



INSTITUTO TECNOLÓGICO DE CIUDAD MADERO

TAREA #6-2:

"Servidor Linux"

Integrantes:

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Materia:

Tecnologías de Aplicaciones Web

Horario:

14:00 - 15:00 hrs.

Cd. Madero, Tamaulipas

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TAREA NO. 6: SERVIDOR LINUX

Instrucciones:

En su sistema operativo Windows 11, instalará el VirtualBox de ORACLE y lo configurará para que se seleccione un Linux Server de acuerdo con las características del Hardware y software con los que cuenta.

Una vez seleccionado: Instale el Linux Server en el VirtualBox.

Configure el Servidor, cómo un Servidor WEB y haga las pruebas necesarias con páginas WEB, desde otro equipo todo conectado en Internet.

Configure el Linux Server, cómo un servidor de Bases de Datos, además realice las pruebas que función con algunas bases de datos desde otro equipo.

DESARROLLO

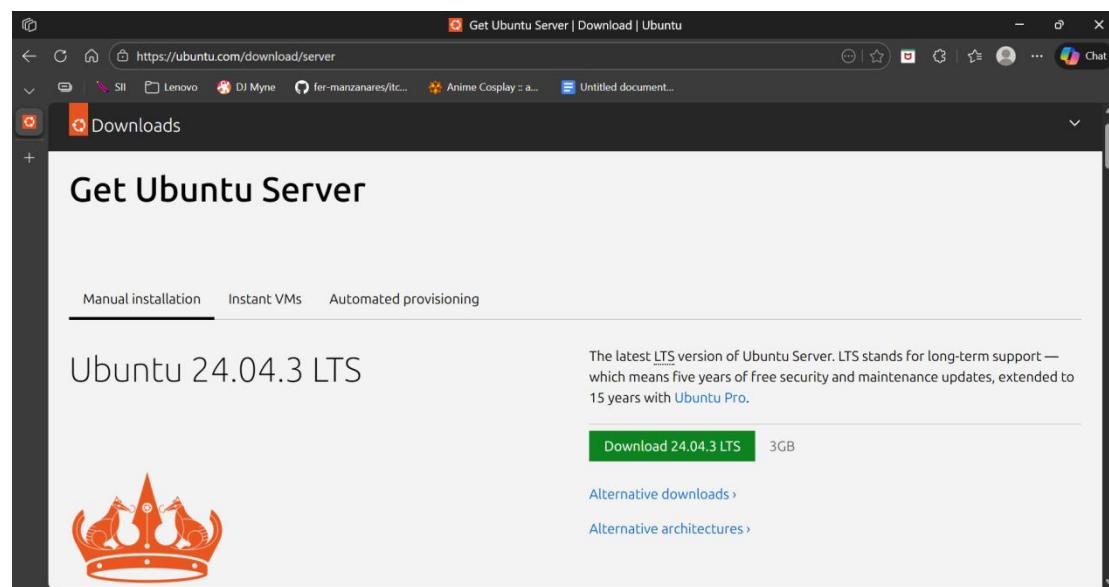
A) Instalación de Virtual Box.

Phasellus sit amet felis nec sapien tincidunt tincidunt. Nullam nec sapien nec sapien tincidunt tincidunt. Sed euismod, urna eu tincidunt consectetur, nisi nisl aliquet nunc, vitae facilisis sapien justo ac nulla. Integer nec sapien vel justo tincidunt fermentum.

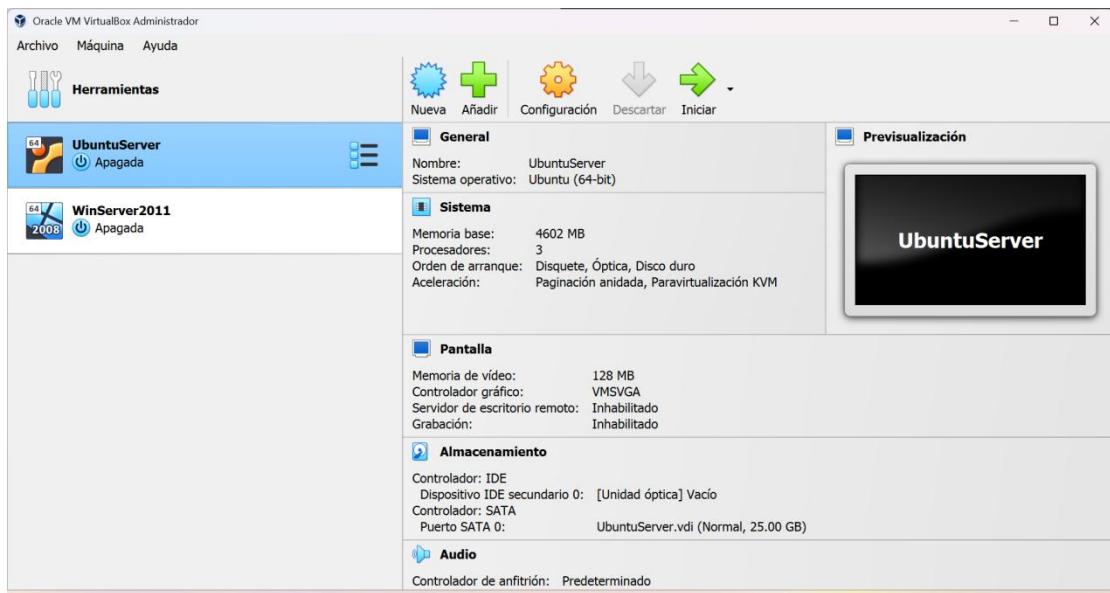
B) Instalación y Configuración de Linux Sever

1. Descargar el instalador desde la página oficial de Ubuntu:

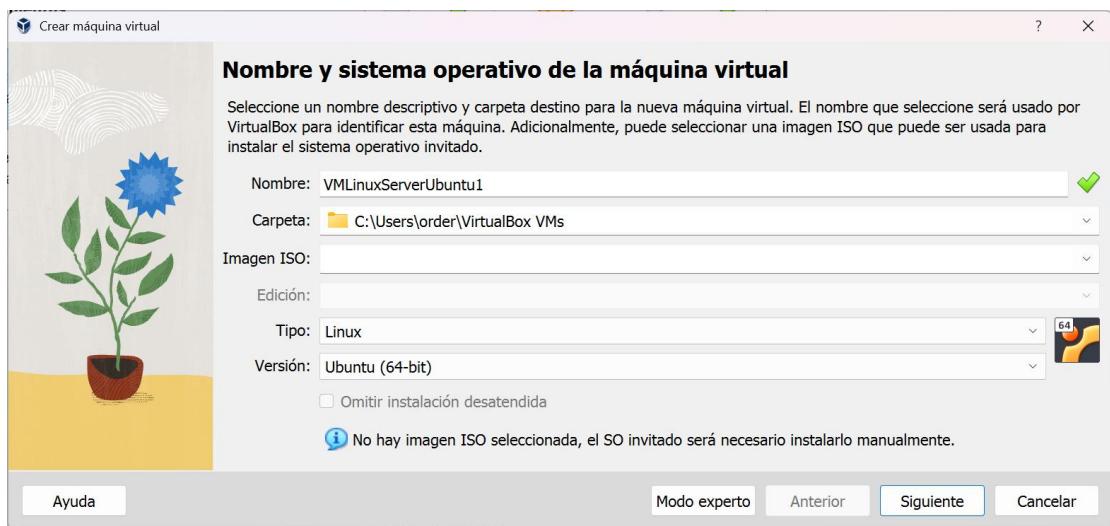
<https://ubuntu.com/download/server>



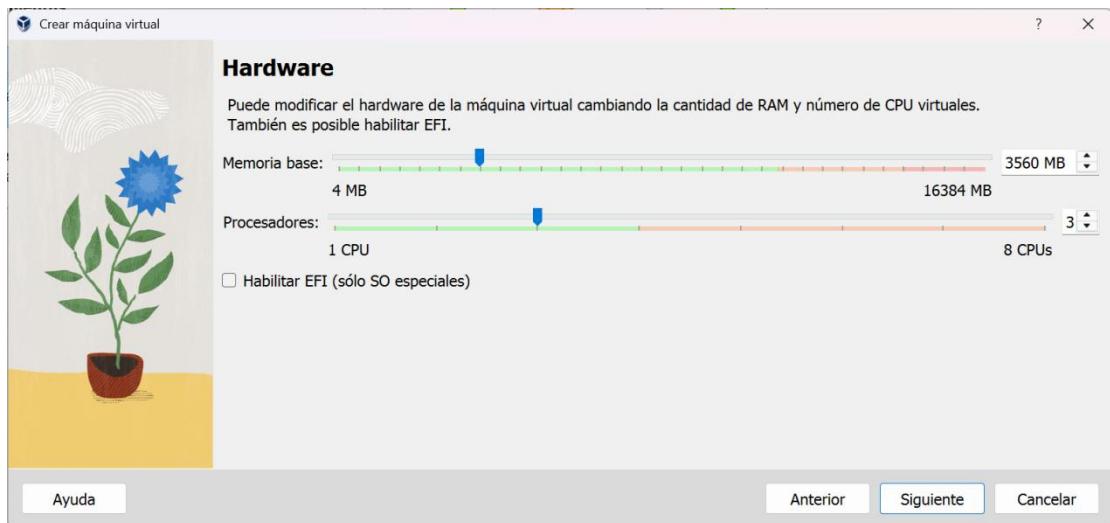
2. Una vez completada la descarga, se abre Virtual Box para comenzar con la creación de la Máquina Virtual (VM).



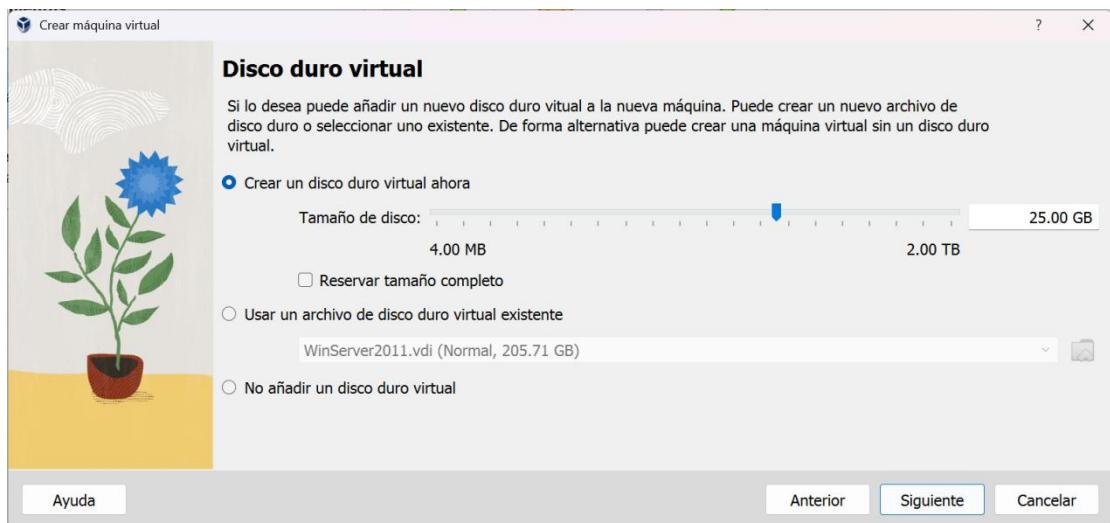
3. Le damos clic en “Añadir” y se abrirá la siguiente ventana, donde le daremos un nombre a la VM.



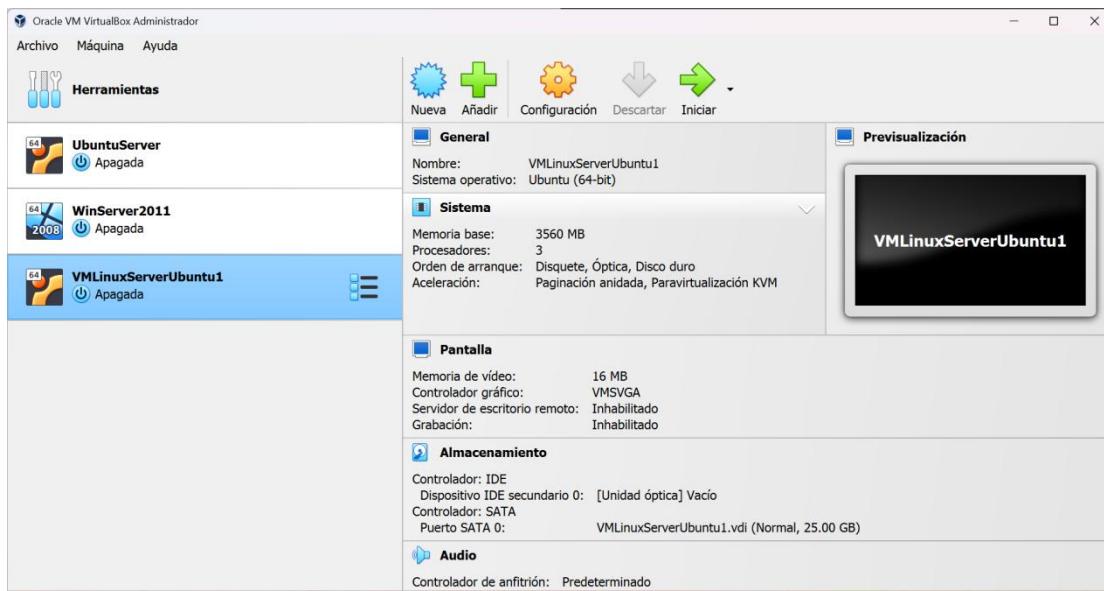
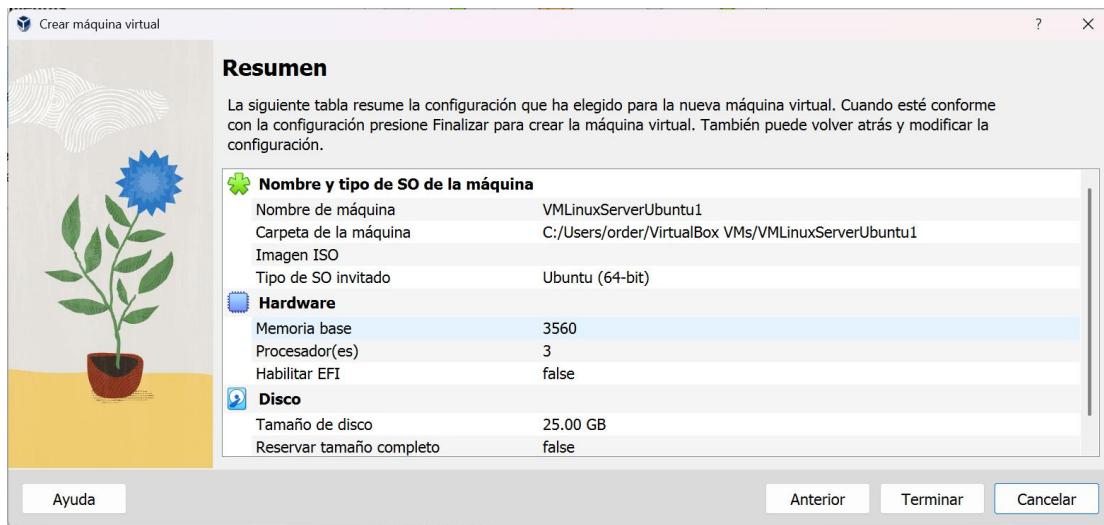
4. Damos clic en “Siguiente” y nos llevará a la configuración del hardware de la VM, específicamente a la memoria RAM y núcleos de procesador que se le dedicará de la máquina huésped. En este caso vamos a asignar el mínimo recomendado de 3GB de memoria RAM y 3 núcleos de los 4 posibles.



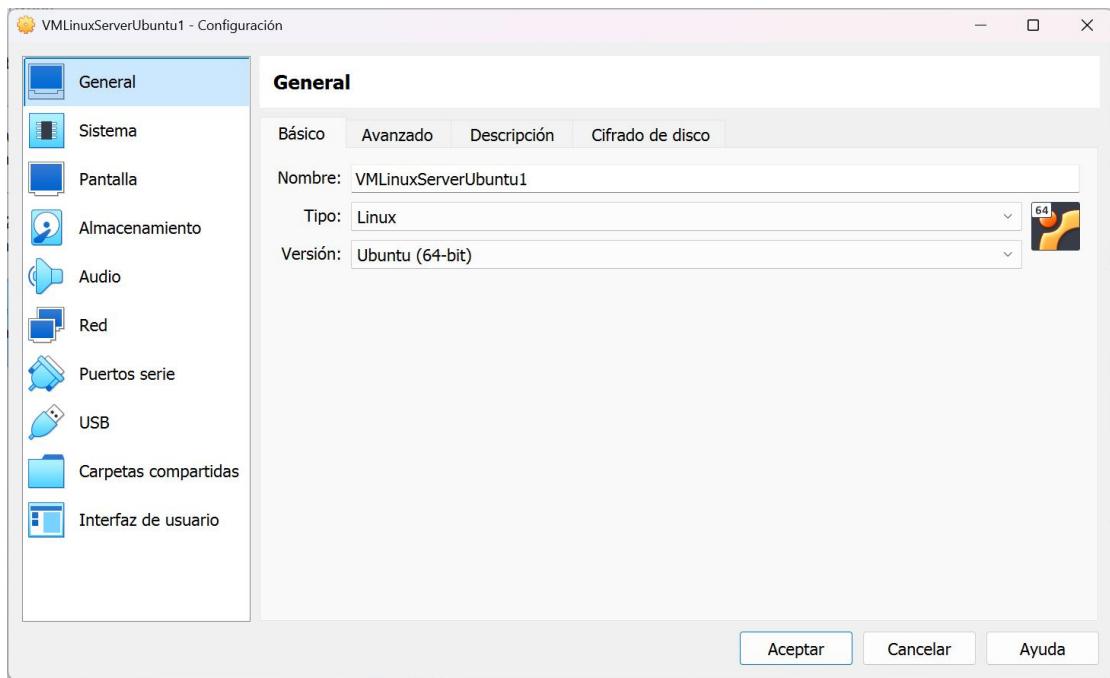
5. Luego procedemos a asignar la memoria virtual que podrá ocupar la máquina, para este caso sera de 25 GB, lo minimo recomendable para instalar el sistema operativo de forma funcional.



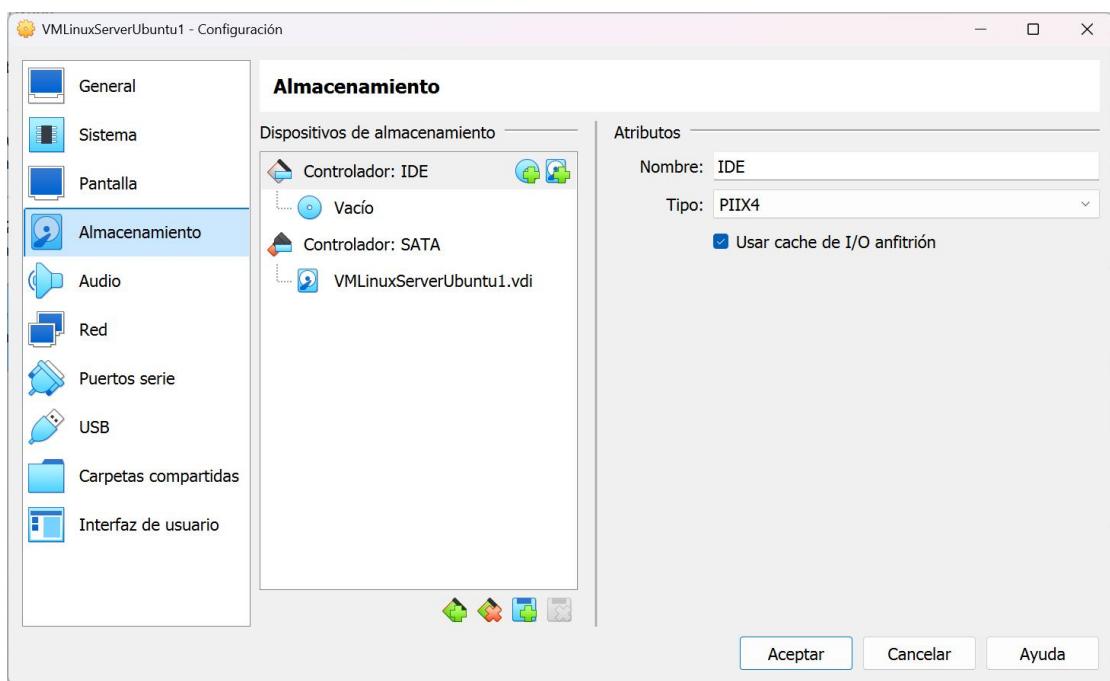
6. Damos clic en "Siguiente" y nos genera un resumen de las especificaciones de la VM, por ultimo damos clic en "Terminar" y la máquina estará lista para comenzar con la instalación y configuración del sistema operativo (SO).



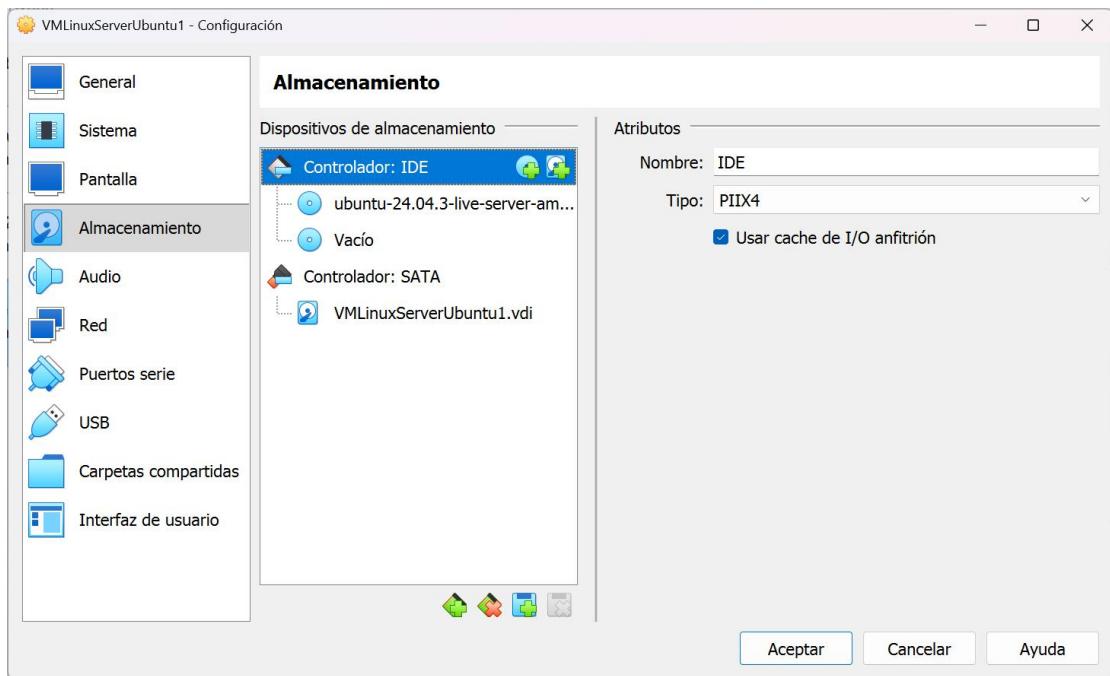
7. A continuación vamos a montar el disco virtual con el SO, seleccionamos la VM que acabamos de crear y hacemos clic en “configuración” en la barra de herramientas.



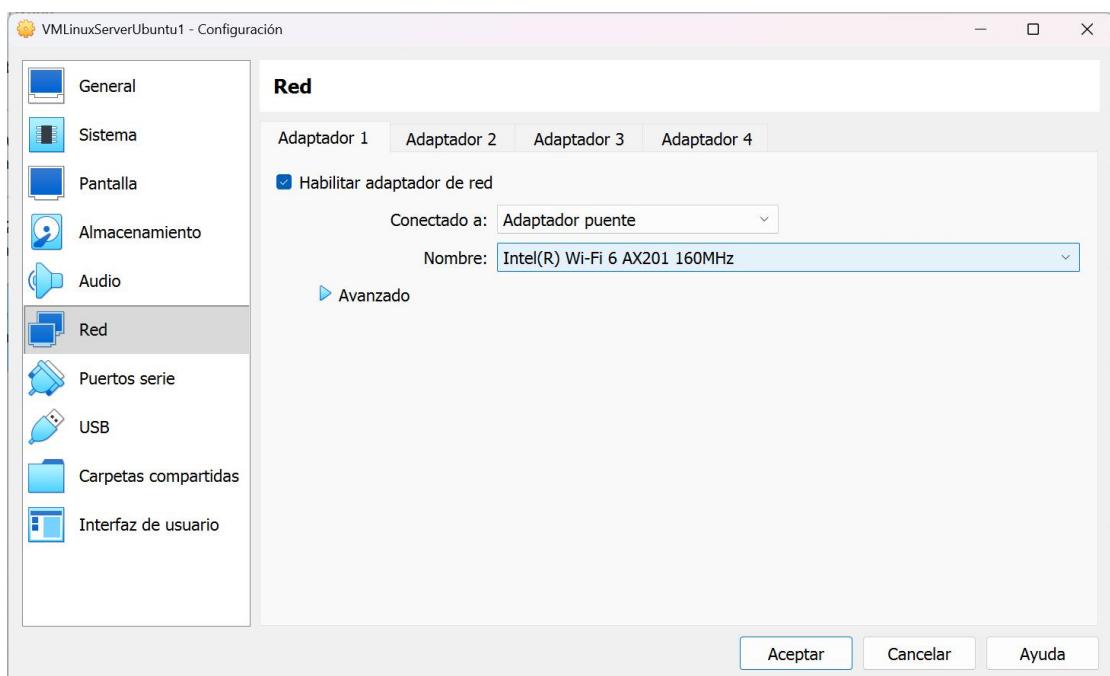
8. Nos dirigimos al apartado de “Almacenamiento” y verificamos que no haya ningun disco montado en “Controlador: IDE”.

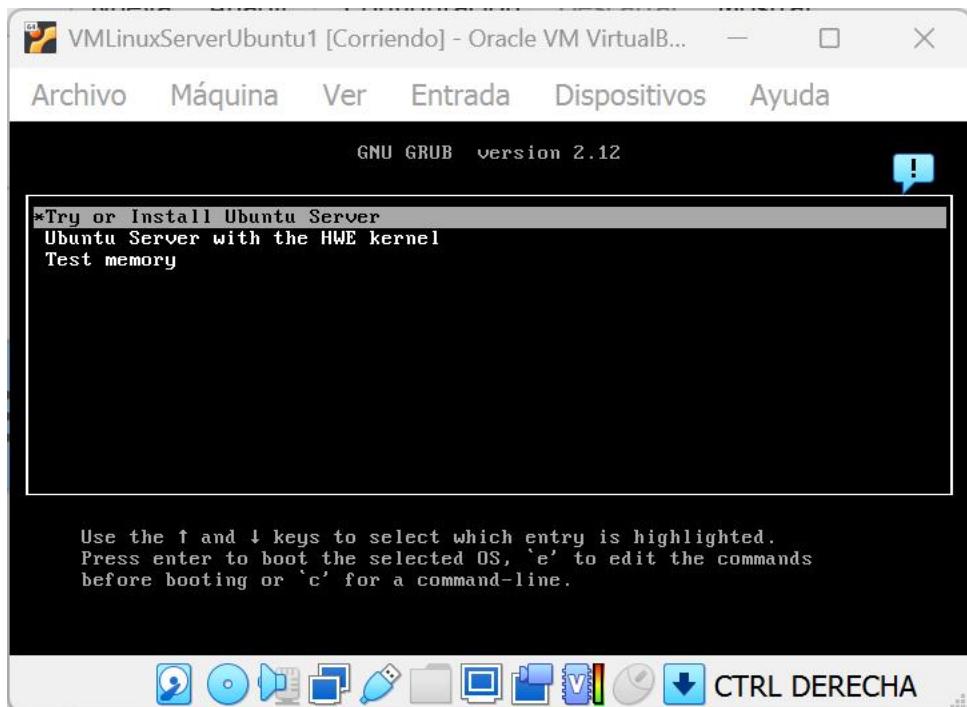


9. Damos clic en “añadir unidad óptica” y seleccionamos el ISO que descargamos desde la carpeta en que lo hicimos.

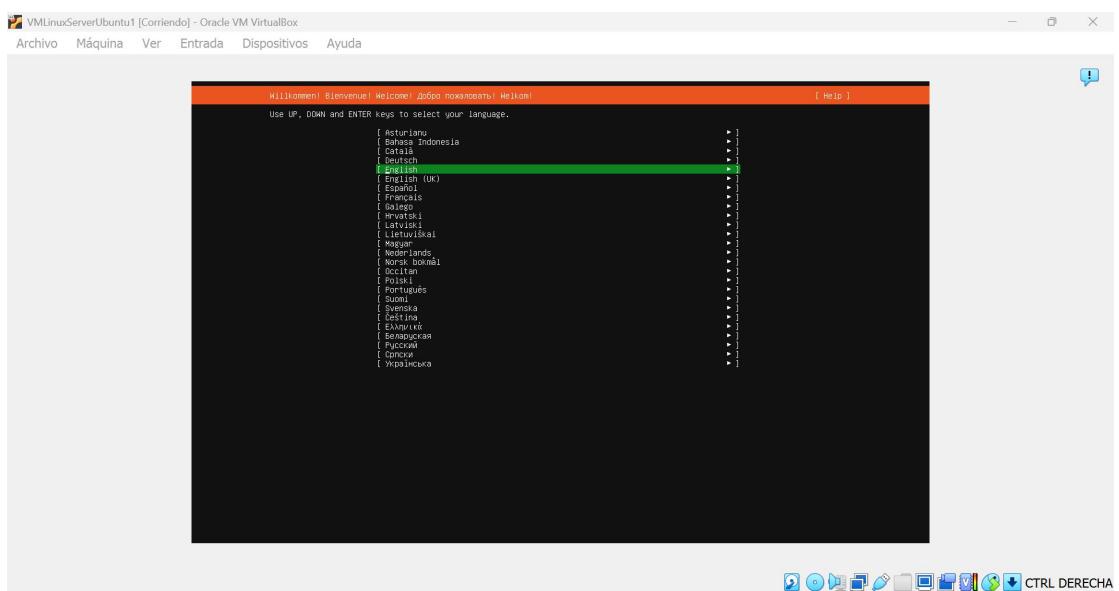


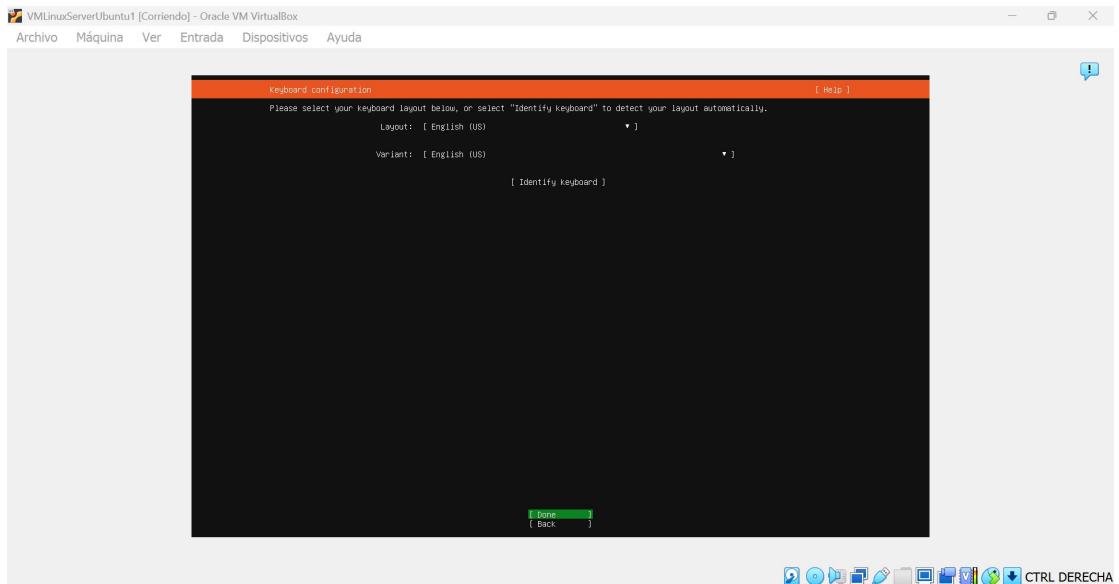
9. Una vez insertado el ISO, damos clic en “Iniciar para comenzar la instalación del SO en la VM”



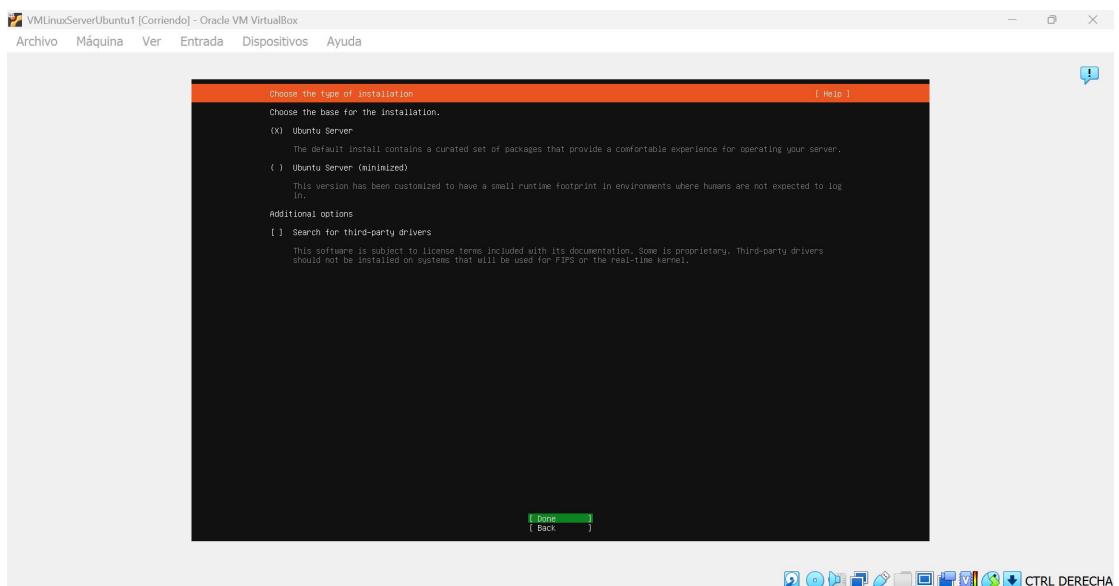


10. Damos clic en “Try or install Ubuntu Server”, esto nos lleva a la configuracion del idioma y teclado, para esta ocasion se elige ingles (US)

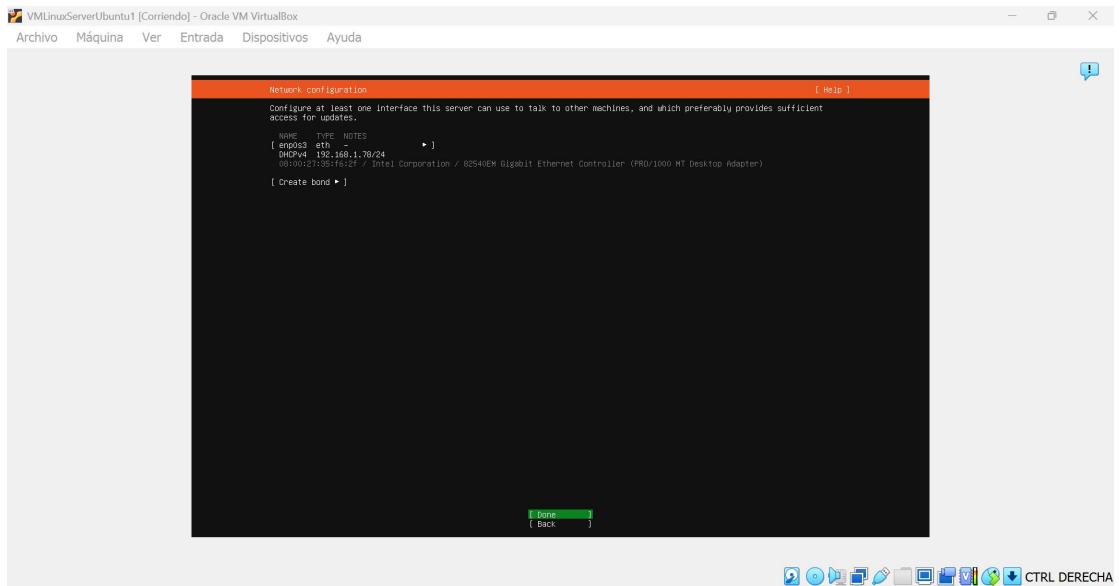




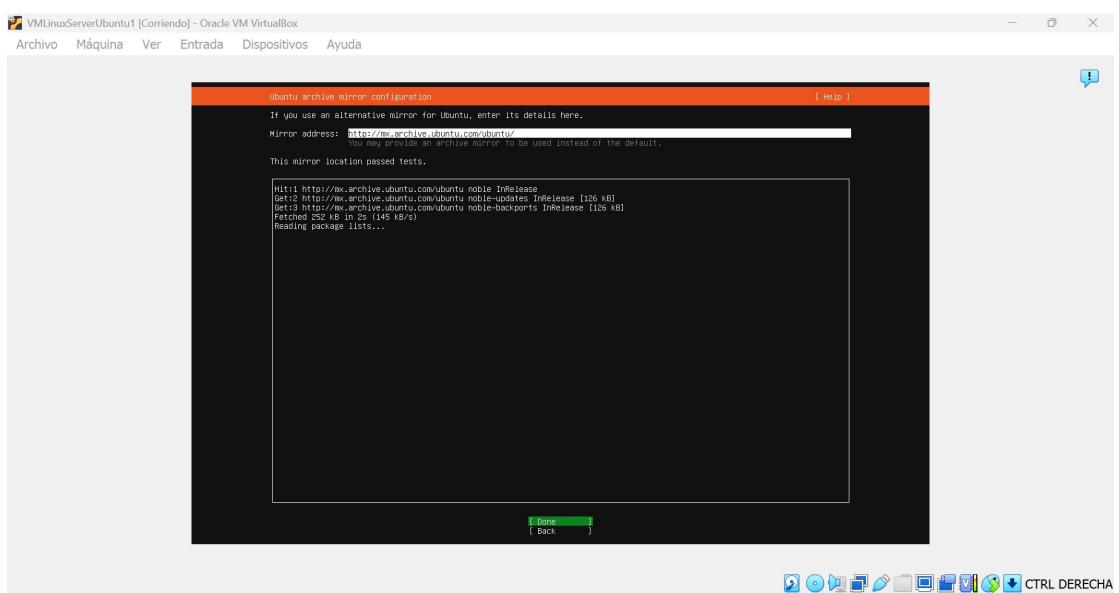
11. Seleccionamos el tipo de instalación. Lo dejamos por default.



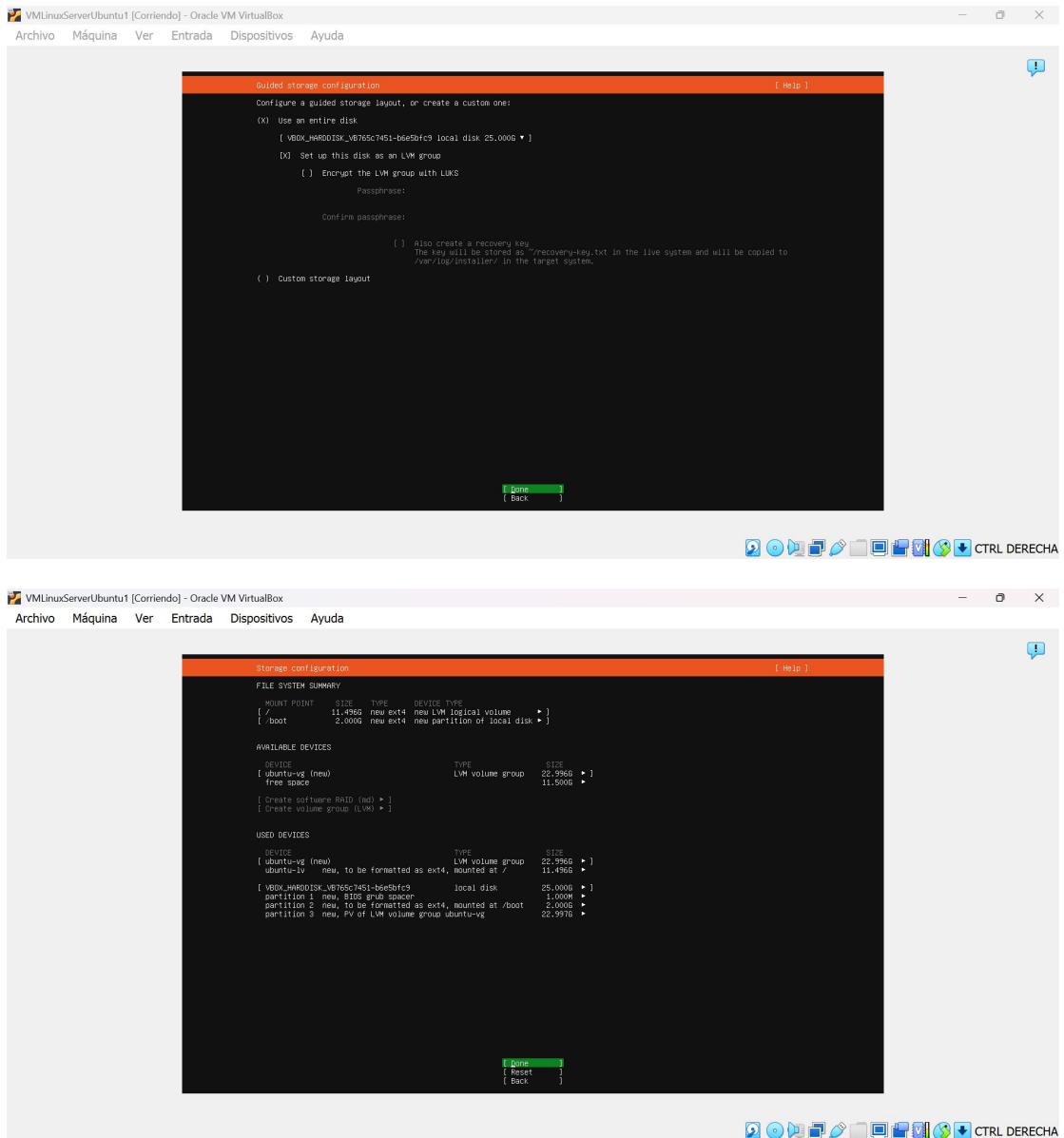
12. Dejamos la configuración de red por default.



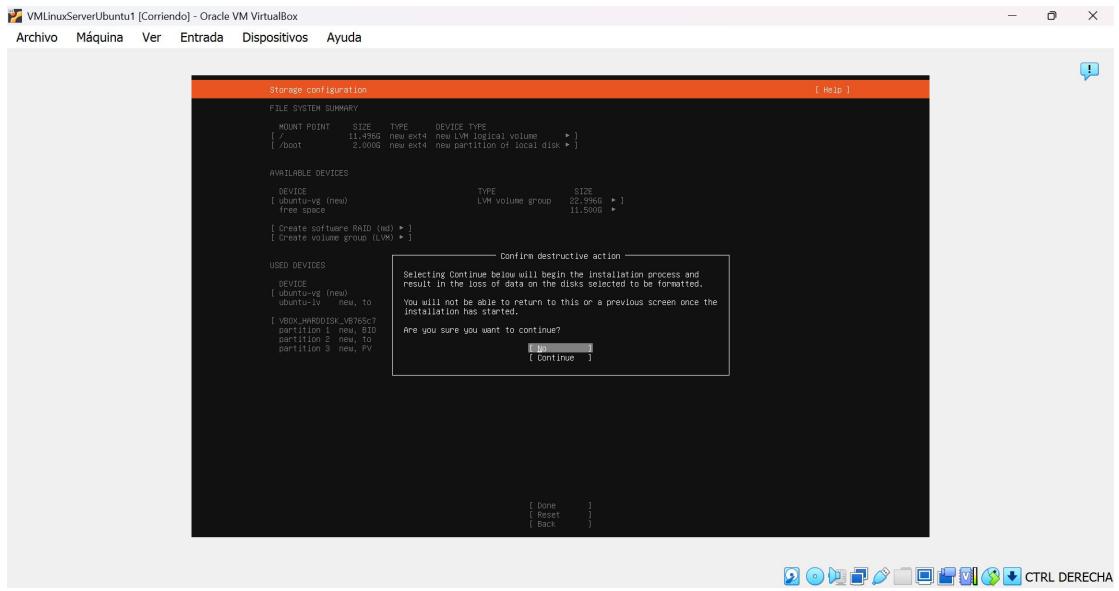
13. Dejamos la configuración del Proxy como esta, seleccionamos “done” y esperamos que se configuren los archivos



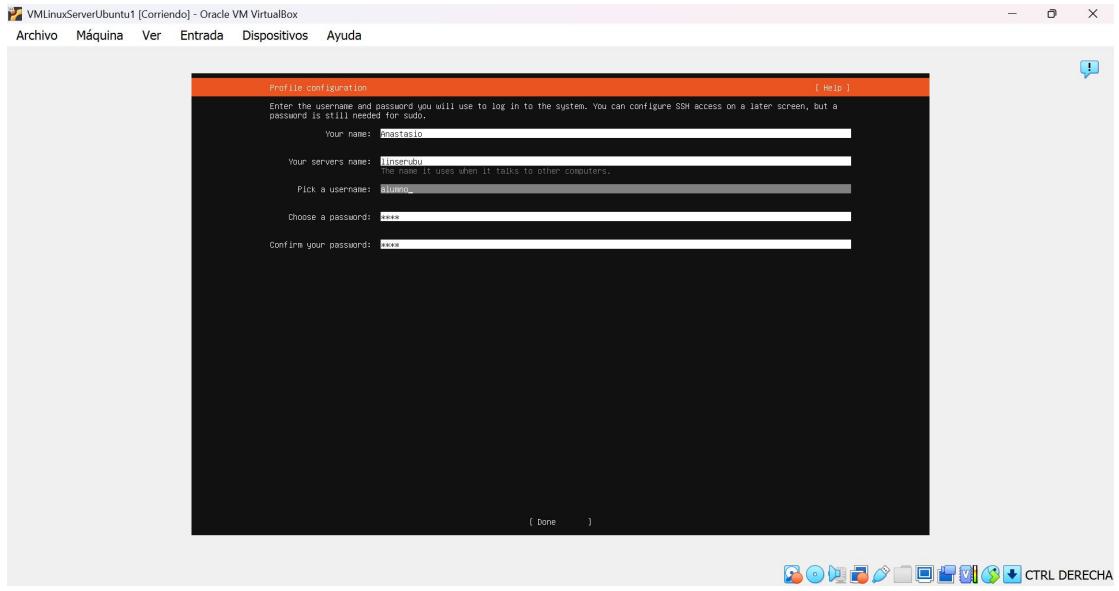
14. Pasamos a la configuración inicial del almacenamiento y lo dejamos como esta, sin modificaciones.



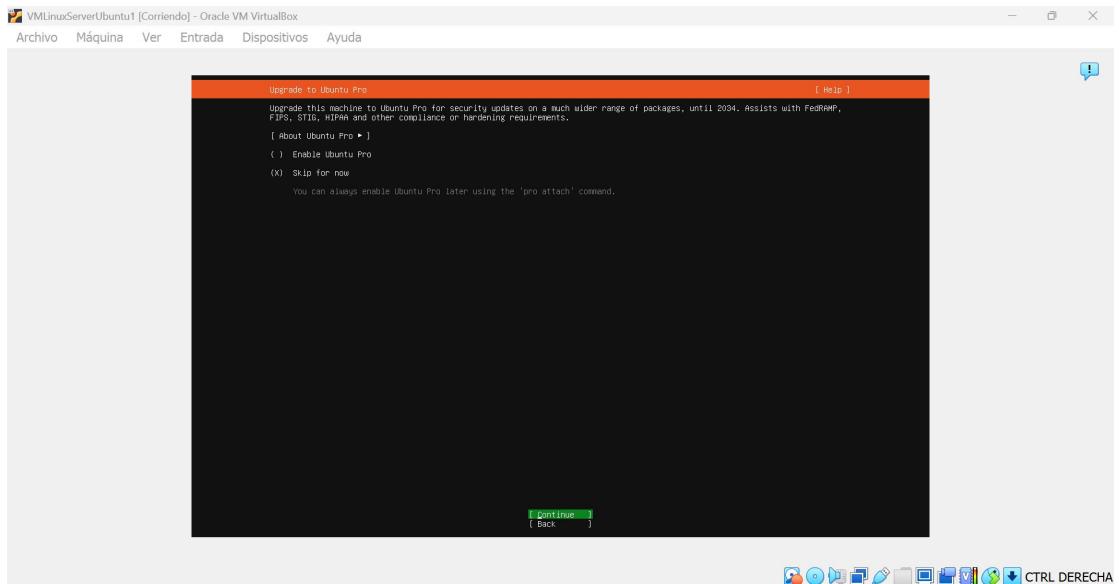
15. Damos siguiente. Y en la nueva ventana damos autorizacion para formatear el disco duro virtual que se creó.



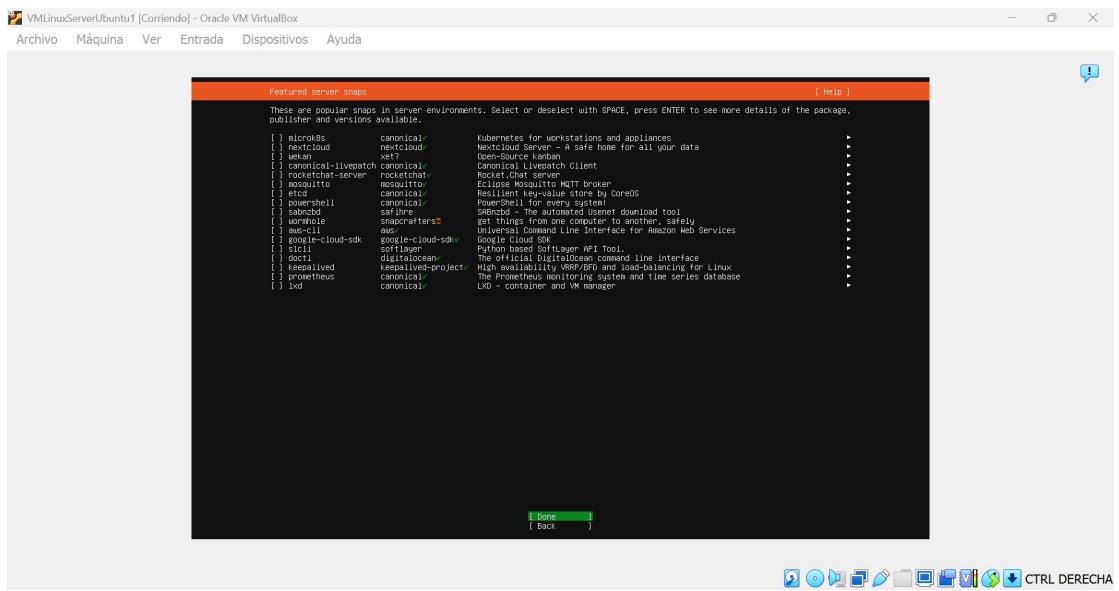
16. Procedemos a Crear nuestro perfil, damos un nombre, el nombre de dominio como servidor, usuario y contraseña, para esta práctica dejaremos la contraseña sencilla, para agilizar el acceso.



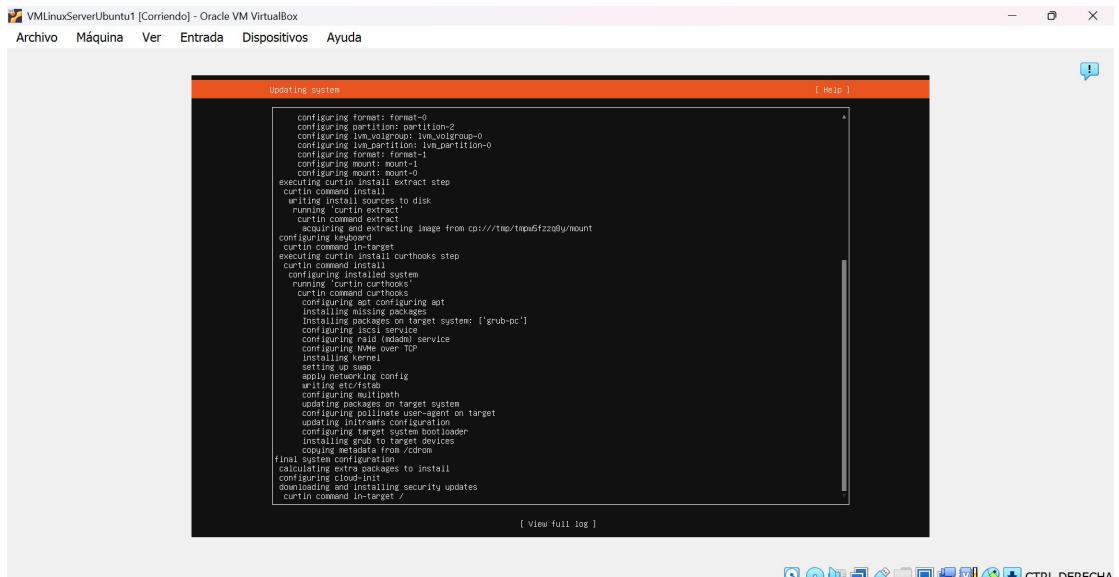
17. Rechazamos la actualización a Ubuntu Pro y seleccionamos continuar.



18. Omitimos la configuración de SSH y otros paquetes por el momento.



19. Esperamos a que termine la instalación. Al final, se nos solicitará reiniciar la máquina, así que lo hacemos.



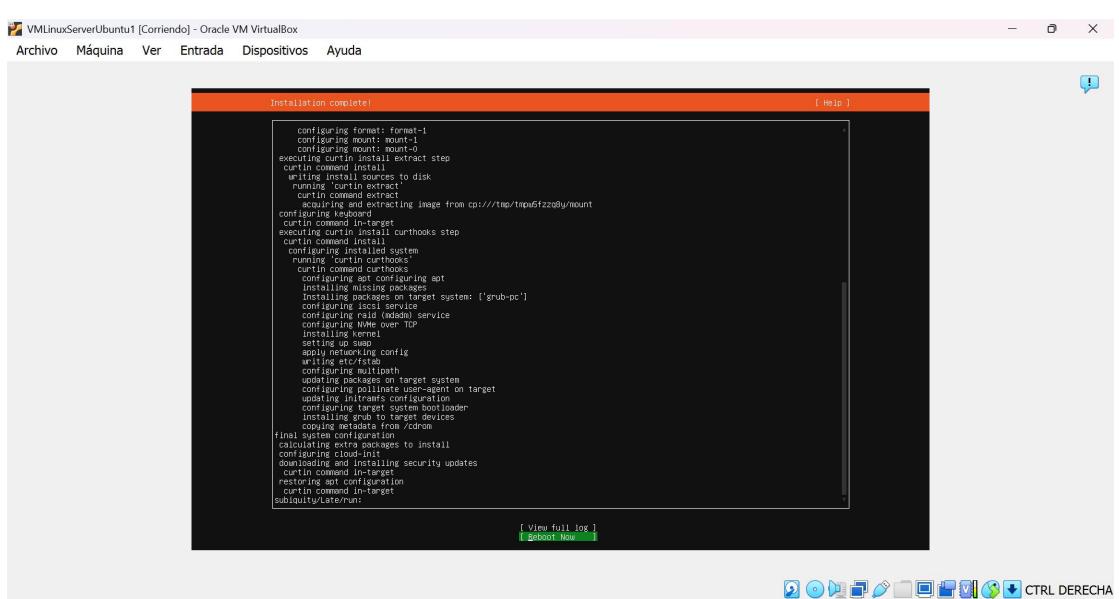
```

Updating system [ Help ]
[ View full log ]

configuring format: format-0
configuring partition: partition-2
configuring volume: volume-0, lvm_vgroup-0
configuring lvm_partition: lvm_partition-0
configuring format: format-1
configuring volume: volume-1
configuring mount: mount-0
executing curtin install extract step
curtin command:
  writing install sources to disk
  running 'curtin extract'
  configuring apt
  acquiring and extracting image from cp://tmp/tmpu5fzz8bu/mount
configuring keyboard
curtin command in-target
executing curtin install curthooks step
curtin command
configuring installed system
  running 'curtin curthooks'
  configuring apt
  configuring apt-configuration
  installing missing packages
  installing local service system: ['grub-pc']
  configuring raid (mdadm) service
  configuring network over TCP
  installing kernel
  setting up swap
  applying kernel config
  writing etc/fstab
  configuring multipath
  updating installed target system
  configuring pollinate user-agent on target
  updating intrans configuration
  configuring local bootloader
  installing grub to target devices
  copying metadata from /cdrom
finalizing system
calculating extra packages to install
configuring cloud-init
downloading security updates
curtin command in-target
restoring apt configuration
curtin command in-target
subsidity/gaterware

[ View full log ] [ Reboot Now ] CTRL DERECHA

```

```

Installation complete! [ Help ]
[ View full log ] [ Reboot Now ] CTRL DERECHA

configuring format: format-1
configuring mount: mount-1
configuring mount: mount-0
executing curtin install extract step
curtin command:
  writing install sources to disk
  running 'curtin extract'
  configuring apt
  acquiring and extracting image from cp://tmp/tmpu5fzz8bu/mount
configuring keyboard
curtin command in-target
executing curtin install curthooks step
curtin command
configuring installed system
  running 'curtin curthooks'
  configuring apt
  configuring apt-configuration
  installing missing packages
  installing local service system: ['grub-pc']
  configuring raid (mdadm) service
  configuring network over TCP
  installing kernel
  setting up swap
  applying kernel config
  writing etc/fstab
  configuring multipath
  updating installed target system
  configuring pollinate user-agent on target
  updating intrans configuration
  configuring local bootloader
  installing grub to target devices
  copying metadata from /cdrom
finalizing system
calculating extra packages to install
configuring cloud-init
downloading security updates
curtin command in-target
restoring apt configuration
curtin command in-target
subsidity/gaterware

[ View full log ] [ Reboot Now ] CTRL DERECHA

```

20. Una vez reiniciado iniciamos con nuestro usuario creado “alumno” y posteriormente procedemos a hacer la configuracion del servidor web.

```

Ubuntu 24.04.3 LTS linservubu tty1
linservubu login: alumno
Password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-90-generic x86_64)

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

System information as of Mon Dec 15 04:46:31 PM UTC 2025

System load: 1.58
Usage of /: 42.4% of 11.21GB
Memory usage: 68
Swap usage: 0%
Processes: 104
Users logged in: 0
IPv4 address for ensps3: 192.168.1.78
IPv6 address for ensps3: 2606:109f:1d:5d26:aew0:27ff:fe35:f62f

Expanded Security Maintenance for Applications is not enabled.

45 updates can be applied immediately.
To see these additional updates run: apt list --upgradeable

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

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/<package>/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.

alumno@linservubu:~$ 

```

CTRL DERECHA

C) Creación de un Servidor Web

1. Actualización de rutina del sistema ejecutando los siguientes comandos una vez iniciado sesión como administrador:

`sudo apt update && sudo apt upgrade -y`

```

Ubuntu 24.04.3 LTS linservubu tty1
linservubu login: alumno
Password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-90-generic x86_64)

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

System information as of Mon Dec 15 10:57:24 PM UTC 2025

System load: 0.52
Usage of /: 42.4% of 11.21GB
Memory usage: 68
Swap usage: 0%
Processes: 104
Users logged in: 0
IPv4 address for ensps3: 192.168.1.78
IPv6 address for ensps3: 2606:109f:1d:5d26:aew0:27ff:fe35:f62f

Expanded Security Maintenance for Applications is not enabled.

45 updates can be applied immediately.
To see these additional updates run: apt list --upgradeable

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

alumno@linservubu:~$ sudo apt update && sudo apt upgrade -y

```

CTRL DERECHA

2. Instalar Node.js y npm. Ejecutar:

```
# Instalar curl si no está disponible
```

```
sudo apt install curl -y
```

A screenshot of a Linux terminal window titled "VMLinuxServerUbuntu1 clonar [Corriendo] - Oracle VM VirtualBox". The window shows a command-line session where the user is installing the curl package using apt-get. The terminal output is as follows:

```
slum@slum:~$ sudo su
root@slum:~# /home/slum$ sudo apt-get install curl -y
Reading package lists... done
Building dependency tree... done
Reading state information... done
curl is already the newest version (7.2.1-1ubuntu4.10.5).
curl0 is already the newest version (7.2.1-1ubuntu4.10.5).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
root@slum:~#
```

Instalar Node.js

```
curl -fsSL https://deb.nodesource.com/setup_lts.x | sudo -E bash -
```

```

Sudo was set to manually installed.
The following NEW packages will be installed:
  apt-transport-https
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 3,978 B of archives.
After this operation, 36.5 kB of additional disk space will be used.
Get:1 http://deb.nodesource.com/ubuntu focal-updates/universe amd64 apt-transport-https all 2.8.3 [3,978 B]
Fetched 3,978 B in 1s (4,659 B/s)
Selecting previously unselected package apt-transport-https.
(Reading database ... 4445 files and directories currently installed.)
Preparing to unpack .../apt-transport-https_2.8.3_all.deb ...
Unpacking apt-transport-https (2.8.3) ...
Setting up apt-transport-https (2.8.3) ...
Scanning processes...
Scanning candidates...
Scanning linux images...

Running kernel seems to be up-to-date.

Restarting services...
Service restarts being deferred:
  /etc/init.d/dbus.service
  systemct1 restart systemd-logind.service
  systemct1 restart unattended-upgrades.service

No containers need to be restarted.

User sessions running outdated binaries:
  alumno @ session #1: login[884]
  alumno @ user manager service: systemd[1010]

No VM guests are running outdated hypervisor (qemu) binaries on this host.

Get:1 https://deb.nodesource.com/node_24.x nodistro InRelease [12.1 kB]
Hit:2 http://security.ubuntu.com/ubuntu focal-security InRelease
Hit:3 http://archive.ubuntu.com/ubuntu focal InRelease
Hit:4 http://archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:5 http://archive.ubuntu.com/ubuntu focal-backports InRelease
Get:6 http://deb.nodesource.com/node_24.x nodistro/main amd64 Packages [4,542 kB]
Fetched 16.7 kB in 2s (9,358 B/s)
Reading package lists... done
Building dependency tree... done
Reading state information... done
All packages are up to date.

2025-12-15 23:00:17 - To Install Node.js, run: apt install nodejs -y
2025-12-15 23:00:17 - You can use Nisolid Runtime as a Node.js alternative
2025-12-15 23:00:17 - To Install Nisolid Runtime, run: apt install nisolid -y
root@linserubu:/home/alumno#

```

sudo apt install nodejs -y

```

root@linserubu:/home/alumno# sudo apt install nodejs -y
Reading package lists... done
Building dependency tree... done
Reading state information... done
The following NEW packages will be installed:
  nodejs
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 37.0 MB of archives.
After this operation, 100 kB of additional disk space will be used.
Get:1 https://deb.nodesource.com/node_24.x nodistro/main amd64 nodejs [87.8 kB]
Fetched 37.0 MB in 4s (8,748 B/s)
Selecting previously unselected package nodejs (24.11.1-1-nodesource).
(Reading database ... 4449 files and directories currently installed.)
Preparing to unpack .../nodejs_24.11.1-1-nodesource_amd64.deb ...
Unpacking nodejs (24.11.1-1-nodesource) ...
Setting up nodejs (24.11.1-1-nodesource) ...
Processing triggers for man-db (2.12.0-1ubuntu2) ...
Scanning processes...
Scanning candidates...
Scanning linux images...

Running kernel seems to be up-to-date.

Restarting services...
Service restarts being deferred:
  /etc/init.d/dbus.service
  systemct1 restart systemd-logind.service
  systemct1 restart unattended-upgrades.service

No containers need to be restarted.

User sessions running outdated binaries:
  alumno @ session #1: login[884]
  alumno @ user manager service: systemd[1010]

No VM guests are running outdated hypervisor (qemu) binaries on this host.

root@linserubu:/home/alumno#

```

Verificar instalación

node --version

npm --version

```

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@linserubu:/home/alumno# node --version
v24.11.1
root@linserubu:/home/alumno# npm --version
11.6.2
root@linserubu:/home/alumno#

```

3. Instalar el servidor web NGINX

```
sudo apt install nginx -y
```

```
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  nginx-common
Suggested packages:
  fcgiwrap nginx-doc ssl-cert
The following NEW packages will be installed:
  nginx nginx-common
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 564 kB of archives.
After this operation, 1,596 kB of additional disk space will be used.
Get:1 http://mx.archive.ubuntu.com/ubuntu noble-updates/main amd64 nginx-common all 1.24.0-2ubuntu7.5 [48.4 kB]
Get:2 http://mx.archive.ubuntu.com/ubuntu noble-updates/main amd64 nginx amd64 1.24.0-2ubuntu7.5 [520 kB]
Fetched 564 kB in 2s (279 kB/s)
Preconfiguring packages ...
Selecting previously unselected package nginx-common.
(Reading database ... 90461 files and directories currently installed.)
Preparing to unpack .../nginx-common_1.24.0-2ubuntu7.5_all.deb ...
Unpacking nginx-common (1.24.0-2ubuntu7.5) ...
Selecting previously unselected package nginx.
Preparing to unpack .../nginx_1.24.0-2ubuntu7.5_amd64.deb ...
Unpacking nginx (1.24.0-2ubuntu7.5) ...
Setting up nginx-common (1.24.0-2ubuntu7.5) ...
Created symlink /etc/systemd/system/multi-user.target.wants/nginx.service → /usr/lib/systemd/system/nginx.service.
Setting up nginx (1.24.0-2ubuntu7.5) ...
 * Upgrading binary nginx
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for ufw (0.36.2-6) ...
Scanning processes...
Scanning candidates...
Scanning linux images...
Running kernel seems to be up-to-date.
Restarting services...
Service restarts being deferred:
/etc/needrestart/restart.d/dbus.service
systemctl restart systemd-logind.service
systemctl restart unattended-upgrades.service

No containers need to be restarted.

User sessions running outdated binaries:
alumno @ session #1: login[884]
alumno @ user manager service: systemd[1010]

No VM guests are running outdated hypervisor (qemu) binaries on this host.
```

Habilitar NGINX para que inicie automáticamente

```
sudo systemctl enable nginx
```

Verificar que está corriendo

```
sudo systemctl status nginx
```

```
root@linserubu:/home/alumno# sudo systemctl enable nginx
Synchronizing state of nginx.service with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable nginx
root@linserubu:/home/alumno# sudo systemctl status nginx
● nginx.service - A high performance web server and a reverse proxy server
   Loaded: loaded (/usr/lib/systemd/system/nginx.service; enabled; preset: enabled)
   Active: active (running) since Mon 2025-12-15 23:14:03 UTC; 1min 47s ago
     Docs: man:nginx(8)
 Main PID: 10357 (nginx)
    Tasks: 4 (limit: 4049)
   Memory: 3.1M (peak: 6.7M)
      CPU: 60ms
     CGroup: /system.slice/nginx.service
             ├─10357 "nginx: master process /usr/sbin/nginx -g daemon on; master_process on;"
             ├─10359 "nginx: worker process"
             ├─10360 "nginx: worker process"
             └─10361 "nginx: worker process"

Dec 15 23:14:03 linserubu systemd[1]: Starting nginx.service - A high performance web server and a reverse proxy server...
Dec 15 23:14:03 linserubu systemd[1]: Started nginx.service - A high performance web server and a reverse proxy server.
root@linserubu:/home/alumno# _
```

4. Instalación de Git para obtener acceso al repositorio donde se encuentra el proyecto para servirlo posteriormente. Instalamos y clonamos el repositorio en cuestión. Para propósitos de esta práctica usaremos uno de los proyectos creados con React durante el presente semestre subido a un repositorio independiente

Para instalar git ejecutamos:

```
sudo apt install git -y
```

```
root@linserubu:/home/alumno# apt install git -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
git is already the newest version (1:2.43.0-1ubuntu7.3).
git set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
root@linserubu:/home/alumno#
```

Posteriormente en la carpeta home del usuario actual

```
cd ~
git clone <url-de-tu-repositorio>
cd <nombre-del-proyecto>
```

```
root@linserubu:~# git clone https://github.com/MyJoker2003/To-Do-App-Testing-21070315.git
Cloning into 'To-Do-App-Testing-21070315'...
remote: Enumerating objects: 29, done.
remote: Counting objects: 100% (29/29), done.
remote: Compressing objects: 100% (24/24), done.
remote: Total 29 (delta 2), reused 29 (delta 2), pack-reused 0 (from 0)
Receiving objects: 100% (29/29), 83.14 KiB | 740.00 KiB/s, done.
Resolving deltas: 100% (2/2), done.
root@linserubu:~# ls
To-Do-App-Testing-21070315
root@linserubu:~# cd To-Do-App-Testing-21070315
root@linserubu:~/To-Do-App-Testing-21070315# _
```

5. Instalar las dependencias de node localmente. Ejecutar los siguientes comandos, incluyendo un build para producción.

```
npm install
```

```
npm run build
```

```
root@linserubu:~/To-Do-App-Testing-21070315# npm install
added 157 packages, and audited 158 packages in 8s

33 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
npm notice
npm notice New minor version of npm available! 11.6.2 -> 11.7.0
npm notice Changelog: https://github.com/npm/cli/releases/tag/v11.7.0
npm notice To update run: npm install -g npm@11.7.0
npm notice
root@linserubu:~/To-Do-App-Testing-21070315# ls
eslint.config.js index.html node_modules package.json package-lock.json public README.md src vite.config.js
root@linserubu:~/To-Do-App-Testing-21070315#
root@linserubu:~/To-Do-App-Testing-21070315# npm run build

> to-do-app@0.0.0 build
> vite build

vite v7.2.4 building client environment for production...
+ 35 modules transformed.
dist/index.html          0.46 kB | gzip:  0.29 kB
dist/assets/uncheck-IB6_EdYb.png 12.86 kB
dist/assets/ToDoListIcon-xw2fQs1g.jpg 23.19 kB
dist/assets/checked-MInknInC.webp 24.88 kB
dist/assets/index-0NJ7fUuy.css   1.84 kB | gzip:  0.82 kB
dist/assets/index-BPrpUlSK.js   195.16 kB | gzip: 61.36 kB
+ built in 3.10s
root@linserubu:~/To-Do-App-Testing-21070315# ls
dist eslint.config.js index.html node_modules package.json package-lock.json public README.md src vite.config.js
root@linserubu:~/To-Do-App-Testing-21070315#
```

6. Configurar el servidor web NGINX, creando un directorio para la aplicación y copiando los archivos generados por el build.

```
sudo mkdir -p /var/www/mi-app  
sudo cp -r dist/* /var/www/mi-app/
```

```
root@linserubu:~/To-Do-App-Testing-21070315# sudo mkdir -p /var/www/to-do  
root@linserubu:~/To-Do-App-Testing-21070315# sudo cp -r dist/* /var/www/to-do/  
root@linserubu:~/To-Do-App-Testing-21070315# _
```

7. Establecer permisos de....:

```
sudo chown -R www-data:www-data /var/www/mi-app  
sudo chmod -R 755 /var/www/mi-app
```

```
root@linserubu:~/To-Do-App-Testing-21070315# sudo chown -R www-data:www-data /var/www/to-do  
root@linserubu:~/To-Do-App-Testing-21070315# sudo chmod -R 755 /var/www/to-do  
root@linserubu:~/To-Do-App-Testing-21070315# _
```

8. Crear la siguiente configuración de NGINX para la app.

```
sudo nano /etc/nginx/sites-available/mi-app
```

Contenido del archivo de configuración

```
server {  
    listen 80;  
    listen [::]:80;  
    server_name tu-dominio.com; # O la IP de tu servidor  
  
    root /var/www/mi-app;  
    index index.html;  
  
    location / {  
        try_files $uri $uri/ /index.html;  
    }  
  
    # Configuración para archivos estáticos  
    location ~  
    \.(js|css|png|jpg|jpeg|gif|ico|svg|woff|woff2|ttf|eot)$ {  
        expires 1y;  
        add_header Cache-Control "public, immutable";  
    }  
}
```

```
GNU nano 7.2                               /etc/nginx/sites-available/to-do
server {
    listen 80;
    listen [::]:80;
    server_name _;

    root /var/www/to-do;
    index index.html;

    location / {
        try_files $uri $uri/ /index.html;
    }

    #Configuracion de archivos estaticos
    location ~* \.(js|css|png|jpg|jpeg|gif|ico|svg|woff|woff2|ttf|eot)$ {
        expires 1y;
        add_header Cache-Control "public, immutable";
    }
}
```

9. Verificar la configuración

```
# Crear enlace simbólico
```

```
sudo ln -s /etc/nginx/sites-available/mi-app /etc/nginx/sites-enabled/
```

```
# Opcional: eliminar la configuración por defecto
```

```
sudo rm /etc/nginx/sites-enabled/default
```

```
# Verificar que la configuración es correcta
```

```
sudo nginx -t
```

```
root@linserubu:~/To-Do-App-Testing-21070315# sudo ln -s /etc/nginx/sites-available/to-do /etc/nginx/sites-enabled/
root@linserubu:~/To-Do-App-Testing-21070315# sudo rm /etc/nginx/sites-enabled/default
root@linserubu:~/To-Do-App-Testing-21070315# sudo nginx -t
nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
nginx: configuration file /etc/nginx/nginx.conf test is successful
root@linserubu:~/To-Do-App-Testing-21070315# -
```

10. Configurar el firewall

```
sudo ufw allow 'Nginx HTTP'
```

```

root@linserubu:~/To-Do-App-Testing-21070315# sudo ufw allow 'Nginx HTTP'
Rules updated
Rules updated (v6)
root@linserubu:~/To-Do-App-Testing-21070315# sudo ufw status
Status: inactive
root@linserubu:~/To-Do-App-Testing-21070315# sudo ufw enable
Firewall is active and enabled on system startup
root@linserubu:~/To-Do-App-Testing-21070315# sudo ufw status verbose
Status: active
Logging: on (low)
Default: deny (incoming), allow (outgoing), disabled (routed)
New profiles: skip

To           Action      From
--          ----       ---
80/tcp (Nginx HTTP) ALLOW IN  Anywhere
80/tcp (Nginx HTTP (v6)) ALLOW IN  Anywhere (v6)

root@linserubu:~/To-Do-App-Testing-21070315#

```

11. Reiniciar el servidor con la nueva configuración

```
sudo systemctl restart nginx
```

```

root@linserubu:~/To-Do-App-Testing-21070315# sudo systemctl restart nginx
root@linserubu:~/To-Do-App-Testing-21070315# sudo systemctl status nginx
● nginx.service - A high performance web server and a reverse proxy server
   Loaded: loaded (/usr/lib/systemd/system/nginx.service; enabled; preset: enabled)
   Active: active (running) since Tue 2025-12-16 00:05:21 UTC; 36s ago
     Docs: man:nginx(8)
     Process: 11084 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
    Process: 11085 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
   Main PID: 11087 (nginx)
      Tasks: 4 (limit: 4049)
        Memory: 3.0M (peak: 3.5M)
         CPU: 59ms
        CGroup: /system.slice/nginx.service
                ├─11087 "nginx: master process /usr/sbin/nginx -g daemon on; master_process on;"
                ├─11088 "nginx: worker process"
                ├─11089 "nginx: worker process"
                └─11090 "nginx: worker process"

Dec 16 00:05:21 linserubu systemd[1]: Starting nginx.service - A high performance web server and a reverse proxy server...
Dec 16 00:05:21 linserubu systemd[1]: Started nginx.service - A high performance web server and a reverse proxy server.
root@linserubu:~/To-Do-App-Testing-21070315# _

```

12. Obtener la dirección ip asignada a la VM.

```

root@linserubu:/home/alumno# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:35:f6:2f brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.78/24 metric 100 brd 192.168.1.255 scope global dynamic enp0s3
        valid_lft 85840sec preferred_lft 85840sec
    inet6 2806:109f:d:5b26:a00:27ff:fe35:f62f/64 scope global dynamic mngtmpaddr noprefixroute
        valid_lft 2591552sec preferred_lft 2591552sec
    inet6 fe80::a00:27ff:fe35:f62f/64 scope link
        valid_lft forever preferred_lft forever
root@linserubu:/home/alumno# _

```

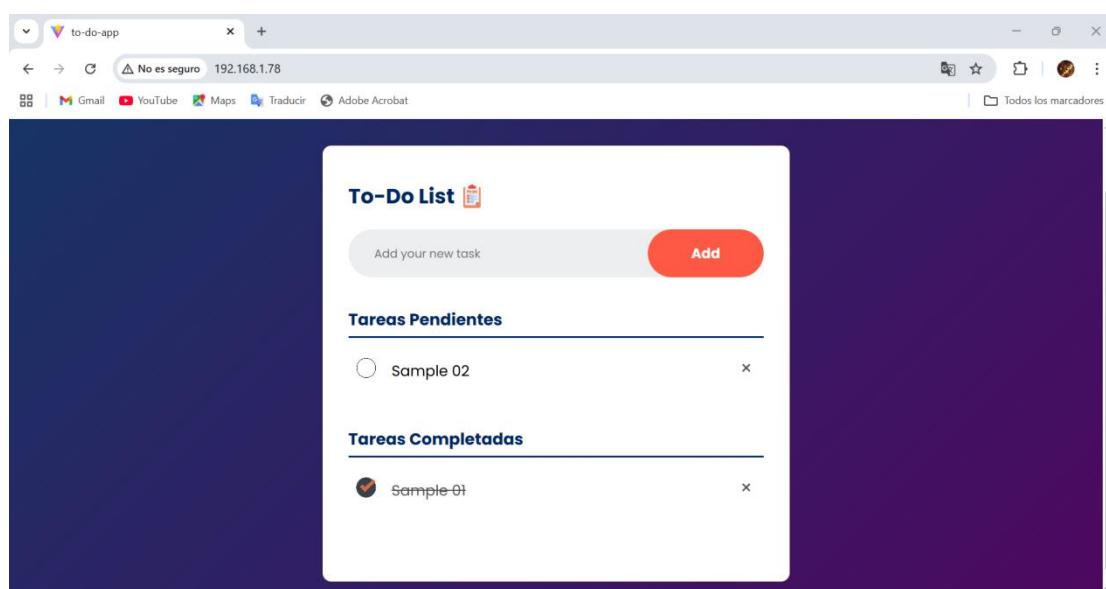
13. Verificar que se puede acceder al archivo html correctamente usando la dirección ip mediante curl

```

root@linserubu:/home/alumno# curl http://localhost
<!doctype html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <link rel="icon" type="image/svg+xml" href="/vite.svg" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <title>to-do-app</title>
    <script type="module" crossorigin src="/assets/index-BPrpUlSK.js"></script>
    <link rel="stylesheet" crossorigin href="/assets/index-DNJ7fUuy.css">
  </head>
  <body>
    <div id="root"></div>
  </body>
</html>
root@linserubu:/home/alumno#

```

14. Acceder desde la maquina huesped a la web app usando la dirección ip en el navegador.



D) Creación de un Servidor de Base de Datos.

1. Instalar MySQL Server y verificar que este ejecutandose correctamente:

```
sudo apt install mysql-server -y
```

```
sudo systemctl status mysql
```

```

root@linserubu:/home/alumno# sudo apt install mysql-server
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
mysql-server is already the newest version (8.0.44-0ubuntu0.24.04.2).
0 upgraded, 0 newly installed, 0 to remove and 26 not upgraded.
root@linserubu:/home/alumno# -

```

```

reading /usr/share/mecab/dic/ipadic/Postp-col.csv ... 91
reading /usr/share/mecab/dic/ipadic/Symbol.csv ... 208
reading /usr/share/mecab/dic/ipadic/Noun.demonst.csv ... 120
reading /usr/share/mecab/dic/ipadic/Noun.proper.csv ... 27328
reading /usr/share/mecab/dic/ipadic/Noun.csv ... 60477
reading /usr/share/mecab/dic/ipadic/Noun.others.csv ... 151
reading /usr/share/mecab/dic/ipadic/Noun.advj.csv ... 3328
reading /usr/share/mecab/dic/ipadic/Noun.name.csv ... 34262
reading /usr/share/mecab/dic/ipadic/Auxll.csv ... 199
reading /usr/share/mecab/dic/ipadic/Conjunction.csv ... 171
reading /usr/share/mecab/dic/ipadic/Adj.csv ... 27210
reading /usr/share/mecab/dic/ipadic/Adnominal.csv ... 135
reading /usr/share/mecab/dic/ipadic/Suffixx.csv ... 1393
reading /usr/share/mecab/dic/ipadic/Postp.csv ... 72999
reading /usr/share/mecab/dic/ipadic/Prefix.csv ... 146
reading /usr/share/mecab/dic/ipadic/Prefix.csv ... 221
reading /usr/share/mecab/dic/ipadic/Adverb.csv ... 3632
reading /usr/share/mecab/dic/ipadic/Verb.csv ... 136750
reading /usr/share/mecab/dic/ipadic/Filler.csv ... 19
reading /usr/share/mecab/dic/ipadic/Noun.adverbial.csv ... 795
reading /usr/share/mecab/dic/ipadic/Noun.number.csv ... 42
reading /usr/share/mecab/dic/ipadic/Noun.erg.csv ... 16668
reading /usr/share/mecab/dic/ipadic/Noun.nat.csv ... 42
emitting double-array: 100% #####|#####
reading /usr/share/mecab/dic/ipadic/mathix.def ... 1316x1318
emitting matrix : 100% #####
done!
update-alternatives: using /var/lib/mecab/dic/ipadic-utf8 to provide /var/lib/mecab/dic.debian (mecab-dictionary) in auto mode
Setting up libbhtml-parser-perl:amd64 (3.81-1build3) ...
Setting up libbhtml-message-perl (6.45-1ubuntu1) ...
Setting up mysql-server (8.0.44-0ubuntu0.24.04.2) ...
Setting up libcogl-pm-perl (4.53-1)
Setting up libbhtml-template-perl (2.97-2) ...
Setting up libcogl-fast-perl (1:2.17-1)
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu0.6) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.
No services need to be restarted.
No containers need to be restarted.
No user sessions are running outdated binaries.
No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@linserubu:/home/alumno# _
```

```

root@linserubu:/home/alumno# sudo systemctl status mysql
● mysql.service - MySQL Community Server
   Loaded: loaded (/usr/lib/systemd/system/mysql.service; enabled; preset: enabled)
   Active: active (running) since Wed 2025-12-17 13:24:04 UTC; 1min 55s ago
     Process: 2350 ExecStartPre=/usr/share/mysql/mysql-systemd-start pre (code=exited, status=0/SUCCESS)
    Main PID: 2359 (mysqld)
      Status: "Server is operational"
        Tasks: 37 (limit: 4047)
       Memory: 363.8M (peak: 378.3M)
         CPU: 3.173s
        CGroup: /system.slice/mysql.service
                  └─2359 /usr/sbin/mysqld

Dec 17 13:24:01 linserubu systemd[1]: Starting mysql.service - MySQL Community Server...
Dec 17 13:24:04 linserubu systemd[1]: Started mysql.service - MySQL Community Server.
root@linserubu:/home/alumno# _
```

2. Configurar la seguridad de MySQL

`sudo mysql_secure_installation`

```

root@linserubu:/home/alumno# sudo mysql_secure_installation
Securing the MySQL server deployment.

Connecting to MySQL using a blank password.

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

Press y|Y for Yes, any other key for No: n

Skipping password set for root as authentication with auth_socket is used by default.
If you would like to use password authentication instead, this can be done with the "ALTER_USER" command.
See https://dev.mysql.com/doc/refman/8.0/en/alter-user.html#alter-user-password-management for more information.

By default, a MySQL installation has an anonymous user,
allowing anyone to log into MySQL without having to have
a user account created for them. This is intended only for
testing, and to make the installation go a bit smoother.
You should remove them before moving into a production
environment.

Remove anonymous users? (Press y|Y for Yes, any other key for No) : n
... skipping.

Normally, root should only be allowed to connect from
'localhost'. This ensures that someone cannot guess at
the root password from the network.

Disallow root login remotely? (Press y|Y for Yes, any other key for No) : n
... skipping.

By default, MySQL comes with a database named 'test' that
anyone can access. This is also intended only for testing,
and should be removed before moving into a production
environment.

Remove test database and access to it? (Press y|Y for Yes, any other key for No) : n

```

```

Connecting to MySQL using a blank password.

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

Press y|Y for Yes, any other key for No: n

Skipping password set for root as authentication with auth_socket is used by default.
If you would like to use password authentication instead, this can be done with the "ALTER_USER" command.
See https://dev.mysql.com/doc/refman/8.0/en/alter-user.html#alter-user-password-management for more information.

By default, a MySQL installation has an anonymous user,
allowing anyone to log into MySQL without having to have
a user account created for them. This is intended only for
testing, and to make the installation go a bit smoother.
You should remove them before moving into a production
environment.

Remove anonymous users? (Press y|Y for Yes, any other key for No) : n
... skipping.

Normally, root should only be allowed to connect from
'localhost'. This ensures that someone cannot guess at
the root password from the network.

Disallow root login remotely? (Press y|Y for Yes, any other key for No) : n
... skipping.

By default, MySQL comes with a database named 'test' that
anyone can access. This is also intended only for testing,
and should be removed before moving into a production
environment.

Remove test database and access to it? (Press y|Y for Yes, any other key for No) : n
... skipping.

Reloading the privilege tables will ensure that all changes
made so far will take effect immediately.

Reload privilege tables now? (Press y|Y for Yes, any other key for No) : y
Success.

All done!
root@linserubu:/home/alumno#

```

3. Configurar MySQL para aceptar conexiones remotas. Editamos el archivo de configuración de la siguiente forma

`sudo nano /etc/mysql/mysql.conf.d/mysqld.cnf`

Buscamos la línea que dice bind-address y la igualamos a 0.0.0.0

```

GNU nano 7.2                               /etc/mysql/mysql.conf.d/mysqld.cnf *

#
# The MySQL database server configuration file.
#
# One can use all long options that the program supports.
# Run program with --help to get a list of available options and with
# --print-defaults to see which it would actually understand and use.
#
# For explanations see
# http://dev.mysql.com/doc/mysql/en/server-system-variables.html

# Here is entries for some specific programs
# The following values assume you have at least 32M ram

[mysqld]
#
# * Basic Settings
#
user          = mysql
# pid-file     = /var/run/mysqld/mysqld.pid
# socket       = /var/run/mysqld/mysqld.sock
# port         = 3306
# datadir      = /var/lib/mysql

# If MySQL is running as a replication slave, this should be
# changed. Ref https://dev.mysql.com/doc/refman/8.0/en/server-system-variables.html#sysvar_tmpdir
# tmpdir        = /tmp
#
# Instead of skip-networking the default is now to listen only on
# localhost which is more compatible and is not less secure.
bind-address    = 0.0.0.0
mysqlx-bind-address = 0.0.0.0
#
# * Fine Tuning
#
key_buffer_size   = 16M
# max_allowed_packet = 64M
# thread_stack      = 256K
# thread_cache_size  = -1

# This replaces the startup script and checks MyISAM tables if needed
# the first time they are touched
myisam-recover-options = BACKUP

```

4. Crear un usuario para acceso remoto. Accedemos a MySQL con :

```
sudo mysql -u root -p
```

```

root@linserubu:/home/alumno# mysql -u root -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 12
Server version: 8.0.44-0ubuntu0.24.04.2 (Ubuntu)

Copyright (c) 2000, 2025, Oracle and/or its affiliates.

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

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

mysql>

```

Dentro de MySQL vamos a generar un nuevo usuario que utilizaremos para acceder desde otro equipo usando workbech (siempre que este conectado a la misma red)

```

CREATE USER 'remoto'@'%' IDENTIFIED BY '1234567890';
GRANT ALL PRIVILEGES ON *.* TO 'remoto'@'%' WITH GRANT OPTION;
FLUSH PRIVILEGES;
EXIT;

```

```

root@linserubu:/home/alumno# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 12
Server version: 8.0.44-0ubuntu0.24.04.2 (Ubuntu)

Copyright (c) 2000, 2025, Oracle and/or its affiliates.

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

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

mysql> CREATE USER 'remoto'@'%' IDENTIFIED BY '1234567890';
Query OK, 0 rows affected (0.05 sec)

mysql> GRANT ALL PRIVILEGES ON *.* TO 'remoto'@'%' WITH GRANT OPTION;
Query OK, 0 rows affected (0.04 sec)

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

mysql> EXIT;
Bye
root@linserubu:/home/alumno# 

```

```

root@linserubu:/home/alumno# mysql -u remoto -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 14
Server version: 8.0.44-0ubuntu0.24.04.2 (Ubuntu)

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

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

mysql> show databases;
+-----+
| Database      |
+-----+
| information_schema |
| mysql          |
| performance_schema |
| sys            |
+-----+
4 rows in set (0.01 sec)

mysql>

```

El símbolo % permite conexiones desde cualquier IP. Si prefieres mayor seguridad, reemplázalo con la IP de tu host.

5. Reiniciar MySQL. Usamos el siguiente comando.

```
sudo systemctl restart mysql
```

```

root@linserubu:/home/alumno# sudo systemctl restart mysql
root@linserubu:/home/alumno# sudo systemctl status mysql
● mysql.service - MySQL Community Server
   Loaded: loaded (/usr/lib/systemd/system/mysql.service; enabled; preset: enabled)
   Active: active (running) since Wed 2025-12-17 13:39:37 UTC; 16s ago
     Process: 2589 ExecStartPre=/usr/share/mysql/mysql-systemd-start pre (code=exited, status=0/SUCCESS)
    Main PID: 2599 (mysqld)
      Status: "Server is operational"
        Tasks: 38 (limit: 4047)
       Memory: 363.8M (peak: 377.9M)
         CPU: 1.927s
        CGroup: /system.slice/mysql.service
                  └─2599 /usr/sbin/mysqld

Dec 17 13:39:34 linserubu systemd[1]: Starting mysql.service - MySQL Community Server...
Dec 17 13:39:37 linserubu systemd[1]: Started mysql.service - MySQL Community Server.
root@linserubu:/home/alumno#

```

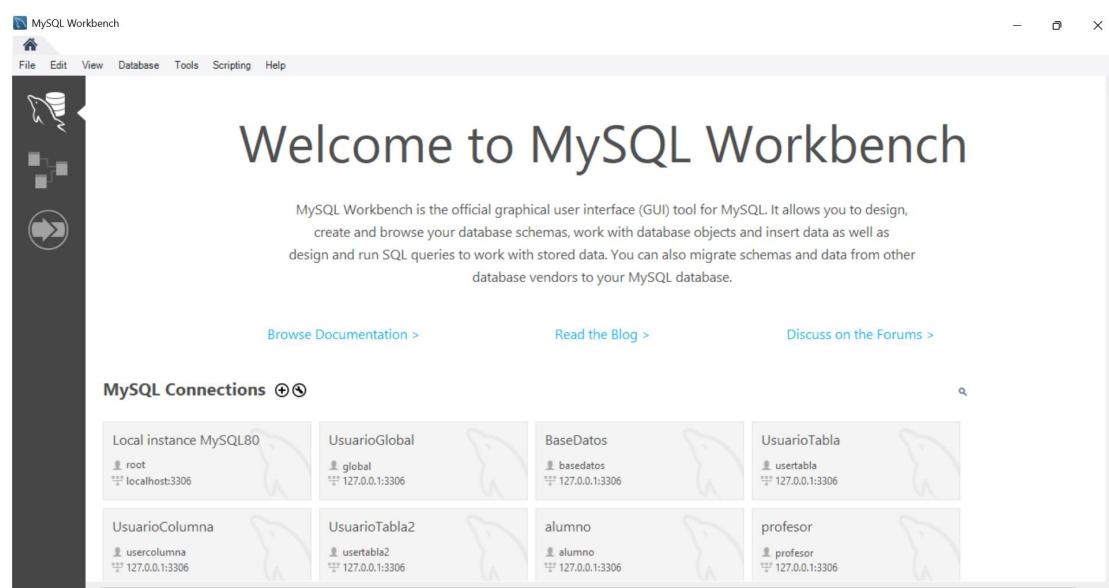
6. Configuramos el firewall, debemos proporcionar acceso al puerto 3306

```
sudo ufw allow 3306/tcp
```

```
sudo ufw reload
```

```
root@linserubu:/home/alumno# sudo ufw allow 3306/tcp
Rule added
Rule added (v6)
root@linserubu:/home/alumno# sudo ufw reload
Firewall reloaded
root@linserubu:/home/alumno#
```

7. Conectarnos desde MySQL Workbench: Abrimos Workbench desde la computadora host y hacemos clic en “+” junto a “MySQL Connections”



8. En el modal que se nos muestra configurar de la siguiente manera:

Connection Name: UbuSerRemote

Connection Method: Standard (TCP/IP)

Hostname: [La IP de la VM]

Port: 3306

Username: remoto

Procedemos a hacer clic en “Test Connection” e ingresamos la contraseña que creamos para el usuario remoto.

Por ultimo damos clic en OK si la conexión es exitosa. Podremos ver lo que hay en el servidor Linux

