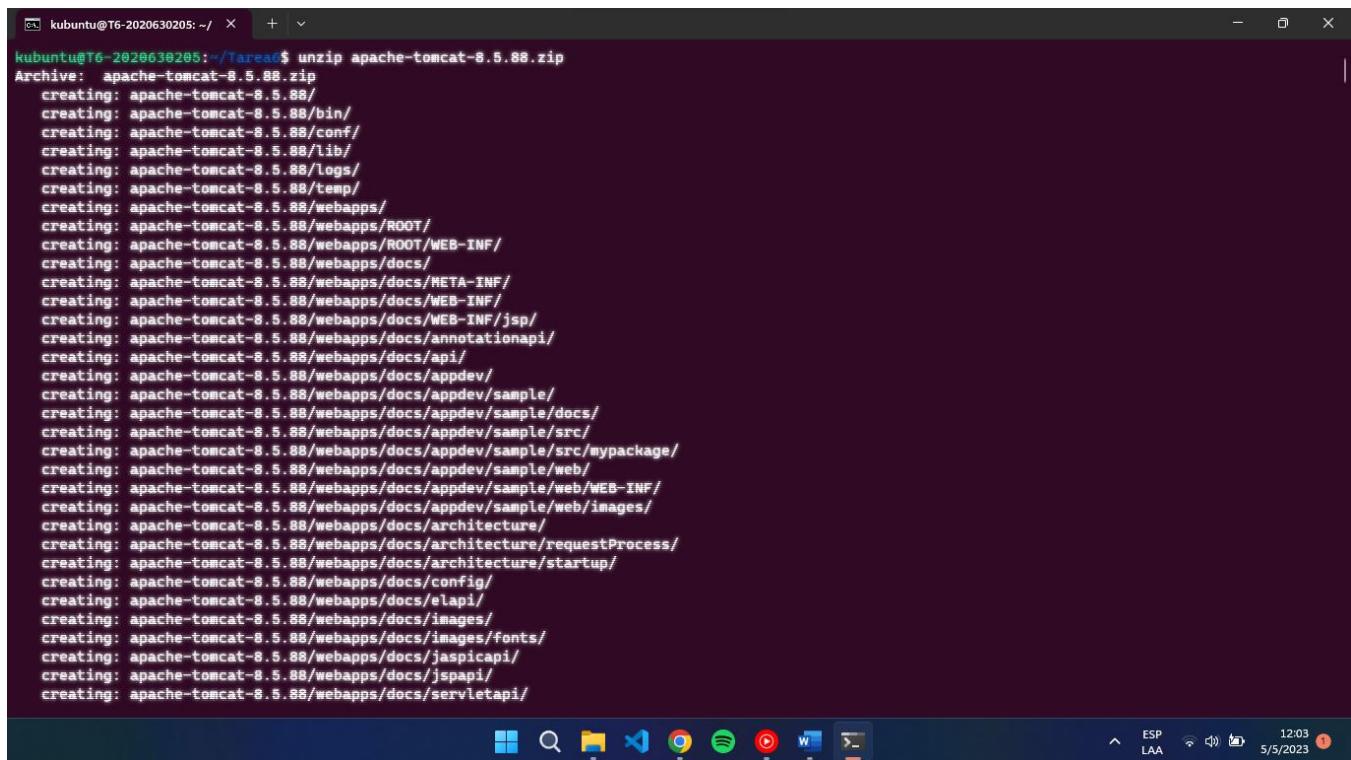
The screenshot shows a browser window with the URL tomcat.apache.org/download-80.cgi. The page displays the download instructions for Tomcat 8.5.88. It includes a sidebar with links to Tomcat documentation, problems, and get involved sections. The main content area provides instructions on verifying file integrity using OpenPGP signatures and SHA-512 checksums. It lists various distribution formats available for download, such as zip, tar.gz, and Windows zip files.

Copiamos el archivo .zip a la máquina virtual



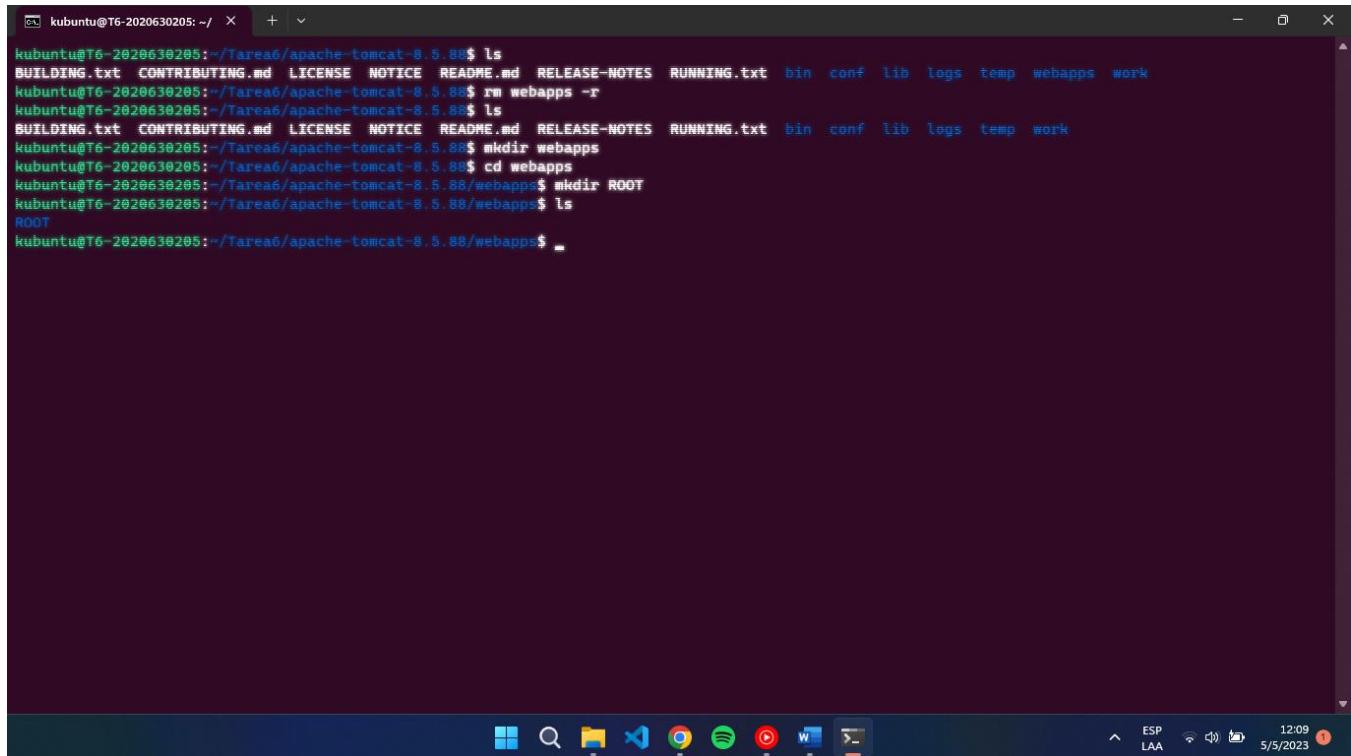
```
kubuntu@T6-2020630205: ~ / + 
kubuntu@T6-2020630205: $ cd Tarea6
kubuntu@T6-2020630205:~/Tarea6$ ls -l
total 10924
-rw-r--r-- 1 kubuntu kubuntu 11182354 May  5 18:01 apache-tomcat-8.5.88.zip
kubuntu@T6-2020630205:~/Tarea6$ _
```

Lo descomprimimos utilizando la herramienta unzip



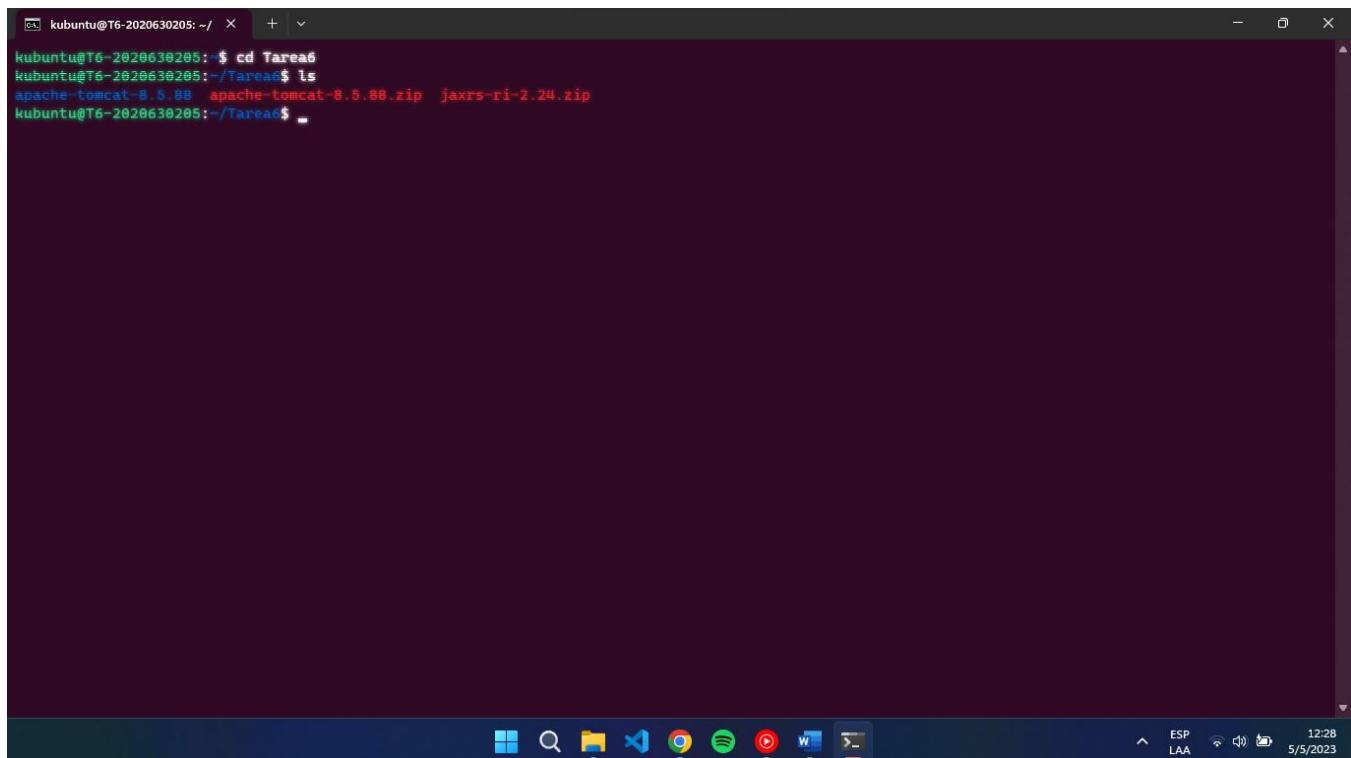
```
kubuntu@T6-2020630205: ~/Tarea6$ unzip apache-tomcat-8.5.88.zip
Archive: apache-tomcat-8.5.88.zip
creating: apache-tomcat-8.5.88/
creating: apache-tomcat-8.5.88/bin/
creating: apache-tomcat-8.5.88/conf/
creating: apache-tomcat-8.5.88/lib/
creating: apache-tomcat-8.5.88/logs/
creating: apache-tomcat-8.5.88/temp/
creating: apache-tomcat-8.5.88/webapps/
creating: apache-tomcat-8.5.88/webapps/ROOT/
creating: apache-tomcat-8.5.88/webapps/ROOT/WEB-INF/
creating: apache-tomcat-8.5.88/webapps/docs/
creating: apache-tomcat-8.5.88/webapps/docs/META-INF/
creating: apache-tomcat-8.5.88/webapps/docs/WEB-INF/
creating: apache-tomcat-8.5.88/webapps/docs/WEB-INF/jsp/
creating: apache-tomcat-8.5.88/webapps/docs/annotationapi/
creating: apache-tomcat-8.5.88/webapps/docs/api/
creating: apache-tomcat-8.5.88/webapps/docs/appdev/
creating: apache-tomcat-8.5.88/webapps/docs/appdev/sample/
creating: apache-tomcat-8.5.88/webapps/docs/appdev/sample/docs/
creating: apache-tomcat-8.5.88/webapps/docs/appdev/sample/src/
creating: apache-tomcat-8.5.88/webapps/docs/appdev/sample/src/mypackage/
creating: apache-tomcat-8.5.88/webapps/docs/appdev/sample/web/
creating: apache-tomcat-8.5.88/webapps/docs/appdev/sample/web/WEB-INF/
creating: apache-tomcat-8.5.88/webapps/docs/appdev/sample/web/images/
creating: apache-tomcat-8.5.88/webapps/docs/architecture/
creating: apache-tomcat-8.5.88/webapps/docs/architecture/requestProcess/
creating: apache-tomcat-8.5.88/webapps/docs/architecture/startup/
creating: apache-tomcat-8.5.88/webapps/docs/config/
creating: apache-tomcat-8.5.88/webapps/docs/elapi/
creating: apache-tomcat-8.5.88/webapps/docs/images/
creating: apache-tomcat-8.5.88/webapps/docs/images/fonts/
creating: apache-tomcat-8.5.88/webapps/docs/jaspicapi/
creating: apache-tomcat-8.5.88/webapps/docs/jspapi/
creating: apache-tomcat-8.5.88/webapps/docs/servletapi/
```

Eliminamos el directorio webapps y creamos uno nuevo con un subdirectorio ROOT



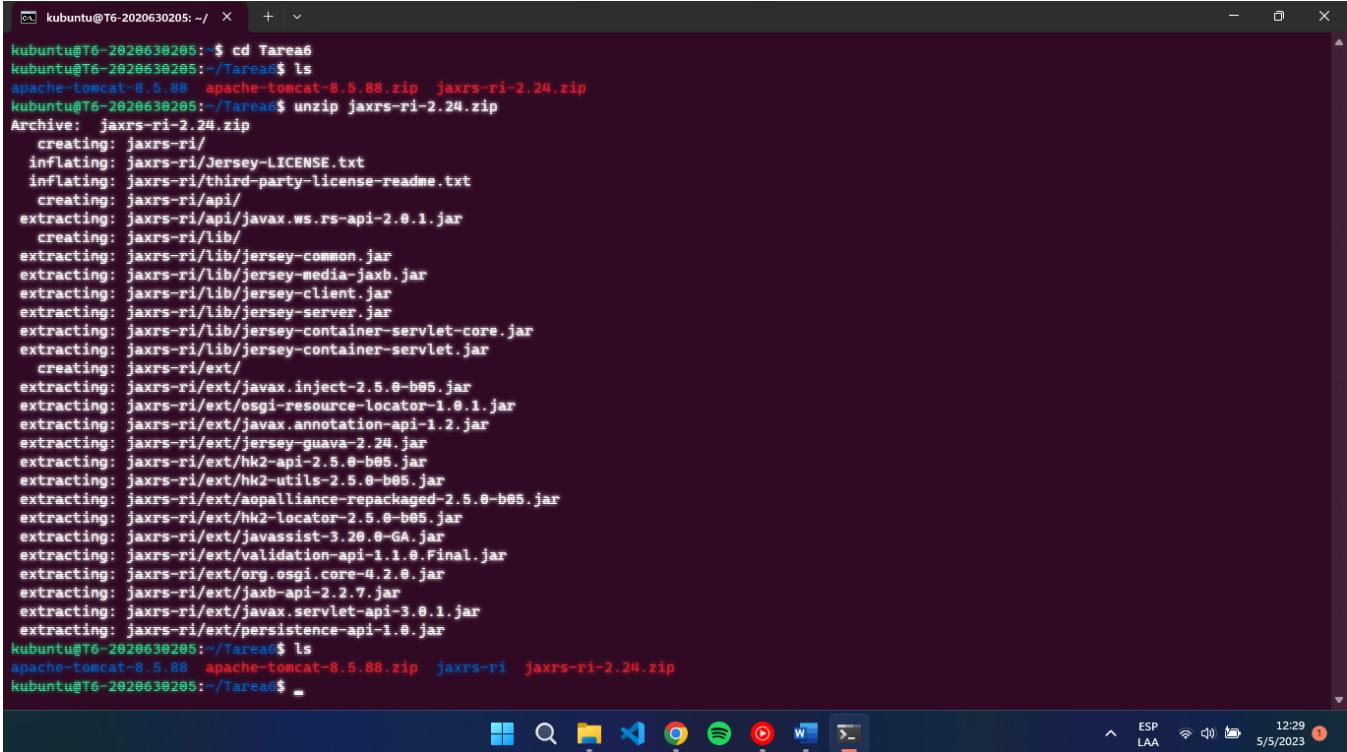
```
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88$ ls
BUILDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs temp webapps work
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88$ rm webapps -r
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88$ ls
BUILDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs temp work
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88$ mkdir webapps
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88$ cd webapps
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88/webapps$ mkdir ROOT
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88/webapps$ ls
ROOT
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88/webapps$ ..
```

Copiamos la biblioteca Jersey a la máquina virtual



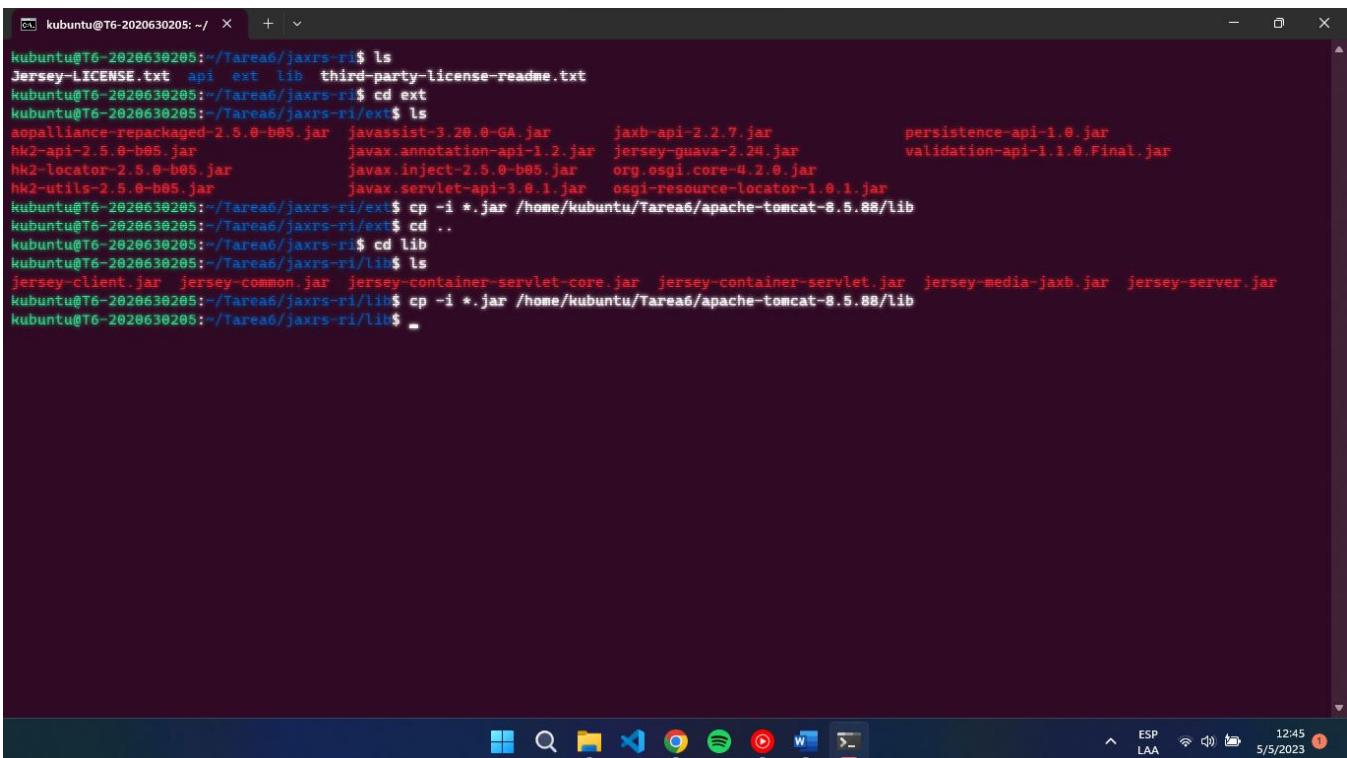
```
kubuntu@T6-2020630205:~$ cd Tarea6
kubuntu@T6-2020630205:~/Tarea6$ ls
apache-tomcat-8.5.88 apache-tomcat-8.5.88.zip jaxrs-ri-2.24.zip
kubuntu@T6-2020630205:~/Tarea6$ ..
```

Descomprimimos el archivo .zip



```
kubuntu@T6-2020630205: ~ / x + v
kubuntu@T6-2020630205: $ cd Tarea6
kubuntu@T6-2020630205:~/Tarea6$ ls
apache-tomcat-8.5.88 apache-tomcat-8.5.88.zip jaxrs-ri-2.24.zip
kubuntu@T6-2020630205:~/Tarea6$ unzip jaxrs-ri-2.24.zip
Archive: jaxrs-ri-2.24.zip
  creating: jaxrs-ri/
  inflating: jaxrs-ri/Jersey-LICENSE.txt
  inflating: jaxrs-ri/third-party-license-readme.txt
  creating: jaxrs-ri/api/
extracting: jaxrs-ri/api/javax.ws.rs-api-2.0.1.jar
  creating: jaxrs-ri/lib/
extracting: jaxrs-ri/lib/jersey-common.jar
extracting: jaxrs-ri/lib/jersey-media-jaxb.jar
extracting: jaxrs-ri/lib/jersey-client.jar
extracting: jaxrs-ri/lib/jersey-server.jar
extracting: jaxrs-ri/lib/jersey-container-servlet-core.jar
extracting: jaxrs-ri/lib/jersey-container-servlet.jar
  creating: jaxrs-ri/ext/
extracting: jaxrs-ri/ext/javax.inject-2.5.0-b05.jar
extracting: jaxrs-ri/ext/osgi-resource-locator-1.0.1.jar
extracting: jaxrs-ri/ext/javax.annotation-api-1.2.jar
extracting: jaxrs-ri/ext/jersey-guava-2.24.jar
extracting: jaxrs-ri/ext/hk2-api-2.5.0-b05.jar
extracting: jaxrs-ri/ext/hk2-utils-2.5.0-b05.jar
extracting: jaxrs-ri/ext/aopalliance-repackaged-2.5.0-b05.jar
extracting: jaxrs-ri/ext/hk2-locator-2.5.0-b05.jar
extracting: jaxrs-ri/ext/javassist-3.20.0-GA.jar
extracting: jaxrs-ri/ext/validation-api-1.1.0.Final.jar
extracting: jaxrs-ri/ext/org.osgi.core-4.2.0.jar
extracting: jaxrs-ri/ext/jAXB-API-2.2.7.jar
extracting: jaxrs-ri/ext/javax.servlet-api-3.0.1.jar
extracting: jaxrs-ri/ext/persistence-api-1.0.jar
kubuntu@T6-2020630205:~/Tarea6$ ls
apache-tomcat-8.5.88 apache-tomcat-8.5.88.zip jaxrs-ri jaxrs-ri-2.24.zip
kubuntu@T6-2020630205:~/Tarea6$ _
```

Copiamos todos los archivos .jar contenidos en la carpeta descomprimida hacia el directorio lib de Tomcat



```
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri$ ls
Jersey-LICENSE.txt api ext lib third-party-license-readme.txt
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri$ cd ext
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri/ext$ ls
aopalliance-repackaged-2.5.0-b05.jar javassist-3.20.0-GA.jar jaxb-api-2.2.7.jar persistence-api-1.0.jar
hk2-api-2.5.0-b05.jar javax.annotation-api-1.2.jar jersey-guava-2.24.jar validation-api-1.1.0.Final.jar
hk2-locator-2.5.0-b05.jar javax.inject-2.5.0-b05.jar org.osgi.core-4.2.0.jar
hk2-utils-2.5.0-b05.jar javax.servlet-api-3.0.1.jar osgi-resource-locator-1.0.1.jar
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri/ext$ cp -i *.jar /home/kubuntu/Tarea6/apache-tomcat-8.5.88/lib
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri/ext$ cd ..
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri$ cd lib
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri/lib$ ls
jersey-client.jar jersey-common.jar jersey-container-servlet-core.jar jersey-container-servlet.jar jersey-media-jaxb.jar jersey-server.jar
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri/lib$ cp -i *.jar /home/kubuntu/Tarea6/apache-tomcat-8.5.88/lib
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri/lib$ _
```

```
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri$ ls
Jersey-LICENSE.txt  api  ext  lib  third-party-license-readme.txt
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri$ cd ext
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri/ext$ ls
aopalliance-repackaged-2.5.0-b05.jar  javassist-3.20.0-GA.jar      jaxb-api-2.2.7.jar      persistence-api-1.0.jar
hk2-api-2.5.0-b05.jar                javax.annotation-api-1.2.jar jersey-guava-2.24.jar    validation-api-1.1.0.Final.jar
hk2-locator-2.5.0-b05.jar            javax.inject-2.5.0-b05.jar org.osgi.core-4.2.0.jar
hk2-utils-2.5.0-b05.jar              javax.servlet-api-3.0.1.jar osgi-resource-locator-1.0.1.jar
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri/ext$ cp -i *.jar /home/kubuntu/Tarea6/apache-tomcat-8.5.88/lib
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri/ext$ cd ..
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri$ cd lib
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri/lib$ ls
jersey-client.jar  jersey-common.jar  jersey-container-servlet-core.jar jersey-container-servlet.jar jersey-media-jaxb.jar  jersey-server.jar
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri/lib$ cp -i *.jar /home/kubuntu/Tarea6/apache-tomcat-8.5.88/lib
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri/lib$ cd ..
kubuntu@T6-2020630205:~/Tarea6/jaxrs-ri$ cd ..
kubuntu@T6-2020630205:~/Tarea6$ cd apache-tomcat-8.5.88
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88$ ls
BUILDING.txt  CONTRIBUTING.md  LICENSE  NOTICE  README.md  RELEASE-NOTES  RUNNING.txt  bin  conf  lib  logs  temp  webapps  work
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88$ cd lib
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88/lib$ ls
annotations-api.jar          jasper.jar           jersey-server.jar        tomcat-i18n-ko.jar
aopalliance-repackaged-2.5.0-b05.jar  jaspic-api.jar   jsp-api.jar           tomcat-i18n-ru.jar
catalina-ant.jar             javassist-3.20.0-GA.jar  org.osgi.core-4.2.0.jar  tomcat-i18n-zh-CN.jar
catalina-ha.jar              javax.annotation-api-1.2.jar  osgi-resource-locator-1.0.1.jar  tomcat-jdbc.jar
catalina-storeconfig.jar     javax.inject-2.5.0-b05.jar  persistence-api-1.0.jar  tomcat-jni.jar
catalina-tribes.jar          javax.servlet-api-3.0.1.jar  servlet-api.jar       tomcat-util-scan.jar
catalina.jar                 jaxb-api-2.2.7.jar      tomcat-coyote.jar    tomcat-util.jar
ecj-4.6.3.jar               jersey-client.jar      tomcat-dbcp.jar     tomcat-websocket.jar
el-api.jar                  jersey-common.jar     tomcat-i18n-de.jar   validation-api-1.1.0.Final.jar
hk2-api-2.5.0-b05.jar        jersey-container-servlet-core.jar  tomcat-i18n-es.jar   websocket-api.jar
hk2-locator-2.5.0-b05.jar    jersey-container-servlet.jar  tomcat-i18n-fr.jar
hk2-utils-2.5.0-b05.jar      jersey-guava-2.24.jar   tomcat-i18n-ja.jar
jasper-el.jar               jersey-media-jaxb.jar
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88/lib$
```

Eliminamos javax.servlet-api-3.0.1.jar

```
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88/lib$ ls
annotations-api.jar          jasper.jar           jersey-server.jar        tomcat-i18n-ko.jar
aopalliance-repackaged-2.5.0-b05.jar  jaspic-api.jar   jsp-api.jar           tomcat-i18n-ru.jar
catalina-ant.jar             javassist-3.20.0-GA.jar  org.osgi.core-4.2.0.jar  tomcat-i18n-zh-CN.jar
catalina-ha.jar              javax.annotation-api-1.2.jar  osgi-resource-locator-1.0.1.jar  tomcat-jdbc.jar
catalina-storeconfig.jar     javax.inject-2.5.0-b05.jar  persistence-api-1.0.jar  tomcat-jni.jar
catalina-tribes.jar          javax.servlet-api-3.0.1.jar  servlet-api.jar       tomcat-util-scan.jar
catalina.jar                 jaxb-api-2.2.7.jar      tomcat-coyote.jar    tomcat-util.jar
ecj-4.6.3.jar               jersey-client.jar      tomcat-dbcp.jar     tomcat-websocket.jar
el-api.jar                  jersey-common.jar     tomcat-i18n-de.jar   validation-api-1.1.0.Final.jar
HK2-api-2.5.0-b05.jar        jersey-container-servlet-core.jar  tomcat-i18n-es.jar   websocket-api.jar
hk2-locator-2.5.0-b05.jar    jersey-container-servlet.jar  tomcat-i18n-fr.jar
hk2-utils-2.5.0-b05.jar      jersey-guava-2.24.jar   tomcat-i18n-ja.jar
jasper-el.jar               jersey-media-jaxb.jar
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88/lib$ rm javax.servlet-api-3.0.1.jar
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88/lib$
```

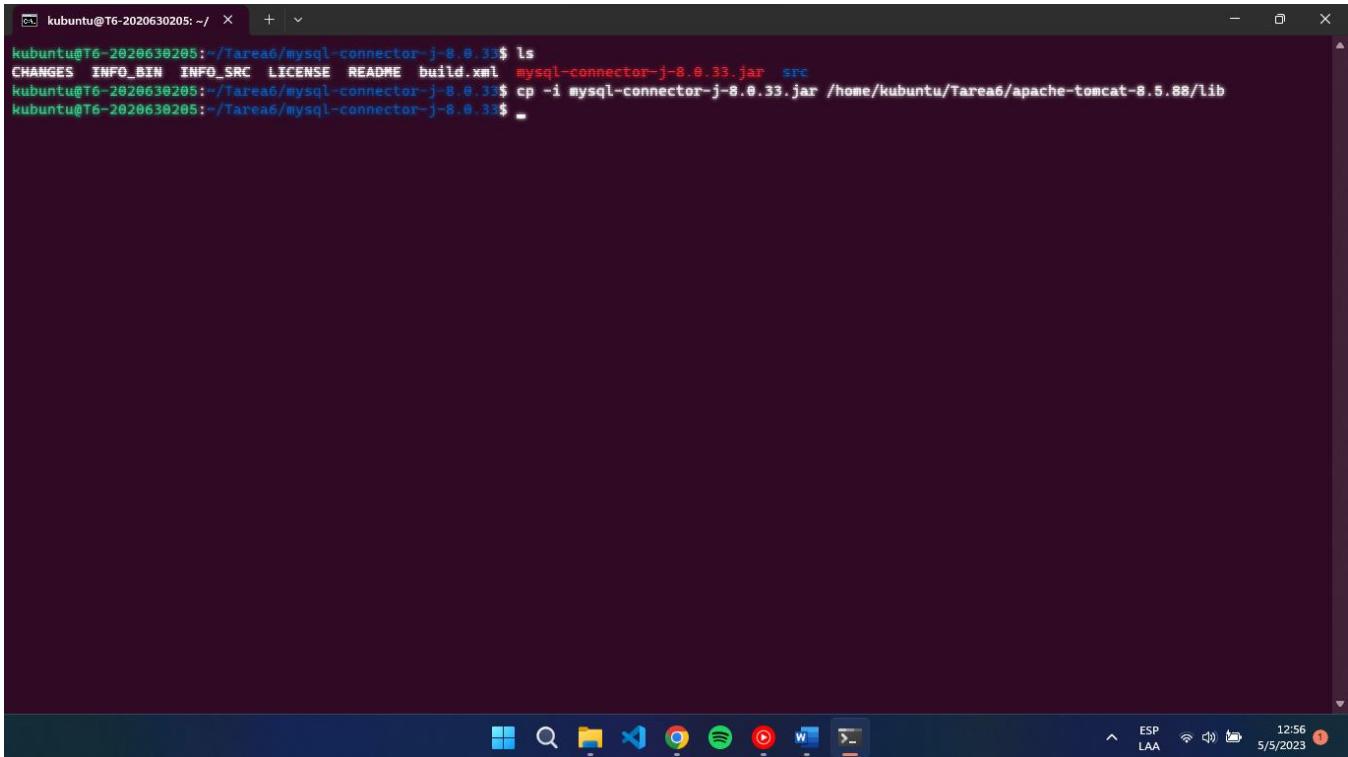
Copiamos el archivo gson-2.3.1.jar al directorio lib de Tomcat

```
kubuntu@T6-2020630205: ~/ + ×
kubuntu@T6-2020630205:~/Tarea6/
kubuntu@T6-2020630205:~/Tarea6$ ls
apache-tomcat-8.5.88 apache-tomcat-8.5.88.zip gson-2.3.1.jar jaxrs-ri jaxrs-ri-2.24.zip
kubuntu@T6-2020630205:~/Tarea6$ cp gson-2.3.1.jar /home/kubuntu/Tarea6/apache-tomcat-8.5.88/lib
kubuntu@T6-2020630205:~/Tarea6$
```

Descomprimimos el conector para mysql

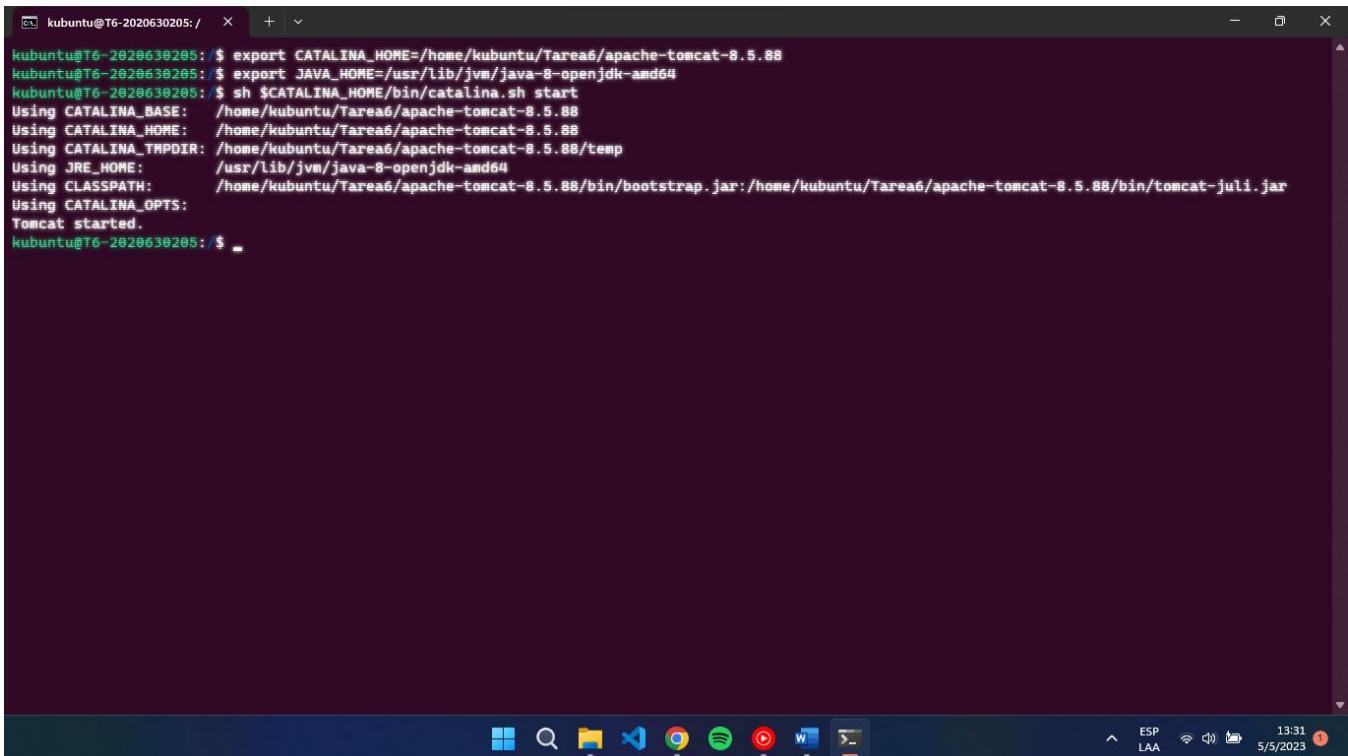
```
kubuntu@T6-2020630205: ~/ + ×
kubuntu@T6-2020630205:~/Tarea6/
kubuntu@T6-2020630205:~/Tarea6$ ls
apache-tomcat-8.5.88 apache-tomcat-8.5.88.zip gson-2.3.1.jar jaxrs-ri jaxrs-ri-2.24.zip mysql-connector-j-8.0.33.zip
kubuntu@T6-2020630205:~/Tarea6$ unzip mysql-connector-j-8.0.33.zip
Archive: mysql-connector-j-8.0.33.zip
  creating: mysql-connector-j-8.0.33/
  creating: mysql-connector-j-8.0.33/src/
  creating: mysql-connector-j-8.0.33/src/build/
  creating: mysql-connector-j-8.0.33/src/build/java/
  creating: mysql-connector-j-8.0.33/src/build/java/documentation/
  creating: mysql-connector-j-8.0.33/src/build/java/instrumentation/
  creating: mysql-connector-j-8.0.33/src/build/misc/
  creating: mysql-connector-j-8.0.33/src/build/misc/debian.in/
  creating: mysql-connector-j-8.0.33/src/build/misc/debian.in/source/
  creating: mysql-connector-j-8.0.33/src/demo/
  creating: mysql-connector-j-8.0.33/src/demo/java/
  creating: mysql-connector-j-8.0.33/src/demo/java/demo/
  creating: mysql-connector-j-8.0.33/src/demo/java/demo/x/
  creating: mysql-connector-j-8.0.33/src/demo/java/demo/x/devapi/
  creating: mysql-connector-j-8.0.33/src/generated/
  creating: mysql-connector-j-8.0.33/src/generated/java/
  creating: mysql-connector-j-8.0.33/src/generated/java/com/
  creating: mysql-connector-j-8.0.33/src/generated/java/com/mysql/
  creating: mysql-connector-j-8.0.33/src/generated/java/com/mysql/cj/
  creating: mysql-connector-j-8.0.33/src/generated/java/com/mysql/cj/x/
  creating: mysql-connector-j-8.0.33/src/generated/java/com/mysql/cj/x/protobuf/
  creating: mysql-connector-j-8.0.33/src/legacy/
  creating: mysql-connector-j-8.0.33/src/legacy/java/
  creating: mysql-connector-j-8.0.33/src/legacy/java/com/
  creating: mysql-connector-j-8.0.33/src/legacy/java/com/mysql/
  creating: mysql-connector-j-8.0.33/src/legacy/java/com/mysql/jdbc/
  creating: mysql-connector-j-8.0.33/src/main/
  creating: mysql-connector-j-8.0.33/src/main/core-api/
  creating: mysql-connector-j-8.0.33/src/main/core-api/java/
  creating: mysql-connector-j-8.0.33/src/main/core-api/java/com/
```

Copiamos el .jar del conector de mysql al directorio lib de Tomcat



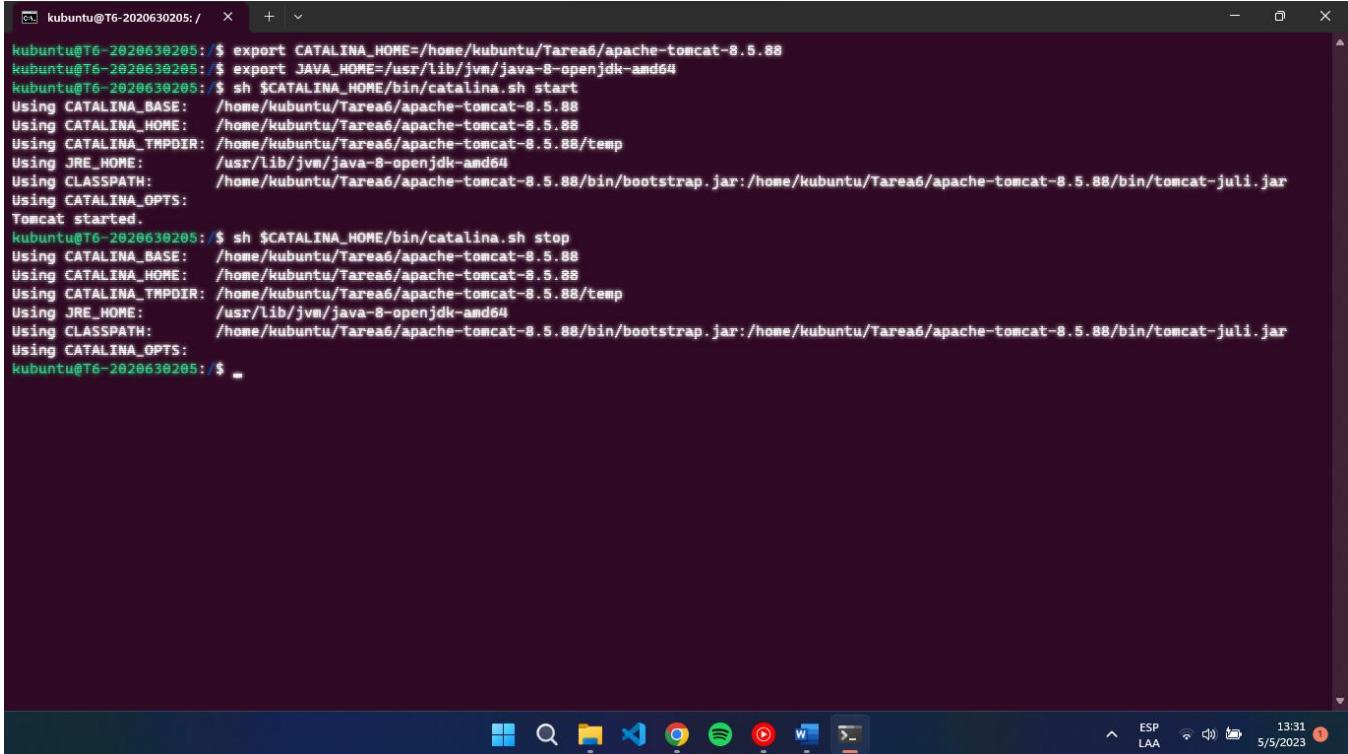
```
kubuntu@T6-2020630205:~/Tarea6/mysql-connector-j-8.0.33$ ls  
CHANGES INFO_BIN INFO_SRC LICENSE README build.xml mysql-connector-j-8.0.33.jar src  
kubuntu@T6-2020630205:~/Tarea6/mysql-connector-j-8.0.33$ cp -i mysql-connector-j-8.0.33.jar /home/kubuntu/Tarea6/apache-tomcat-8.5.88/lib  
kubuntu@T6-2020630205:~/Tarea6/mysql-connector-j-8.0.33$
```

Creamos las variables de entorno para CATALINA_HOME y JAVA_HOME para iniciar posteriormente el servidor Tomcat



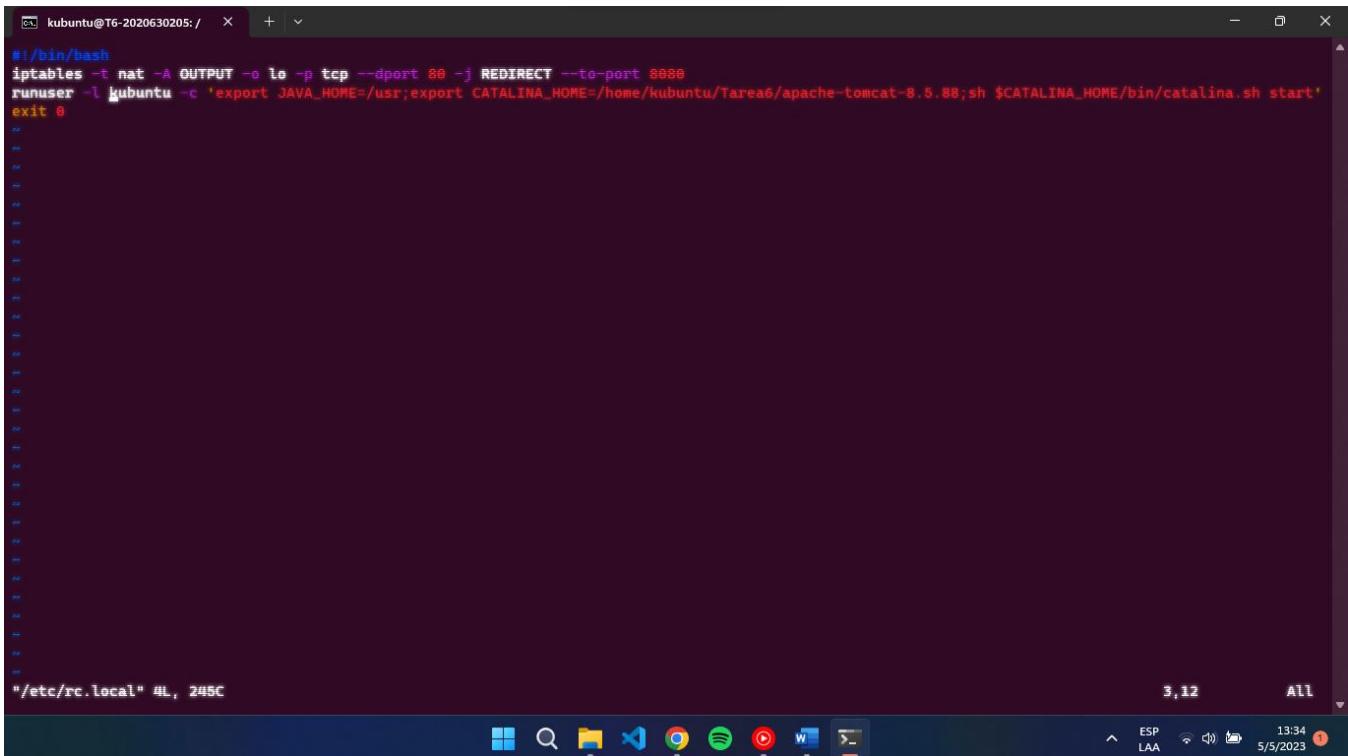
```
kubuntu@T6-2020630205:/$ export CATALINA_HOME=/home/kubuntu/Tarea6/apache-tomcat-8.5.88  
kubuntu@T6-2020630205:/$ export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64  
kubuntu@T6-2020630205:/$ sh $CATALINA_HOME/bin/catalina.sh start  
Using CATALINA_BASE: /home/kubuntu/Tarea6/apache-tomcat-8.5.88  
Using CATALINA_HOME: /home/kubuntu/Tarea6/apache-tomcat-8.5.88  
Using CATALINA_TMPDIR: /home/kubuntu/Tarea6/apache-tomcat-8.5.88/temp  
Using JRE_HOME: /usr/lib/jvm/java-8-openjdk-amd64  
Using CLASSPATH: /home/kubuntu/Tarea6/apache-tomcat-8.5.88/bin/bootstrap.jar:/home/kubuntu/Tarea6/apache-tomcat-8.5.88/bin/tomcat-juli.jar  
Using CATALINA_OPTS:  
Tomcat started.  
kubuntu@T6-2020630205: $
```

Al igual que ya lo podemos detener



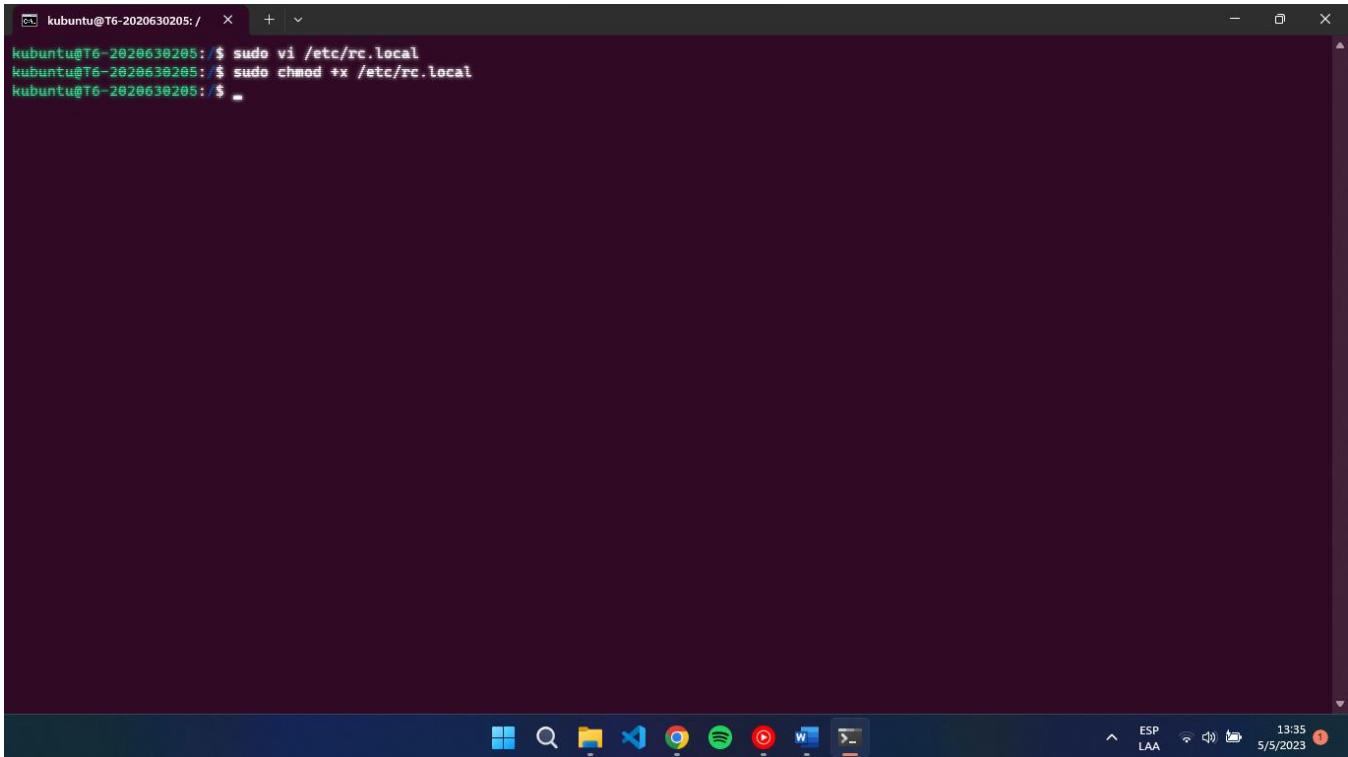
```
kubuntu@T6-2020630205: ~ + 
kubuntu@T6-2020630205: $ export CATALINA_HOME=/home/kubuntu/Tarea6/apache-tomcat-8.5.88
kubuntu@T6-2020630205: $ export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64
kubuntu@T6-2020630205: $ sh $CATALINA_HOME/bin/catalina.sh start
Using CATALINA_BASE: /home/kubuntu/Tarea6/apache-tomcat-8.5.88
Using CATALINA_HOME: /home/kubuntu/Tarea6/apache-tomcat-8.5.88
Using CATALINA_TMPDIR: /home/kubuntu/Tarea6/apache-tomcat-8.5.88/temp
Using JRE_HOME: /usr/lib/jvm/java-8-openjdk-amd64
Using CLASSPATH: /home/kubuntu/Tarea6/apache-tomcat-8.5.88/bin/bootstrap.jar:/home/kubuntu/Tarea6/apache-tomcat-8.5.88/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Tomcat started.
kubuntu@T6-2020630205: $ sh $CATALINA_HOME/bin/catalina.sh stop
Using CATALINA_BASE: /home/kubuntu/Tarea6/apache-tomcat-8.5.88
Using CATALINA_HOME: /home/kubuntu/Tarea6/apache-tomcat-8.5.88
Using CATALINA_TMPDIR: /home/kubuntu/Tarea6/apache-tomcat-8.5.88/temp
Using JRE_HOME: /usr/lib/jvm/java-8-openjdk-amd64
Using CLASSPATH: /home/kubuntu/Tarea6/apache-tomcat-8.5.88/bin/bootstrap.jar:/home/kubuntu/Tarea6/apache-tomcat-8.5.88/bin/tomcat-juli.jar
Using CATALINA_OPTS:
kubuntu@T6-2020630205: $
```

Creamos el archivo /etc/rc.local para que cada se inicie la máquina virtual se inicie también el servidor Tomcat



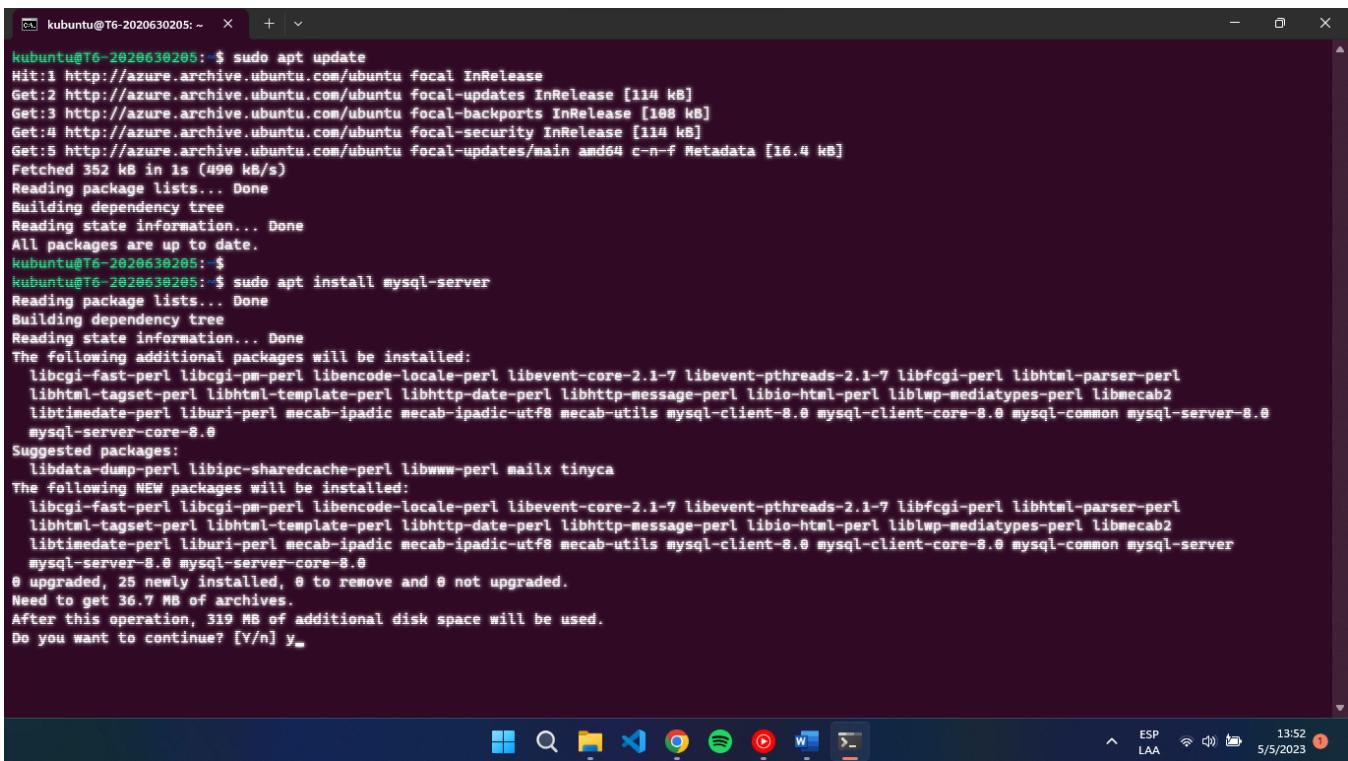
```
#!/bin/bash
iptables -t nat -A OUTPUT -o lo -p tcp --dport 80 -j REDIRECT --to-port 8080
runuser -l kubuntu -c 'export JAVA_HOME=/usr;export CATALINA_HOME=/home/kubuntu/Tarea6/apache-tomcat-8.5.88;sh $CATALINA_HOME/bin/catalina.sh start'
exit 0
```

Convertimos el archivo a ejecutable.



```
kubuntu@T6-2020630205:~$ sudo vi /etc/rc.local
kubuntu@T6-2020630205:~$ sudo chmod +x /etc/rc.local
kubuntu@T6-2020630205:~$
```

Instalamos mysql



```
kubuntu@T6-2020630205:~$ sudo apt update
Get:1 http://azure.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://azure.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:3 http://azure.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:4 http://azure.archive.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:5 http://azure.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [16.4 kB]
Fetched 352 kB in 1s (498 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
kubuntu@T6-2020630205:~$ sudo apt install mysql-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libcgi-fast-perl libcgi-pm-perl libencode-locale-perl libevent-core-2.1-7 libevent-pthreads-2.1-7 libfcgi-perl libhtml-parser-perl
  libhtml-tagset-perl libhtml-template-perl libhttp-date-perl libhttp-message-perl libio-html-perl liblwp-mediatypes-perl libmecab2
  libtimedate-perl liburi-perl mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0 mysql-client-core-8.0 mysql-common mysql-server-8.0
  mysql-server-core-8.0
Suggested packages:
  libdata-dump-perl libipc-sharedcache-perl libwww-perl mailx tinyca
The following NEW packages will be installed:
  libcgi-fast-perl libcgi-pm-perl libencode-locale-perl libevent-core-2.1-7 libevent-pthreads-2.1-7 libfcgi-perl libhtml-parser-perl
  libhtml-tagset-perl libhtml-template-perl libhttp-date-perl libhttp-message-perl libio-html-perl liblwp-mediatypes-perl libmecab2
  libtimedate-perl liburi-perl mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0 mysql-client-core-8.0 mysql-common mysql-server-8.0
  mysql-server-core-8.0
0 upgraded, 25 newly installed, 0 to remove and 0 not upgraded.
Need to get 36.7 MB of archives.
After this operation, 319 MB of additional disk space will be used.
Do you want to continue? [Y/n] y_
```

Y cuando hacemos la instalación segura no nos permite ingresar la contraseña, pero posteriormente se agrega.

```
kevin + X - ▾
Last login: Fri May  5 18:54:13 2023 from 187.198.26.165
kubuntu@T6-2020630205:~$ sudo mysql_secure_installation

Securing the MySQL server deployment.

Connecting to MySQL using a blank password.

VALIDATE PASSWORD COMPONENT can be used to test passwords
and improve security. It checks the strength of password
and allows the users to set only those passwords which are
secure enough. Would you like to setup VALIDATE PASSWORD component?

Press y|Y for Yes, any other key for No: N
Please set the password for root here.

New password:
Re-enter new password:
... Failed! Error: SET PASSWORD has no significance for user 'root'@'localhost' as the authentication method used doesn't store authentication data
in the MySQL server. Please consider using ALTER USER instead if you want to change authentication parameters.

New password:
Re-enter new password:
... Failed! Error: SET PASSWORD has no significance for user 'root'@'localhost' as the authentication method used doesn't store authentication data
in the MySQL server. Please consider using ALTER USER instead if you want to change authentication parameters.

New password:
Re-enter new password:
... Failed! Error: SET PASSWORD has no significance for user 'root'@'localhost' as the authentication method used doesn't store authentication data
in the MySQL server. Please consider using ALTER USER instead if you want to change authentication parameters.

ESP LAA 14:14 5/5/2023
```

Ejecutamos el monitor y creamos el usuario root con todos los privilegios y su contraseña

```
kubuntu@T6-2020630205:~ + X
kubuntu@T6-2020630205:~$ sudo mysql
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.32-Ubuntu0.20.04.2 (Ubuntu)

Copyright (c) 2000, 2023, Oracle and/or its affiliates.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> ALTER USER 'root'@'localhost' IDENTIFIED WITH mysql_native_password BY '1234';
Query OK, 0 rows affected (0.04 sec)

mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.02 sec)

mysql> quit
Bye
kubuntu@T6-2020630205:~
```

Creamos un usuario desde el usuario root y también le asignamos una contraseña. Le otorgamos los permisos para ingresar a la base de datos servicio_web

```
kubuntu@T6-2020630205: ~ + - X
kubuntu@T6-2020630205: $ mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 10
Server version: 8.0.32-0ubuntu0.20.04.2 (Ubuntu)

Copyright (c) 2000, 2023, Oracle and/or its affiliates.

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> create user keving@localhost identified by '1234';
Query OK, 0 rows affected (0.22 sec)

mysql> grant all on servicio_web.* to keving@localhost;
Query OK, 0 rows affected (0.04 sec)

mysql> quit
Bye
kubuntu@T6-2020630205: $
```

Creamos la base de datos servicio_web con las dos tablas que lo contienen

```
kubuntu@T6-2020630205: ~ + - X
kubuntu@T6-2020630205: $ mysql -u kevin -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 11
Server version: 8.0.32-0ubuntu0.20.04.2 (Ubuntu)

Copyright (c) 2000, 2023, Oracle and/or its affiliates.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> create database servicio_web;
Query OK, 1 row affected (0.14 sec)

mysql> use servicio_web;
Database changed
mysql> create table usuarios ( id_usuario integer auto_increment primary key, email varchar(100) not null, nombre varchar(100) not null, apellido_pa
terno varchar(100) not null, apellido_materno varchar(100), fecha_nacimiento datetime not null, telefono bigint, genero char(1));
Query OK, 0 rows affected (0.21 sec)

mysql> create table fotos_usuarios ( id_foto integer auto_increment primary key, foto longblob, id_usuario integer not null);
Query OK, 0 rows affected (0.27 sec)

mysql> alter table fotos_usuarios add foreign key (id_usuario) references usuarios(id_usuario);
Query OK, 0 rows affected (0.52 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> create unique index usuarios_1 on usuarios(email);
Query OK, 0 rows affected (0.21 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> _
```

Compilamos la clase Servicio.java del archivo anteriormente descomprimido Servicio.zip

```
kubuntu@T6-2020630205:~/Tarea6/Servicio$ javac -cp $CATALINA_HOME/lib/javax.ws.rs-api-2.0.1.jar:$CATALINA_HOME/lib/gson-2.3.1.jar:. servicio_json/Servicio.java
kubuntu@T6-2020630205:~/Tarea6/Servicio$ _
```

Editamos el archivo context.xml para agregar el usuario y la contraseña

Ejecutamos los comandos para ejecutar el servidor Tomcat

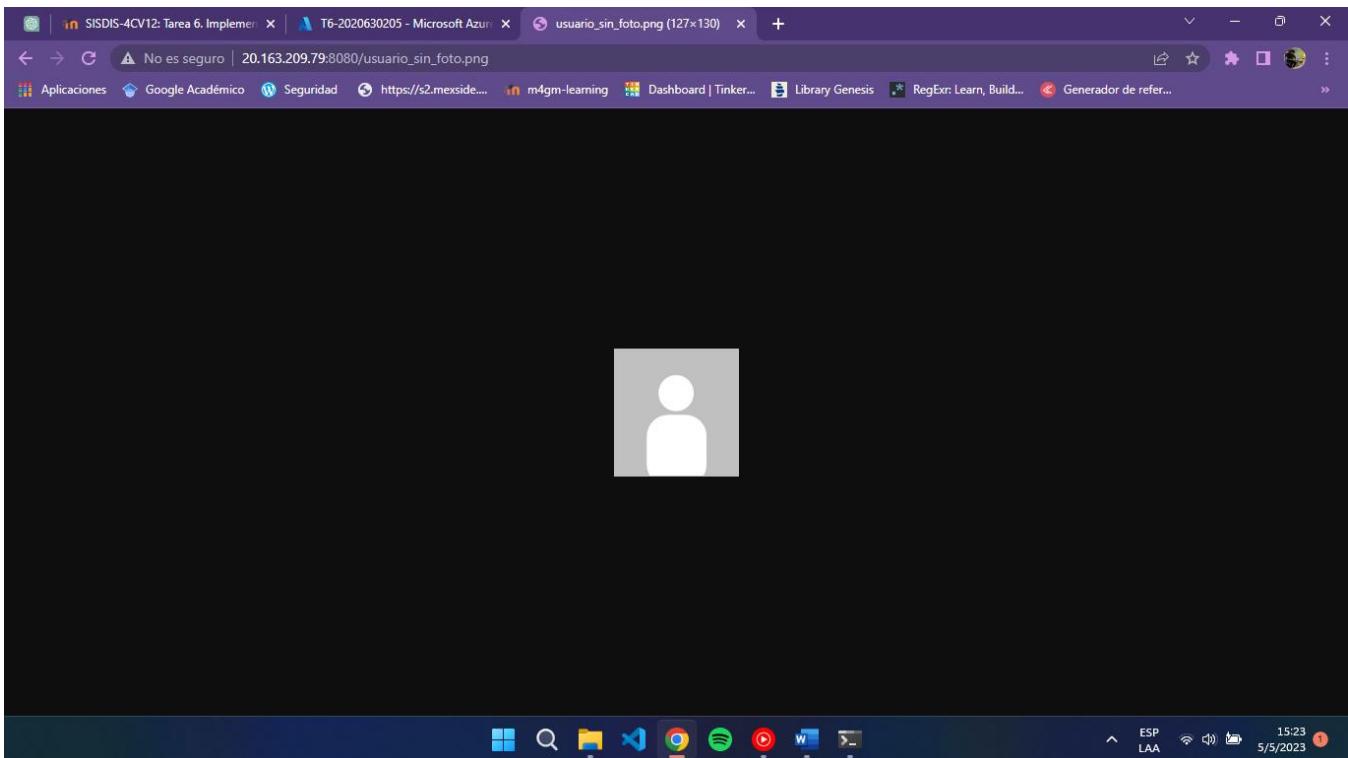
```
kubuntu@T6-2020630205:~/Tarea6/Servicio$ rm WEB-INF/classes/servicio_json/*
rm: cannot remove 'WEB-INF/classes/servicio_json/*': No such file or directory
kubuntu@T6-2020630205:~/Tarea6/Servicio$ rm WEB-INF/classes/servicio_url/*
rm: cannot remove 'WEB-INF/classes/servicio_url/*': No such file or directory
kubuntu@T6-2020630205:~/Tarea6/Servicio$ cp servicio_json/*.class WEB-INF/classes/servicio_json/.
kubuntu@T6-2020630205:~/Tarea6/Servicio$ jar cvf Servicio.war WEB-INF META-INF
added manifest
adding: WEB-INF/(in = @) (out= @)(stored 0%)
adding: WEB-INF/web.xml(in = 656) (out= 294)(deflated 55%)
adding: WEB-INF/classes/(in = @) (out= @)(stored 0%)
adding: WEB-INF/classes/servicio_url/(in = @) (out= @)(stored 0%)
adding: WEB-INF/classes/servicio_json/(in = @) (out= @)(stored 0%)
adding: WEB-INF/classes/servicio_json/Usuario.class(in = 435) (out= 295)(deflated 32%)
adding: WEB-INF/classes/servicio_json/AdaptadorJsonBase64.class(in = 1885) (out= 741)(deflated 58%)
adding: WEB-INF/classes/servicio_json/ParamBorraUsuario.class(in = 259) (out= 285)(deflated 20%)
adding: WEB-INF/classes/servicio_json/ParamConsultaUsuario.class(in = 265) (out= 209)(deflated 21%)
adding: WEB-INF/classes/servicio_json/ParamAltaUsuario.class(in = 264) (out= 198)(deflated 25%)
adding: WEB-INF/classes/servicio_json/Servicio.class(in = 8552) (out= 3936)(deflated 54%)
adding: WEB-INF/classes/servicio_json/ParamModificaUsuario.class(in = 272) (out= 204)(deflated 25%)
adding: WEB-INF/classes/servicio_json/Error.class(in = 284) (out= 226)(deflated 22%)
ignoring entry META-INF/
adding: META-INF/context.xml(in = 301) (out= 214)(deflated 28%)
kubuntu@T6-2020630205:~/Tarea6/Servicio$ _
```

Desplegamos el servidor de Tomcat

```
kubuntu@T6-2020630205:~/Tarea6/Servicio$ rm WEB-INF/classes/servicio_json/*
rm: cannot remove 'WEB-INF/classes/servicio_json/*': No such file or directory
kubuntu@T6-2020630205:~/Tarea6/Servicio$ rm WEB-INF/classes/servicio_url/*
rm: cannot remove 'WEB-INF/classes/servicio_url/*': No such file or directory
kubuntu@T6-2020630205:~/Tarea6/Servicio$ cp servicio_json/*.class WEB-INF/classes/servicio_json/.
kubuntu@T6-2020630205:~/Tarea6/Servicio$ jar cvf Servicio.war WEB-INF META-INF
added manifest
adding: WEB-INF/(in = @) (out= @)(stored 0%)
adding: WEB-INF/web.xml(in = 656) (out= 294)(deflated 55%)
adding: WEB-INF/classes/(in = @) (out= @)(stored 0%)
adding: WEB-INF/classes/servicio_url/(in = @) (out= @)(stored 0%)
adding: WEB-INF/classes/servicio_json/(in = @) (out= @)(stored 0%)
adding: WEB-INF/classes/servicio_json/Usuario.class(in = 435) (out= 295)(deflated 32%)
adding: WEB-INF/classes/servicio_json/AdaptadorJsonBase64.class(in = 1885) (out= 741)(deflated 58%)
adding: WEB-INF/classes/servicio_json/ParamBorraUsuario.class(in = 259) (out= 285)(deflated 20%)
adding: WEB-INF/classes/servicio_json/ParamConsultaUsuario.class(in = 265) (out= 209)(deflated 21%)
adding: WEB-INF/classes/servicio_json/ParamAltaUsuario.class(in = 264) (out= 198)(deflated 25%)
adding: WEB-INF/classes/servicio_json/Servicio.class(in = 8552) (out= 3936)(deflated 54%)
adding: WEB-INF/classes/servicio_json/ParamModificaUsuario.class(in = 272) (out= 204)(deflated 25%)
adding: WEB-INF/classes/servicio_json/Error.class(in = 284) (out= 226)(deflated 22%)
ignoring entry META-INF/
adding: META-INF/context.xml(in = 301) (out= 214)(deflated 28%)
kubuntu@T6-2020630205:~/Tarea6/Servicio$ ls
META-INF Servicio.war WEB-INF compila_json.sh compila_url.sh servicio_json servicio_url
kubuntu@T6-2020630205:~/Tarea6/Servicio$ cp Servicio.war $CATALINA_HOME/webapps/
kubuntu@T6-2020630205:~/Tarea6/Servicio$ _
```

Copiamos los archivos a la carpeta ROOT anteriormente creada y así ya podemos acceder a ellos

```
kubuntu@T6-2020630205: ~/ < + >
kubuntu@T6-2020630205:~/Tarea6$ ls
Servicio apache-tomcat-8.5.88 jaxrs-ri mysql-connector-j-8.0.33
kubuntu@T6-2020630205:~/Tarea6$ cd apache-tomcat-8.5.88/
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88$ ls
BUILDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs temp webapps work
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88$ cd webapps/
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88/webapps$ ls
ROOT
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88/webapps$ cd ROOT/
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88/webapps/ROOT$ ls
WSClient.js prueba.json.html prueba_url.html usuario_sin_foto.png
kubuntu@T6-2020630205:~/Tarea6/apache-tomcat-8.5.88/webapps/ROOT$ -
```



Ingresamos al formulario prueba_json.html desde un teléfono inteligente e ingresamos un usuario en el apartado “alta usuario”

The image displays three screenshots of a web application interface, specifically a user creation form titled "Alta de usuario".

Screenshot 1 (Left): A light gray background. On the left is a vertical sidebar with three buttons: "Alta usuario" (highlighted), "Consulta usuario", and "Borra usuario". The main area contains a form with the following fields:

- Email *: kevin@correo.com
- Nombre *: Kevin
- Apellido paterno *: Federer
- Apellido materno: Rodríguez
- Fecha de nacimiento *: 03/11/1999, 23:20
- Teléfono: 1234567890
- Género: Masculino

Below the form is a placeholder image of a cat, and below that is a file input field labeled "Elegir archivos" with the file name "PXL_202303...3907635.jpg". At the bottom are three buttons: "Agregar usuario", "Limpiar pantalla", and "Regresar".

Screenshot 2 (Middle): A light gray background, identical to the first screenshot but with different input values.

Screenshot 3 (Right): A dark gray background. In the center is a message box containing the text "20.163.209.79:8080 dice" above "OK" and below "Aceptar". The main area is identical to the other screenshots, showing the same form fields and sidebar.

Si intentamos crear otro usuario con el mismo correo, nos da el error de que el correo ya ha sido registrado anteriormente

Alta de usuario

Email *

Nombre *

Apellido paterno *

Apellido materno

Fecha de nacimiento *

Teléfono

Género



Elegir archivos PXL_202303...3907635.jpg

[Agregar usuario](#)

[Limpiar pantalla](#)

[Regresar](#)

Alta de usuario

Email *

Nombre *

Apellido paterno *

Apellido materno

Fecha de nacimiento *

20.163.209.79:8080 dice

{"message": "Duplicate entry 'kevin@correo.com' for key 'usuarios.usuarios_1'"}

Aceptar

[Agregar usuario](#)

[Limpiar pantalla](#)

[Regresar](#)

Si consultamos el usuario podemos ver que es el mismo que registramos anteriormente y lo modificamos

| | | |
|----------------------------------|----------------------------------|----------------------------------|
| Consulta usuario | Modifica usuario | Modifica usuario |
|----------------------------------|----------------------------------|----------------------------------|

Consulta usuario

Email *
kevin@correo.com

[Buscar usuario](#)

[Regresar](#)

Modifica usuario

Email *
kevin@correo.com

Nombre *
Kevin

Apellido paterno *
Federer

Apellido materno
Rodríguez

Fecha de nacimiento *
03/11/1999, 23:20

Teléfono
1234567890

Genero
Masculino



[Elegir archivos](#) | Sin archivos seleccionados
[Quitar foto](#)

[Guardar cambios](#)

[Regresar](#)

Modifica usuario

Email *
kevin@correo.com

Nombre *
Kevin

Apellido paterno *
Federer

Apellido materno
Messi

Fecha de nacimiento *
03/11/1999, 23:20

Teléfono
1234567890

Genero
Masculino



[Elegir archivos](#) | Sin archivos seleccionados
[Quitar foto](#)

[Guardar cambios](#)

[Regresar](#)

Vemos que los cambios se guardaron y si hacemos de nuevo la consulta la información fue modificada

Modifica usuario

Email *
kevin@correo.com

Nombre *
Kevin

Apellido paterno *
Federer

Apellido materno
Messi

Fecha de nacimiento *
03/11/1999, 23:20

20.163.209.79:8080 dice

OK

Aceptar



Elegir archivos Sin archivos seleccionados
Quitar foto

Guardar cambios

Regresar

Modifica usuario

Email *
kevin@correo.com

Nombre *
Kevin

Apellido paterno *
Federer

Apellido materno
Messi

Fecha de nacimiento *
03/11/1999, 23:20

Teléfono
1234567890

Genero
Masculino

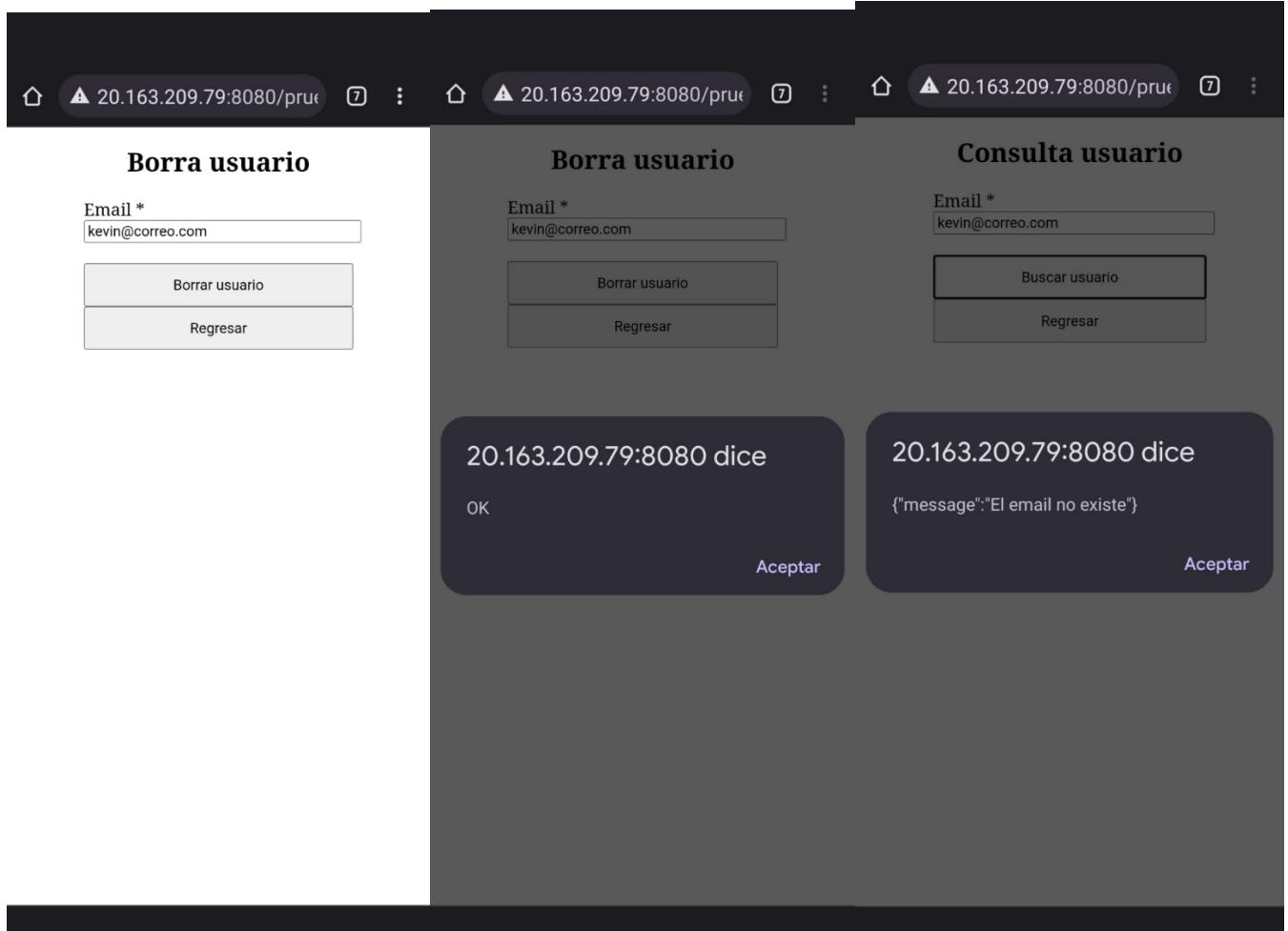


Elegir archivos Sin archivos seleccionados
Quitar foto

Guardar cambios

Regresar

Procedemos a borrar el usuario y verificamos que se haya borrado exitosamente



Eliminamos el servicio de json e iniciamos el que se implementó en URL.

```
kubuntu@T6-2020630205:~/Tarea6/Servicio$ rm -rf $CATALINA_HOME/webapps/Servicio.war $CATALINA_HOME/webapps/Servicio
kubuntu@T6-2020630205:~/Tarea6/Servicio$ _
```

```
kubuntu@T6-2020630205:~/Tarea6/Servicio$ javac -cp $CATALINA_HOME/lib/javax.ws.rs-api-2.0.1.jar:$CATALINA_HOME/lib/gson-2.3.1.jar:. servicio_url/Servicio.java
kubuntu@T6-2020630205:~/Tarea6/Servicio$ rm WEB-INF/classes/servicio_url/*
rm: cannot remove 'WEB-INF/classes/servicio_url/*': No such file or directory
kubuntu@T6-2020630205:~/Tarea6/Servicio$ rm WEB-INF/classes/servicio_json/*
kubuntu@T6-2020630205:~/Tarea6/Servicio$ cp servicio_url/*.class WEB-INF/classes/servicio_url/
kubuntu@T6-2020630205:~/Tarea6/Servicio$ jar cvf Servicio.war WEB-INF META-INF
added manifest
adding: WEB-INF/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/web.xml(in = 656) (out= 294)(deflated 55%)
adding: WEB-INF/classes/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio_url/(in = 0) (out= 0)(stored 0%)
adding: WEB-INF/classes/servicio_url/Userario.class(in = 1070) (out= 604)(deflated 43%)
adding: WEB-INF/classes/servicio_url/AdaptadorGsonBase64.class(in = 1804) (out= 741)(deflated 58%)
adding: WEB-INF/classes/servicio_url/Servicio.class(in = 8182) (out= 3883)(deflated 53%)
adding: WEB-INF/classes/servicio_url/Error.class(in = 283) (out= 219)(deflated 22%)
adding: WEB-INF/classes/servicio_json/(in = 0) (out= 0)(stored 0%)
ignoring entry META-INF/
adding: META-INF/context.xml(in = 301) (out= 214)(deflated 28%)
kubuntu@T6-2020630205:~/Tarea6/Servicio$ cp Servicio.war $CATALINA_HOME/webapps/
kubuntu@T6-2020630205:~/Tarea6/Servicio$ _
```

Ingresamos al formulario prueba_url.html desde un teléfono inteligente e ingresamos un usuario en el apartado “alta usuario”

The image displays three browser tabs and a virtual keyboard. The central tab is titled "Alta de usuario" and contains the following form fields:

| | |
|-----------------------|--|
| Email * | <input type="text" value="kevin@correo.com"/> |
| Nombre * | <input type="text" value="Kevin"/> |
| Apellido paterno * | <input type="text" value="Lopez"/> |
| Apellido materno | <input type="text" value="Obrador"/> |
| Fecha de nacimiento * | <input type="text" value="27/10/1995, 18:23"/> |
| Teléfono | <input type="text" value="123456789"/> |
| Genero | <input type="text" value="Masculino"/> |

Below the form is a placeholder profile picture icon and a button labeled "Elegir archivos". To the right of the form are three buttons: "Agregar usuario", "Limpiar pantalla", and "Regresar".

The left tab shows a search result for "Alta usuario" with the URL http://20.163.209.79:8080/prueba_url.html. The right tab shows a search result for "Borra usuario" with the URL http://20.163.209.79:8080/prueba_url.html.

A virtual keyboard is visible at the bottom left, showing a standard QWERTY layout with additional symbols and a numeric keypad.

Damos de alta al usuario y si intentamos crear otro con el mismo correo nos da error

The image displays two side-by-side screenshots of a web application interface for adding a user. Both screenshots show a form with fields for Email, Nombre, Apellido paterno, Apellido materno, and Fecha de nacimiento. The left screenshot shows a successful addition with a message from '20.163.209.79:8080' indicating 'OK'. The right screenshot shows an error message from '20.163.209.79:8080' stating 'Duplicate entry 'kevin@correo.com' for key 'usuarios.usuarios_1''. Both screenshots include a 'Aceptar' button at the bottom right.

Alta de usuario

Email *
kevin@correo.com

Nombre *
Kevin

Apellido paterno *
Lopez

Apellido materno
Obrador

Fecha de nacimiento *
02/10/2008, 18:27

Alta de usuario

Email *
kevin@correo.com

Nombre *
Alexa

Apellido paterno *
Fernández

Apellido materno
Noroña

Fecha de nacimiento *
02/10/2001, 18:27

20.163.209.79:8080 dice

OK

Aceptar

Elegir archivos Sin archivos seleccionados

Agregar usuario

Limpiar pantalla

Regresar

20.163.209.79:8080 dice

{"message":"Duplicate entry 'kevin@correo.com' for key 'usuarios.usuarios_1'"}

Aceptar

Elegir archivos Sin archivos seleccionados

Agregar usuario

Limpiar pantalla

Regresar

Consultamos la existencia del usuario y lo modificamos

Consulta usuario

Email *
kevin@correo.com

Buscar usuario
Regresar

Modifica usuario

Email *
kevin@correo.com

Nombre *
Kevin

Apellido paterno *
Lopez

Apellido materno
Obrador

Fecha de nacimiento *
02/10/2008, 18:27

Teléfono
123456897

Género
Masculino

Elegir archivos Sin archivos seleccionados
Quitar foto

Guardar cambios
Regresar

Modifica usuario

Email *
kevin@correo.com

Nombre *
Kevin

Apellido paterno *
Fernández

Apellido materno
Obrador

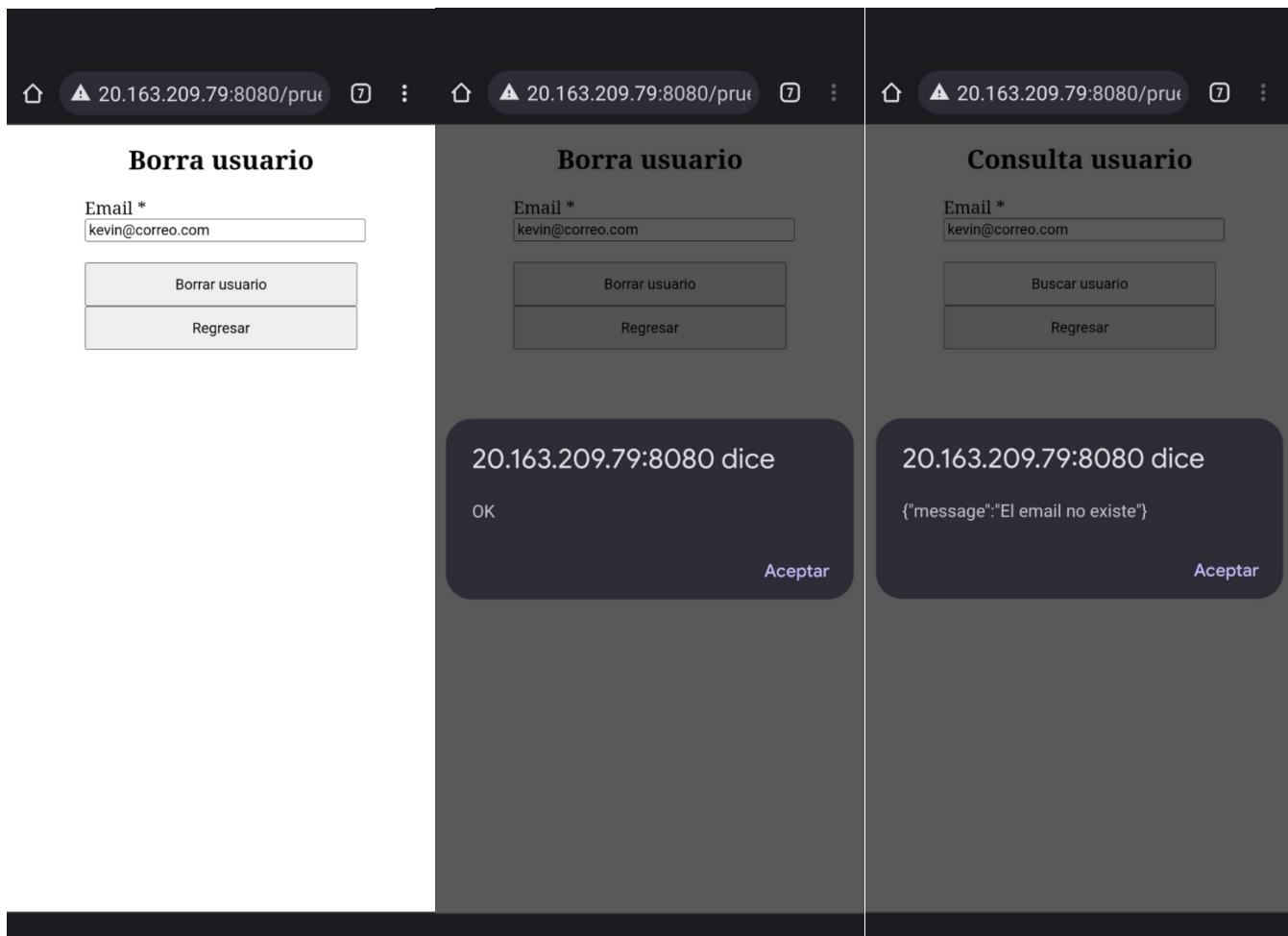
Fecha de nacimiento *
02/10/2008, 18:27

20.163.209.79:8080 dice

OK

Aceptar

Eliminamos el usuario y verificamos que se haya eliminado con éxito



Creamos la imagen de la máquina virtual de Ubuntu y eliminamos la máquina virtual.

A screenshot of a Windows desktop environment. At the top is a dark blue taskbar with various icons for search, file explorer, and other applications. Below the taskbar is a white terminal window titled 'kevin' with a black background. It contains the following text:

```
kubuntu@T6-2020630205:~$ sudo waagent -deprovision
/usr/sbin/waagent:27: DeprecationWarning: the imp module is deprecated in favour of importlib; see the module's documentation for alternative uses
import imp
WARNING! The waagent service will be stopped.
WARNING! Cached DHCP leases will be deleted.
WARNING! root password will be disabled. You will not be able to login as root.
WARNING! /etc/resolv.conf will NOT be removed, this is a behavior change to earlier versions of Ubuntu.
Do you want to proceed (y/n)?
kubuntu@T6-2020630205:~$ logout
Connection to 20.163.209.79 closed.

C:\Users\kevin>
```

A screenshot of the Microsoft Azure portal interface. At the top is a purple header bar with the URL 'portal.azure.com/#view/Microsoft_Azure_DiskMgmt/CaptureVmBlade/subscriptionId/6c0fafff-6b04-4b16-866d-c9f342629ddc/resourceGroup/ESCOM/location/EASTUS'. Below the header is a dark blue navigation bar with various links like 'Aplicaciones', 'Google Académico', 'Seguridad', etc. The main content area has a white background and displays the 'Create an image' wizard.

Create an image

Basics **Tags** **Review + create**

Create an image from this virtual machine that can be used to deploy additional virtual machines and virtual machine scale sets. With a shared image, you can easily replicate the image to Azure regions around the world and manage versions of the image. Certain information from the virtual machine will be carried forward to the image including OS type, VM generation, plan, and publishing details. [Learn more](#)

Project details

Subscription: Azure for Students

Resource group *: ESCOM

Instance details

Region: (US) East US

Share image to Azure compute gallery:

Yes, share it to a gallery as a VM image version.

No, capture only a managed image.

Review + create < Previous Next : Tags > Give feedback

SISDIS-4CV12: Tarea 6. Implementación de una máquina virtual en Azure | Microsoft Azure

Create an image - Microsoft Azure

portal.azure.com/#view/Microsoft_Azure_DiskMgmt/CaptureVmBlade/subscriptionId/6c0fffff-6b04-4b16-866d-c9f342629ddc/resourceGroup/ESCOM/location/US/EAST-US

Aplicaciones Google Académico Seguridad https://s2.mexside... m4gm-learning Dashboard | Tinker... Library Genesis RegExr: Learn, Build... Generador de referencias

Microsoft Azure Search resources, services, and docs (G+)

klopezs1602@alumno.i... INSTITUTO POLITÉCNICO NACIONAL

Home > T6-2020630205 >

Create an image

Instance details

Region: (US) East US

Share image to Azure compute gallery:

- Yes, share it to a gallery as a VM image version.
- No, capture only a managed image.

Automatically delete this virtual machine after creating the image:

Zone resiliency:

Before creating an image, use "waagent -deprovision+user" to prepare the Linux guest OS on the virtual machine. If you create an image from a virtual machine that hasn't been generalized, any virtual machines created from that image won't start.

Name: T6-2020630205

Review + create < Previous Next : Tags > Give feedback

ESP LAA 19:03 8/5/2023

SISDIS-4CV12: Tarea 6. Implementación de una máquina virtual en Azure | Microsoft Azure

Microsoft.Compute-CaptureVM-20230508190259 | Overview

Deployment

Search Delete Cancel Redeploy Download Refresh

Overview

Your deployment is complete

Deployment name: Microsoft.Compute-CaptureVM-20230508190259 Start time: 5/8/2023, 7:04:03 PM
Subscription: Azure for Students Correlation ID: dbb2bfa4-3cf8-4b60-861f-c9f75c97ec1a
Resource group: ESCOM

Deployment details

Next steps

Go to resource

Cost management

Get notified to stay within your budget and prevent unexpected charges on your bill.

Set up cost alerts >

Microsoft Defender for Cloud

Secure your apps and infrastructure

Go to Microsoft Defender for Cloud >

Free Microsoft tutorials

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Work with an expert

Azure experts | Azure partner providers

ESP LAA 19:04 8/5/2023

Conclusiones

En conclusión, implementar un servicio web estilo REST utilizando JAX-RS sobre el servidor de aplicaciones Tomcat en una máquina virtual de Ubuntu Server en Azure es una tarea que puede ser realizada con relativa facilidad utilizando las herramientas adecuadas.

JAX-RS es una especificación Java que proporciona soporte para servicios web RESTful, lo que permite crear servicios web altamente escalables y flexibles utilizando el lenguaje de programación Java. Tomcat, por otro lado, es un servidor de aplicaciones web ligero y popular que es compatible con JAX-RS y es fácil de instalar y configurar.

La implementación de un servicio web estilo REST utilizando JAX-RS y Tomcat implica escribir código Java que define los recursos que se van a exponer a través del servicio web, y luego empaquetar y desplegar la aplicación web resultante en Tomcat. Una vez que la aplicación web está en ejecución en Tomcat, se puede acceder a ella a través de una URL específica que se define en el código Java.

En resumen, la implementación de servicios web REST utilizando JAX-RS y Tomcat es una tarea valiosa y esencial para cualquier desarrollador que busque crear aplicaciones web escalables y flexibles en Java. Con las herramientas adecuadas, esta tarea puede ser realizada con éxito en una máquina virtual de Ubuntu Server en Azure, lo que permite a los desarrolladores aprovechar la flexibilidad y escalabilidad de la nube para sus proyectos de desarrollo.