

TAREA 1 - DESPLIEGUE DE APLICACIONES WEB

Ubuntu Server en VirtualBox e instalación de servidor LAMP
Y TOMCAT

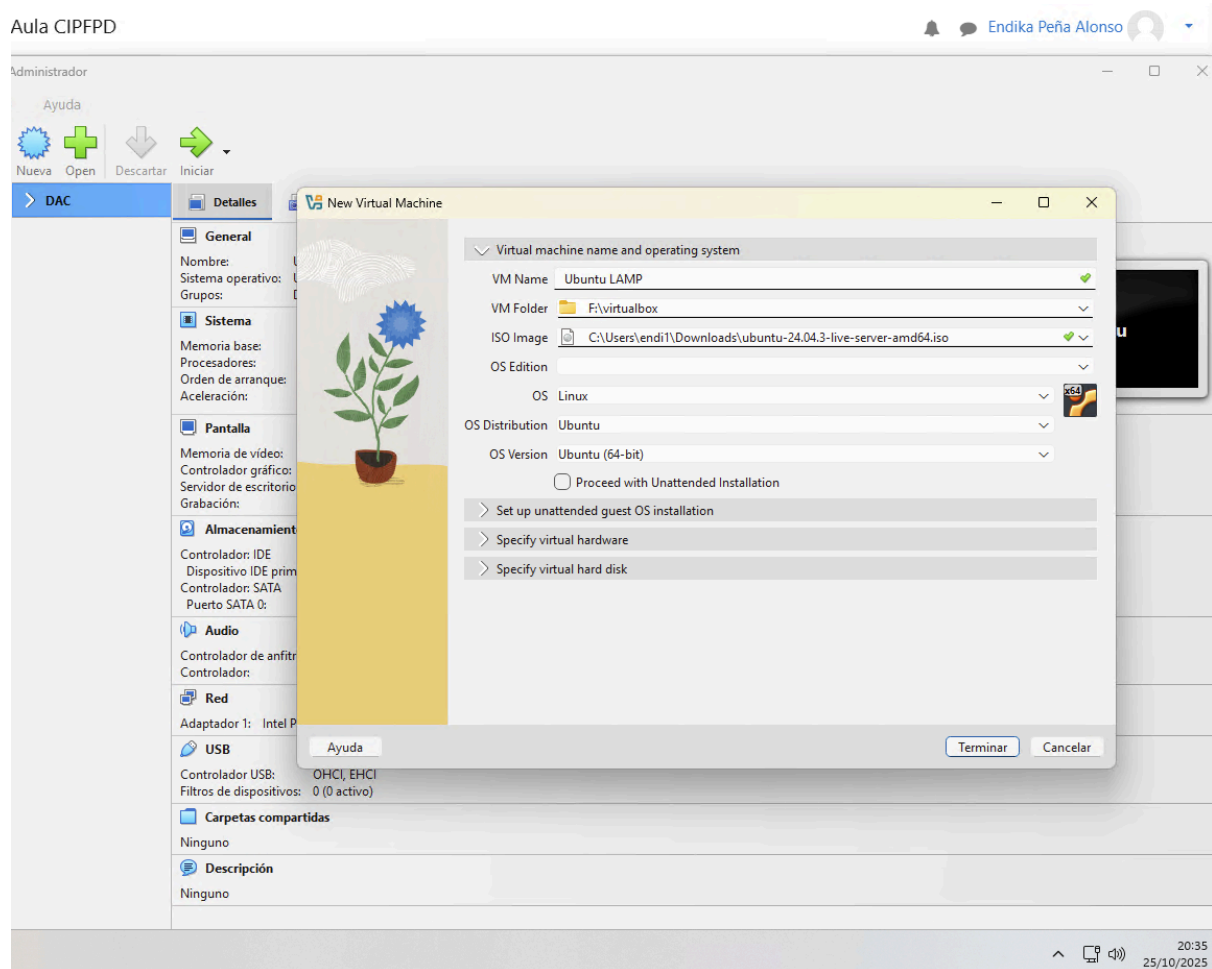
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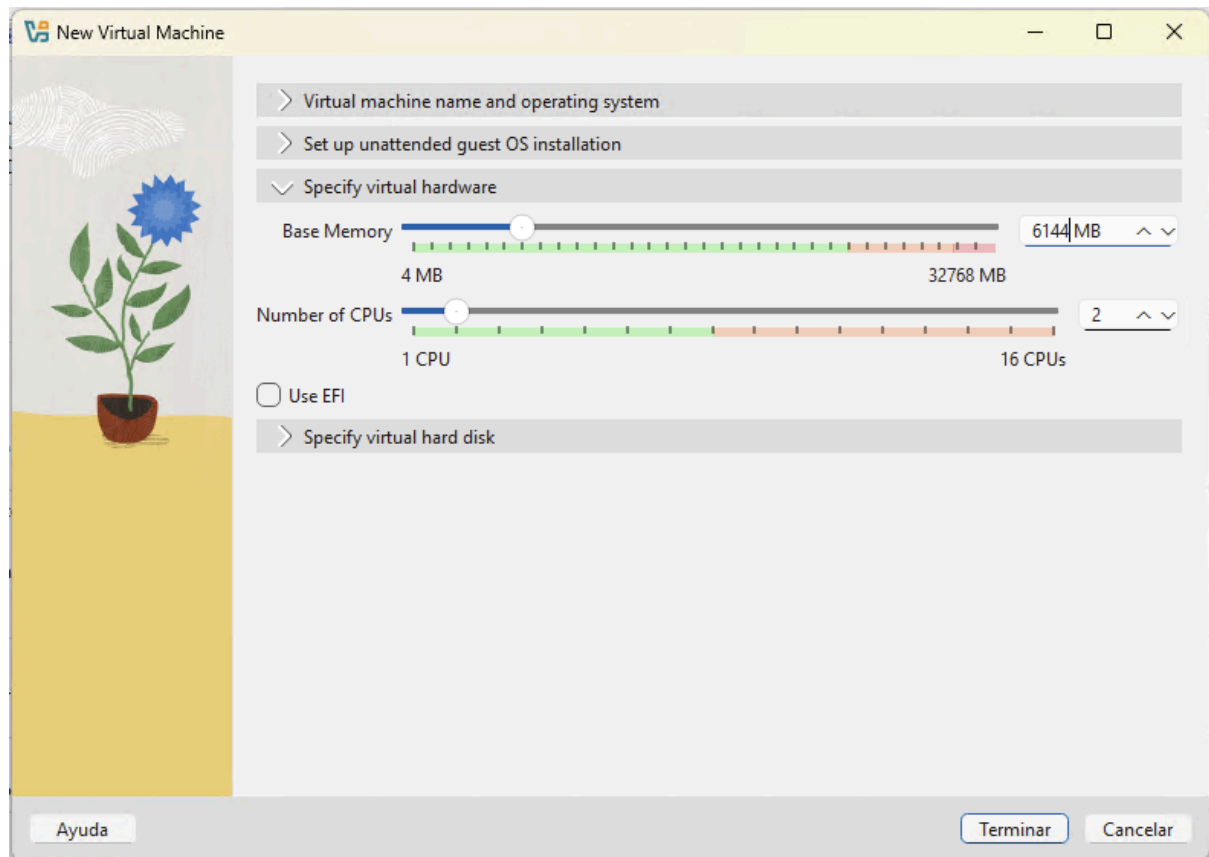
Creación de las máquinas virtuales

Vamos a crear la máquina virtual en VBox ambas se crearán de la misma forma por lo que solo voy a documentar la creación de una y la otra será un clon pero con otro nombre.

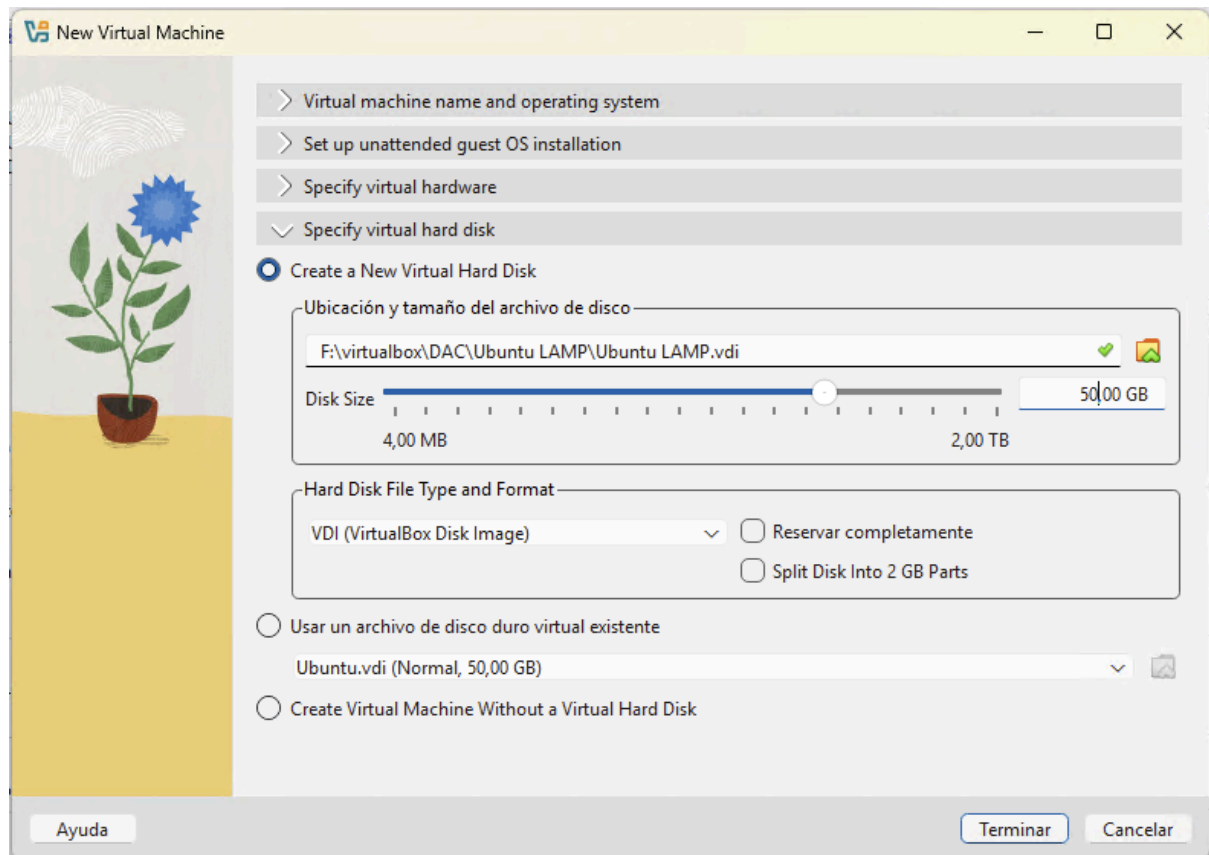
Configuración de la VM



CPU y RAM



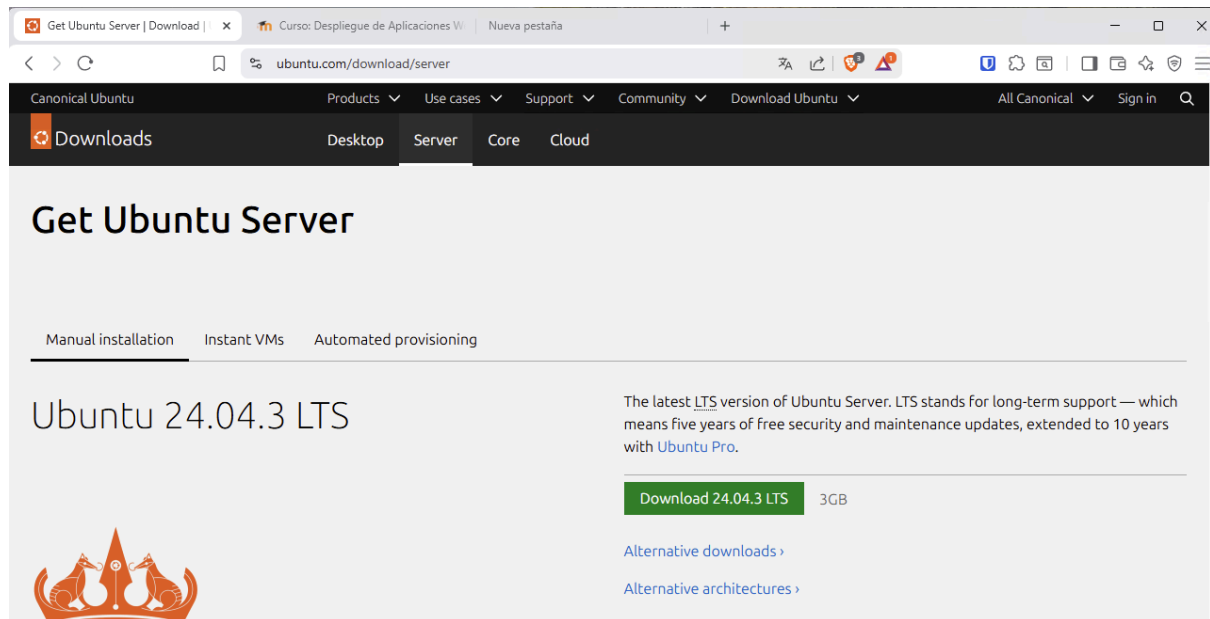
Espacio en disco



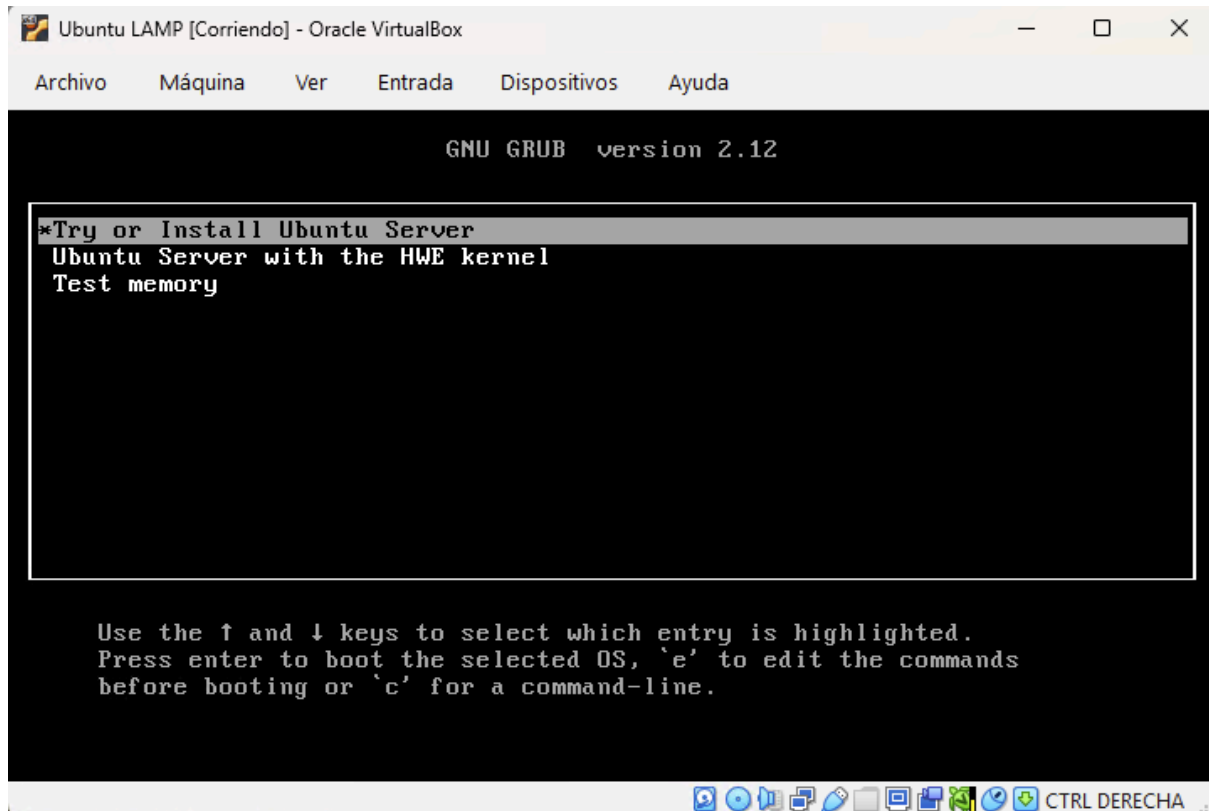
Instalación del sistema operativo

El sistema operativo es ubuntu server en su última versión LTS (long term support) 24.04 que se puede descargar desde el siguiente enlace en el momento de redacción de la presente práctica.

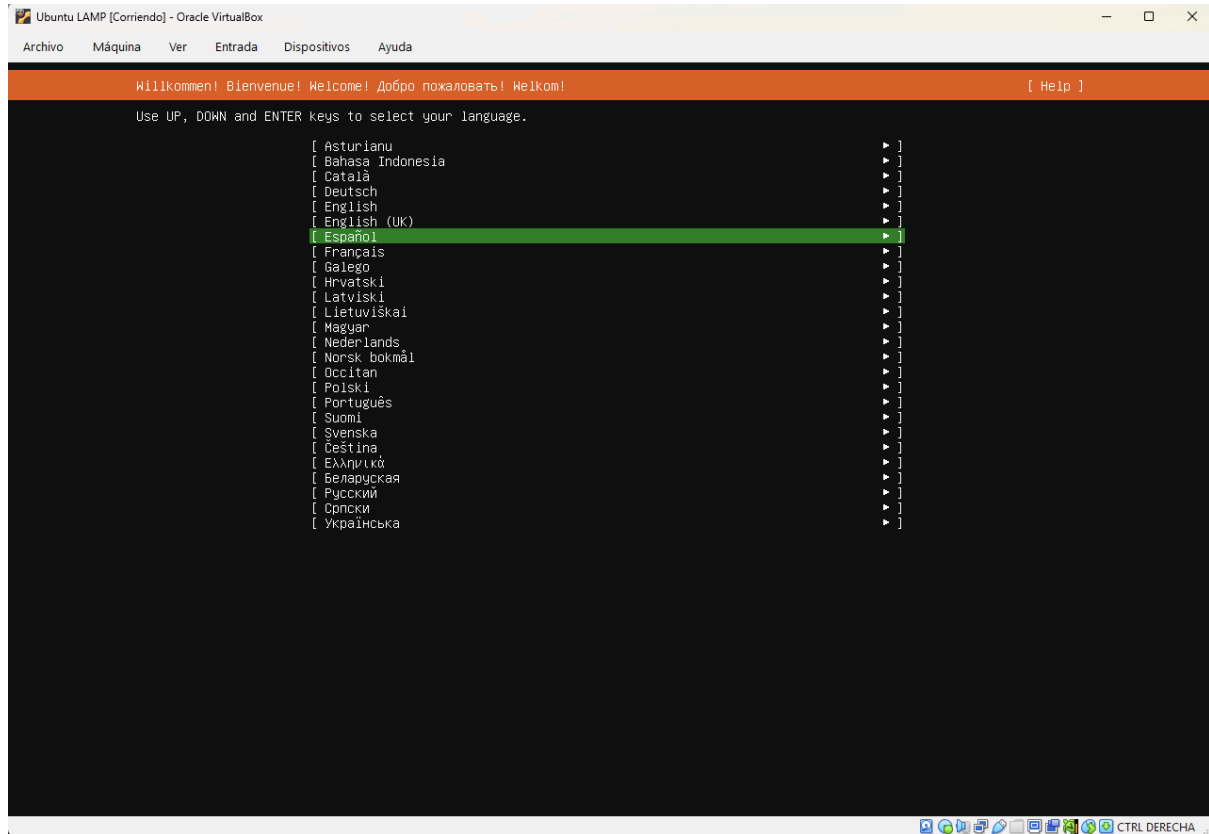
<https://ubuntu.com/download/server>

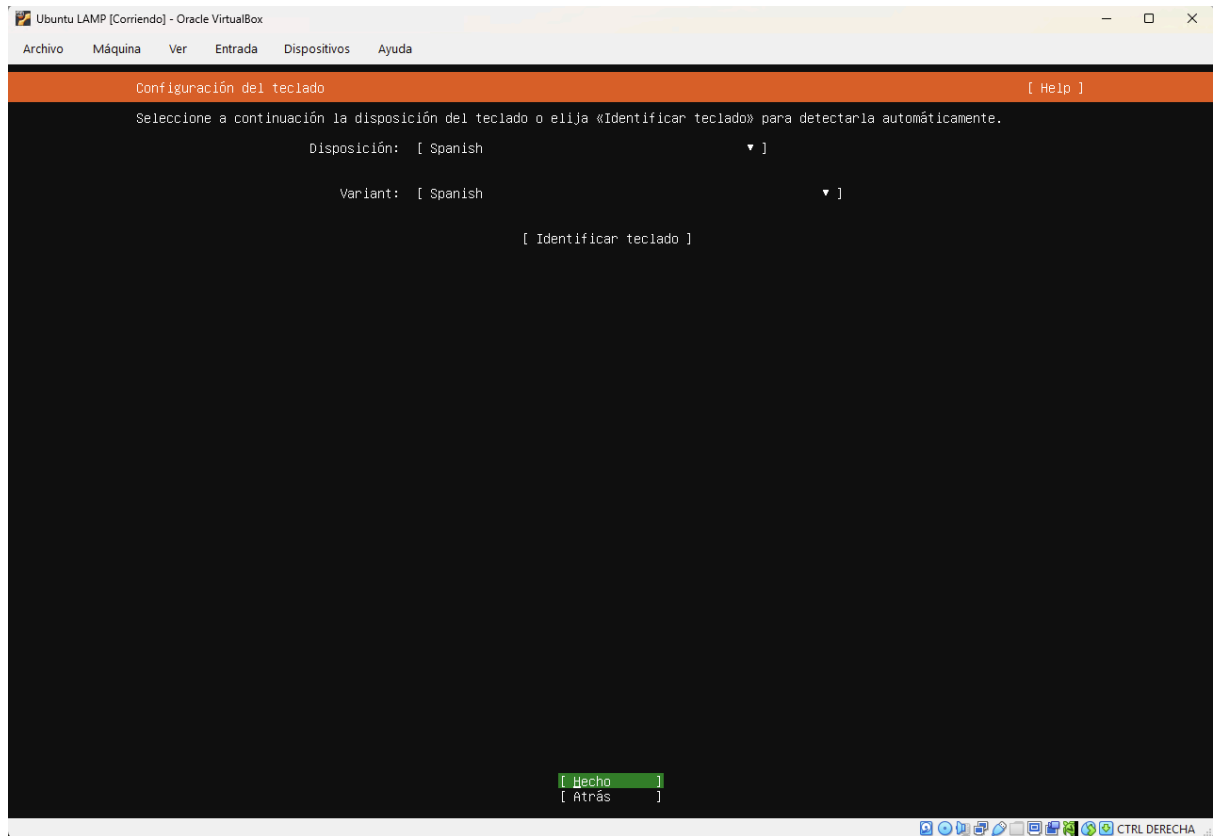


Durante el proceso de instalación vamos a seguir el asistente.

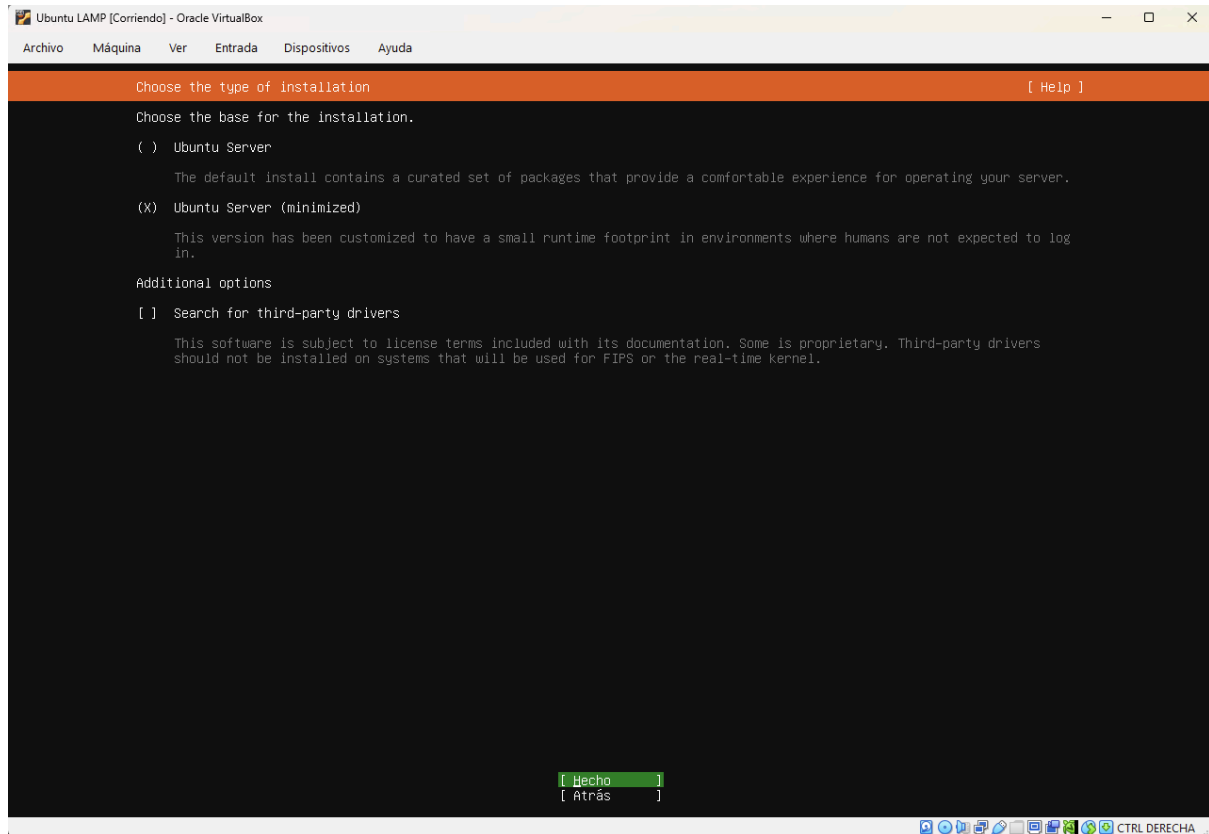


Elegimos el idioma en el que se instala el sistema operativo y el tipo de Layout tengo en el teclado de forma habitual en español que tenemos la Ñ tenemos que indicarle la de español para que las teclas que hay pintadas en el teclado corresponda con la tecla que se imprime en pantalla al pulsarla.

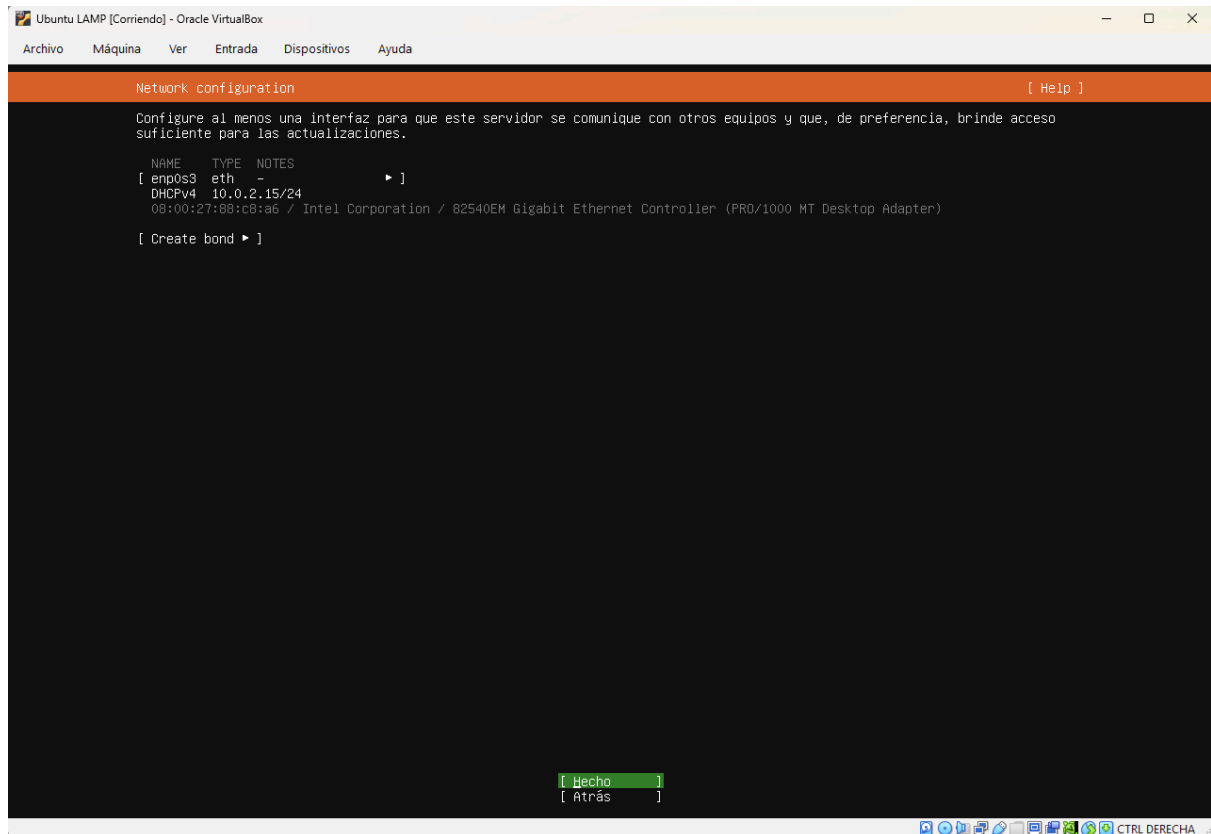




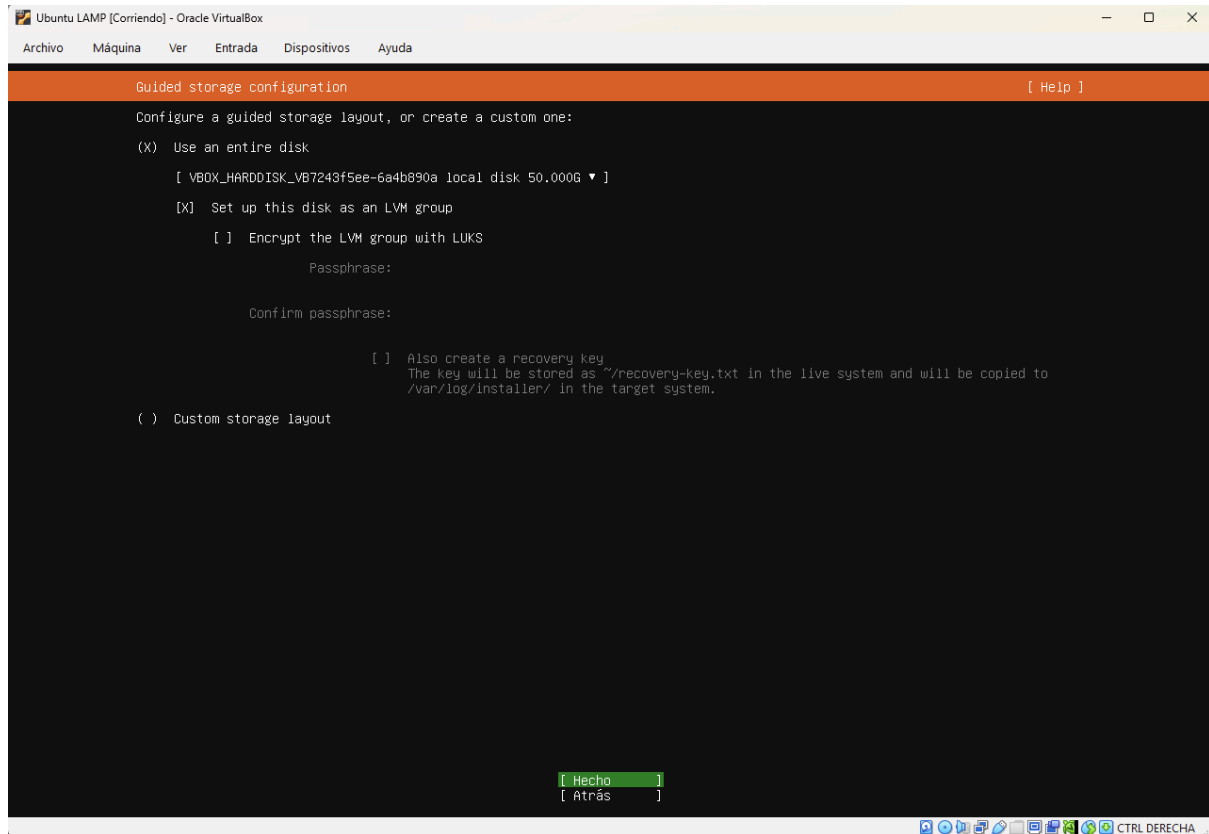
En este caso voy a elegir la instalación minimized para que incluya por defecto la menor cantidad de paquetes o software preinstalado posible para que sea lo más ligero posible.

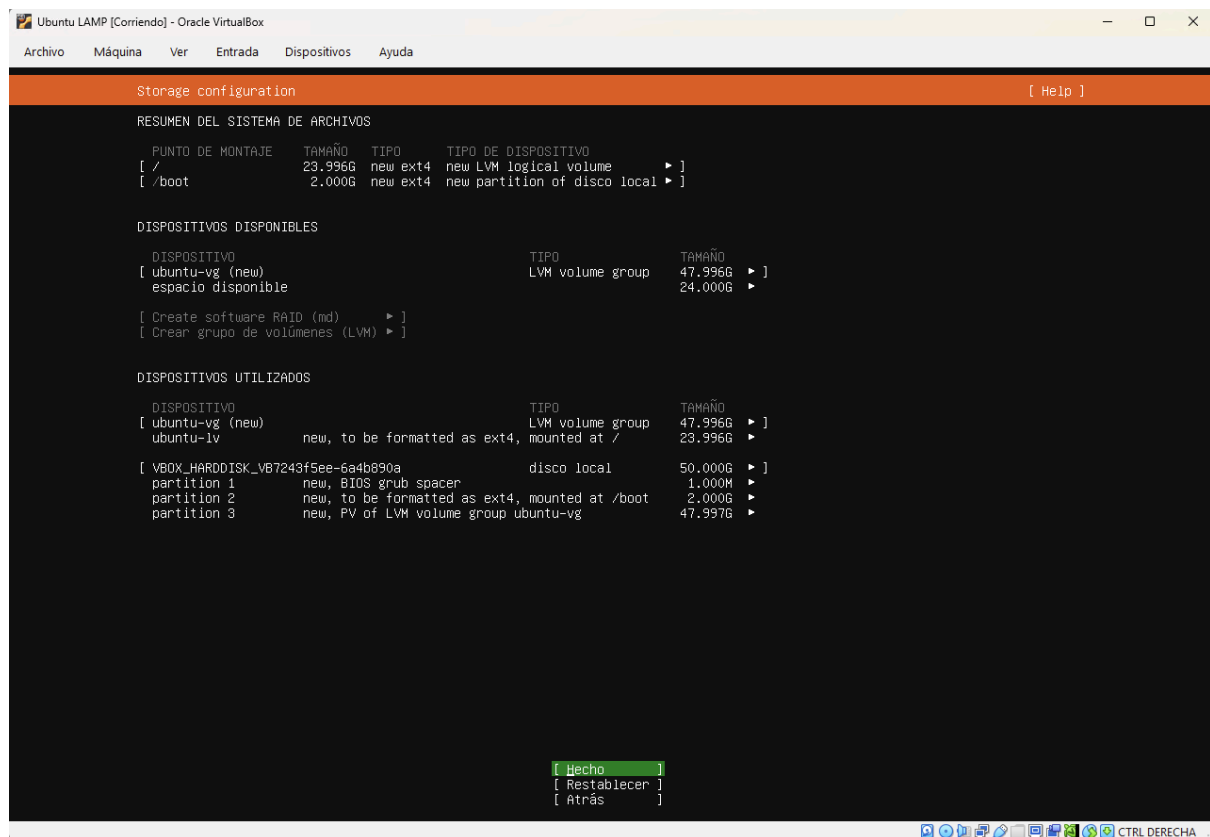


La red la voy a dejar en DHCP ya que el adaptador de red de la máquina lo tengo en NAT, para poder acceder de forma remota a este servidor y usando la configuración actual NAT voy a tener que redirigir puertos desde el Hypervisor de VirtualBox.

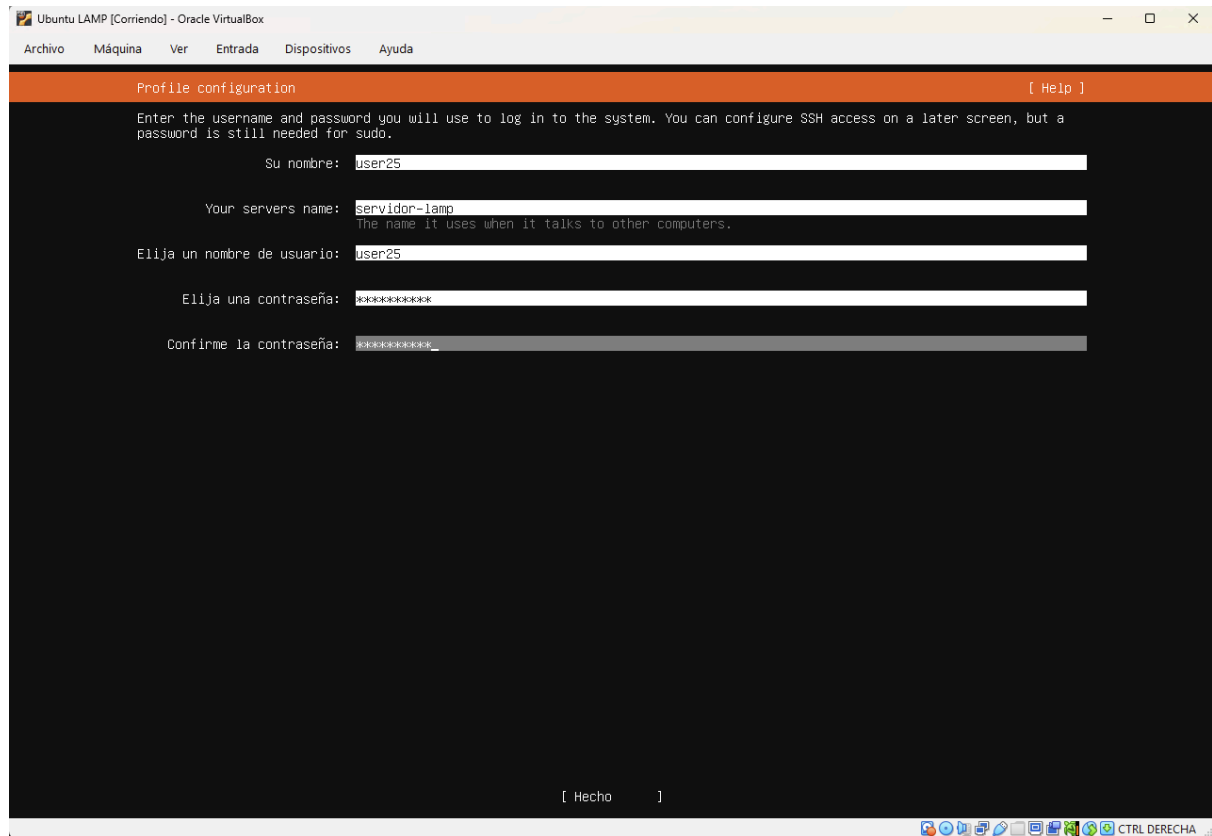


Para el fin de la práctica el servidor voy a particionarlo de forma automática usando LVM por si necesito ampliar.

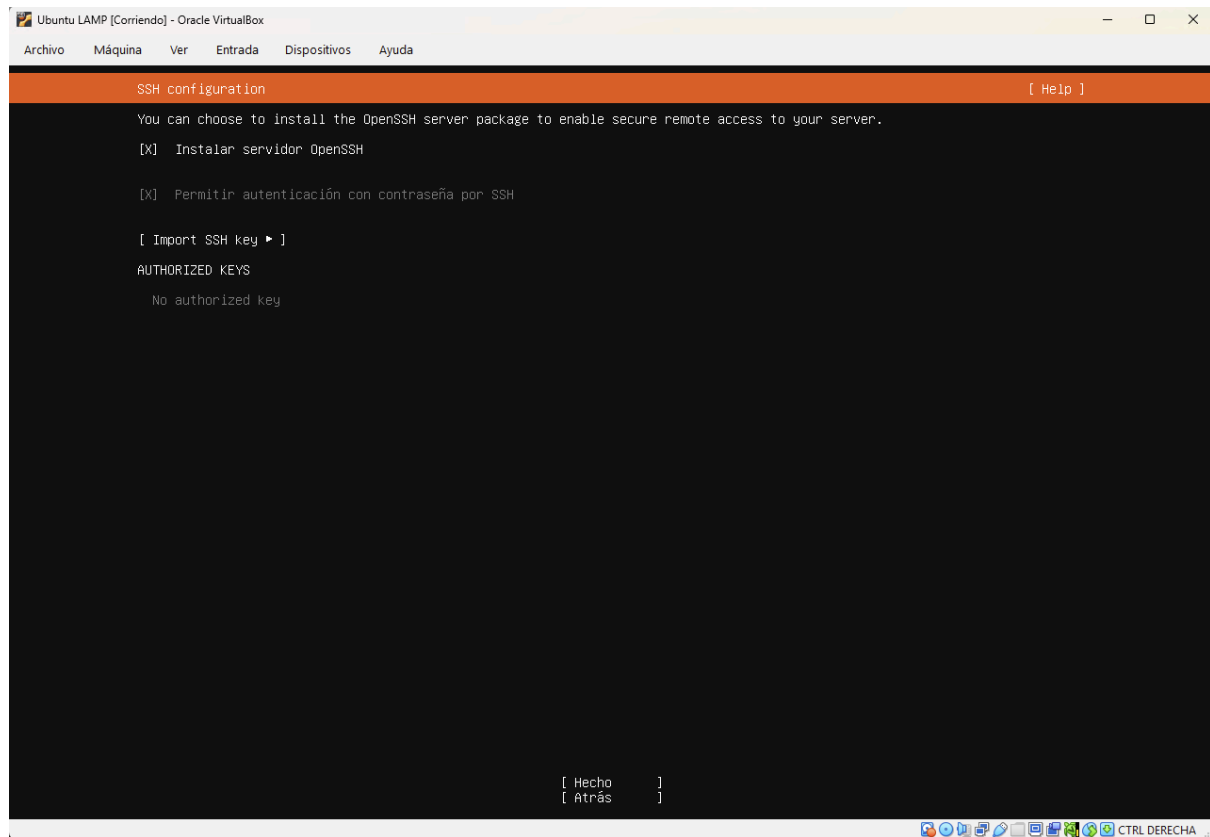




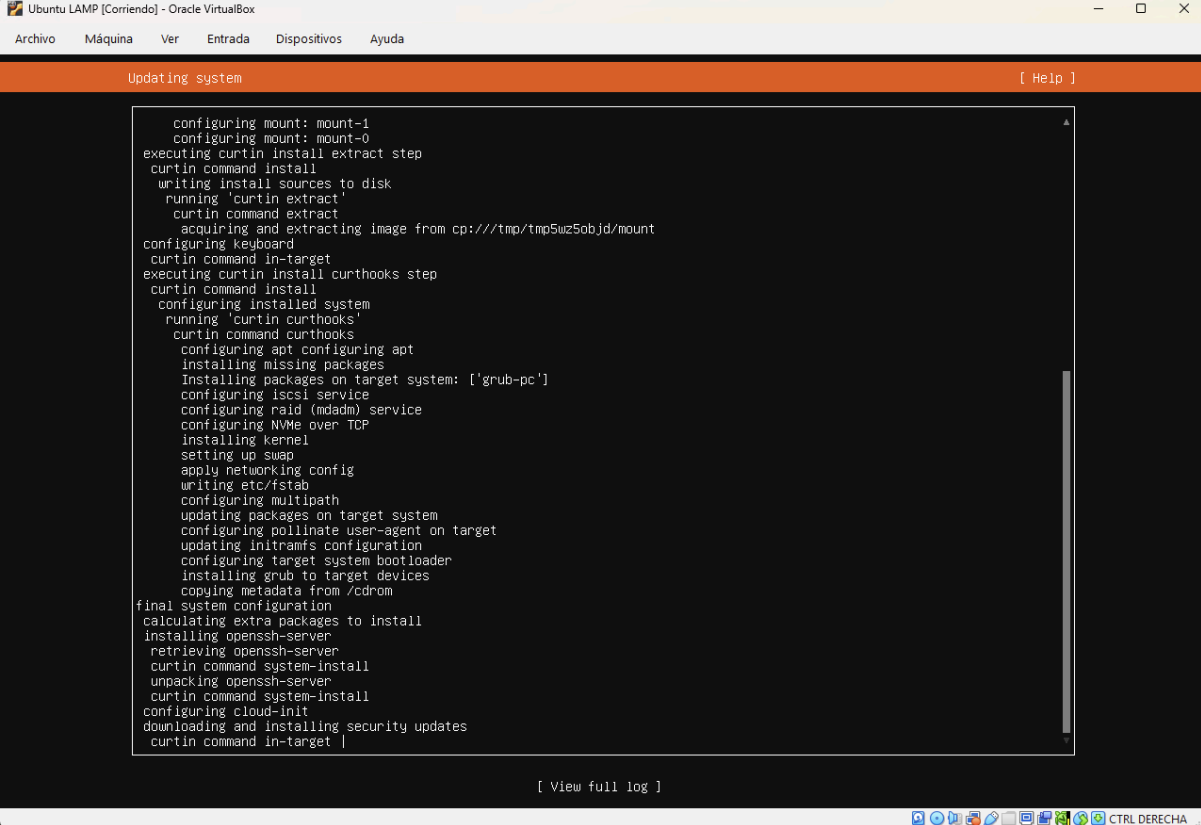
En el siguiente paso configuraremos los datos del administrador del servidor este usuario tiene permisos para elevar privilegios usando el comando sudo.



Marco la instalación de OpenSSH para poder acceder a él de forma remota.



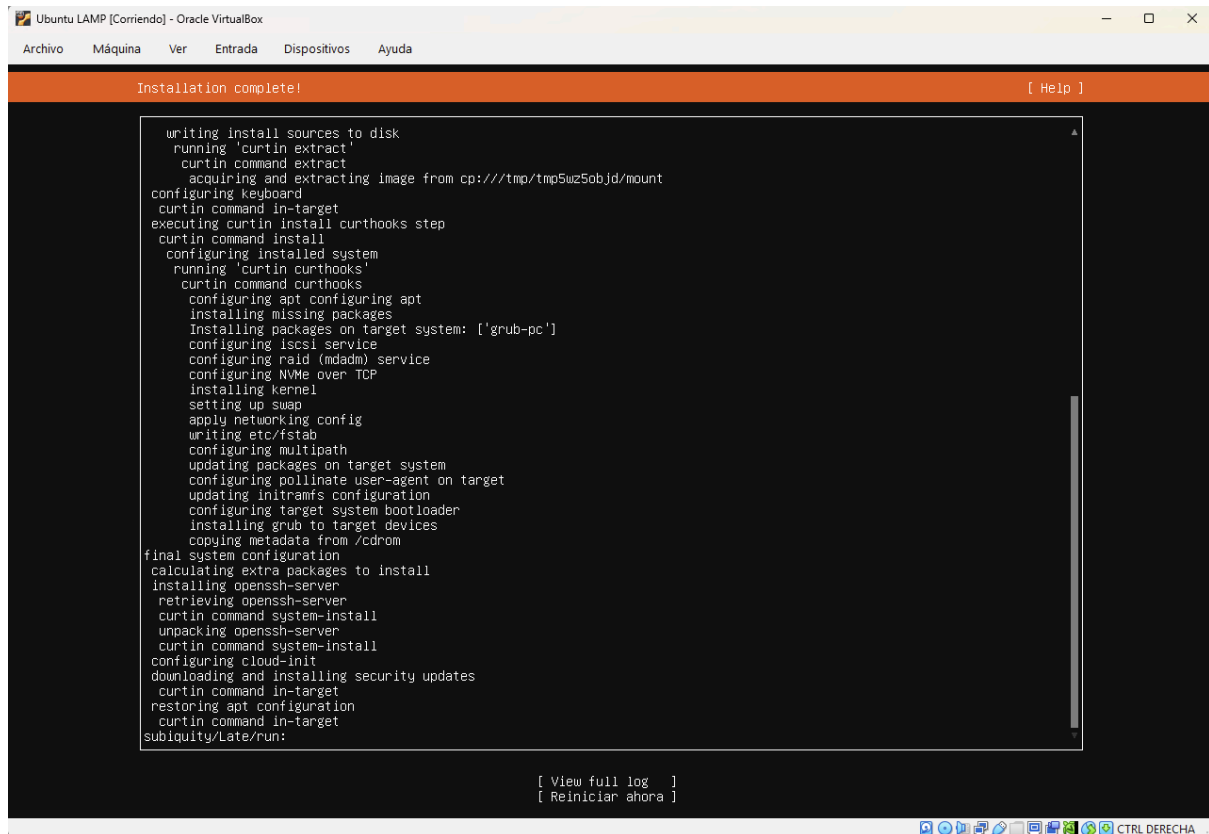
Esperamos a que el sistema operativo se instale en el disco una vez termine nos pedirá reiniciar y retirar previamente al reinicio el "CD" de instalación.



```
Updating system [ Help ]

configuring mount: mount-1
configuring mount: mount-0
executing curtin install extract step
curtin command install
writing install sources to disk
running 'curtin extract'
curtin command extract
acquiring and extracting image from cp:///tmp/tmp5uz5objd/mount
configuring keyboard
curtin command in-target
executing curtin install curthooks step
curtin command install
configuring installed system
running 'curtin curthooks'
curtin command curthooks
configuring apt configuring apt
installing missing packages
installing packages on target system: ['grub-pc']
configuring iscsi service
configuring raid (mdadm) service
configuring NVMe over TCP
installing kernel
setting up swap
apply networking config
writing etc/fstab
configuring multipath
updating packages on target system
configuring pollinate user-agent on target
updating initramfs configuration
configuring target system bootloader
installing grub to target devices
copying metadata from /cdrom
final system configuration
calculating extra packages to install
installing openssh-server
retrieving openssh-server
curtin command system-install
unpacking openssh-server
curtin command system-install
configuring cloud-init
downloading and installing security updates
curtin command in-target |

[ View full log ]
```

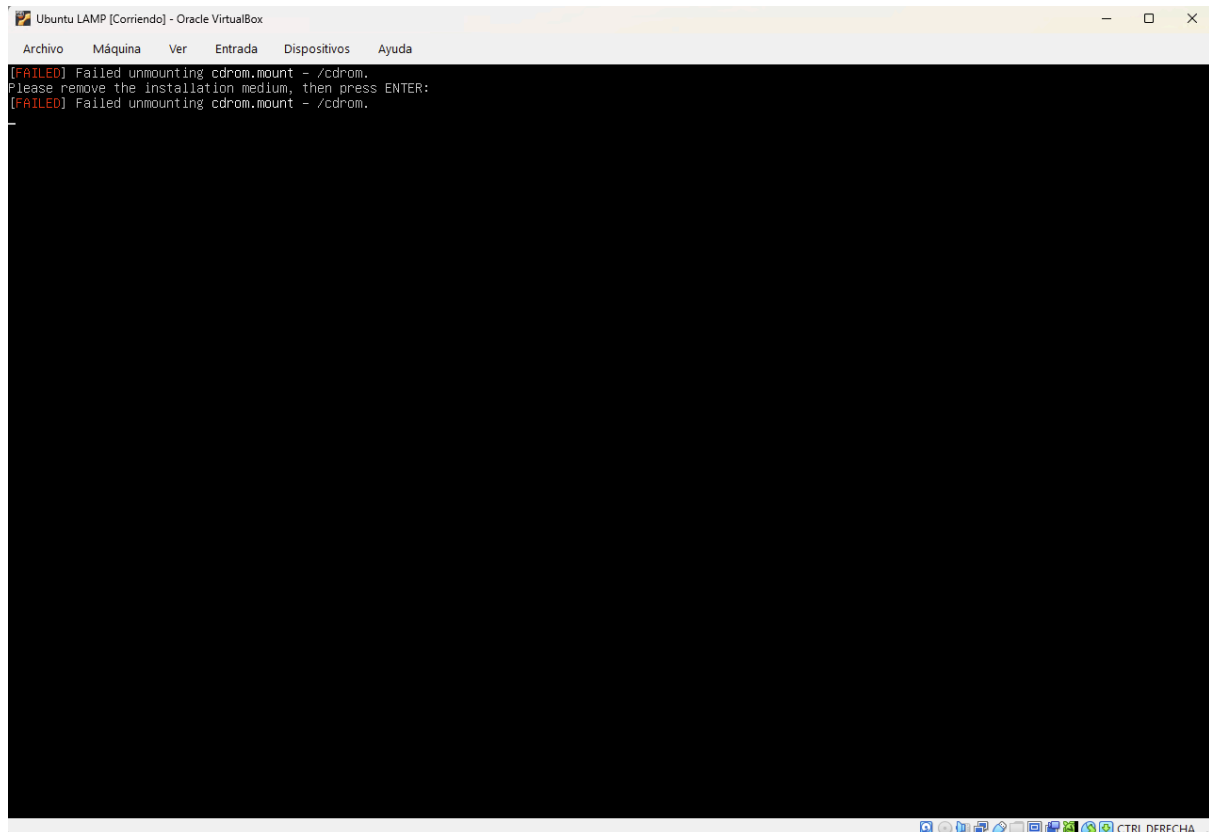



```
Ubuntu LAMP [Corriendo] - Oracle VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

Installation complete! [ Help ]

writing install sources to disk
running 'curtin extract'
curtin command extract
acquiring and extracting image from cp:///tmp/tmp5wz5objd/mount
configuring keyboard
curtin command in-target
executing curtin install curthooks step
curtin command install
configuring installed system
running 'curtin curthooks'
curtin command curthooks
configuring apt configuring apt
installing missing packages
Installing packages on target system: ['grub-pc']
configuring iscsi service
configuring raid (mdadm) service
configuring NVMe over TCP
installing kernel
setting up swap
apply networking config
writing etc/fstab
configuring multipath
updating packages on target system
configuring pollinate user-agent on target
updating initramfs configuration
configuring target system bootloader
installing grub to target devices
copying metadata from /cdrom
final system configuration
calculating extra packages to install
installing openssh-server
retrieving openssh-server
curtin command system-install
unpacking openssh-server
curtin command system-install
configuring cloud-init
downloading and installing security updates
curtin command in-target
restoring apt configuration
curtin command in-target
subiquity/Late/run:

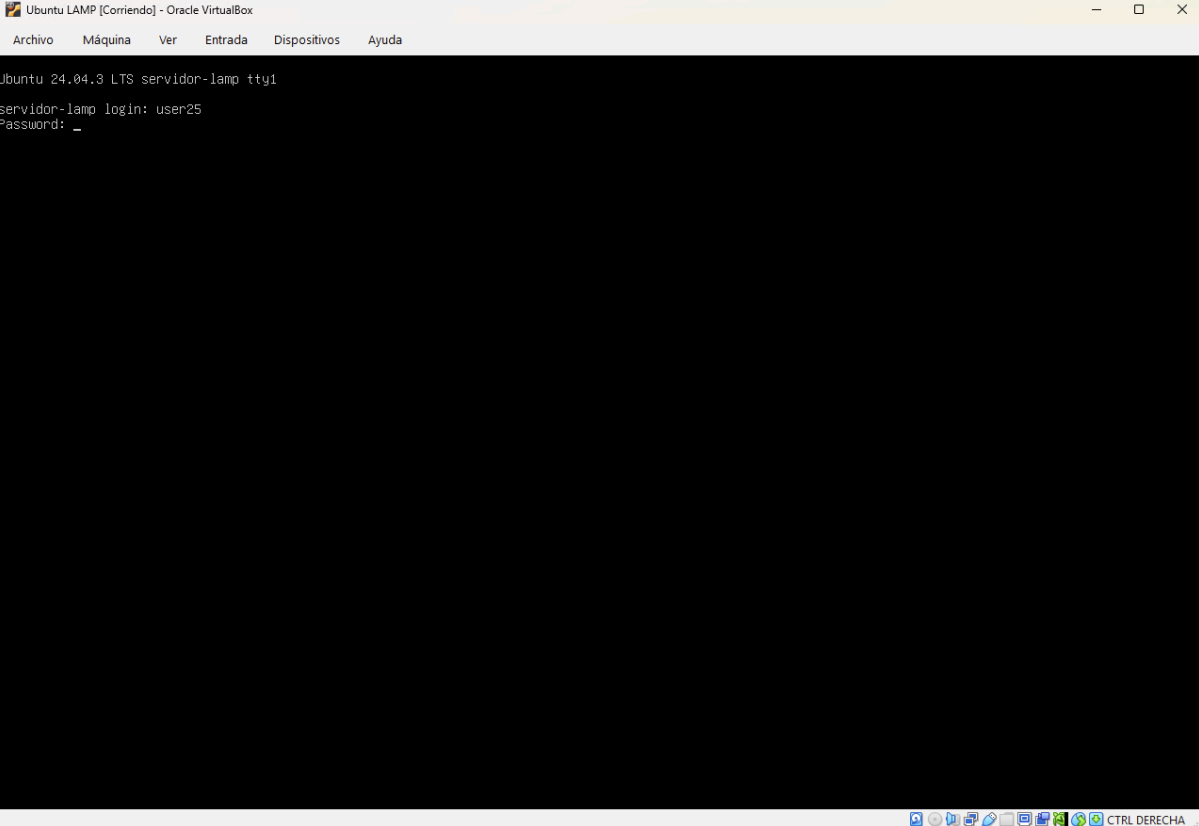
[ View full log ]
[ Reiniciar ahora ]
```



```
Ubuntu LAMP [Corriendo] - Oracle VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

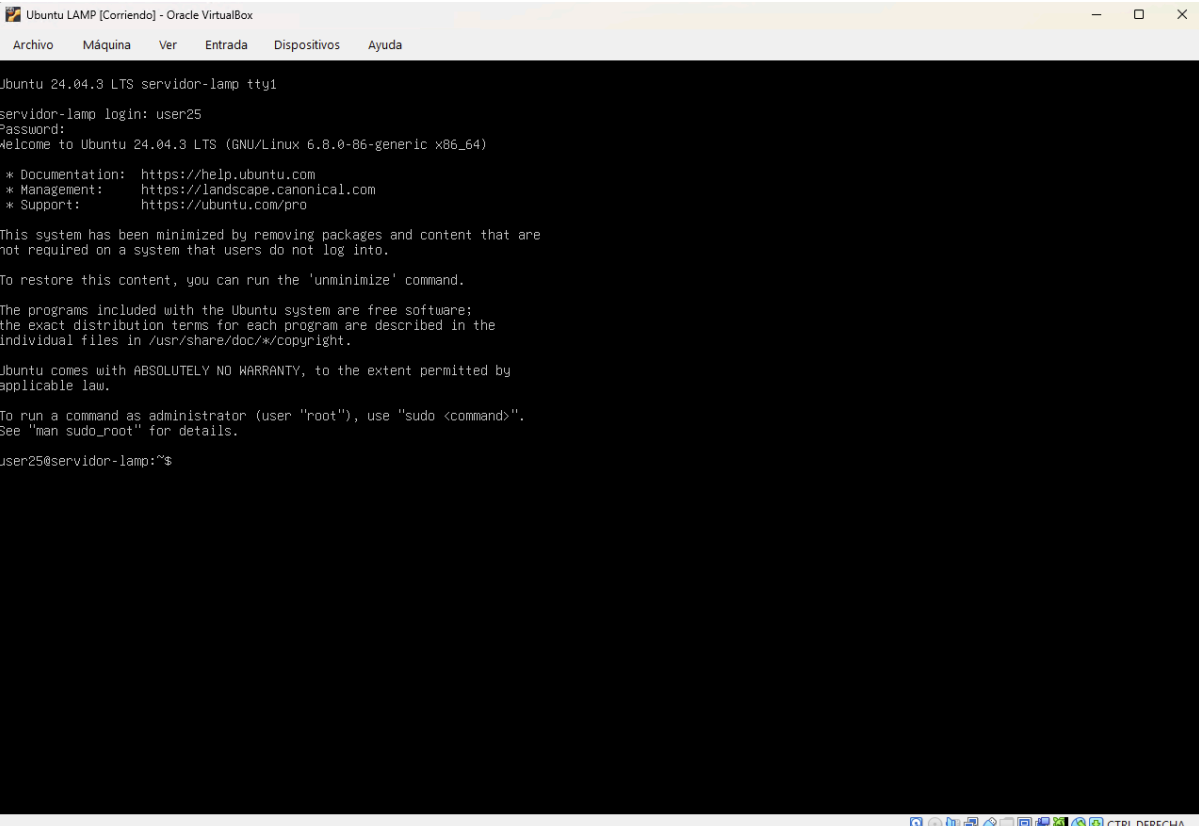
[FAILED] Failed unmounting cdrom.mount - /cdrom.
Please remove the installation medium, then press ENTER:
[FAILED] Failed unmounting cdrom.mount - /cdrom.
```

Ya tenemos el servidor instalado una vez se reinicie nos pedirá usuario y password para iniciar sesión.



```
Ubuntu LAMP [Corriendo] - Oracle VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

Ubuntu 24.04.3 LTS servidor-lamp tty1
servidor-lamp login: user25
Password: _
```



```
Ubuntu LAMP [Corriendo] - Oracle VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

Ubuntu 24.04.3 LTS servidor-lamp tty1
servidor-lamp login: user25
Password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-86-generic x86_64)

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

This system has been minimized by removing packages and content that are
not required on a system that users do not log into.

To restore this content, you can run the 'unminimize' command.

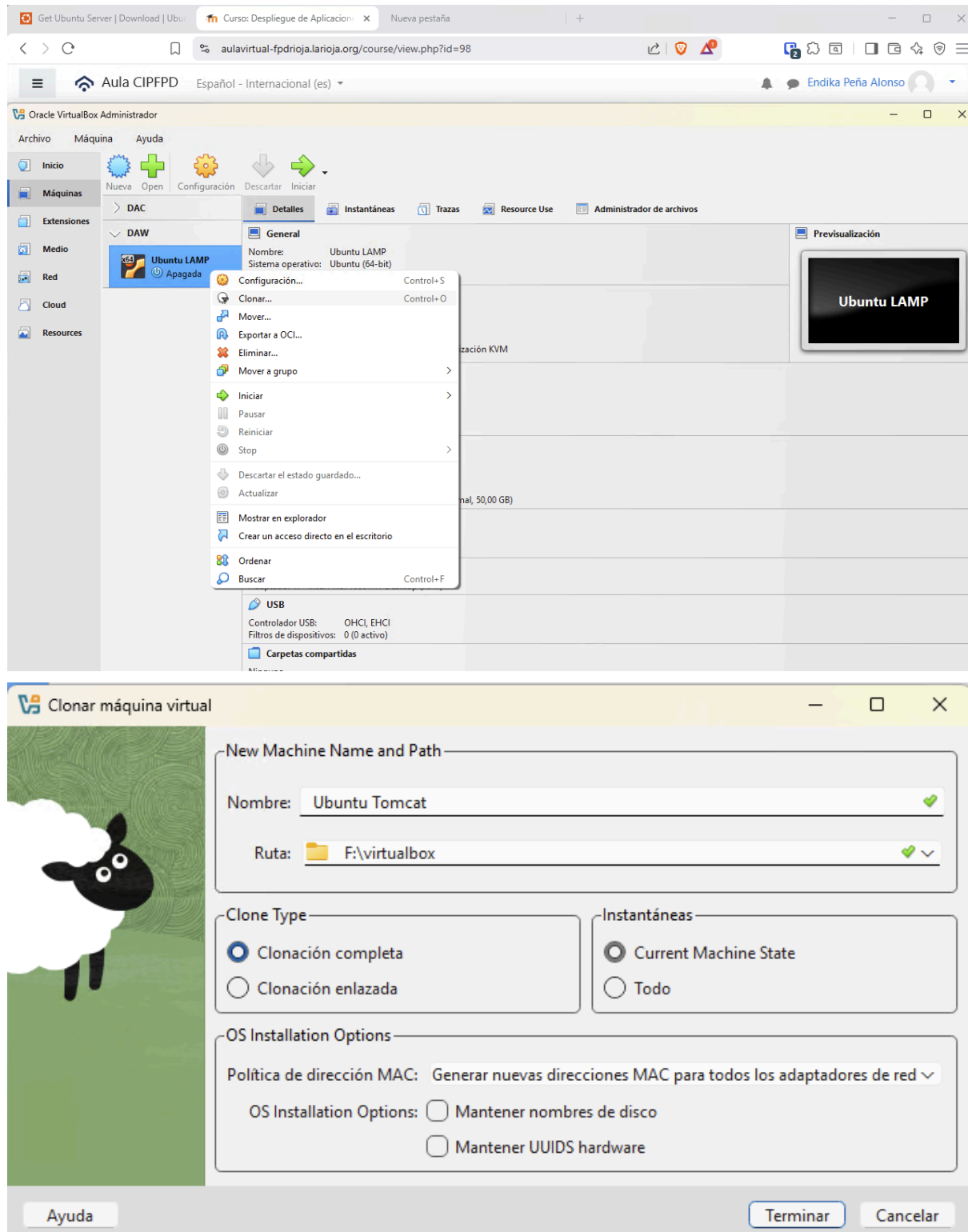
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

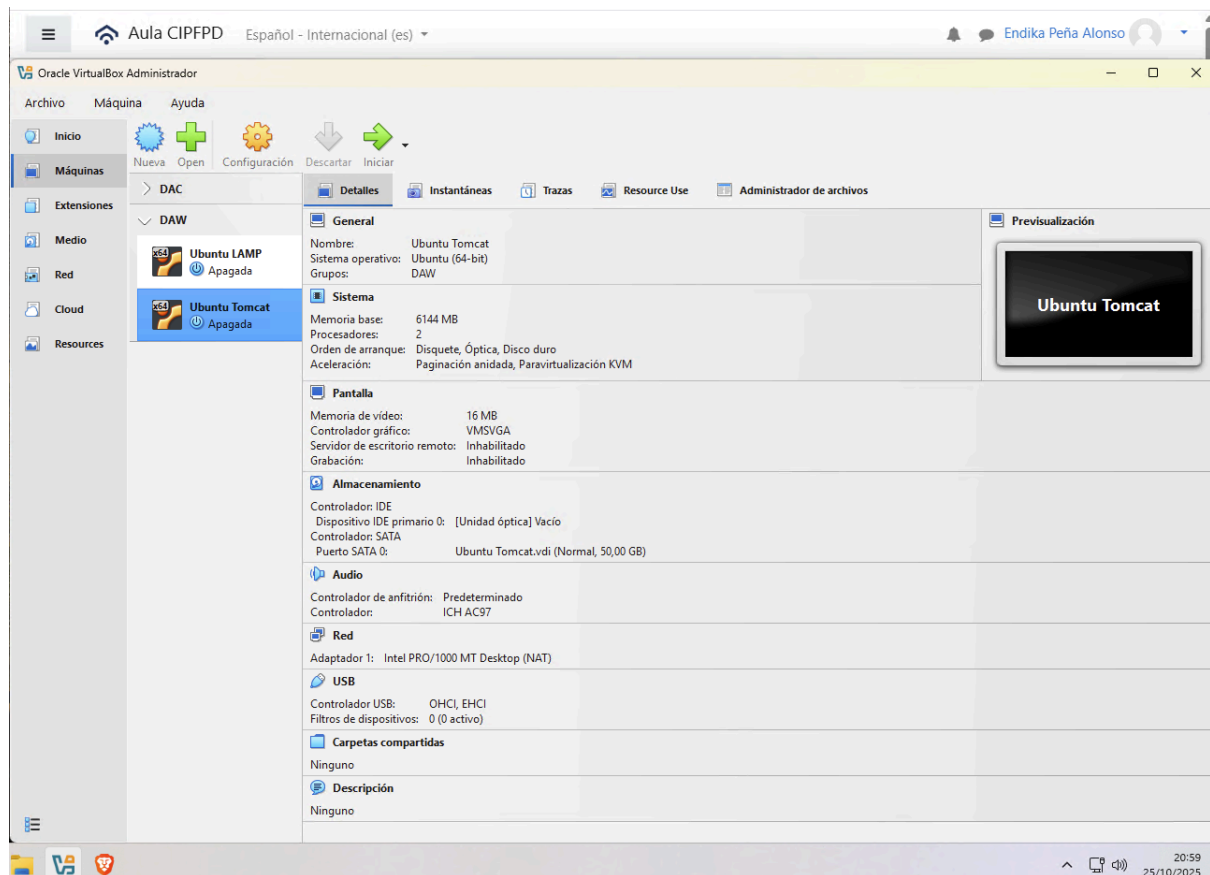
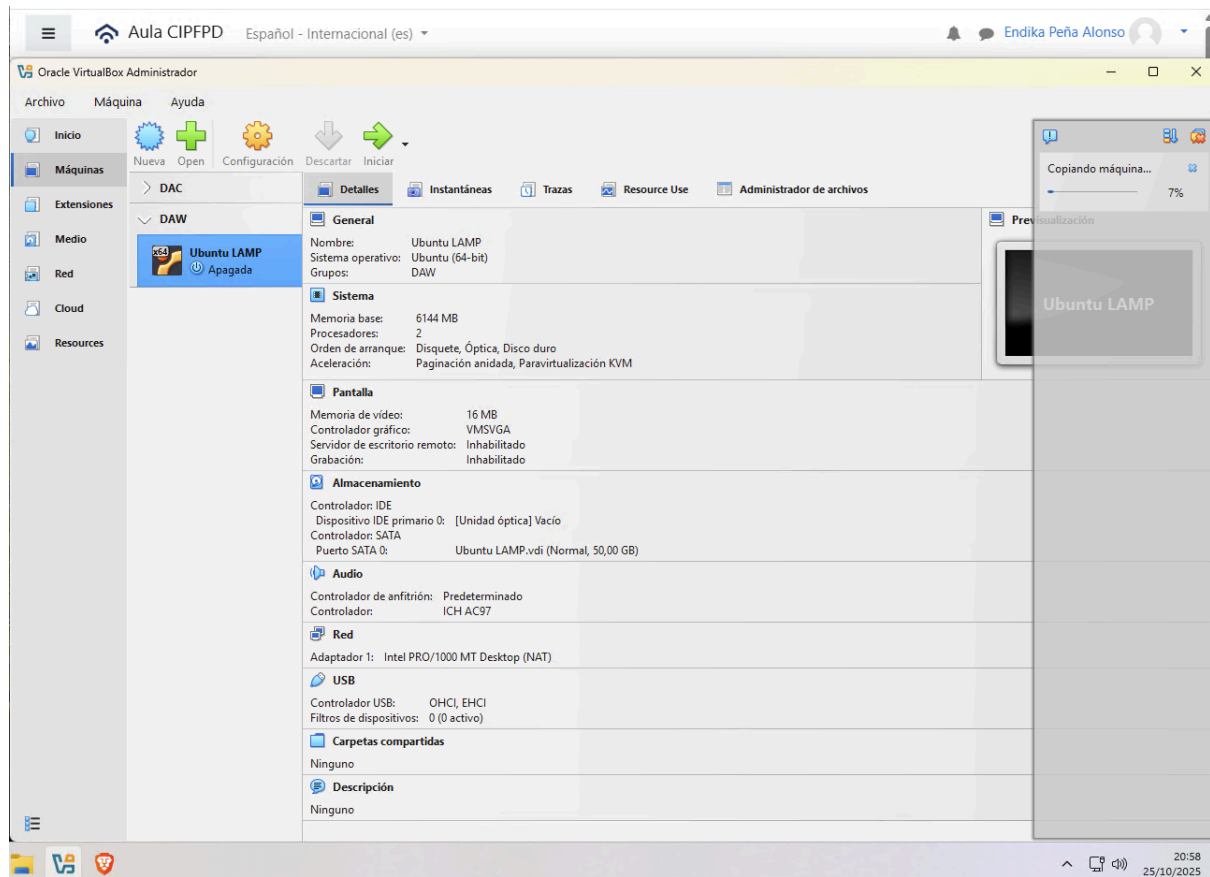
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

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

user25@servidor-lamp:~$
```

Clonando máquina para usarla en VM tomcat.

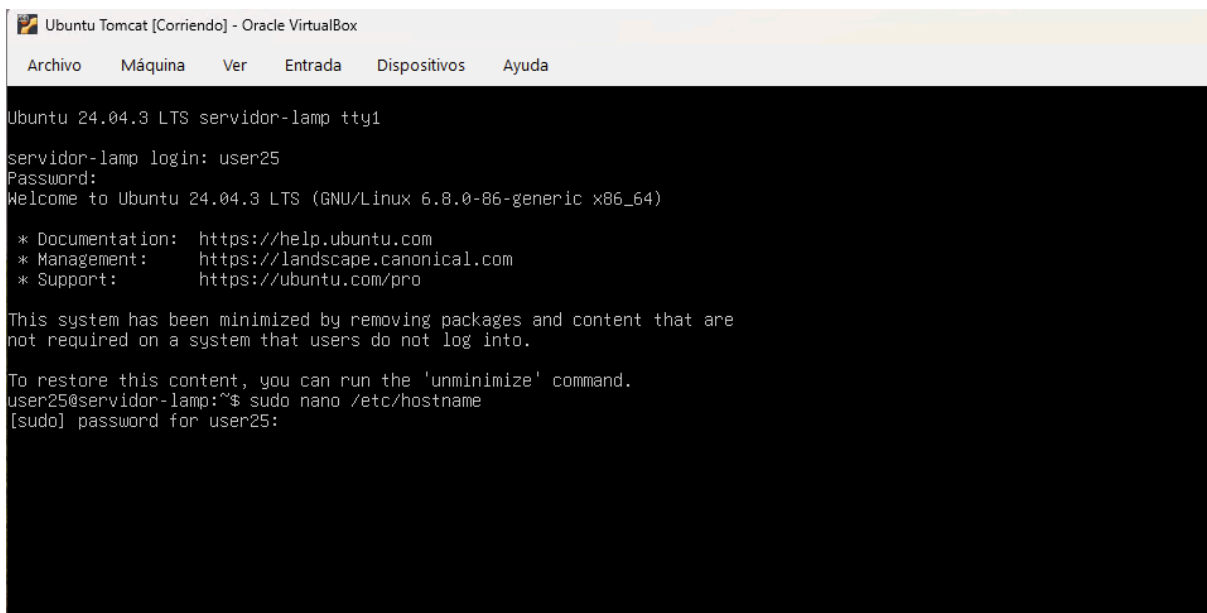




Cambiando el nombre de servidor en el sistema operativo de la VM tomcat.

En este paso voy a cambiar el hostname o nombre del servidor que pusimos al instalar el sistema operativo al clonarlo este nombre también se ha clonado y para diferenciar las máquinas virtuales voy a modificar el nombre del servidor.

Para modificar el hostname hay que arrancar la máquina virtual, iniciar sesión y modificar el fichero de configuración /etc/hostname



```
Ubuntu Tomcat [Corriendo] - Oracle VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

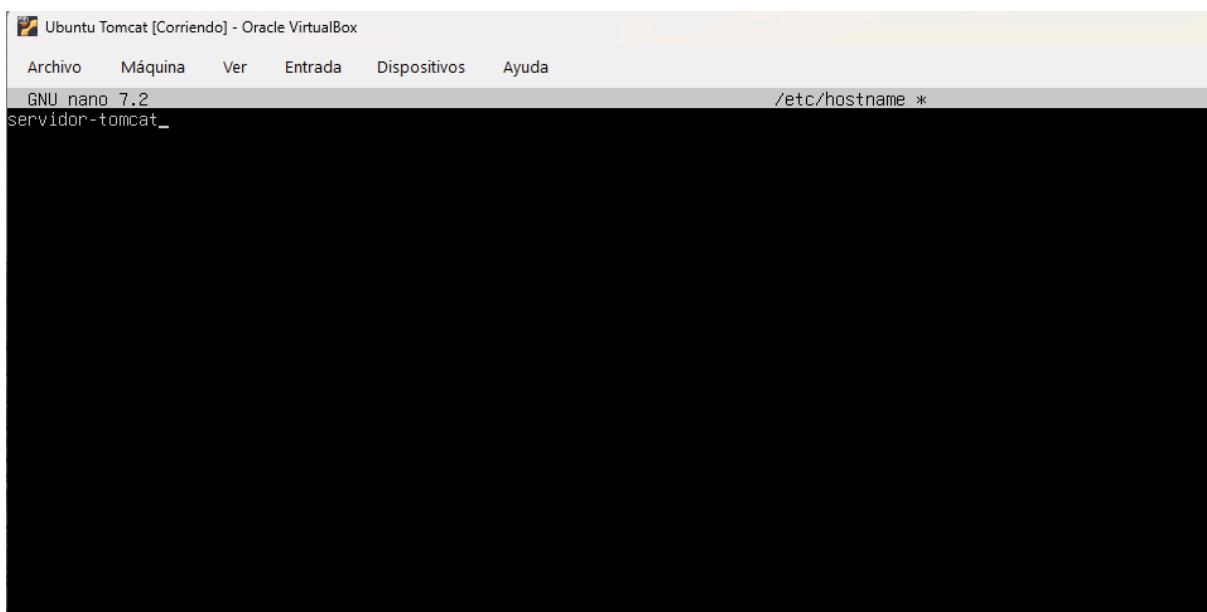
Ubuntu 24.04.3 LTS servidor-lamp tty1
servidor-lamp login: user25
Password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-86-generic x86_64)

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

This system has been minimized by removing packages and content that are
not required on a system that users do not log into.

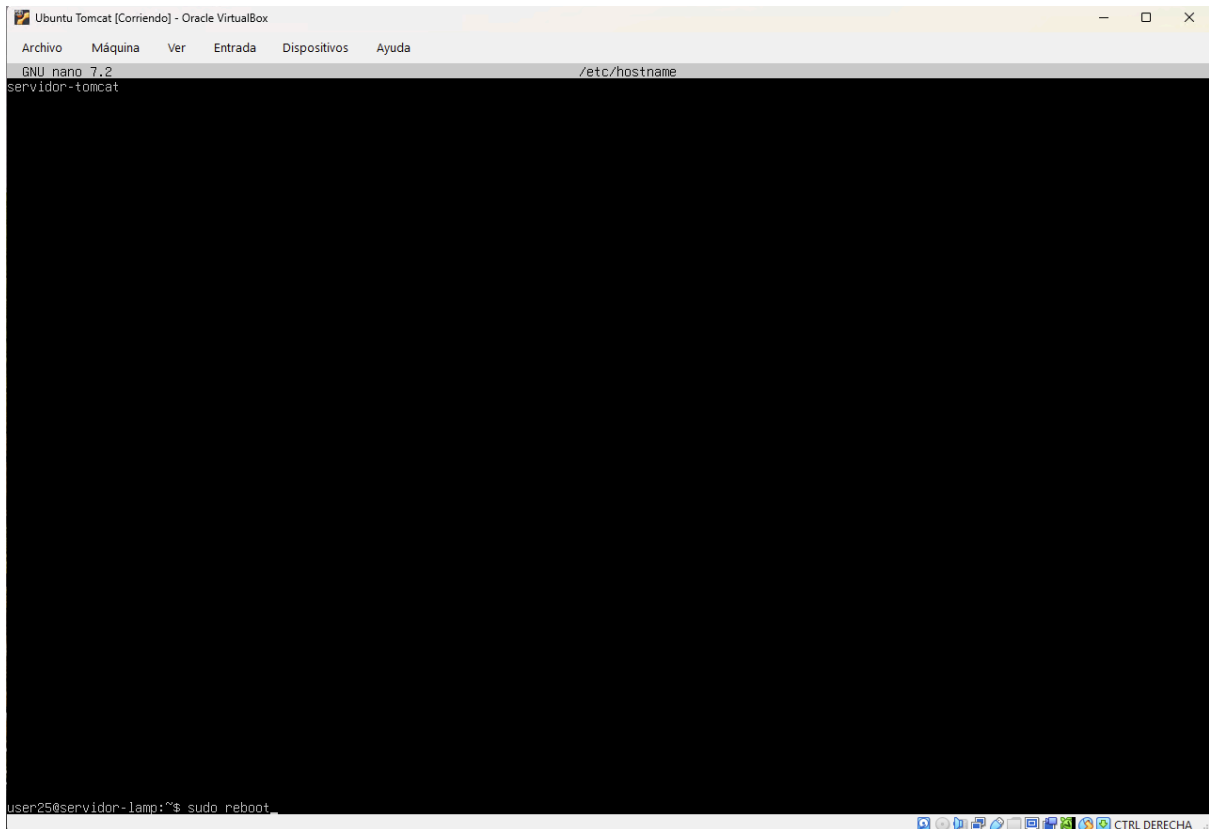
To restore this content, you can run the 'unminimize' command.
user25@servidor-lamp:~$ sudo nano /etc/hostname
[sudo] password for user25:
```

Modificamos el nombre y para que surta efecto hay que reiniciar el servidor con sudo reboot.



```
Ubuntu Tomcat [Corriendo] - Oracle VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

GNU nano 7.2 /etc/hostname *
servidor-tomcat_
```



Ahora como vemos el nombre del servidor ya ha cambiado



Máquina virtual 1 LAMP

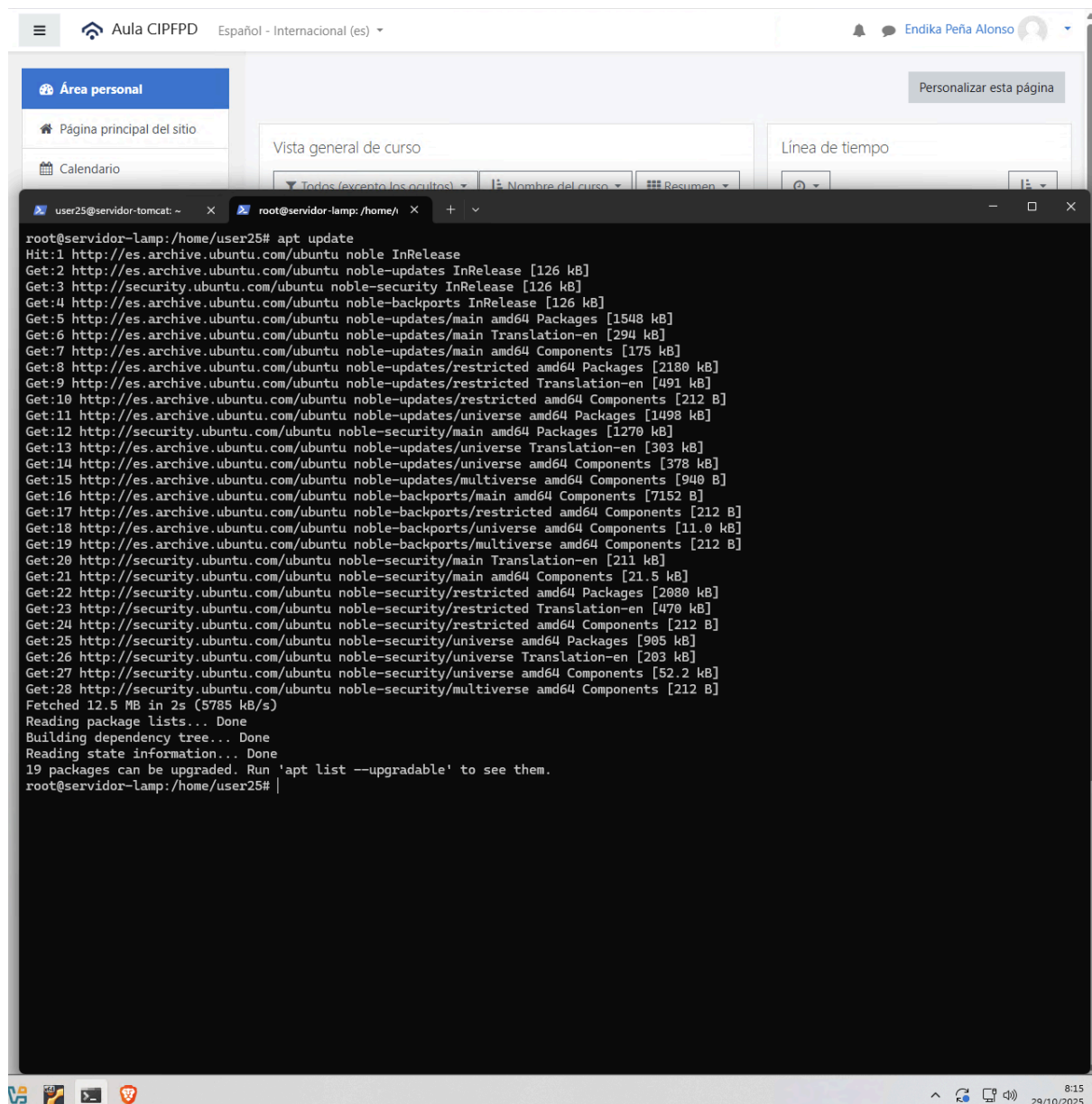
Enunciado: Instala y configura Apache, MySQL y PHP

Resumen de los paquetes a instalar

Para la instalación vamos a instalar los siguientes paquetes en nuestra distribución ubuntu-server 24.04 LTS.

apache2, php, libapache2-mod-php php-mysql mariadb-server

Lo primero antes de empezar vamos a actualizar la lista de paquetes desde las fuentes o repositorios.



```
root@servidor-lamp: /home/user25# apt update
Hit:1 http://es.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://es.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:4 http://es.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:5 http://es.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1548 kB]
Get:6 http://es.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [294 kB]
Get:7 http://es.archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:8 http://es.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [2180 kB]
Get:9 http://es.archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [491 kB]
Get:10 http://es.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:11 http://es.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1498 kB]
Get:12 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1270 kB]
Get:13 http://es.archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [303 kB]
Get:14 http://es.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [378 kB]
Get:15 http://es.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:16 http://es.archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [7152 B]
Get:17 http://es.archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [212 B]
Get:18 http://es.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [11.0 kB]
Get:19 http://es.archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Get:20 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [211 kB]
Get:21 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [21.5 kB]
Get:22 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [2080 kB]
Get:23 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [470 kB]
Get:24 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [212 B]
Get:25 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [905 kB]
Get:26 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [203 kB]
Get:27 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [52.2 kB]
Get:28 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [212 B]
Fetched 12.5 MB in 2s (5785 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
19 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@servidor-lamp: /home/user25#
```

Instalación de los paquetes

sudo su para elevar privilegios y usar el usuario root del sistema.

En este caso voy a usar mariadb en lugar de mysql ya que aunque ambos son opensource mysql tiene ciertas cosas distintas en últimas versiones y mariadb es compatible con mysql.

```
root@servidor-lamp:/home/user25# apt install apache2 php libapache2-mod-php php-mysql mariadb-server
```

Comprobación de los paquetes instalados

Apache2

```
root@servidor-lamp:/home/user25# dpkg -l | grep apache2
ii apache2                2.4.58-1ubuntu8.8      amd64      Apache HTTP Server
ii apache2-bin            2.4.58-1ubuntu8.8      amd64      Apache HTTP Server (modules and other binary files)
ii apache2-data           2.4.58-1ubuntu8.8      all        Apache HTTP Server (common files)
ii apache2-utils          2.4.58-1ubuntu8.8      amd64      Apache HTTP Server (utility programs for web servers)
ii libapache2-mod-php     2:8.3+93ubuntu2        all        server-side, HTML-embedded scripting language (Apache 2 module) (default)
ii libapache2-mod-php8.3  8.3.6-0ubuntu0.24.04.5 amd64      server-side, HTML-embedded scripting language (Apache 2 module)
```

PHP

```
root@servidor-lamp:/home/user25# dpkg -l | grep php
ii libapache2-mod-php     2:8.3+93ubuntu2        all        server-side, HTML-embedded scripting language (Apache 2 module) (default)
ii libapache2-mod-php8.3  8.3.6-0ubuntu0.24.04.5 amd64      server-side, HTML-embedded scripting language (Apache 2 module)
ii php                   2:8.3+93ubuntu2        all        server-side, HTML-embedded scripting language (default)
ii php-common            2:93ubuntu2            all        Common files for PHP packages
ii php-mysql             2:8.3+93ubuntu2        all        MySQL module for PHP [default]
ii php8.3               8.3.6-0ubuntu0.24.04.5 all        server-side, HTML-embedded scripting language (metapackage)
ii php8.3-cli            8.3.6-0ubuntu0.24.04.5 amd64      command-line interpreter for the PHP scripting language
ii php8.3-common         8.3.6-0ubuntu0.24.04.5 amd64      documentation, examples and common module for PHP
ii php8.3-mysql          8.3.6-0ubuntu0.24.04.5 amd64      MySQL module for PHP
ii php8.3-opcache        8.3.6-0ubuntu0.24.04.5 amd64      Zend OpCache module for PHP
ii php8.3-readline       8.3.6-0ubuntu0.24.04.5 amd64      readline module for PHP
```

MariaDB

```
root@servidor-lamp:/home/user25# dpkg -l | grep mariadb
ii libmariadb3:amd64      1:10.11.13-0ubuntu0.24.04.1 amd64      MariaDB database client library
ii mariadb-client         1:10.11.13-0ubuntu0.24.04.1 amd64      MariaDB database client binaries
ii mariadb-client-core    1:10.11.13-0ubuntu0.24.04.1 amd64      MariaDB database core client binaries
ii mariadb-common         1:10.11.13-0ubuntu0.24.04.1 all        MariaDB database common files (e.g. /etc/mysql/mariadb.conf.d/)
ii mariadb-plugin-provider-bzip2 1:10.11.13-0ubuntu0.24.04.1 amd64      BZip2 compression support in the server and storage engines
ii mariadb-plugin-provider-lz4  1:10.11.13-0ubuntu0.24.04.1 amd64      LZ4 compression support in the server and storage engines
ii mariadb-plugin-provider-lzma 1:10.11.13-0ubuntu0.24.04.1 amd64      LZMA compression support in the server and storage engines
ii mariadb-plugin-provider-lzo  1:10.11.13-0ubuntu0.24.04.1 amd64      LZO compression support in the server and storage engines
ii mariadb-plugin-provider-snappy 1:10.11.13-0ubuntu0.24.04.1 amd64      Snappy compression support in the server and storage engines
ii mariadb-server         1:10.11.13-0ubuntu0.24.04.1 amd64      MariaDB database server binaries
ii mariadb-server-core    1:10.11.13-0ubuntu0.24.04.1 amd64      MariaDB database core server files
```


Configurando apache2 para inicio automático

Para iniciar automáticamente un servicio debemos activarlo en el arranque para ello primero voy a visualizar el estado del servicio apache2

`systemctl status apache2`

```
root@servidor-lamp:/home/user25# systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: active (running) since Wed 2025-10-29 07:37:33 UTC; 4min 26s ago
     Docs: https://httpd.apache.org/docs/2.4/
   Process: 10146 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
  Main PID: 10149 (apache2)
    Tasks: 6 (limit: 7018)
   Memory: 10.8M (peak: 11.3M)
      CPU: 86ms
   CGroup: /system.slice/apache2.service
           └─10149 /usr/sbin/apache2 -k start
             └─10152 /usr/sbin/apache2 -k start
               └─10153 /usr/sbin/apache2 -k start
                 └─10154 /usr/sbin/apache2 -k start
                   └─10155 /usr/sbin/apache2 -k start
                     └─10156 /usr/sbin/apache2 -k start

Oct 29 07:37:33 servidor-lamp systemd[1]: Starting apache2.service - The Apache HTTP Server...
Oct 29 07:37:33 servidor-lamp apachectl[10148]: AH00558: apache2: Could not reliably determine the server's fully qualified domain name,
using 127.0.1.1. Set the 'ServerName' directive globally to suppress this message
Oct 29 07:37:33 servidor-lamp systemd[1]: Started apache2.service - The Apache HTTP Server.
```

Activar el inicio automático del servicio apache2

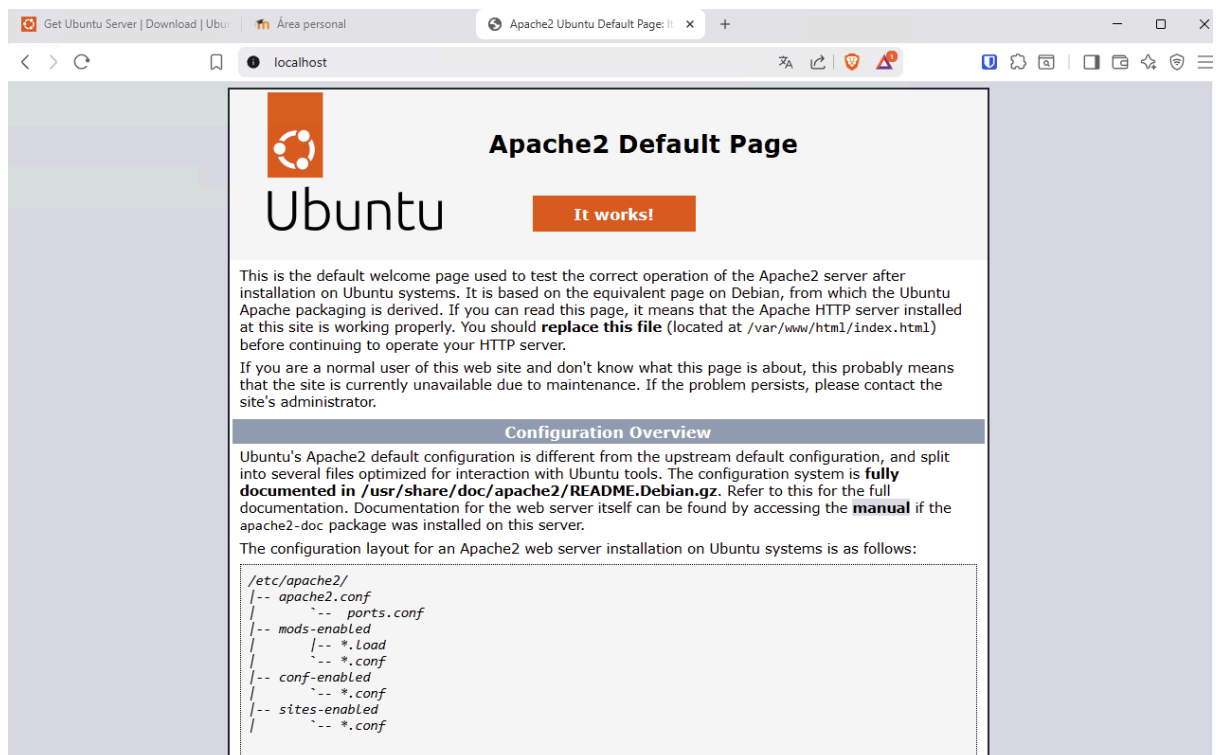
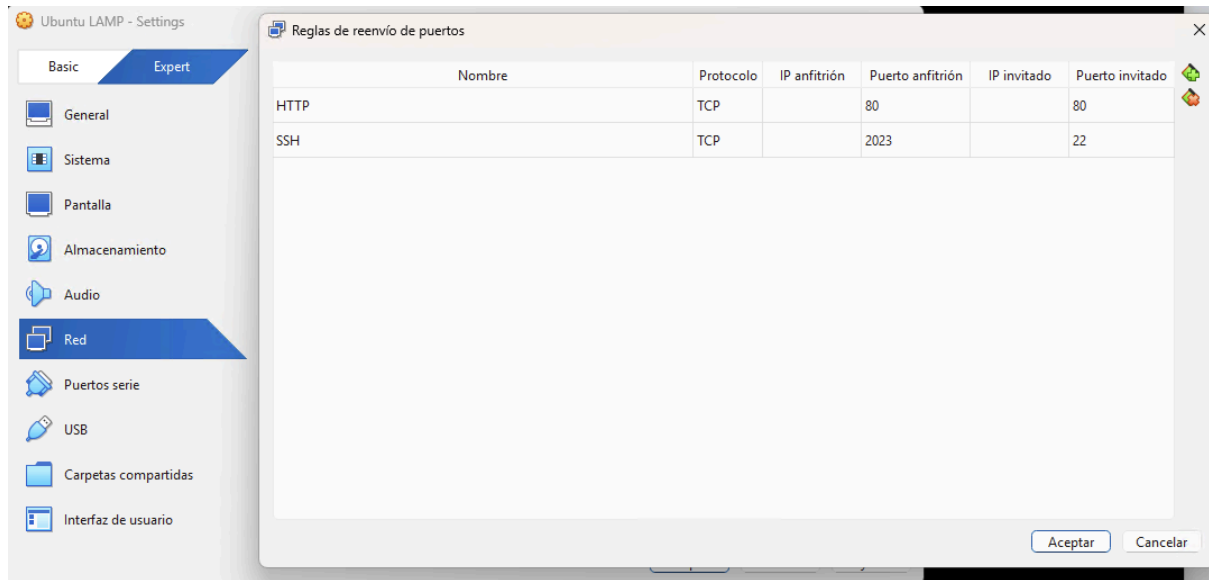
`systemctl enable apache2`

```
root@servidor-lamp:/home/user25# systemctl enable apache2
Synchronizing state of apache2.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable apache2
```

Comprobación de funcionamiento Apache2

En mi caso como no tengo IP 's en red local disponibles para las máquinas virtuales las he creado con la red en NAT y con el reenvío de puertos activos, por ello aparece en la URL del navegador localhost.

Configuración puertos de la máquina virtual



Máquina virtual 2 Tomcat 11 y MYSQL

Enunciado: Instala y configura Tomcat 11 y MySQL

Resumen de los paquetes a instalar

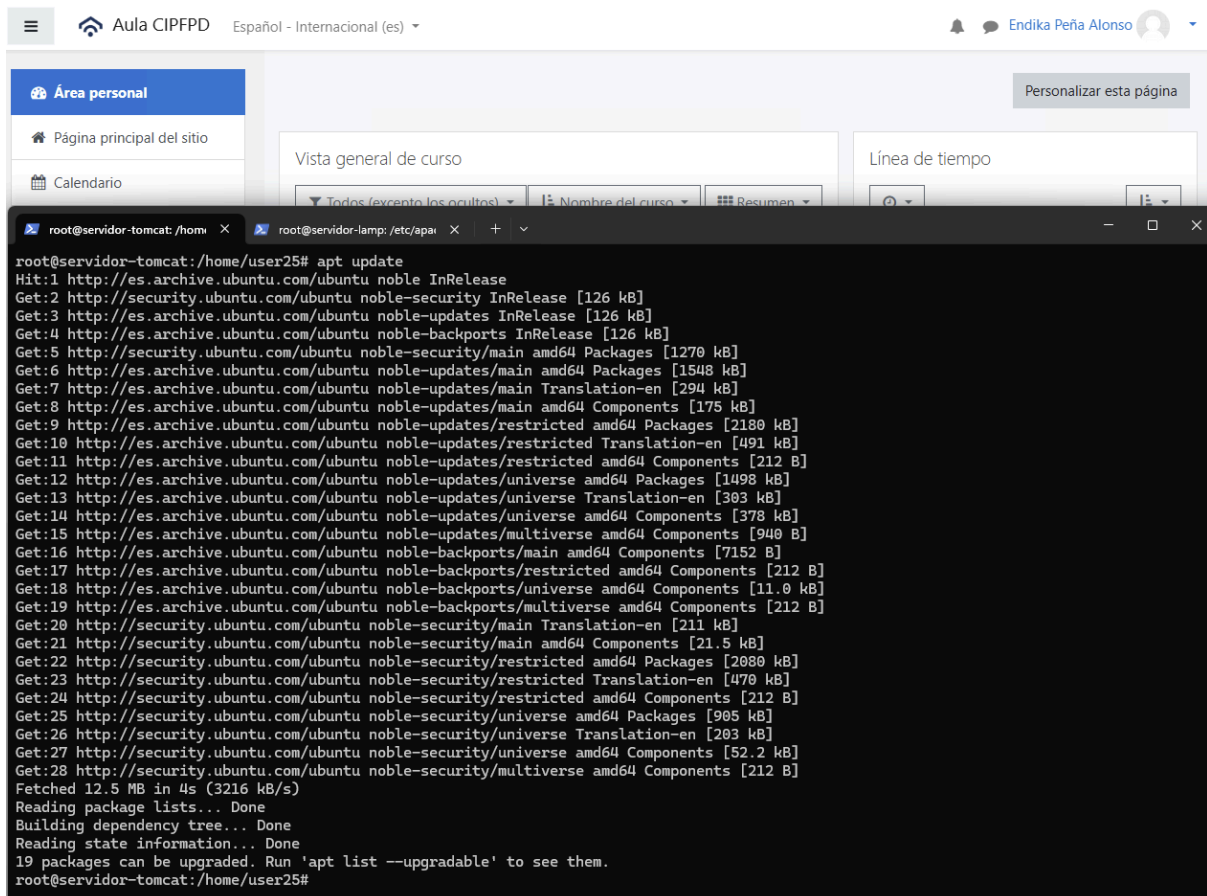
Para la instalación vamos a instalar los siguientes paquetes en nuestra distribución ubuntu-server 24.04 LTS.

default-jdk, mariadb-server, tomcat, curl (para poder descargar las fuentes de tomcat desde el servidor).

Versión de tomcat 9

<https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.111/bin/apache-tomcat-9.0.111.tar.gz>

Lo primero antes de empezar vamos a actualizar la lista de paquetes desde las fuentes o repositorios.



The screenshot shows a web browser interface with a course page titled 'Vista general de curso' and a terminal window open in the foreground. The terminal displays the output of the 'apt update' command, showing the process of updating package lists from various Ubuntu repositories. The terminal output includes details about the size of the downloaded files and the status of the update process.

```
root@servidor-tomcat:/home/user25# apt update
Hit:1 http://es.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:3 http://es.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:4 http://es.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:5 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1270 kB]
Get:6 http://es.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1548 kB]
Get:7 http://es.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [294 kB]
Get:8 http://es.archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:9 http://es.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [2180 kB]
Get:10 http://es.archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [491 kB]
Get:11 http://es.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:12 http://es.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1498 kB]
Get:13 http://es.archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [303 kB]
Get:14 http://es.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [378 kB]
Get:15 http://es.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:16 http://es.archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [7152 B]
Get:17 http://es.archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [212 B]
Get:18 http://es.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [11.0 kB]
Get:19 http://es.archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Get:20 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [211 kB]
Get:21 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [21.5 kB]
Get:22 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [2080 kB]
Get:23 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [470 kB]
Get:24 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [212 B]
Get:25 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [905 kB]
Get:26 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [203 kB]
Get:27 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [52.2 kB]
Get:28 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [212 B]
Fetched 12.5 MB in 4s (3216 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
19 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@servidor-tomcat:/home/user25#
```

Instalación de los paquetes

sudo su para elevar privilegios y usar el usuario root del sistema.

En este caso voy a usar mariadb en lugar de mysql ya que aunque ambos son opensource mysql tiene ciertas cosas distintas en últimas versiones y mariadb es compatible con mysql.

```
root@servidor-tomcat:/home/user25# apt install -y default-jdk curl mariadb-server
```

Comprobaciones de los paquetes instalados.

Java

```
root@servidor-tomcat:/home/user25# java --version
openjdk 21.0.8 2025-07-15
OpenJDK Runtime Environment (build 21.0.8+9-Ubuntu-0ubuntu124.04.1)
OpenJDK 64-Bit Server VM (build 21.0.8+9-Ubuntu-0ubuntu124.04.1, mixed mode, sharing)
```

MariaDB

```
root@servidor-tomcat:/home/user25# dpkg -l | grep mariadb
ii  libmariadb3:amd64      1:10.11.13-0ubuntu0.24.04.1    amd64      MariaDB database client library
ii  mariadb-client         1:10.11.13-0ubuntu0.24.04.1    amd64      MariaDB database client binaries
ii  mariadb-client-core    1:10.11.13-0ubuntu0.24.04.1    amd64      MariaDB database core client binaries
ii  mariadb-common         1:10.11.13-0ubuntu0.24.04.1    all        MariaDB database common files (e.g. /etc/mysql/mariadb.conf.d/)
ii  mariadb-plugin-provider-bzip2 1:10.11.13-0ubuntu0.24.04.1    amd64      BZip2 compression support in the server and storage engines
ii  mariadb-plugin-provider-lz4  1:10.11.13-0ubuntu0.24.04.1    amd64      LZ4 compression support in the server and storage engines
ii  mariadb-plugin-provider-lzma 1:10.11.13-0ubuntu0.24.04.1    amd64      LZMA compression support in the server and storage engines
ii  mariadb-plugin-provider-lzo  1:10.11.13-0ubuntu0.24.04.1    amd64      LZO compression support in the server and storage engines
ii  mariadb-plugin-provider-snappy 1:10.11.13-0ubuntu0.24.04.1    amd64      Snappy compression support in the server and storage engines
ii  mariadb-server         1:10.11.13-0ubuntu0.24.04.1    amd64      MariaDB database server binaries
ii  mariadb-server-core    1:10.11.13-0ubuntu0.24.04.1    amd64      MariaDB database core server files
```

Instalación de TOMCAT

Para la instalación de tomcat es más manual y hay que realizar ciertas configuraciones previas a instalar el paquete.

- Crear un usuario y grupo para tomcat

groupadd #nombre_grupo# && useradd -s /bin/false (esto es para que el usuario de tomcat no tenga acceso a una shell) -g #nombre_grupo_tomcat# -d /opt/tomcat (es la home del usuario tomcat) #nombre_usuario#

```
root@servidor-tomcat:/home/user25# groupadd tomcat && useradd -s /bin/false -g tomcat -d /opt/tomcat tomcat
root@servidor-tomcat:/home/user25# id tomcat
uid=1001(tomcat) gid=1001(tomcat) groups=1001(tomcat)
```

- Descargamos el software de tomcat desde el directorio /tmp ya que en /tmp se suelen tener permisos desde cualquier usuario.

```
root@servidor-tomcat:/tmp# curl -O https://d1cdn.apache.org/tomcat/tomcat-9/v9.0.111/bin/apache-tomcat-9.0.111.tar.gz
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           %             %             Dload  Upload  Total   Spent    Left   Speed
100 12.4M  100 12.4M    0     0  30.3M      0  --:--:-- --:--:-- --:--:--  30.3M
```

- Creamos la carpeta de tomcat y le indicamos que el usuario y grupo tomcat es el propietario de forma recursiva.

```
root@servidor-tomcat:/tmp# mkdir -p /opt/tomcat && chown tomcat:tomcat -R /opt/tomcat
root@servidor-tomcat:/tmp# ls -l /opt
total 4
drwxr-xr-x 2 tomcat tomcat 4096 Oct 29 09:03 tomcat
```

- Vamos a desempaquetar el código de tomcat

```
root@servidor-tomcat:/tmp# tar -xzf apache-tomcat-9.0.111.tar.gz -C /opt/tomcat --strip-components=1
```

```
root@servidor-tomcat:/tmp# ls -l /opt/tomcat/
total 152
-rw-r----- 1 root root 24136 Oct 10 14:13 BUILDING.txt
-rw-r----- 1 root root  6096 Oct 10 14:13 CONTRIBUTING.md
-rw-r----- 1 root root 57092 Oct 10 14:13 LICENSE
-rw-r----- 1 root root  2333 Oct 10 14:13 NOTICE
-rw-r----- 1 root root  3283 Oct 10 14:13 README.md
-rw-r----- 1 root root  6902 Oct 10 14:13 RELEASE-NOTES
-rw-r----- 1 root root 16543 Oct 10 14:13 RUNNING.txt
drwxr-x--- 2 root root  4096 Oct 29 09:08 bin
drwx----- 2 root root  4096 Oct 10 14:13 conf
drwxr-x--- 2 root root  4096 Oct 29 09:08 lib
drwxr-x--- 2 root root  4096 Oct 10 14:13 logs
drwxr-x--- 2 root root  4096 Oct 29 09:08 temp
drwxr-x--- 7 root root  4096 Oct 10 14:13 webapps
drwxr-x--- 2 root root  4096 Oct 10 14:13 work
```

- Volvemos a cambiar el propietario y grupo de los ficheros.

```
root@servidor-tomcat:/tmp# chown tomcat:tomcat -R /opt/tomcat/
root@servidor-tomcat:/tmp# ls -l /opt/tomcat/
total 152
-rw-r----- 1 tomcat tomcat 24136 Oct 10 14:13 BUILDING.txt
-rw-r----- 1 tomcat tomcat  6096 Oct 10 14:13 CONTRIBUTING.md
-rw-r----- 1 tomcat tomcat 57092 Oct 10 14:13 LICENSE
-rw-r----- 1 tomcat tomcat  2333 Oct 10 14:13 NOTICE
-rw-r----- 1 tomcat tomcat  3283 Oct 10 14:13 README.md
-rw-r----- 1 tomcat tomcat  6902 Oct 10 14:13 RELEASE-NOTES
-rw-r----- 1 tomcat tomcat 16543 Oct 10 14:13 RUNNING.txt
drwxr-x--- 2 tomcat tomcat  4096 Oct 29 09:08 bin
drwx----- 2 tomcat tomcat  4096 Oct 10 14:13 conf
drwxr-x--- 2 tomcat tomcat  4096 Oct 29 09:08 lib
drwxr-x--- 2 tomcat tomcat  4096 Oct 10 14:13 logs
drwxr-x--- 2 tomcat tomcat  4096 Oct 29 09:08 temp
drwxr-x--- 7 tomcat tomcat  4096 Oct 10 14:13 webapps
drwxr-x--- 2 tomcat tomcat  4096 Oct 10 14:13 work
```

- Vamos a crear el fichero que define un servicio en systemd que es el gestor de servicios que viene incluido en ubuntu-server.

nano /etc/systemd/system/tomcat.service

```
GNU nano 7.2 /etc/systemd/system/tomcat.service
[Unit]
Description=Apache Tomcat Web Application Container
After=network.target

[Service]
Type=forking

Environment="JAVA_HOME=/usr/lib/jvm/java-1.21.0-openjdk-amd64"
Environment="CATALINA_PID=/opt/tomcat/temp/tomcat.pid"
Environment="CATALINA_HOME=/opt/tomcat/"
Environment="CATALINA_BASE=/opt/tomcat/"
Environment="CATALINA_OPTS=-Xms512M -Xmx1024M -server -XX:+UseParallelGC"
Environment="JAVA_OPTS=-Djava.awt.headless=true -Djava.security.egd=file:/dev/./urandom"

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

User=tomcat
Group=tomcat
UMask=0007
RestartSec=10
Restart=always

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

systemctl daemon-reload para que encuentre nuevos ficheros de servicio
systemctl start tomcat para arrancar el servicio de tomcat
systemctl enable tomcat para activar el inicio automático de tomcat

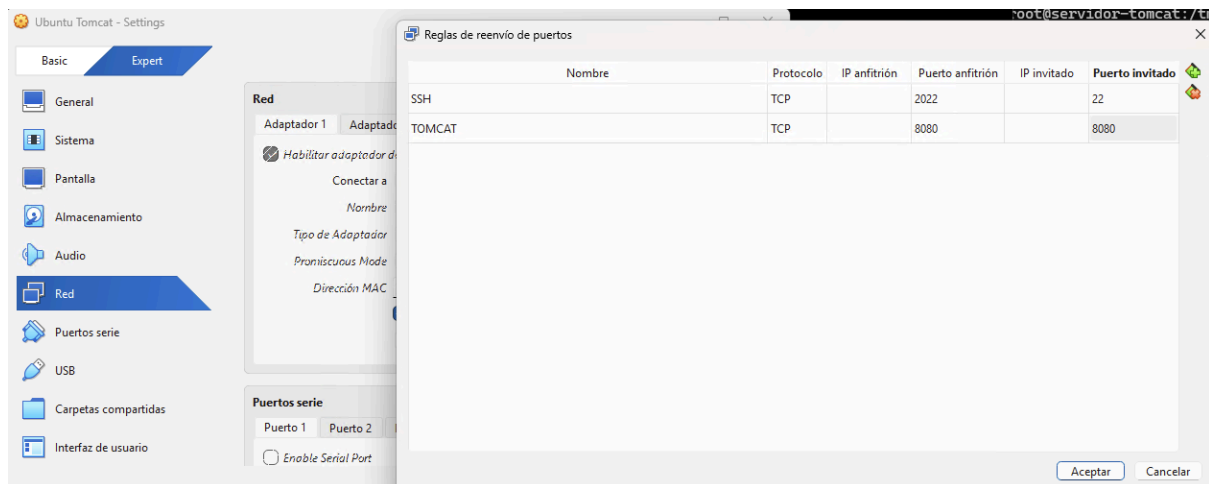
```
root@servidor-tomcat:/tmp# systemctl daemon-reload
root@servidor-tomcat:/tmp# systemctl start tomcat
root@servidor-tomcat:/tmp# systemctl enable tomcat
root@servidor-tomcat:/tmp# systemctl status tomcat
● tomcat.service - Apache Tomcat Web Application Container
   Loaded: loaded (/etc/systemd/system/tomcat.service; enabled; preset: enabled)
   Active: active (running) since Wed 2025-10-29 09:21:10 UTC; 1min 42s ago
     Main PID: 4087 (java)
       Tasks: 30 (limit: 7018)
    Memory: 122.9M (peak: 124.5M)
         CPU: 3.577s
    CGroup: /system.slice/tomcat.service
            └─4087 /usr/lib/jvm/java-1.21.0-openjdk-amd64/bin/java -Djava.util.logging.config.file=/opt/tomcat/conf/logging.properties -Djava.util.logging.manager=org.apache.juli.ClassLoaderLogManager -Djava.awt.headless=true -Djava.security.egd=file:/dev/./urandom -Djdk.tls.ephemeralDHKeySize=2048 -Djava.protocol.handler.pkgs=org.apache.catalina.webresources -Dsun.io.useCanonCaches=false -Dorg.apache.catalina.security.SecurityListener.UMASK=0027 -Xms512M -Xmx1024M -server -XX:+UseParallelGC -Dignore.endorsed.dirs=-classpath /opt/tomcat/bin/bootstrap.jar:/opt/tomcat/bin/tomcat-juli.jar -Dcatalina.base=/opt/tomcat/ -Dcatalina.home=/opt/tomcat/ -Djava.io.tmpdir=/opt/tomcat/temp org.apache.catalina.startup.Bootstrap start

Oct 29 09:21:10 servidor-tomcat systemd[1]: tomcat.service: Scheduled restart job, restart counter is at 5.
Oct 29 09:21:10 servidor-tomcat systemd[1]: Starting tomcat.service - Apache Tomcat Web Application Container...
Oct 29 09:21:10 servidor-tomcat startup.sh[4080]: Tomcat started.
Oct 29 09:21:10 servidor-tomcat systemd[1]: Started tomcat.service - Apache Tomcat Web Application Container.
```

Comprobación de funcionamiento Tomcat

En mi caso como no tengo IP 's en red local disponibles para las máquinas virtuales las he creado con la red en NAT y con el reenvío de puertos activos, por ello aparece en la URL del navegador localhost.

Configuración puertos de la máquina virtual



The image shows the Apache Tomcat/9.0.111 web interface in a browser. The address bar shows 'localhost:8080'. The page has a navigation bar with links: Home, Documentation, Configuration, Examples, Wiki, Mailing Lists, and Find Help. The main content area displays 'Apache Tomcat/9.0.111' and a green banner stating 'If you're seeing this, you've successfully installed Tomcat. Congratulations!'. Below this, there is a 'Recommended Reading' section with links to 'Security Considerations How-To', 'Manager Application How-To', and 'Clustering/Session Replication How-To'. To the right of these links are buttons for 'Server Status', 'Manager App', and 'Host Manager'. Below the recommended reading is a 'Developer Quick Start' section with links to 'Tomcat Setup', 'First Web Application', 'Realms & AAA', 'JDBC Data Sources', 'Examples', 'Servlet Specifications', and 'Tomcat Versions'. At the bottom, there are three yellow boxes: 'Managing Tomcat' (with security warnings and a link to 'Read more...'), 'Documentation' (with links to 'Tomcat 9.0 Documentation', 'Tomcat 9.0 Configuration', and 'Tomcat Wiki'), and 'Getting Help' (with links to 'FAQ and Mailing Lists' and a list of mailing lists including 'tomcat-announce' and 'tomcat-users').