



INSTITUTO POLITÉCNICO NACIONAL
ESCUELA SUPERIOR DE CÓMPUTO



SISTEMAS DISTRIBUIDOS

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Grupo: 7CV3

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Tarea 1: Desarrollo e implementación en la nube de un proxy
HTTPS inverso con servidores HTTP

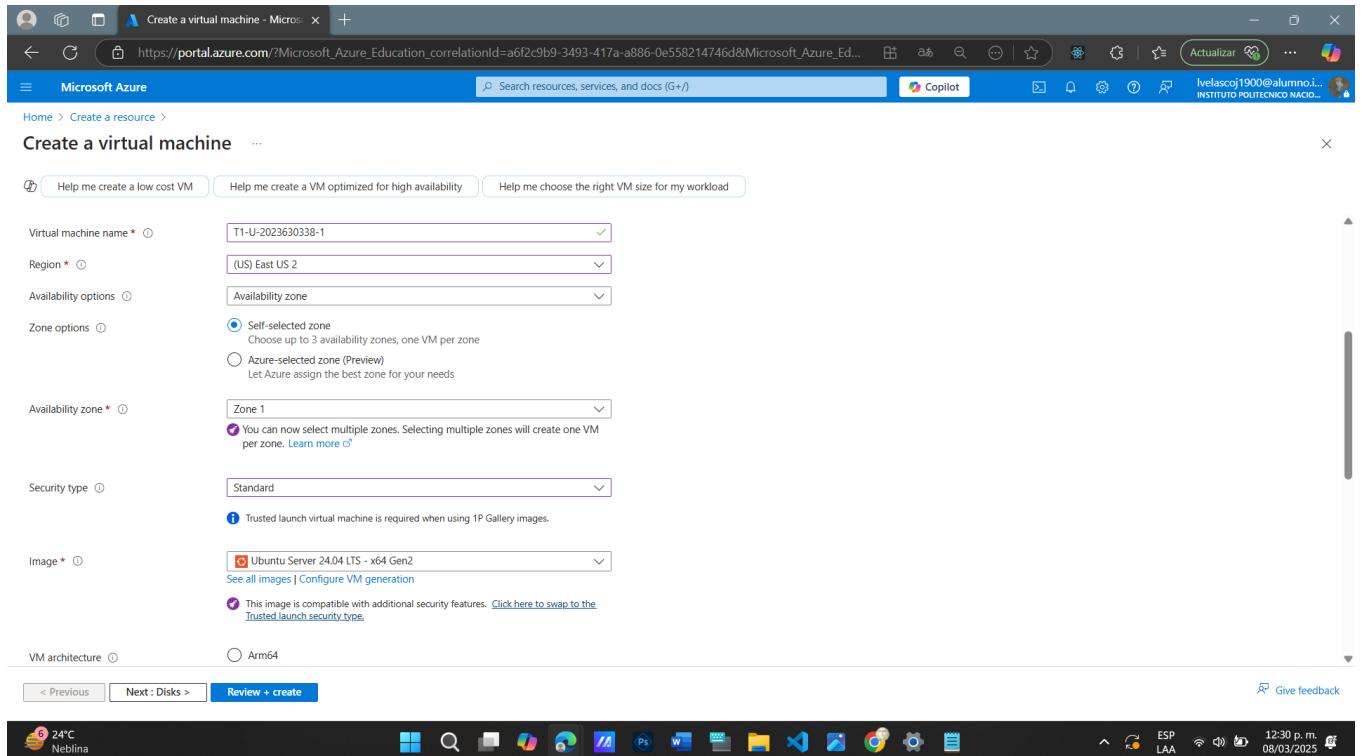
Fecha de Entrega: 10/Mar/2025

DESARROLLO

Ejecución del administrador de tráfico en Ubuntu

1. Creación de las máquinas virtuales en Ubuntu 24 B1s (1GB de RAM, 1CPU) y disco tipo HDD con 30 GB.

- En la siguiente imagen se muestra el nombre de la maquina virtual con el nombre requerido para la **primera máquina virtual en Ubuntu**, seguridad estándar, imagen del SO Ubuntu 24.



- En la siguiente imagen se puede ver el tamaño del disco requerido en la tarea.

The screenshot shows the 'Create a virtual machine' wizard on the Microsoft Azure portal. The 'OS disk' section is highlighted, showing the 'Image default (30 GiB)' selected for size and 'Standard HDD (locally-redundant storage)' selected for type. A note states: '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.' Below this, under 'Key management', 'Platform-managed key' is selected. At the bottom, there's a table for 'Data disks for TI-U-2023630338-1' with columns for Name, Size (GiB), Disk type, Host caching, and Delete with VM. The 'Review + create' button is at the bottom right.

- En la siguiente imagen se puede ver los puertos de entrada que dejamos abiertos, que se específicamente se nos piden en el punto 3 de la tarea.

The screenshot shows the 'Networking' tab of the 'Create a virtual machine' wizard. Under 'Network interface', it says 'When creating a virtual machine, a network interface will be created for you.' The 'Virtual network' dropdown is set to '(new) TI-U-2023630338-1-vnet'. In the 'Public inbound ports' section, 'Allow selected ports' is selected, and the dropdown shows 'HTTP (80), HTTPS (443), SSH (22)'. A warning message below states: '⚠️ This will allow all IP addresses to access your virtual machine. This is only...'. The 'Review + create' button is at the bottom right.

- Se deshabilita el diagnóstico de arranque.

Create a virtual machine

Help me create a low cost VM Help me create a VM optimized for high availability Help me choose the right VM size for my workload

Basics Disks Networking Management **Monitoring** Advanced Tags Review + create

Configure monitoring options for your VM.

Alerts
Enable recommended alert rules

Diagnostics
Boot diagnostics Enable with managed storage account (recommended)
 Enable with custom storage account
 Disable

Enable OS guest diagnostics

Health
Enable application health monitoring

< Previous Next : Advanced > **Review + create** Give feedback

24°C Neblina 12:38 p.m. 08/03/2025

- Revisión antes de crear la máquina virtual

Create a virtual machine

Validation passed

Help me create a low cost VM Help me create a VM optimized for high availability Help me choose the right VM size for my workload

Basics

Subscription	Azure for Students
Resource group	(new) T1-U-2023630338-1_group
Virtual machine name	T1-U-2023630338-1
Region	East US 2
Availability options	Availability zone
Zone options	Self-selected zone
Availability zone	1
Security type	Standard
Image	Ubuntu Server 24.04 LTS - Gen2
VM architecture	x64
Size	Standard B1s (1 vcpus, 1 GiB memory)
Enable Hibernation	No
Authentication type	Password
Username	luisvela
Public inbound ports	HTTP, HTTPS, SSH
Azure Spot	No

Disks

OS disk size: Image default

< Previous Next > **Create** Download a template for automation Give feedback

24°C Neblina 12:44 p.m. 08/03/2025

Create a virtual machine - Microsoft Azure

https://portal.azure.com/?Microsoft_Azure_Education_correlationId=a6f2c9b9-3493-417a-a886-0e558214746d&Microsoft_Azure_Edu...

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

Actualizar

lvelascoj1900@alumno... INSTITUTO POLITÉCNICO NACIONAL

Home > Create a resource >

Create a virtual machine

Validation passed

Help me create a low cost VM Help me create a VM optimized for high availability Help me choose the right VM size for my workload

Disk

OS disk size	Image default
OS disk type	Standard HDD LRS
Use managed disks	Yes
Delete OS disk with VM	Enabled
Ephemeral OS disk	No

Networking

Virtual network	(new) T1-U-2023630338-1-vnet
Subnet	(new) default (10.0.0/24)
Public IP	(new) T1-U-2023630338-1-ip
Accelerated networking	Off
Place this virtual machine behind an existing load balancing solution?	No
Delete public IP and NIC when VM is deleted	Disabled

Management

Microsoft Defender for Cloud	Basic (free)
System assigned managed identity	Off
Login with Microsoft Entra ID	Off

< Previous Next > Create Download a template for automation Give feedback

6 24°C Nebulosa

Windows Start Menu Icons

12:44 p.m. 08/03/2025

2. Conexión a la primera máquina virtual en Ubuntu donde se ejecutará el AdministardorTrafico.java

- En la siguiente imagen podemos ver la conexión por SSH, se me olvido tomar captura, pero la IP pública era 128.85.128.68 la cual se puede ver en la imagen.

```
luisvela@T1-U-2023630338-1: ~ + ^
```

Instale la versión más reciente de PowerShell para obtener nuevas características y mejoras. <https://aka.ms/PSWindows>

```
PS C:\Users\luis Velasco> ssh luisvela@128.85.128.169
The authenticity of host '128.85.128.169 (128.85.128.169)' can't be established.
ED25519 key fingerprint is SHA256:8k5d/PasLlsLwHanGEEDSKrIXYWNNGZ0wf15EBWUyLE.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '128.85.128.169' (ED25519) to the list of known hosts.
luisvela@128.85.128.169's password:
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1021-azure x86_64)

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

System information as of Sat Mar  8 18:56:14 UTC 2025

System load: 0.07      Processes:           112
Usage of /: 5.4% of 28.02GB  Users logged in:   0
Memory usage: 27%        IPv4 address for eth0: 10.0.0.4
Swap usage:  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.

```
luisvela@T1-U-2023630338-1:~$ |
```

USD/MXN -0.21%

Windows Start Menu Icons

12:56 p.m. 08/03/2025

- En la siguiente imagen ya solo se logra ver la información de la **segunda máquina virtual con Ubuntu**, ya que los pasos para crearla fueron los mismos.

T1-U-2023630338-2

Virtual machine

Overview

Essentials

Resource group (move) : T1-U-2023630338-1 group_03081259	Operating system : Linux
Status : Running	Size : Standard B1s (1 vcpu, 1 GiB memory)
Location : East US 2 (Zone 1)	Public IP address : 48.211.221.228
Subscription (move) : Azure for Students	Virtual network/subnet : T1-U-2023630338-2-vnet/default
Subscription ID : e1d319c4-9458-4992-b305-fe400976ae65	DNS name : Not configured
Availability zone : 1	Health state : -
Tags (edit) : Add tags	Time created : 3/8/2025, 7:05 PM UTC

Properties **Monitoring** **Capabilities (7)** **Recommendations** **Tutorials**

Virtual machine

Computer name : T1-U-2023630338-2	Networking
Operating system : Linux	Public IP address : 48.211.221.228 (Network interface t1-u-2023630338-2518_x1)
VM generation : V2	Public IP address (IPv6) : -
VM architecture : x64	Private IP address : 10.1.0.4
Agent status : Not Ready	Private IP address (IPv6) : -
Agent version : Unknown	Virtual network/subnet : T1-U-2023630338-2-vnet/default
Hibernation : Disabled	DNS name : Configure

- Conectándonos por SSH a la **segunda máquina virtual con Ubuntu**, cuya IP pública es 48.211.221.228

```

PS C:\Users\Luis Velasco> ssh luisvela2@48.211.221.228
The authenticity of host '48.211.221.228 (48.211.221.228)' can't be established.
ED25519 key fingerprint is SHA256:V9avq9hSnt4fDJuCPmFbj0R2SB1Rv5DlqaJ1LbVeugY.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '48.211.221.228' (ED25519) to the list of known hosts.
luisvela2@48.211.221.228's password:
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1021-azure x86_64)

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

System information as of Sat Mar  8 19:16:44 UTC 2025

System load:  0.01      Processes:          109
Usage of /:   5.4% of 28.02GB  Users logged in:     0
Memory usage: 27%           IPv4 address for eth0: 10.1.0.4
Swap usage:   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.

luisvela2@T1-U-2023630338-2:~$ |

```

- En la siguiente imagen se ve la información general de la **tercera máquina virtual en Ubuntu** creada (no se ponen las capturas de la creación ya que el proceso es el mismo).

The screenshot shows the Microsoft Azure portal interface for a virtual machine named "T1-U-2023630338-3". The main content area displays the following details:

Information	Value
Resource group (move)	T1-U-2023630338-3_group
Status	: Running
Location	: East US 2 (Zone 1)
Subscription (move)	Azure for Students
Subscription ID	e1d319c4-9458-4992-b305-fe400976ae65
Availability zone	: 1
Operating system	: Linux (ubuntu 24.04)
Size	: Standard B1s (1 vcpu, 1 GiB memory)
Public IP address	: 48.211.222.102
Virtual network/subnet	T1-U-2023630338-3-vnet/default
DNS name	: Not configured
Health state	: -
Time created	: 3/8/2025, 7:19 PM UTC

The left sidebar shows the navigation menu for the virtual machine, including sections like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Connect, Networking, Application security groups, Network manager, Settings, Availability + scale, Security, Backup + disaster recovery, Operations, Monitoring, Automation, and Help.

3. Abrir en la primera máquina virtual los puertos 80 y 443.

Este punto lo resolvimos desde que estábamos creando la primer maquina virtual de Ubuntu, se puede ver en las imágenes anteriores.

4. Abrir el puerto 8080 en la segunda máquina virtual y en la tercera máquina virtual.

- En las siguientes imágenes se puede observar cuando se crea la regla del puerto de entrada 8080 para la **segunda máquina virtual de Ubuntu**, así como la confirmación.

The screenshot shows the Azure portal interface for managing network settings. On the left, the navigation menu includes 'Virtual machines' and 'Networking'. Under 'Networking', 'Network settings' is selected. The main content area displays the 'T1-U-2023630338-2 | Network settings' page. On the right, a modal window titled 'Add inbound security rule' is open, showing the configuration for a new rule:

- Source:** Any
- Source port ranges:** 8080
- Destination:** Any
- Service:** Custom
- Destination port ranges:** 8080
- Protocol:** TCP
- Action:** Allow
- Priority:** 310
- Name:** AllowAnyCustom8080Inbound

The 'Inbound port rules' table shows the following entries:

Priority	Name	Port
300	SSH	22
65000	AllowVnetInBound	Any
65001	AllowAzureLoadBalancerInBound	Any
65500	DenyAllInBound	Any
310	AllowAnyCustom8080Inbound	8080

The screenshot shows the same 'T1-U-2023630338-2 | Network settings' page after the rule has been added. The 'Inbound port rules' table now includes the new rule:

Priority	Name	Port	Protocol	Source	Destination	Action
300	SSH	22	TCP	Any	Any	Allow
310	AllowAnyCustom8080Inbound	8080	TCP	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

- En las siguientes imágenes se puede observar cuando se crea la regla del puerto de entrada 8080 para la tercera máquina virtual de Ubuntu, así como la confirmación.

The screenshot shows the Azure portal interface. On the left, the navigation pane lists 'Virtual machines' with three entries: T1-U-2023630338-1, T1-U-2023630338-2, and T1-U-2023630338-3. The middle section displays the 'Network settings' for 'T1-U-2023630338-3'. On the right, a modal window titled 'Add inbound security rule' is open, showing the configuration for a new rule:

- Source:** Any
- Source port ranges:** * (empty)
- Destination:** Any
- Service:** Custom
- Destination port ranges:** 8080
- Protocol:** TCP (selected)
- Action:** Allow (selected)
- Priority:** 310
- Name:** AllowAnyCustom8080Inbound

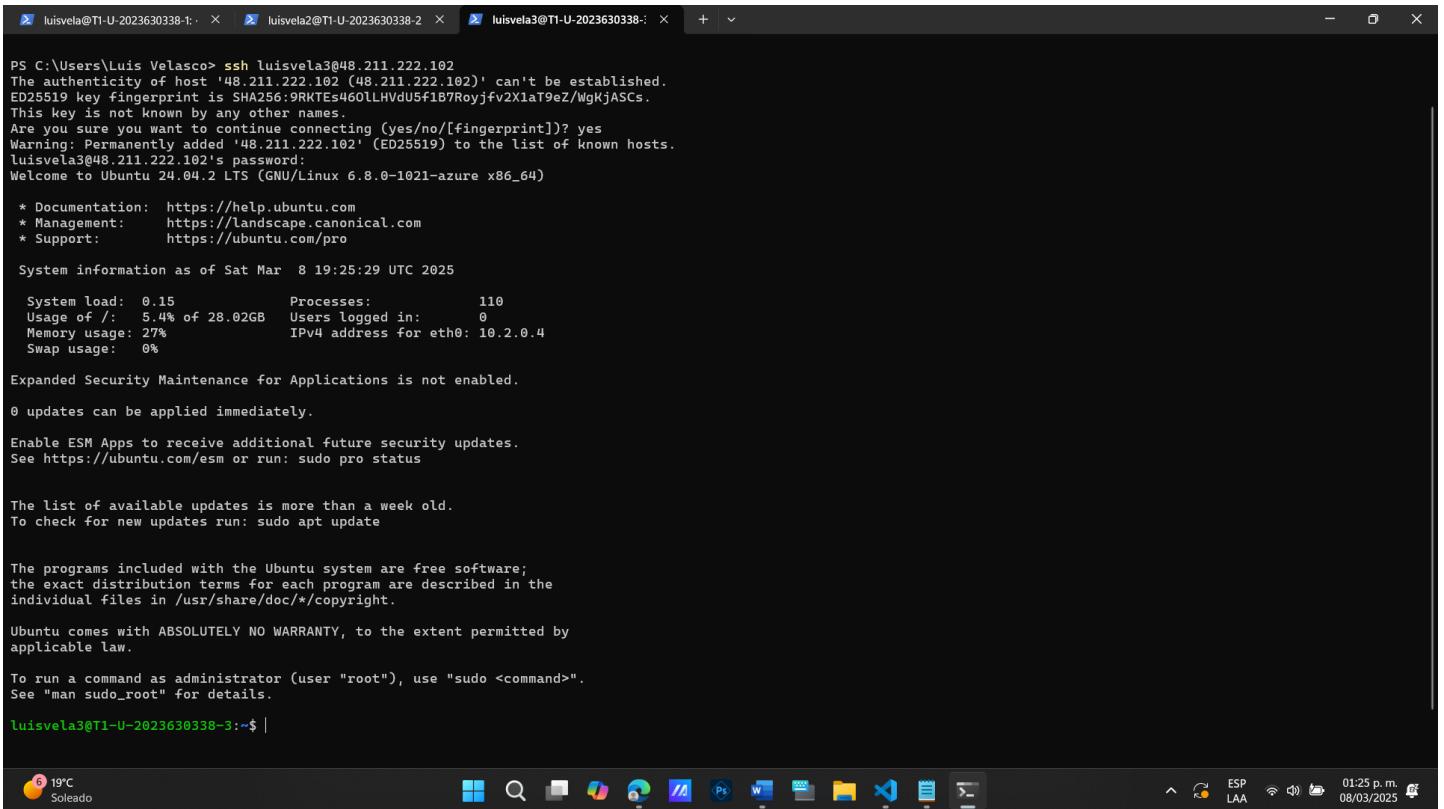
The 'Rules' section below the modal shows the existing rule 'AllowAnyCustom8080Inbound' with priority 310.

This screenshot shows the same Azure portal interface after the rule has been added. The 'Rules' section now displays two entries:

Priority	Name	Port	Protocol	Source	Destination	Action
300	SSH	22	TCP	Any	Any	Allow
310	AllowAnyCustom8080Inbound	8080	TCP	Any	Any	Allow

The status bar at the bottom indicates the date and time as 08/03/2025 01:23 p.m.

- Conectándonos por SSH a la tercera máquina virtual en Ubuntu, cuya IP pública es 48.211.222.102



```

PS C:\Users\Luis Velasco> ssh luisvela3@48.211.222.102
The authenticity of host '48.211.222.102 (48.211.222.102)' can't be established.
ED25519 key fingerprint is SHA256:9RKTEs46OLHVdU5f1B7RoyjfV2XiaT9eZ/WgKjASCs.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '48.211.222.102' (ED25519) to the list of known hosts.
luisvela3@48.211.222.102's password:
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1021-azure x86_64)

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

System information as of Sat Mar  8 19:25:29 UTC 2025

System load: 0.15      Processes:           110
Usage of '/': 5.4% of 28.02GB   Users logged in:    0
Memory usage: 27%          IPv4 address for eth0: 10.2.0.4
Swap usage:  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

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individual files in /usr/share/doc/*copyright.

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applicable law.

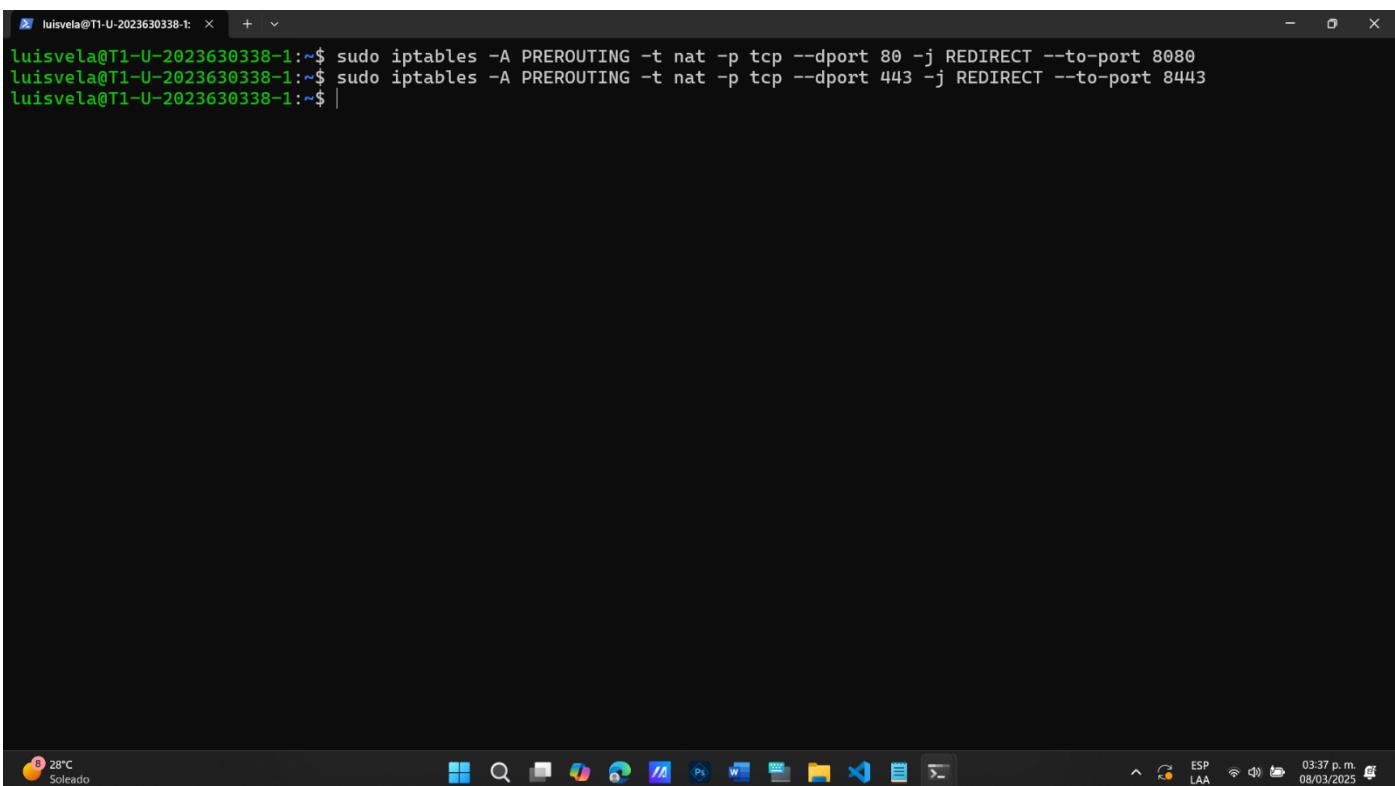
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

luisvela3@T1-U-2023630338-3:~$ |

```

5. En la primera máquina virtual mapear el puerto 80 al puerto 8080.
6. En la primera máquina virtual mapear el puerto 443 al puerto 8443.

- En la siguiente imagen se aplicamos el comando iptables para mapear los puertos en la primera máquina virtual con Ubuntu como se nos pide en los puntos 5 y 6.



```

luisvela@T1-U-2023630338-1:~$ sudo iptables -A PREROUTING -t nat -p tcp --dport 80 -j REDIRECT --to-port 8080
luisvela@T1-U-2023630338-1:~$ sudo iptables -A PREROUTING -t nat -p tcp --dport 443 -j REDIRECT --to-port 8443
luisvela@T1-U-2023630338-1:~$ |

```

- Ahora vamos a instalar openjdk17 ya que es el que me recomendó la línea de comandos al aplicar el comando java --version. Esto lo haremos para las 3 máquinas virtuales.

```

luisvela@T1-U-2023630338-1:~$ sudo apt install openjdk-17-jre-headless
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  alsamixer-conf alsamixer-common ca-certificates-java
  fontconfig-config fonts-dejavu-core fonts-dejavu-mono
  java-common libasound2-data libasound2t64
  libavahi-client3 libavahi-common-data libavahi-common3
  libcurl3 libcurl3-gnutls libfontconfig1 libgraphite2-3 libharfbuzz0b
  libjpeg-turbo8 libjpeg8 liblcms2-2 libpcssclite1
Suggested packages:
  default-jre alsamixer-utils libasound2-plugins cups-common
  liblcms2-utils pscd 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:
  alsamixer-conf alsamixer-common ca-certificates-java
  fontconfig-config fonts-dejavu-core fonts-dejavu-mono
  java-common libasound2-data libasound2t64
  libavahi-client3 libavahi-common-data libavahi-common3
  libcurl3 libcurl3-gnutls libfontconfig1 libgraphite2-3 libharfbuzz0b
  libjpeg-turbo8 libjpeg8 liblcms2-2 libpcssclite1

luisvela@T1-U-2023630338-2:~$ sudo apt install openjdk-17-jre-headless
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  alsamixer-conf alsamixer-common ca-certificates-java
  fontconfig-config fonts-dejavu-core fonts-dejavu-mono
  java-common libasound2-data libasound2t64
  libavahi-client3 libavahi-common-data libavahi-common3
  libcurl3 libcurl3-gnutls libfontconfig1 libgraphite2-3 libharfbuzz0b
  libjpeg-turbo8 libjpeg8 liblcms2-2 libpcssclite1
Suggested packages:
  default-jre alsamixer-utils libasound2-plugins cups-common
  liblcms2-utils pscd 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:
  alsamixer-conf alsamixer-common ca-certificates-java
  fontconfig-config fonts-dejavu-core fonts-dejavu-mono
  java-common libasound2-data libasound2t64
  libavahi-client3 libavahi-common-data libavahi-common3
  libcurl3 libcurl3-gnutls libfontconfig1 libgraphite2-3 libharfbuzz0b
  libjpeg-turbo8 libjpeg8 liblcms2-2 libpcssclite1

```

- Comprobando que se instaló correctamente en cada una de las VM, haciendo java --version.

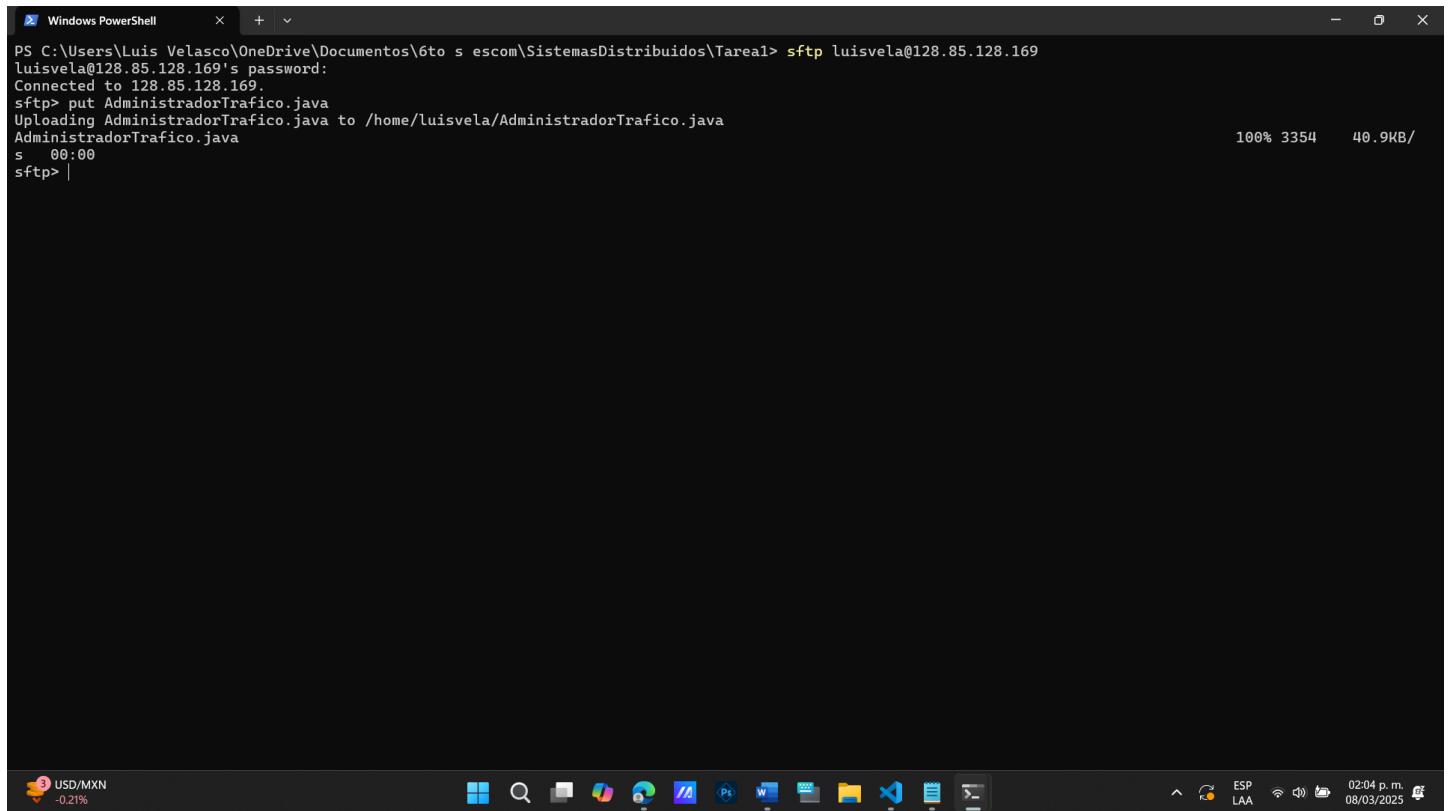
```

luisvela@T1-U-2023630338-1:~$ java --version
openjdk 17.0.14 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-124.04)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-124.04, mixed mode, sharing)
luisvela@T1-U-2023630338-1:~$

luisvela@T1-U-2023630338-2:~$ java --version
openjdk 17.0.14 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-124.04)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-124.04, mixed mode, sharing)
luisvela@T1-U-2023630338-2:~|

```

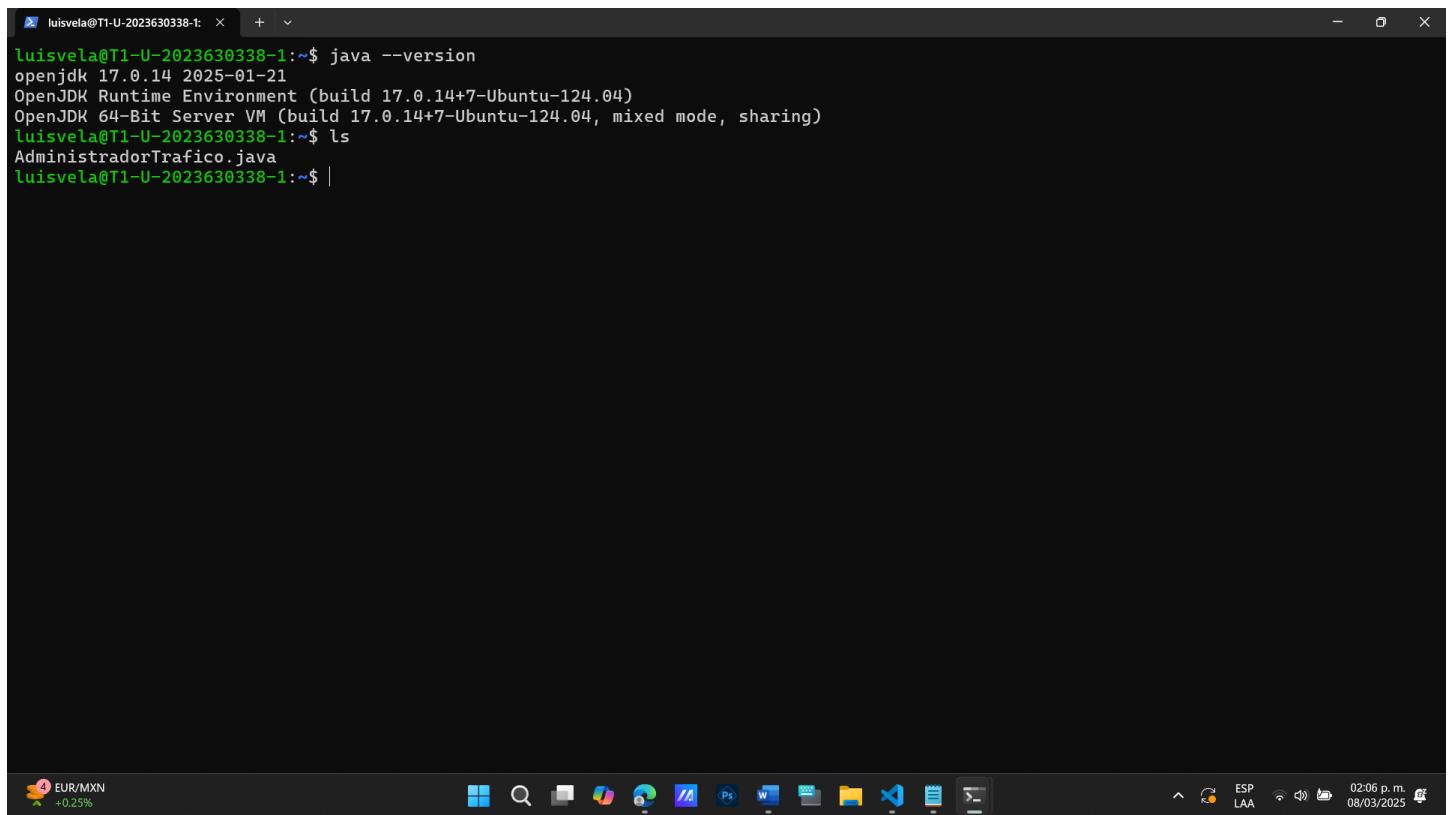
- Para la primera máquina virtual, nos conectamos con SFTP para mandar el AdministradorTrafico.java de la maquina local a la VM.



```
PS C:\Users\Luis Velasco\OneDrive\Documentos\6to semestre\Sistemas Distribuidos\Tarea1> sftp luisvela@128.85.128.169
luisvela@128.85.128.169's password:
Connected to 128.85.128.169.
sftp> put AdministradorTrafico.java
Uploading AdministradorTrafico.java to /home/luisvela/AdministradorTrafico.java
AdministradorTrafico.java
s 00:00
sftp> |
```

The screenshot shows a Windows PowerShell window titled "Windows PowerShell". The command `sftp luisvela@128.85.128.169` is run, followed by `put AdministradorTrafico.java`. The file is uploaded to the user's home directory in the VM. The progress bar indicates 100% completion at 40.9KB. The taskbar at the bottom shows various pinned icons and the system tray displays battery level (-0.21%) and network status (ESP LAA).

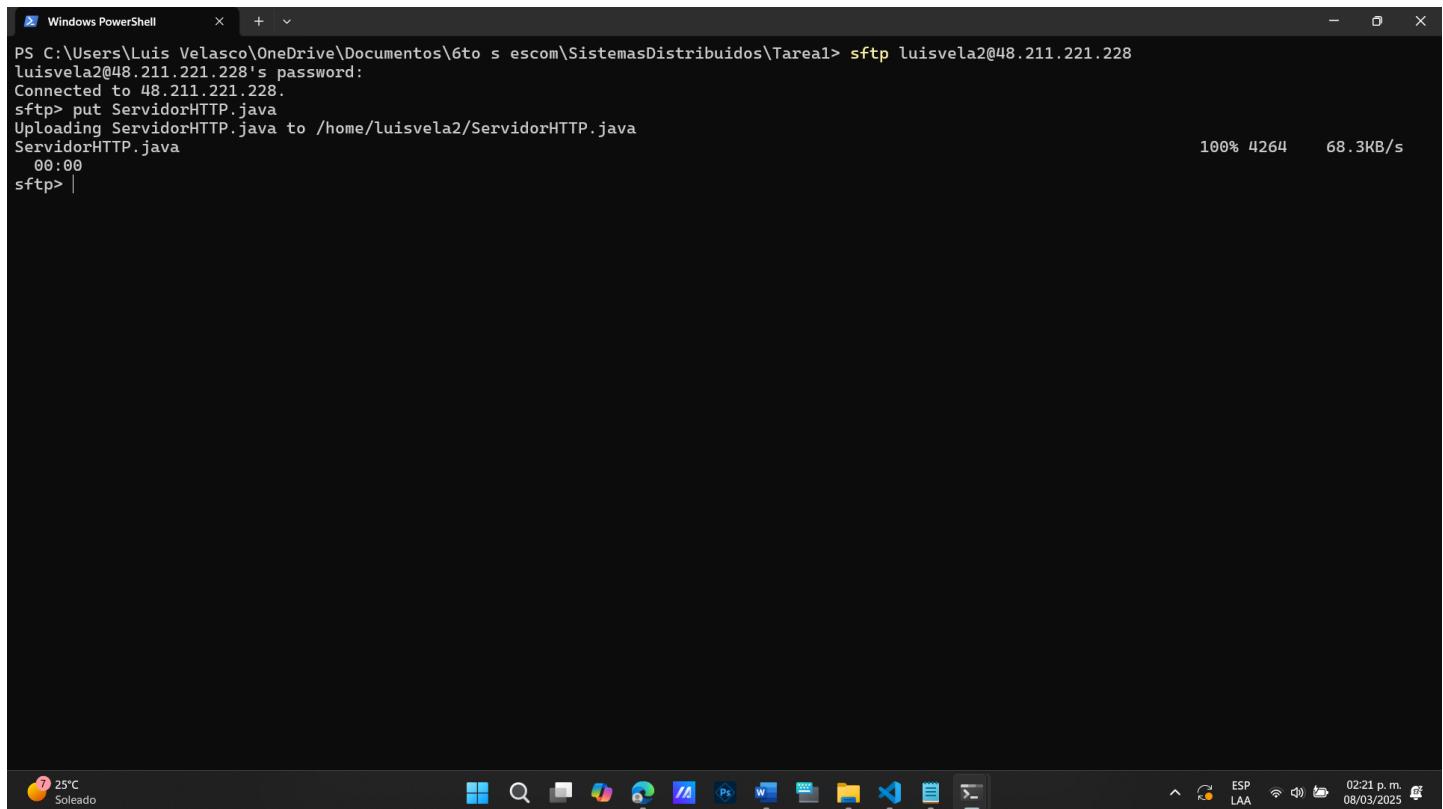
- Comprobando que el AdministradorTrafico.java llego, listándolo los archivos con el comando ls



```
luisvela@T1-U-2023630338-1:~$ java --version
openjdk 17.0.14 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-124.04)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-124.04, mixed mode, sharing)
luisvela@T1-U-2023630338-1:~$ ls
AdministradorTrafico.java
luisvela@T1-U-2023630338-1:~$ |
```

The screenshot shows a Linux terminal window titled "luisvela@T1-U-2023630338-1:~\$". It first runs the `java --version` command to check Java version. Then it runs `ls` to list files in the current directory, showing the file "AdministradorTrafico.java". The taskbar at the bottom shows various pinned icons and the system tray displays battery level (+0.25%) and network status (ESP LAA).

- Para la **segunda máquina virtual**, nos conectamos con SFTP para mandar el ServidorHTTP.java de la maquina local a la VM

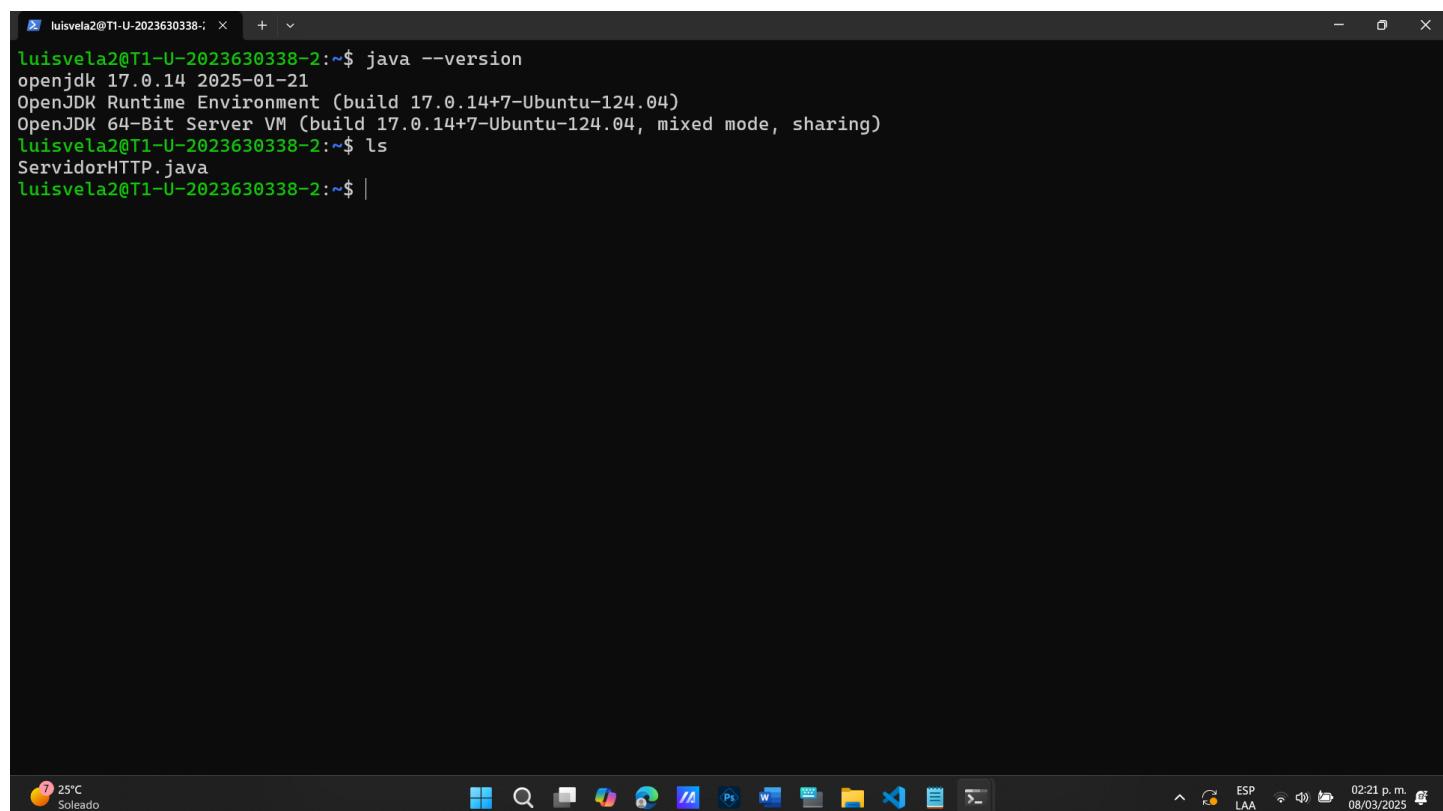


```
Windows PowerShell

PS C:\Users\Luis Velasco\OneDrive\Documentos\6to semestre\escom\SistemasDistribuidos\Tarea1> sftp luisvela2@48.211.221.228
luisvela2@48.211.221.228's password:
Connected to 48.211.221.228.
sftp> put ServidorHTTP.java
Uploading ServidorHTTP.java to /home/luisvela2/ServidorHTTP.java
ServidorHTTP.java
 00:00          100% 4264   68.3KB/s
sftp> |
```

The screenshot shows a Windows PowerShell window titled "Windows PowerShell". The command `sftp luisvela2@48.211.221.228` is run, followed by `put ServidorHTTP.java`. The progress bar indicates the upload is at 100% completion with a speed of 68.3KB/s. The status bar at the bottom shows system icons like battery level, signal strength, and date/time.

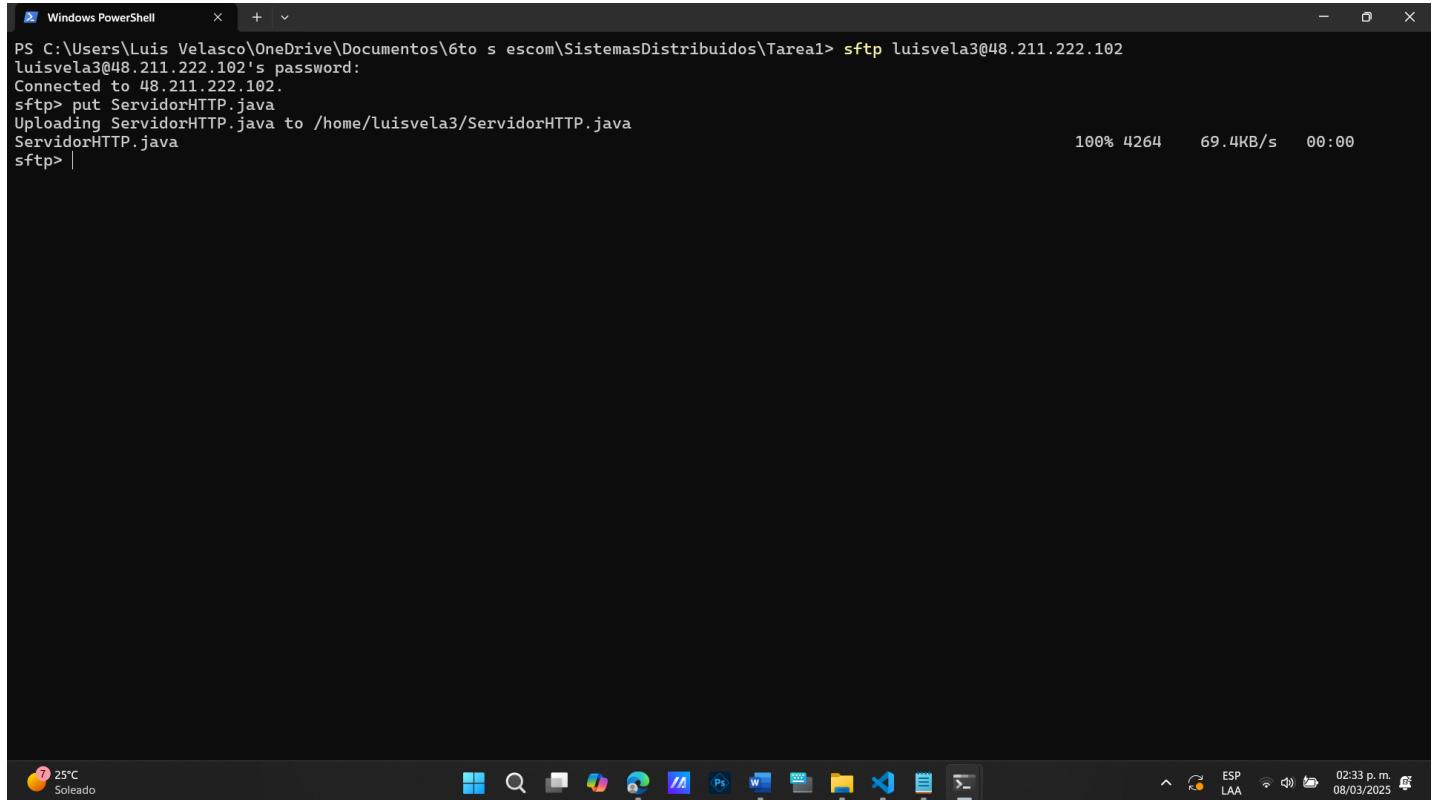
- Comprobando que el ServidorHTTP.java llego, listándolo los archivos con el comando ls



```
luisvela2@T1-U-2023630338-2:~$ java --version
openjdk 17.0.14 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-124.04)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-124.04, mixed mode, sharing)
luisvela2@T1-U-2023630338-2:~$ ls
ServidorHTTP.java
luisvela2@T1-U-2023630338-2:~$ |
```

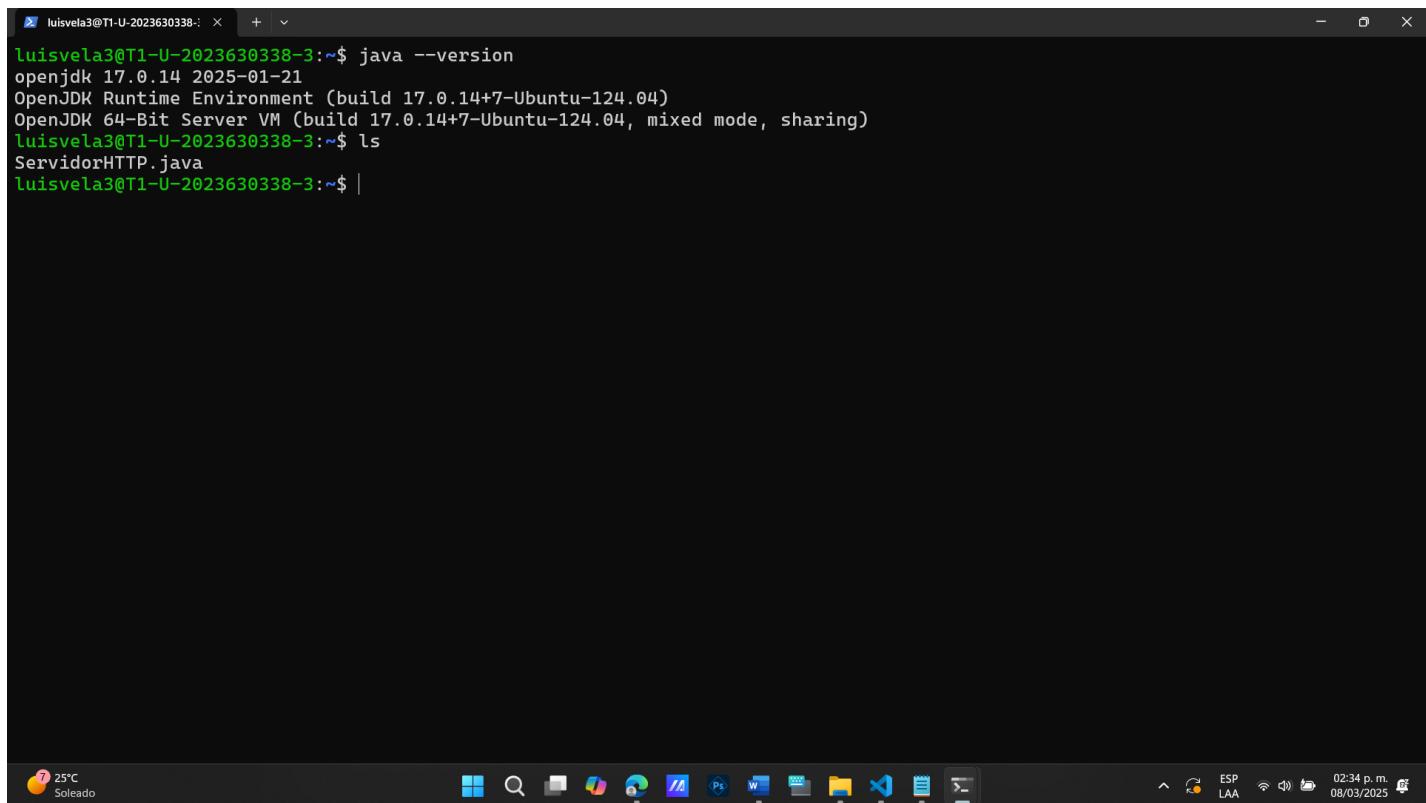
The screenshot shows a Linux terminal window titled "luisvela2@T1-U-2023630338-2:~\$". The user runs `java --version` and `ls` to list files. The output shows the Java version and the presence of the "ServidorHTTP.java" file. The status bar at the bottom shows system icons and the date/time.

- Para la tercera máquina virtual, nos conectamos con SFTP para mandar el ServidorHTTP.java de la maquina local a la VM



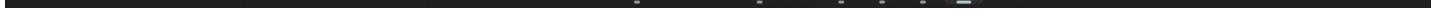
```
PS C:\Users\Luis Velasco\OneDrive\Documentos\6to semestre\Sistemas Distribuidos\Tarea1> sftp luisvela3@48.211.222.102
luisvela3@48.211.222.102's password:
Connected to 48.211.222.102.
sftp> put ServidorHTTP.java
Uploading ServidorHTTP.java to /home/luisvela3/ServidorHTTP.java
ServidorHTTP.java                                100% 4264      69.4KB/s   00:00
sftp> |
```

- Comprobando que el ServidorHTTP.java llego, listándolo los archivos con el comando ls



```
luisvela3@T1-U-2023630338-3:~$ java --version
openjdk 17.0.14 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-124.04)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-124.04, mixed mode, sharing)
luisvela3@T1-U-2023630338-3:~$ ls
ServidorHTTP.java
luisvela3@T1-U-2023630338-3:~$ |
```

7. Ejecutar el programa ServidorHTTP.java en la segunda máquina virtual y en la tercera máquina virtual.



```
luisvela2@T1-U-2023630338-2:~$ ls
ServidorHTTP.java
luisvela2@T1-U-2023630338-2:~$ javac ServidorHTTP.java
luisvela2@T1-U-2023630338-2:~$ ls
'ServidorHTTP$Worker.class'  ServidorHTTP.java
  ServidorHTTP.class
luisvela2@T1-U-2023630338-2:~$ java ServidorHTTP
Servidor 1 HTTP en el puerto 8080

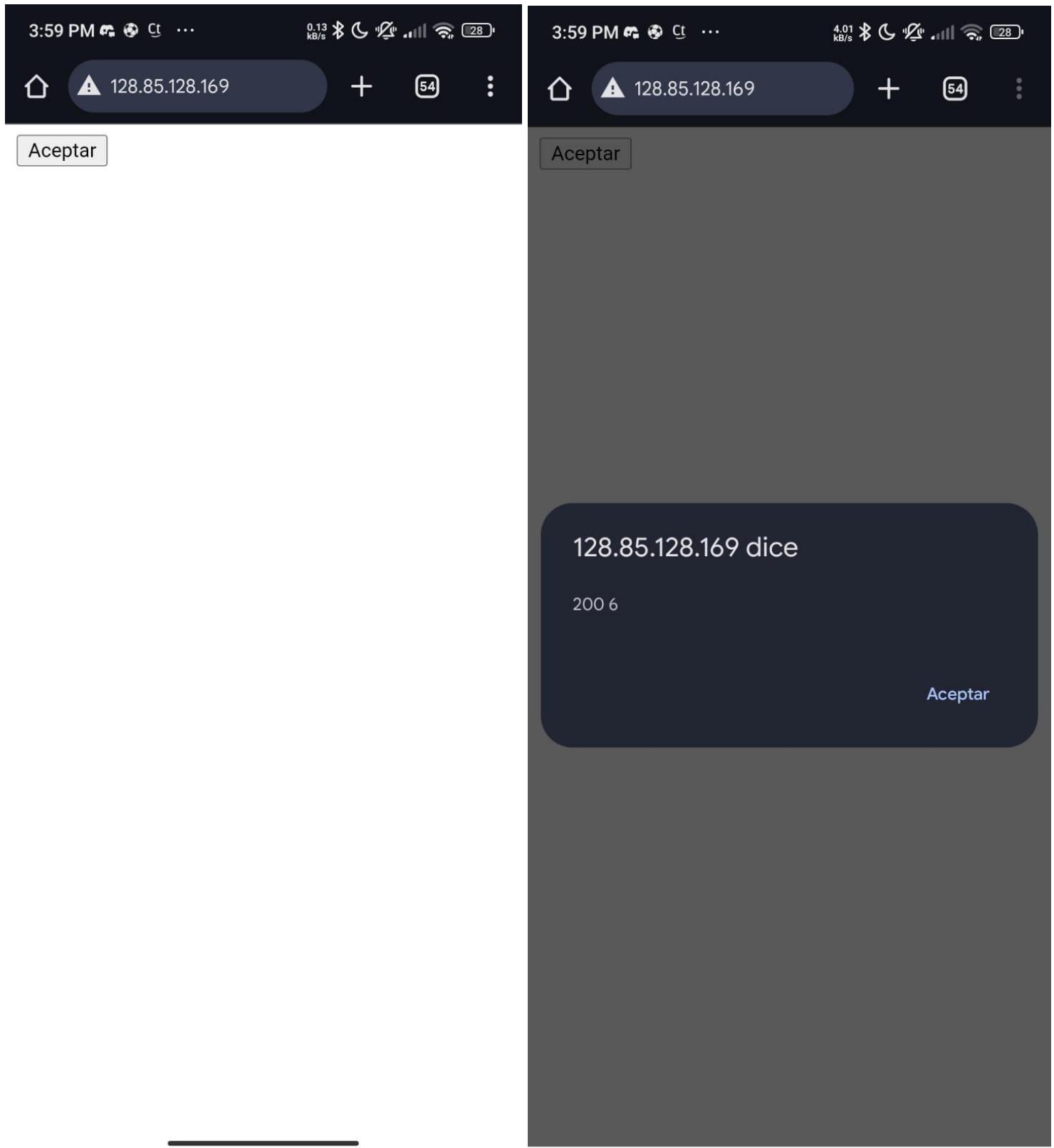
luisvela3@T1-U-2023630338-3:~$ ls
ServidorHTTP.java
luisvela3@T1-U-2023630338-3:~$ javac ServidorHTTP.java
luisvela3@T1-U-2023630338-3:~$ ls
'ServidorHTTP$Worker.class'  ServidorHTTP.java
  ServidorHTTP.class
luisvela3@T1-U-2023630338-3:~$ java ServidorHTTP
Servidor 2 HTTP en el puerto 8080
```

- Ejecutando el AdministradorTrafico.java en la primera máquina virtual.



```
luisvela@T1-U-2023630338-1:~$ javac AdministradorTrafico.java
luisvela@T1-U-2023630338-1:~$ java AdministradorTrafico 8080 48.211.221.228 8080 48.211.222.102 8080
Proxy en puerto: 8080
Servidor-1 en 48.211.221.228:8080
Servidor-2 en 48.211.222.102:8080
```

8. Ingresando la URL <http://128.85.128.169>, donde el dominio es la IP pública de la primera máquina virtual en donde se ejecutó el AdministradorTráfico.java.



- Así se ven las consolas de los servidores remotos 1 y 2:

```

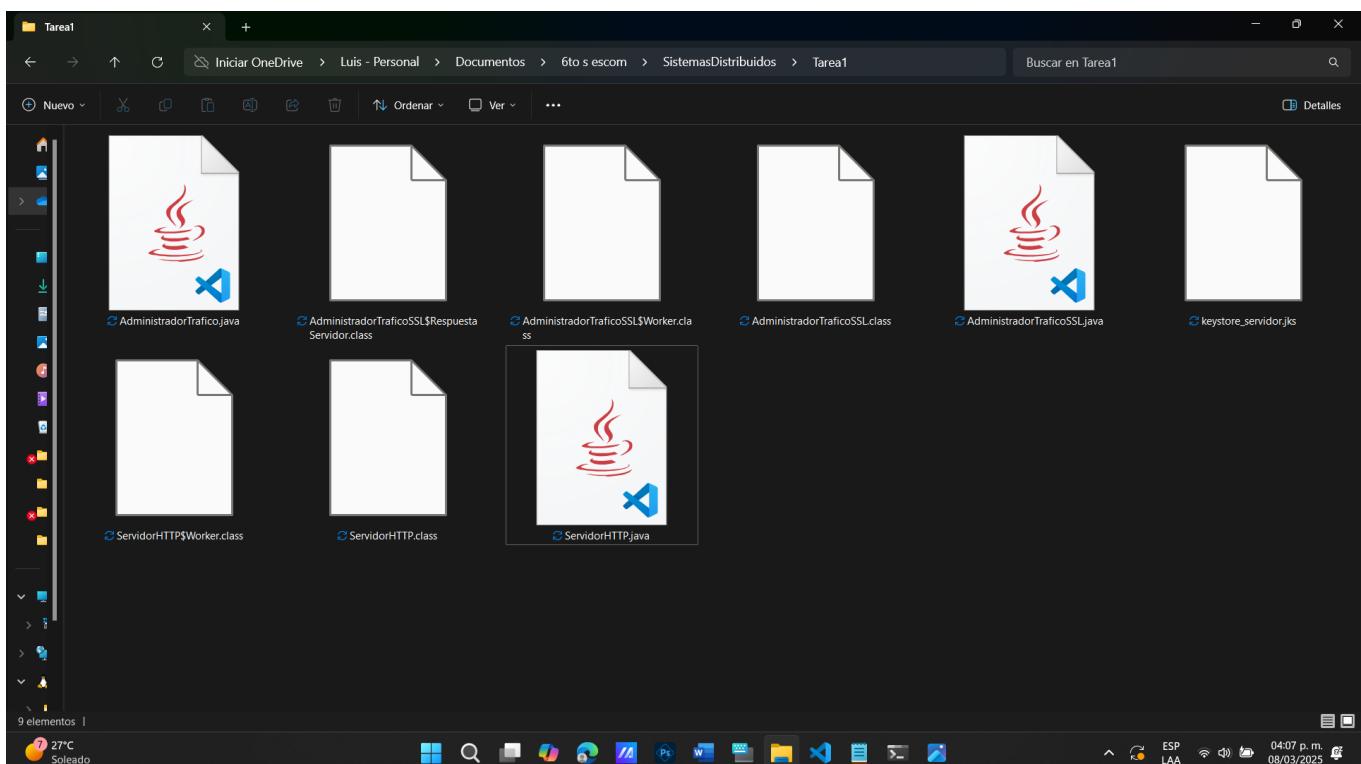
luisvela2@TI-U-2023630338-2:~$ java ServidorHTTP
Servidor 1 HTTP en el puerto 8080
Petición: GET / HTTP/1.1
Encabezado: Host: 128.85.128.169
Encabezado: Connection: keep-alive
Encabezado: Upgrade-Insecure-Requests: 1
Encabezado: User-Agent: Mozilla/5.0 (Linux; Android 10; K) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/133.0.0.0 Mobile Safari/537.36
Encabezado: Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
Encabezado: Accept-Encoding: gzip, deflate
Encabezado: Accept-Language: es-US,es-419;q=0.9,es;q=0.8,en;q=0.7
Encabezado:
Petición: GET /favicon.ico HTTP/1.1
Encabezado: Host: 128.85.128.169
Encabezado: Connection: keep-alive
Encabezado: User-Agent: Mozilla/5.0 (Linux; Android 10; K) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/133.0.0.0 Mobile Safari/537.36
Encabezado: Accept: image/avif,image/webp,image/apng,image/svg+xml,image/*,*/*;q=0.8
Encabezado: Referer: http://128.85.128.169/
Encabezado: Accept-Encoding: gzip, deflate
Encabezado: Accept-Language: es-US,es-419;q=0.9,es;q=0.8,en;q=0.7
Encabezado:
Petición: GET /suma?a=1&b=2&c=3 HTTP/1.1
Encabezado: Host: 128.85.128.169
Encabezado: Connection: keep-alive
Encabezado: User-Agent: Mozilla/5.0 (Linux; Android 10; K) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/133.0.0.0 Mobile Safari/537.36
Encabezado: Accept: */*
Encabezado: Referer: http://128.85.128.169/
Encabezado: Accept-Encoding: gzip, deflate
Encabezado: Accept-Language: es-US,es-419;q=0.9,es;q=0.8,en;q=0.7
Encabezado:
Petición: GET / HTTP/1.1
Encabezado: User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/90.0.4430.85 Safari/537.36 Edg/90.0.818.46
Encabezado: Accept-Encoding: gzip, deflate
Encabezado: Accept: */*

```

luisvela3@TI-U-2023630338-3:~\$ java ServidorHTTP
Servidor 2 HTTP en el puerto 8080
Petición: GET / HTTP/1.0
Encabezado: User-Agent: Expans, a Palo Alto Networks company, searches across the global IPv4 space multiple times per day to identify customers' presences on the Internet. If you would like to be excluded from our scans, please send IP addresses/domains to: scaninfo@paloaltonetworks.com
Encabezado: Accept: */
Encabezado:
Petición: GET / HTTP/1.1
Encabezado: Host: 128.85.128.169
Encabezado: Connection: keep-alive
Encabezado: Upgrade-Insecure-Requests: 1
Encabezado: User-Agent: Mozilla/5.0 (Linux; Android 10; K) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/133.0.0.0 Mobile Safari/537.36
Encabezado: Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
Encabezado: Accept-Encoding: gzip, deflate
Encabezado: Accept-Language: es-US,es-419;q=0.9,es;q=0.8,en;q=0.7
Encabezado:
Petición: GET /favicon.ico HTTP/1.1
Encabezado: Host: 128.85.128.169
Encabezado: Connection: keep-alive
Encabezado: User-Agent: Mozilla/5.0 (Linux; Android 10; K) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/133.0.0.0 Mobile Safari/537.36
Encabezado: Accept: image/avif,image/webp,image/apng,image/svg+xml,image/*,*/*;q=0.8
Encabezado: Referer: http://128.85.128.169/
Encabezado: Accept-Encoding: gzip, deflate
Encabezado: Accept-Language: es-US,es-419;q=0.9,es;q=0.8,en;q=0.7
Encabezado:
Petición: GET /suma?a=1&b=2&c=3 HTTP/1.1
Encabezado: Host: 128.85.128.169
Encabezado: Connection: keep-alive
Encabezado: User-Agent: Mozilla/5.0 (Linux; Android 10; K) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/133.0.0.0 Mobile Safari/537.36
Encabezado: Accept: */*
Encabezado: Referer: http://128.85.128.169/
Encabezado: Accept-Encoding: gzip, deflate
Encabezado: Accept-Language: es-US,es-419;q=0.9,es;q=0.8,en;q=0.7
Encabezado:

9. Crear en la primera máquina virtual un keystore.

- Anteriormente, en mi máquina local yo ya había creado un keystore, el cual fue nombrado "keystore_servidor.jks"



- Lo recomendable es conectarme a la máquina virtual por SFTP y mandarle el archivo, que ya está en mi máquina local.

The screenshot shows a Windows desktop environment with two terminal windows side-by-side. The left terminal window is a Windows PowerShell session. It starts with the command `sftp luisvela@128.85.128.169`, followed by entering a password. Then, it lists files from a local directory and transfers them to a remote location via SFTP. The right terminal window is a Linux session on a machine named `T1-U-2023630338-1`. It shows the user has uploaded several Java class files and a keystore file to the `/home/luisvela` directory. The desktop taskbar at the bottom includes icons for File Explorer, Task View, Start, Search, Taskbar settings, and pinned applications like Microsoft Edge, File Explorer, and Visual Studio Code.

```

Windows PowerShell
PS C:\Users\luis Velasco\OneDrive\Documentos\6to s escom\SistemasDistribuidos\Tarea1> sftp luisvela@128.85.128.169
luisvela@128.85.128.169's password:
Connected to 128.85.128.169.
sftp> put keystore_servidor.jks
Uploading Keystore_servidor.jks to /home/luisvela/keystore_servidor.jks
keystore_servidor.jks          100% 2772   48.3KB/s  00:00
sftp> put AdministradorTraficoSSL.java
Uploading AdministradorTraficoSSL.java to /home/luisvela/AdministradorTraficoSSL.java
AdministradorTraficoSSL.java      100% 3834   69.3KB/s  00:00
sftp>

luisvela@T1-U-2023630338-1:~$ ls
'AdministradorTrafico$RespuestaServidor.class'
'AdministradorTrafico$Worker.class'
AdministradorTrafico.class
AdministradorTrafico.java
AdministradorTraficoSSL.java
keystore_servidor.jks
luisvela@T1-U-2023630338-1:~$ |

```

10. Modificar el servidor del proxy en el programa `AdministradorTrafico.java` para que utilice sockets seguros. El nuevo programa se llamará `AdministradorTraficoSSL.java`. Este programa deberá usar el keystore creado anteriormente y deberá usar el puerto 8443.

- En este punto, el programa fue modificado tal como se indica, el código será proporcionado en los documentos subidos en la tarea y en la conversación con la IA ChatGPT.

11. Ejecutar el programa AdministradorTraficoSSL.java en la primera máquina virtual.

The screenshot shows three terminal windows side-by-side on a Windows desktop. The leftmost window (luisvela@T1-U-2023630338-1) displays the command 'javac AdministradorTraficoSSL.java' followed by the output of the Java program which includes IP addresses and port numbers. The middle window (luisvela2@T1-U-2023630338-2) shows the command 'java ServidorHTTP' and its output. The rightmost window (luisvela3@T1-U-2023630338-3) also shows the command 'java ServidorHTTP' and its output. Below the terminals is a taskbar with various icons and a system tray showing weather (27°C), network (ESP LAA), battery (04:34 p.m., 08/03/2025).

```
luisvela@T1-U-2023630338-1:~$ javac AdministradorTraficoSSL.java
luisvela@T1-U-2023630338-1:~$ java AdministradorTraficoSSL 8443 48.211.221.228 8080 48.211.222.102 8080
Servidor HTTPS seguro ejecutando en el puerto: 8443

luisvela2@T1-U-2023630338-2:~$ java ServidorHTTP
Servidor 1 HTTP en el puerto 8080

luisvela3@T1-U-2023630338-3:~$ java ServidorHTTP
Servidor 2 HTTP en el puerto 8080
```

12. Ingresar la URL <https://128.85.128.169>, donde el dominio es la IP pública de la primera máquina virtual.

4:35 PM Ct ⚽ ...

0.17 kB/s ⚡ ⚪ 🔍 25°



https://128.85.128.169



54



4:36 PM Ct ⚽ ...

48.6 kB/s ⚡ ⚪ 🔍 25°



https://128.85.128.169



54



Aceptar



La conexión no es privada

Es posible que un atacante esté intentando robarte la información de **128.85.128.169** (por ejemplo, contraseñas, mensajes o tarjetas de crédito). [Obtén más información sobre esta advertencia](#)

NET::ERR_CERT_AUTHORITY_INVALID



[Activa la protección mejorada](#) para obtener el nivel más alto de seguridad de Chrome

Volver a un sitio seguro

Opciones avanzadas

4:36 PM Ct ...

48.6 kB/s ⚡ ⚡ 25%



https://128.85.128.169



54



Aceptar

- Así se ven las consolas de los servidores remotos 1 y 2.

```
luisvela2@T1-U-2023630338:~$ java ServidorHTTP
Servidor 1 HTTP en el puerto 8080
Petición: GET / HTTP/1.1
Encabezado: Host: 128.85.128.169
Encabezado: Connection: keep-alive
Encabezado: Cache-Control: max-age=0
Encabezado: sec-ch-ua: "Not(A:Brand";v="99", "Google Chrome";v="133", "Chromium";v="133"
Encabezado: sec-ch-ua-mobile: ?1
Encabezado: sec-ch-ua-platform: "Android"
Encabezado: Upgrade-Insecure-Requests: 1
Encabezado: User-Agent: Mozilla/5.0 (Linux; Android 10; K) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/133.0.0.0 Mobile Safari/537.36
Encabezado: Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
Encabezado: Sec-Fetch-Site: none
Encabezado: Sec-Fetch-Mode: navigate
Encabezado: Sec-Fetch-User: ?1
Encabezado: Sec-Fetch-Dest: document
Encabezado: Accept-Encoding: gzip, deflate, br, zstd
Encabezado: Accept-Language: es-US,es-419;q=0.9,es;q=0.8,en;q=0.7
Encabezado:
Petición: GET /favicon.ico HTTP/1.1
Encabezado: Host: 128.85.128.169
Encabezado: Connection: keep-alive
Encabezado: sec-ch-ua-platform: "Android"
Encabezado: User-Agent: Mozilla/5.0 (Linux; Android 10; K) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/133.0.0.0 Mobile Safari/537.36
Encabezado: sec-ch-ua: "Not(A:Brand";v="99", "Google Chrome";v="133", "Chromium";v="133"
Encabezado: sec-ch-ua-mobile: ?1
Encabezado: Accept: image/avif,image/webp,image/apng,image/svg+xml,image/*,*/*;q=0.8
Encabezado: Sec-Fetch-Site: same-origin
Encabezado: Sec-Fetch-Mode: no-cors
Encabezado: Sec-Fetch-Dest: image
Encabezado: Referer: https://128.85.128.169/
Encabezado: Accept-Encoding: gzip, deflate, br, zstd
Encabezado: Accept-Language: es-US,es-419;q=0.9,es;q=0.8,en;q=0.7
Encabezado:
Petición: GET / HTTP/1.1
Encabezado: Host: 128.85.128.169
Encabezado: Connection: keep-alive
Encabezado: sec-ch-ua: "Not(A:Brand";v="99", "Google Chrome";v="133", "Chromium";v="133"
luisvela3@T1-U-2023630338:~$ java ServidorHTTP
Servidor 2 HTTP en el puerto 8080
Petición: GET / HTTP/1.1
Encabezado: Host: 128.85.128.169
Encabezado: Connection: keep-alive
Encabezado: Cache-Control: max-age=0
Encabezado: sec-ch-ua: "Not(A:Brand";v="99", "Google Chrome";v="133", "Chromium";v="133"
Encabezado: sec-ch-ua-mobile: ?1
Encabezado: sec-ch-ua-platform: "Android"
Encabezado: Upgrade-Insecure-Requests: 1
Encabezado: User-Agent: Mozilla/5.0 (Linux; Android 10; K) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/133.0.0.0 Mobile Safari/537.36
Encabezado: Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
Encabezado: Sec-Fetch-Site: none
Encabezado: Sec-Fetch-Mode: navigate
Encabezado: Sec-Fetch-User: ?1
Encabezado: Sec-Fetch-Dest: document
Encabezado: Accept-Encoding: gzip, deflate, br, zstd
Encabezado: Accept-Language: es-US,es-419;q=0.9,es;q=0.8,en;q=0.7
Encabezado:
Petición: GET /favicon.ico HTTP/1.1
Encabezado: Host: 128.85.128.169
Encabezado: Connection: keep-alive
Encabezado: sec-ch-ua-platform: "Android"
Encabezado: User-Agent: Mozilla/5.0 (Linux; Android 10; K) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/133.0.0.0 Mobile Safari/537.36
Encabezado: sec-ch-ua: "Not(A:Brand";v="99", "Google Chrome";v="133", "Chromium";v="133"
Encabezado: sec-ch-ua-mobile: ?1
Encabezado: Accept: image/avif,image/webp,image/apng,image/svg+xml,image/*,*/*;q=0.8
Encabezado: Sec-Fetch-Site: same-origin
Encabezado: Sec-Fetch-Mode: no-cors
Encabezado: Sec-Fetch-Dest: image
Encabezado: Referer: https://128.85.128.169/
Encabezado: Accept-Encoding: gzip, deflate, br, zstd
Encabezado: Accept-Language: es-US,es-419;q=0.9,es;q=0.8,en;q=0.7
Encabezado:
Petición: GET / HTTP/1.1
Encabezado: Host: 128.85.128.169
Encabezado: Connection: keep-alive
Encabezado: sec-ch-ua: "Not(A:Brand";v="99", "Google Chrome";v="133", "Chromium";v="133"
Encabezado: sec-ch-ua-mobile: ?1
Encabezado: sec-ch-ua-platform: "Android"
Encabezado: Upgrade-Insecure-Requests: 1
Encabezado: User-Agent: Mozilla/5.0 (Linux; Android 10; K) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/133.0.0.0 Mobile Safari/537.36
Encabezado: Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
Encabezado: Sec-Fetch-Site: none
```

13. Eliminar la primera máquina virtual:

Microsoft Azure

Search resources, services, and docs (G+)

Home > All resources

Instituto Politécnico Nacional (correo.ipn.mx)

Create Manage view Refresh Export to CSV Open query Assign tags Delete

Filter for any field... Subscription equals all Resource group equals all Type equals all Location equals all Add filter

Unsecure resources Recommendations 19 Changed resources

Name ↑	Type ↑	Resource group ↑
NetworkWatcher_eastus2	Network Watcher	NetworkWatcherRG
NetworkWatcher_mexicentral	Network Watcher	NetworkWatcherRG
T1-U-2023630338-1_OsDisk_1_280d85aa807e4bc6b6be79de4f4eb13d	Disk	T1-U-2023630338-1_GROUP
T1-U-2023630338-2_OsDisk_1_b568824c9fe24c3f839fea8dee26ee1f	Disk	T1-U-2023630338-1_GROUP_03081259
T1-U-2023630338-1	Virtual machine	T1-U-2023630338-1_group
t1-u-2023630338-1890_z1	Network Interface	T1-U-2023630338-1_group
T1-U-2023630338-1-nsg	Network security group	T1-U-2023630338-1_group
T1-U-2023630338-1-ip	Public IP address	T1-U-2023630338-1_group
T1-U-2023630338-1-vnet	Virtual network	T1-U-2023630338-1_group
T1-U-2023630338-2	Virtual machine	T1-U-2023630338-1_group_03081259
t1-u-2023630338-2518_z1	Network Interface	T1-U-2023630338-1_group_03081259
T1-U-2023630338-2-nsg	Network security group	T1-U-2023630338-1_group_03081259
T1-U-2023630338-2-ip	Public IP address	T1-U-2023630338-1_group_03081259
T1-U-2023630338-2-vnet	Virtual network	T1-U-2023630338-1_group_03081259

Previous Page 1 of 1 Next > Showing 1 to 22 of 22 records.

Copilot

lvelascoj1900@alumno.i... INSTITUTO POLITÉCNICO NACIO...

Delete Resources

The selected resources along with their related resources and contents will be permanently deleted. If you are unsure of the selected resource dependencies, navigate to the individual resource page to perform the delete operation. More details of the resource dependencies are available in the manage experience.

Resources to be deleted (5)

Name	Resource type
T1-U-2023630338-1	Virtual machine
T1-U-2023630338-1_OsDisk_1_280d85aa807e4bc6b6be79de4f4eb6t	Disk
t1-u-2023630338-1890_z1	Network Interface
T1-U-2023630338-1-nsg	Network security group
T1-U-2023630338-1-ip	Public IP address

Apply force delete for selected Virtual machines and Virtual machine scale sets

Enter "delete" to confirm deletion *

27°C Soleado

ESP LAA 04:46 p. m. 08/03/2025

Ejecución del administrador de tráfico en Windows

- Crear una máquina virtual con Windows Server 2016 B2s con 4 GB de RAM, 2CPU y disco HDD con 127 GB.
- En la siguiente imagen se puede ver la configuración de especificaciones básicas, como el nombre requerido "T1-W-2023630338-1", la imagen del SO, el tipo de seguridad, etc.

The screenshot shows the 'Create a virtual machine' wizard in Microsoft Azure. The 'Instance details' step is selected. Key configuration options shown include:

- Virtual machine name:** T1-W-2023630338-1
- Region:** (US) East US 2
- Availability options:** Availability zone
- Zone options:** Self-selected zone (selected), choosing up to 3 availability zones, one VM per zone.
- Availability zone:** Zone 1
- Security type:** Standard
- Image:** Windows Server 2016 Datacenter - x64 Gen2

At the bottom, there are navigation buttons: < Previous, Next : Disks >, Review + create, and Give feedback. The taskbar at the bottom shows various pinned icons and the date/time: 05:08 p.m. 08/03/2025.

- En la siguiente imagen se ve la configuración del disco.

The screenshot shows the 'Create a virtual machine' wizard in Microsoft Azure, specifically the 'Review + create' step. The 'Data disks for T1-W-2023630338-1' section is visible. Key configuration options shown include:

- OS disk:** Image default (127 GiB), Standard HDD (locally-redundant storage)
- Encryption at host:** Not registered (checkbox is empty)
- Delete with VM:** Checked
- Key management:** Platform-managed key
- Enable Ultra Disk compatibility:** Not checked

At the bottom, there are navigation buttons: < Previous, Next : Networking >, Review + create, and Give feedback. The taskbar at the bottom shows various pinned icons and the date/time: 05:09 p.m. 08/03/2025.

- En la siguiente imagen se ve la configuración de red.

The screenshot shows the 'Create a virtual machine' wizard in the Microsoft Azure portal. The current step is 'Network interface'. The configuration includes:

- Virtual network:** (new) T1-W-202363038-1-vnet
- Subnet:** (new) default (10.3.0.0/24)
- Public IP:** (new) T1-W-202363038-1-ip
- NIC network security group:** Basic (selected)
- Public inbound ports:** Allow selected ports (selected), RDP (3389) is listed.
- A warning message: "⚠️ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses."

At the bottom, there are buttons for 'Delete public IP and NIC when VM is deallocated' (unchecked), '< Previous' and 'Next : Management >', and a 'Review + create' button.

- En la siguiente imagen, se muestra la configuración de administración, a la cual no le movimos nada.

The screenshot shows the 'Create a virtual machine' wizard in the Microsoft Azure portal. The current step is 'Administration'. The configuration includes:

- Identity:** Enable system assigned managed identity (unchecked)
- Microsoft Entra ID:** Login with Microsoft Entra ID (unchecked)
 - A note: "💡 RBAC role assignment of Virtual Machine Administrator Login or Virtual Machine User Login is required when using Microsoft Entra ID login. [Learn more](#)"
 - A warning message: "⚠️ This image does not support Login with Microsoft Entra ID."
- Auto-shutdown:** Enable auto-shutdown (unchecked)
- Backup:** Enable backup (unchecked)

At the bottom, there are buttons for '< Previous' and 'Next : Monitoring >', and a 'Review + create' button.

- En la siguiente imagen, vemos la configuración de monitoreo a la cual le desactivamos el diagnóstico de arranque.

The screenshot shows the 'Monitoring' tab of the Azure VM creation wizard. Under 'Diagnostics', the 'Boot diagnostics' section has the 'Disable' option selected. Other sections like 'Health' and 'Logs' are also visible but not interacted with.

Monitoring Tab:

- Alerts:** Enable recommended alert rules (checkbox)
- Diagnostics:**
 - Boot diagnostics:** Disable (radio button selected)
 - Enable OS guest diagnostics:** (checkbox)
- Health:** Enable application health monitoring (checkbox)

Bottom Navigation: < Previous, Next : Advanced >, Review + create, Give feedback

- En las siguientes imágenes veremos la configuración que establecimos, antes de crear la VM.

The screenshot shows the 'Review + create' step of the Azure VM creation wizard, indicating 'Validation passed'. The 'Basics' section displays the configuration details.

Basics:

Subscription	Azure for Students
Resource group	(new) T1-W-2023630338-1_group
Virtual machine name	T1-W-2023630338-1
Region	East US 2
Availability options	Availability zone
Zone options	Self-selected zone
Availability zone	1
Security type	Standard
Image	Windows Server 2016 Datacenter - Gen2
VM architecture	x64
Size	Standard B2s (2 vcpus, 4 GiB memory)
Enable Hibernation	No
Username	luisWin
Public inbound ports	RDP
Already have a Windows license?	No
Azure Spot	No

Disk:

OS disk size	Image default
OS disk type	Standard HDD LRS

Bottom Navigation: < Previous, Next >, Create, Download a template for automation, Give feedback

2. Abrir en la máquina virtual los puertos 80 y 443.

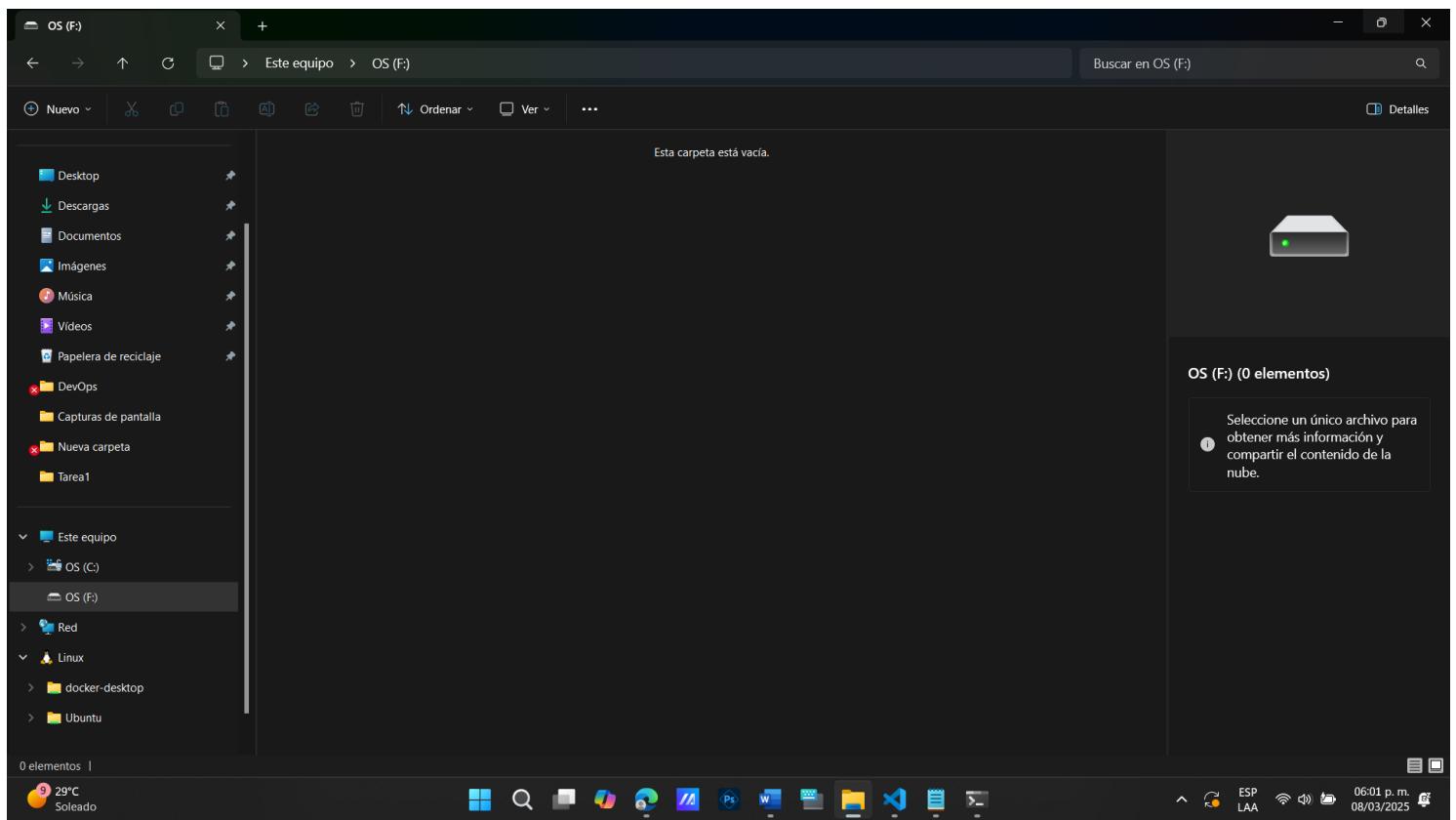
- El próximo paso es descargar el archivo RDP que nos proporciona la instancia de la VM de Windows creada.

The screenshot shows the Microsoft Azure portal interface. At the top, it displays the URL <https://portal.azure.com/#@correo.ipn.mx/resource/subscriptions/e1d319c4-9458-4992-b305-fe400976ae65/resourcegroups/T1-W-2023630338-1/>. Below the header, there's a search bar and a Copilot button. The main content area shows a virtual machine named "T1-W-2023630338-1 | Connect". On the left, a sidebar menu is open under the "Connect" section, listing various connection methods like Bastion, Windows Admin Center, Networking, Settings, Availability + scale, Security, Backup + disaster recovery, Operations, Monitoring, Automation, and Help. The "Native RDP" option is highlighted and expanded, showing its details: Admin username (luisWin), Port (3389), and Just-in-time policy (Unsupported by plan). At the bottom of this panel, there are "Select" and "Download RDP file" buttons. The status bar at the bottom of the screen shows weather information (29°C Soleado), system icons, and the date/time (05:59 p.m. 08/03/2025).

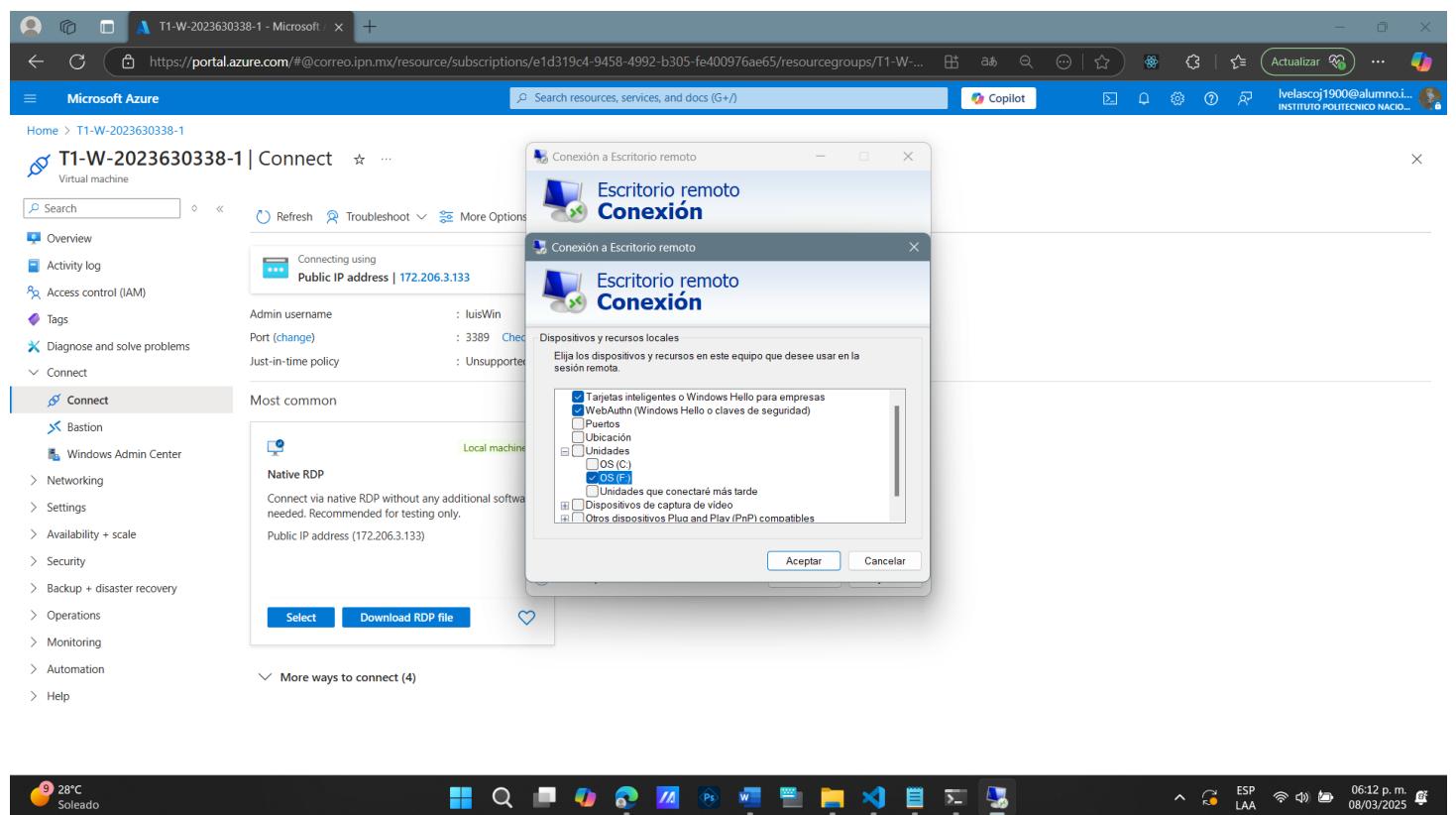
- Como siguiente paso, en una ventana de cmd, crearemos un directorio con el comando mkdir llamado “prueba” y después con el comando subst crearemos una unidad virtual F donde apuntará al directorio “prueba” previamente creado.

The screenshot shows a Windows Command Prompt window titled "Símbolo del sistema". Inside the window, the user runs two commands: "mkdir prueba" and "subst f: prueba". The output of the first command shows the creation of a new directory "prueba" in the user's OneDrive folder. The output of the second command shows the creation of a virtual drive "f:" that points to the "prueba" directory. In the background, the Microsoft Azure portal sidebar is visible, showing the "Native RDP" connection method selected. The status bar at the bottom of the screen shows weather information (29°C Soleado), system icons, and the date/time (06:01 p.m. 08/03/2025).

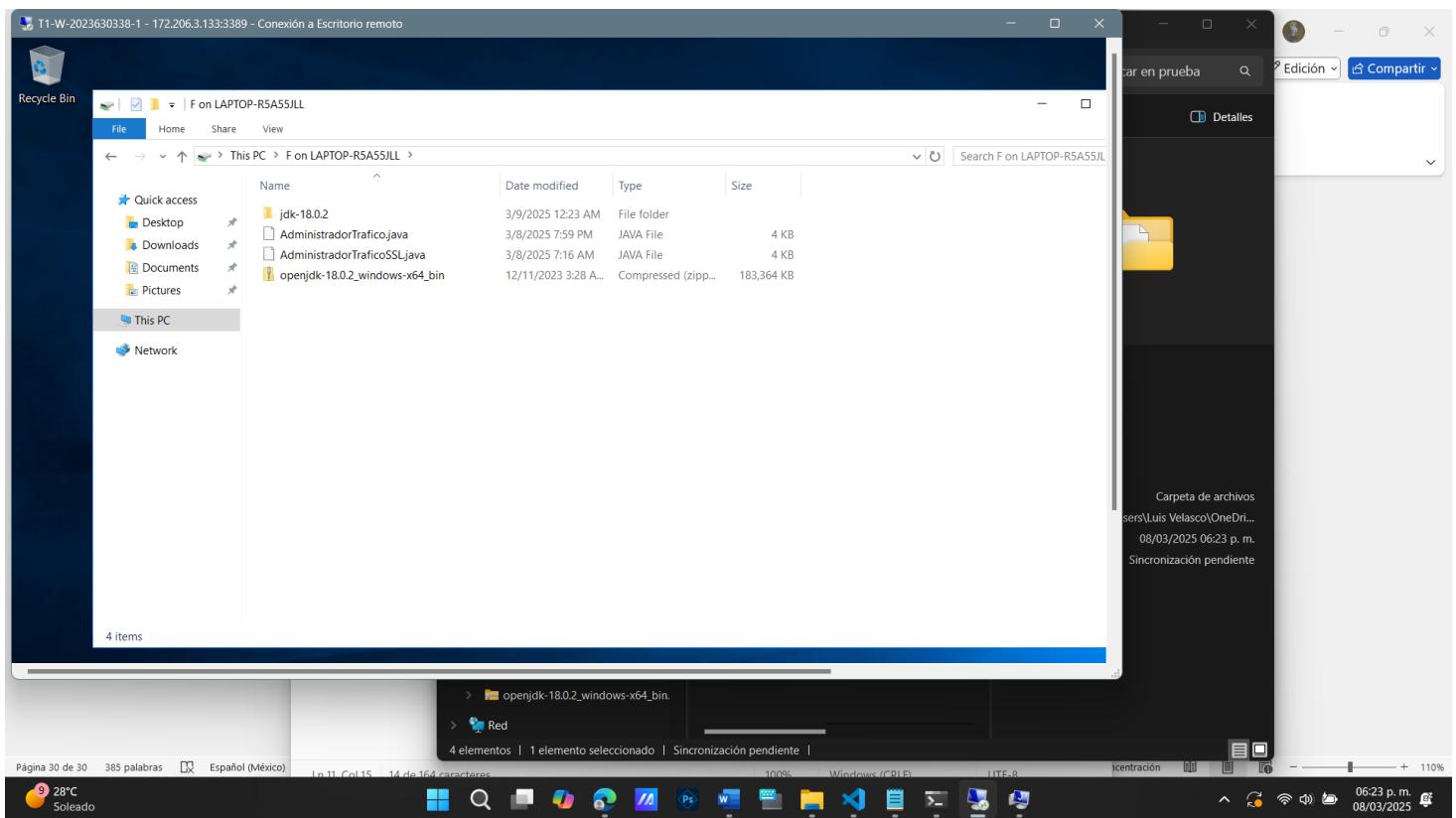
- Verificando que la unidad virtual se creó, en el administrador de archivos de Windows.



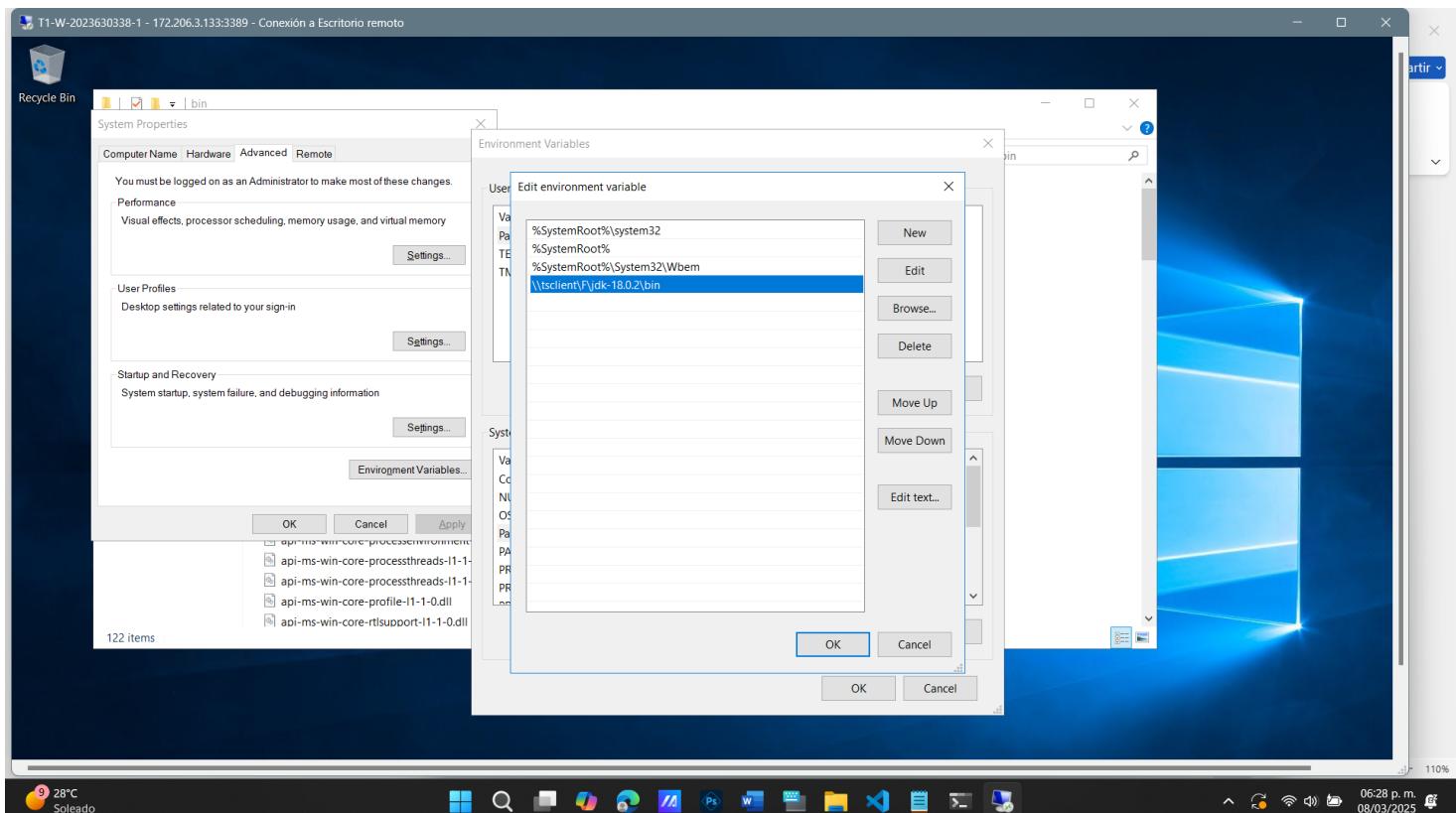
- Modificando el archivo RDP que descargamos antes, en la pestaña "Recursos Locales", abriendo las opciones de la casilla "Unidades" y seleccionando la unidad de disco F creada previamente.



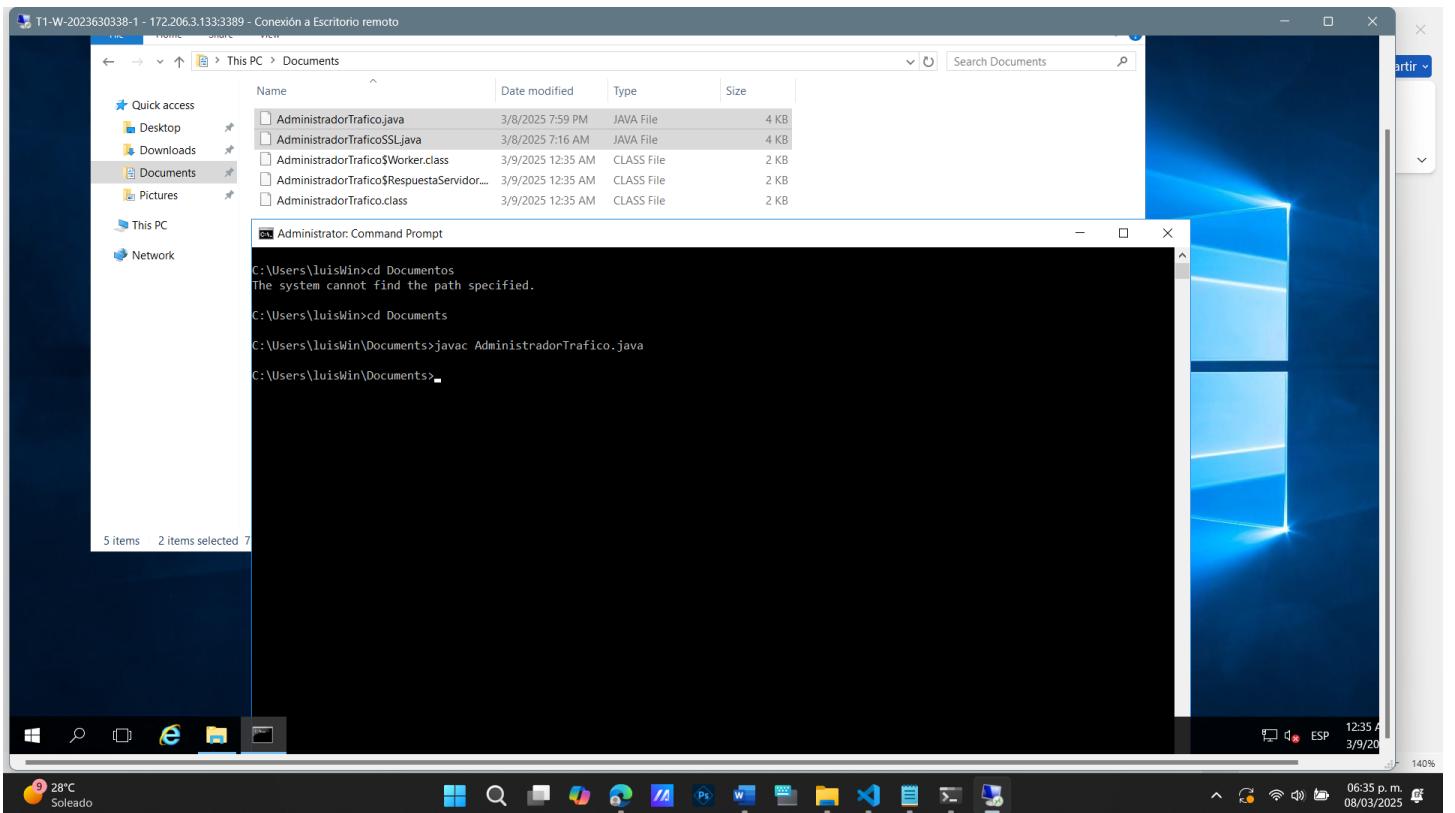
- En la carpeta de nuestro local, vamos a copiar el AdministradorTrafico.java, AdministradorTraficoSSL.java y el jdk-18.0.2, y en la VM se visualizarán:



- Agregando la ruta del directorio "bin" a la variable de entorno path de la VM



- Compilando el AdministradorTrafico.java



- Como último paso, se desactivará en una venta de PowerShell el firewall de Windows ya que suele bloquear el tráfico de red.

T1-W-2023630338-1 - 172.206.3.133:3389 - Conexión a Escritorio remoto

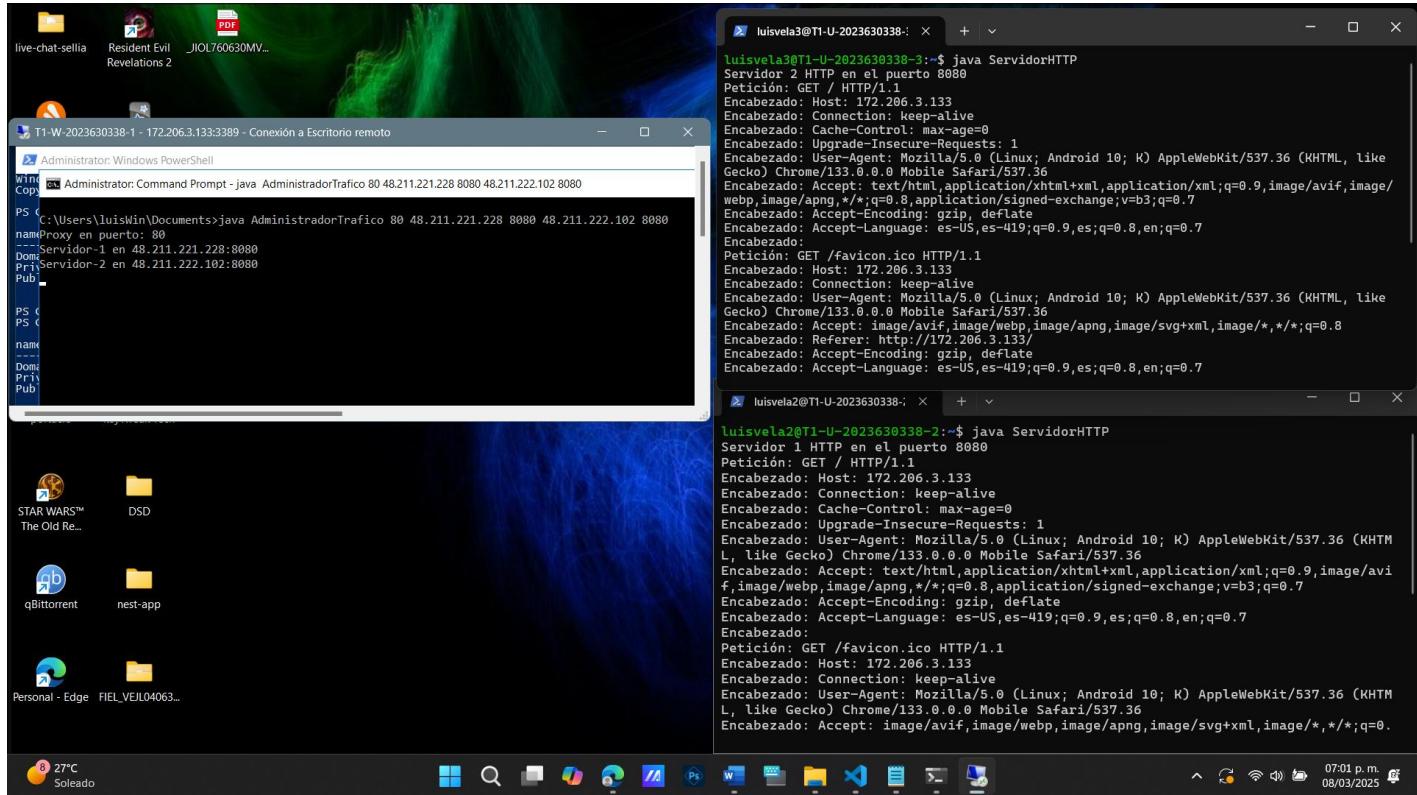
Administrator: Windows PowerShell

```
Windows PowerShell
Copyright (C) 2016 Microsoft Corporation. All rights reserved.

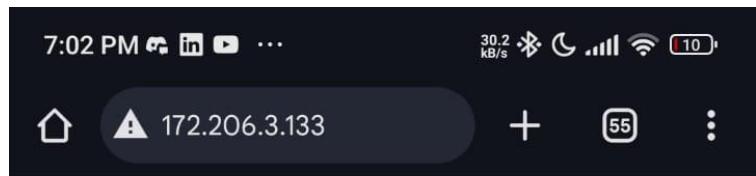
PS C:\Users\luisWin> Get-NetFirewallProfile | select name, enabled
Cname Enabled
--- -----
Domain True
Private True
Public True
C
PS C:\Users\luisWin> Set-NetFirewallProfile -Profile Domain,Public,Private -Enabled false
PS C:\Users\luisWin> Get-NetFirewallProfile | select name, enabled
Name Enabled
Sdomain False
Private False
Public False
PS C:\Users\luisWin>
```

28°C Soleado 06:55 p.m. 08/03/2025

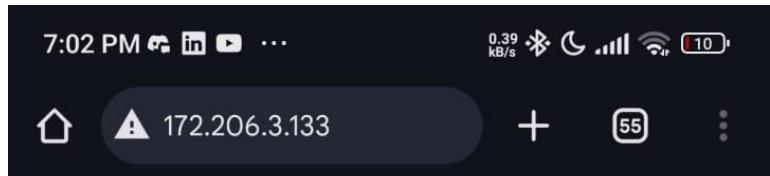
3. Ejecutar el programa AdministradorTrafico.java en la máquina virtual. El programa deberá usar el puerto 80



4. Ingresar la URL <http://172.206.3.133>, donde el host es la IP pública de la máquina virtual de Windows donde esta corriendo el Administrador de Tráfico.



Aceptar



Aceptar

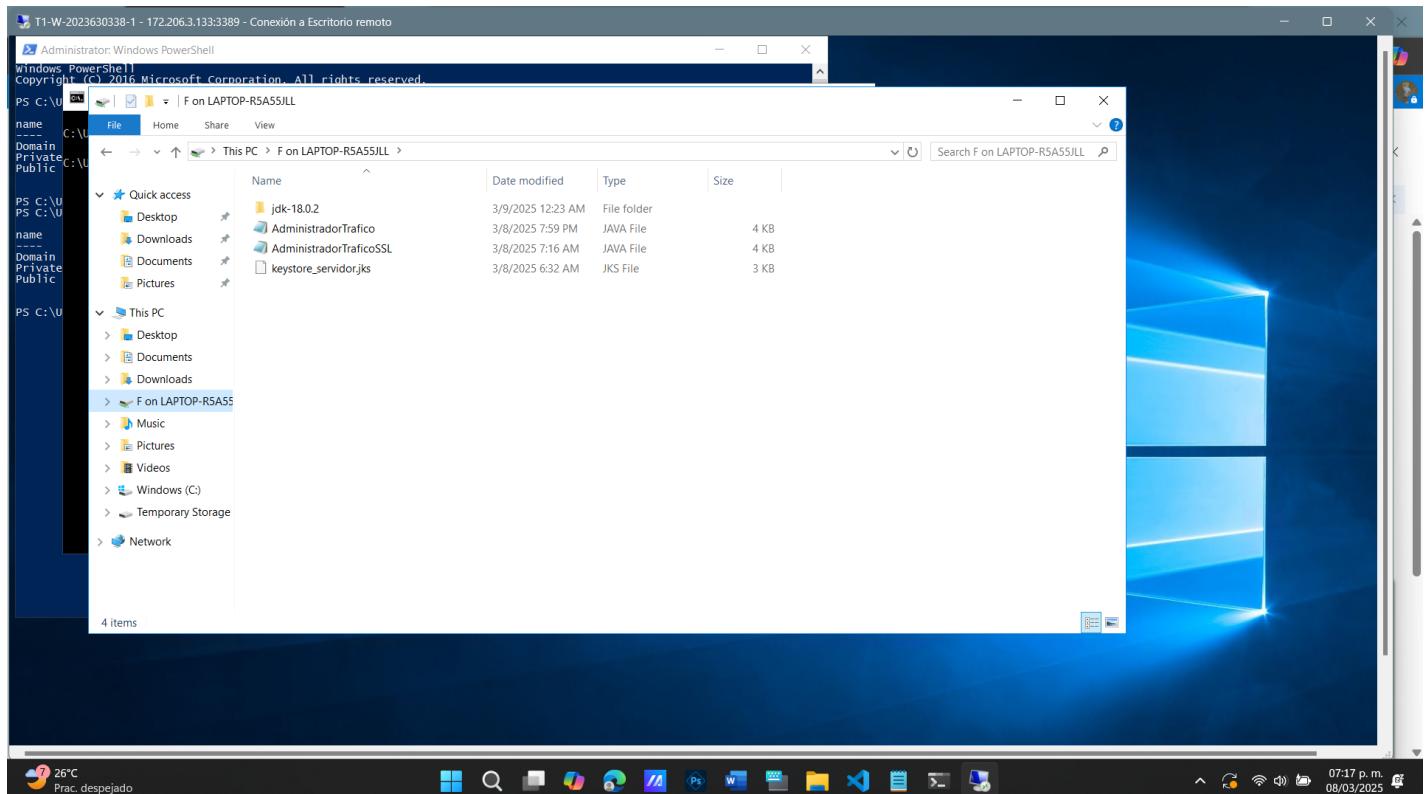
172.206.3.133 dice

200 6

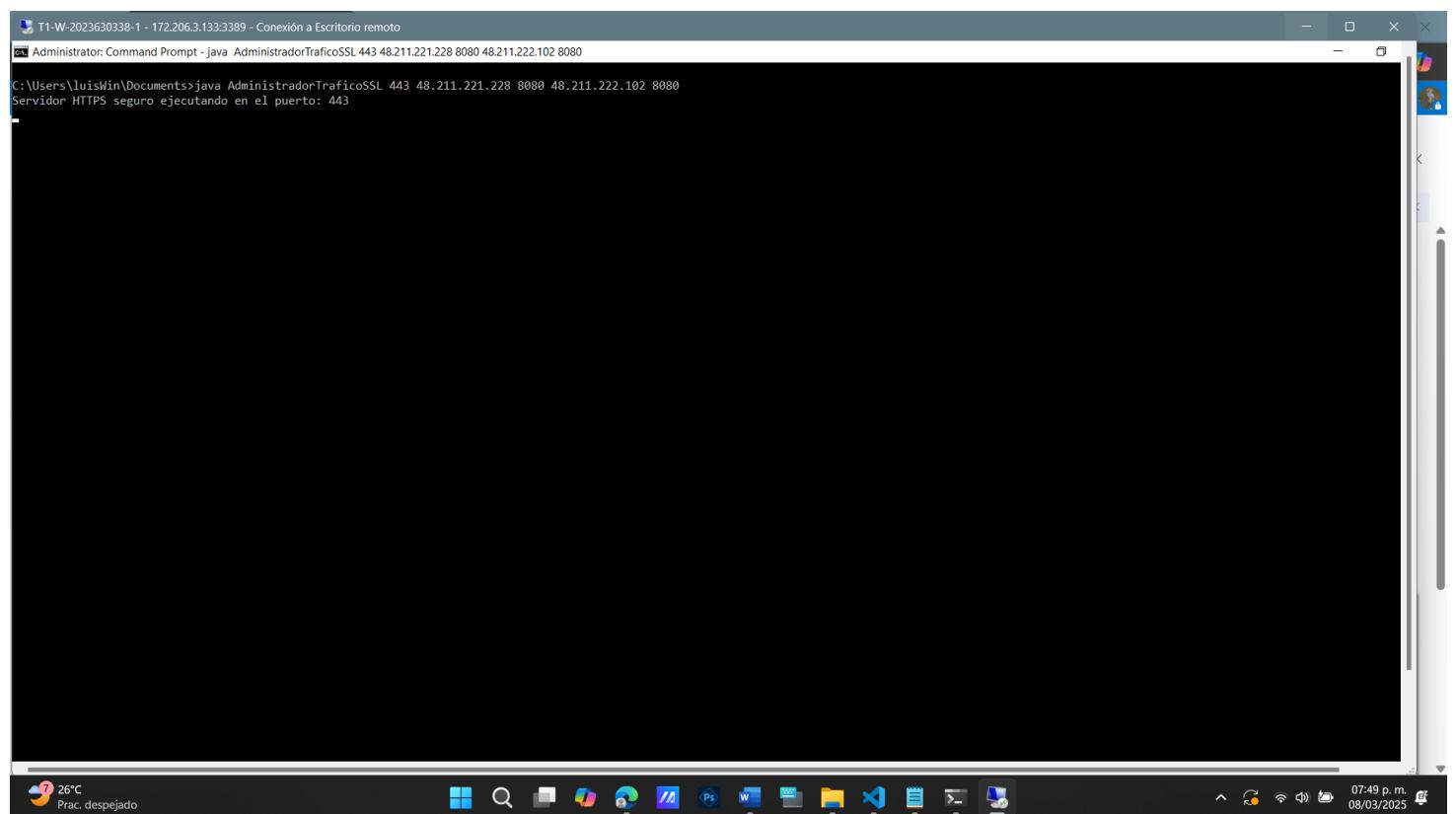
Aceptar

5. Crear en la máquina virtual un keystore (keystore_servidor.jks).

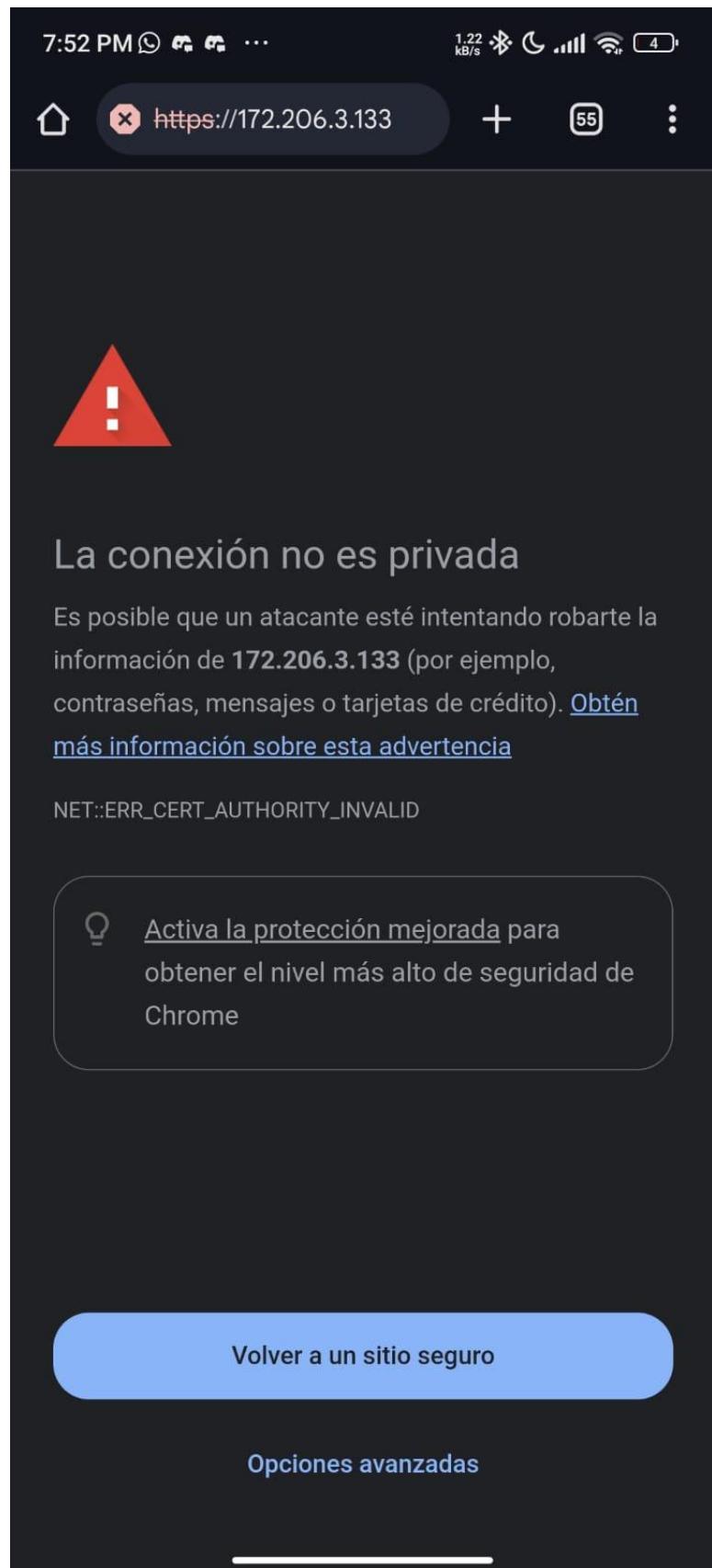
- Ya que ya tenía un keystore creado anteriormente, lo usare aquí, entonces copiare el archivo a la carpeta “prueba” en mi local, para que pueda verlo en la VM.



6. Ejecutar el programa AdministradorTraficoSSL.java en la VM.



7. Ingresar la URL <https://172.206.3.133>, donde el host es la IP pública de la máquina virtual de Windows donde está corriendo el Administrador de Tráfico SSL.



7:52 PM ☀️ 🌐 ⏱

1.43 kB/s 🔍 4G



https://172.206.3.133



55



Aceptar

172.206.3.133 dice

200 6

Aceptar

8. Eliminar las 3 máquinas virtuales y todos los recursos asociados.

The screenshot shows the Microsoft Azure portal interface. On the left, there's a list of resources under 'All resources' for 'Instituto Politecnico Nacional'. On the right, a 'Delete Resources' dialog is open, listing 16 resources to be deleted, including virtual machines, network security groups, and disks. The dialog includes a confirmation message and a text input field for entering 'delete' to confirm.

Delete Resources

The selected resources along with their related resources and contents will be permanently deleted. If you are unsure of the selected resource dependencies, navigate to the individual resource page to perform the delete operation. More details of the resource dependencies are available in the manage experience.

Resources to be deleted (16)

Name	Resource type	Remove
fits-example-nsg	Network security gr...	<input checked="" type="button"/> Remove
T1-U-2023630338-2	Virtual machine	<input checked="" type="button"/> Remove
T1-U-2023630338-2-ip	Public IP address	<input checked="" type="button"/> Remove
T1-U-2023630338-2-nsg	Network security gr...	<input checked="" type="button"/> Remove
T1-U-2023630338-2-vnet	Virtual network	<input checked="" type="button"/> Remove
T1-U-2023630338-2518_z1	Network Interface	<input checked="" type="button"/> Remove
T1-U-2023630338-2_b568824c9fe24c3f839fea8dee26ee1f	Disk	<input checked="" type="button"/> Remove
T1-U-2023630338-3	Virtual machine	<input checked="" type="button"/> Remove
T1-U-2023630338-3-ip	Public IP address	<input checked="" type="button"/> Remove
T1-U-2023630338-3-nsg	Network security gr...	<input checked="" type="button"/> Remove
		<input type="checkbox"/> Apply force delete for selected Virtual machines and Virtual machine scale sets <small>(1)</small>
		Enter "delete" to confirm deletion *
		<input type="text" value="delete"/>
		<input type="button" value="Delete"/> <input type="button" value="Cancel"/>

All resources

Home > Microsoft Azure

Subscription equals all Resource group equals all Type equals all Location equals all Add filter

2 Unsecure resources 0 Recommendations 21 Changed resources

Name ↑ Type ↑ Resource group ↑

Name	Type	Resource group
fits-example-nsg	Network security group	fits-example_group
fits-example-vnet	Virtual network	fits-example_group
NetworkWatcher_eastus2	Network Watcher	NetworkWatcherRG
NetworkWatcher_mexicentral	Network Watcher	NetworkWatcherRG
T1-U-2023630338-1-vnet	Virtual network	T1-U-2023630338-1_group
T1-U-2023630338-2	Virtual machine	T1-U-2023630338-1_group_03081259
T1-U-2023630338-2-ip	Public IP address	T1-U-2023630338-1_group_03081259
T1-U-2023630338-2-nsg	Network security group	T1-U-2023630338-1_group_03081259
T1-U-2023630338-2-vnet	Virtual network	T1-U-2023630338-1_group_03081259
t1-u-2023630338-2518_z1	Network Interface	T1-U-2023630338-1_group_03081259
T1-U-2023630338-2_b568824c9fe24c3f839fea8dee26ee1f	Disk	T1-U-2023630338-1_GROUP_03081259
T1-U-2023630338-3	Virtual machine	T1-U-2023630338-3_group
T1-U-2023630338-3-ip	Public IP address	T1-U-2023630338-3_group
T1-U-2023630338-3-nsg	Network security gr...	T1-U-2023630338-3_group

< Previous Page 1 of 1 Next > Showing 1 to 24 of 24 records.

26°C Prac. despejado

ESP LAA 08:01 p.m. 08/03/2025

CONCLUSIONES

Me gustaría dividir mis conclusiones en dos partes; la primera parte, primero que nada he aprendido algunas cosas nuevas que no sabía antes, por ejemplo, el como mandar archivos a las VM con SFTP, ya que yo acostumbraba, por ejemplo en instancias de EC2 de AWS, a abrir el servicio de CloudShell y en la consola y simplemente cargar el recurso y ya; también he reflexionado acerca de cómo el prompt engineering se vuelve cada día más importante, tanto como los programadores y la gente que no programa tanto, debido a la eficiencia que es casi imposible de implementar en proyectos.

Y la segunda parte de mis conclusiones se basan en errores, no tanto relacionados al desarrollo de la práctica, si no a aspectos como que algunas de mis capturas de pantalla se ven unas en diferente orden, ya que en algunos puntos empecé a hacer lo que ya sabía y luego leía en los requerimientos que tenía que hacer algo más como establecer reglas para los puertos de entradas; no es algo que afecte a la práctica, pero me gustaría mantener ese orden.