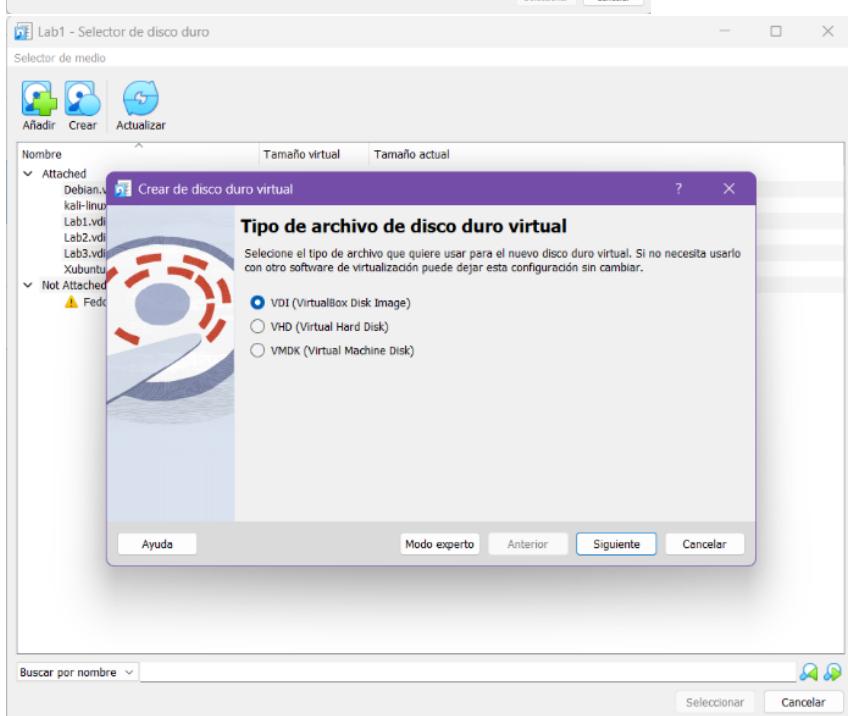
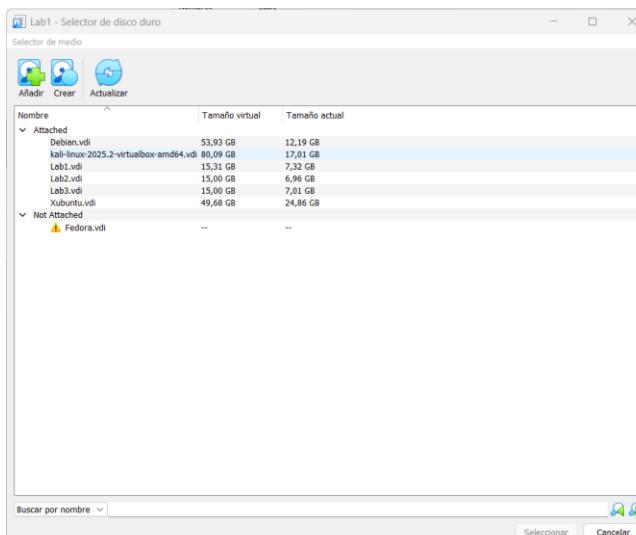
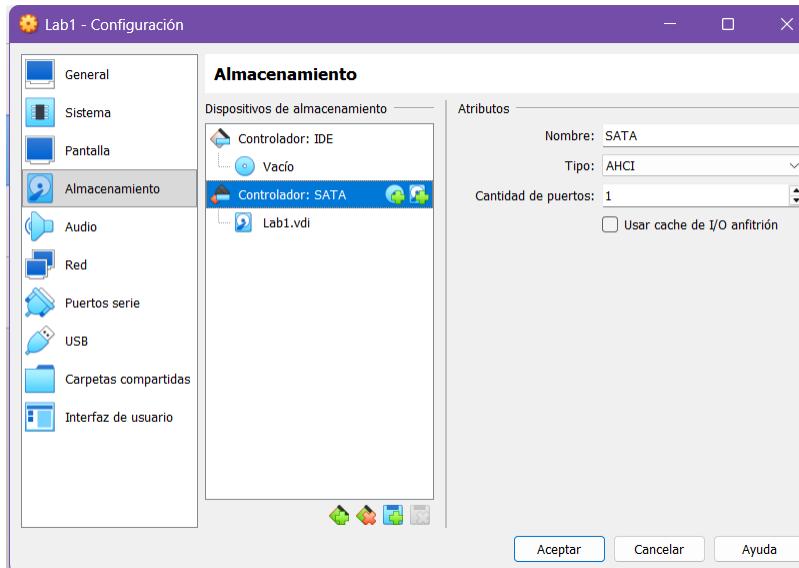
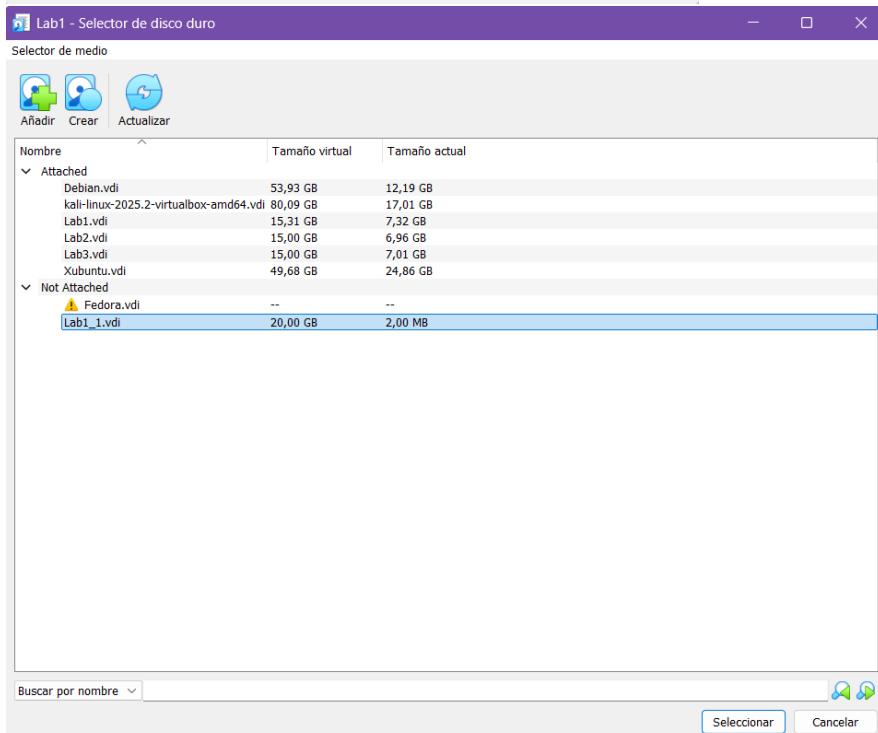
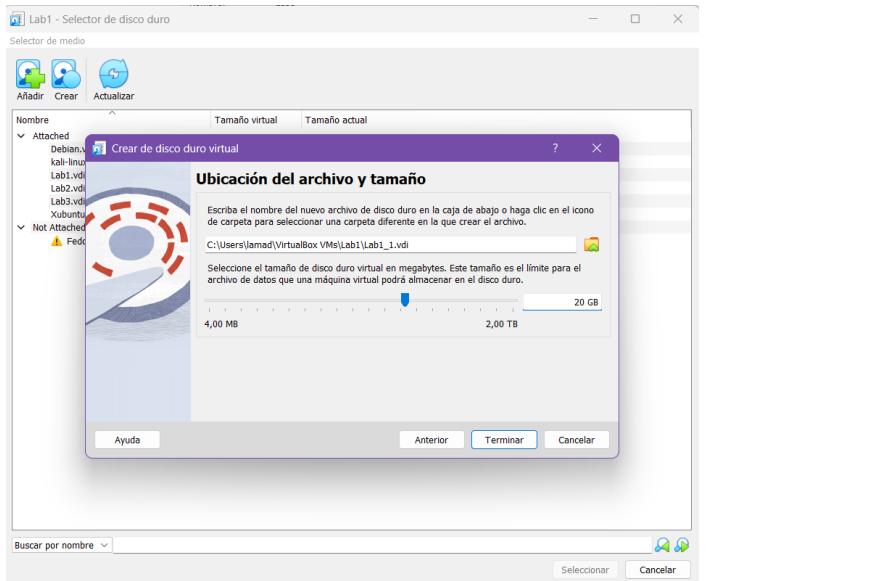
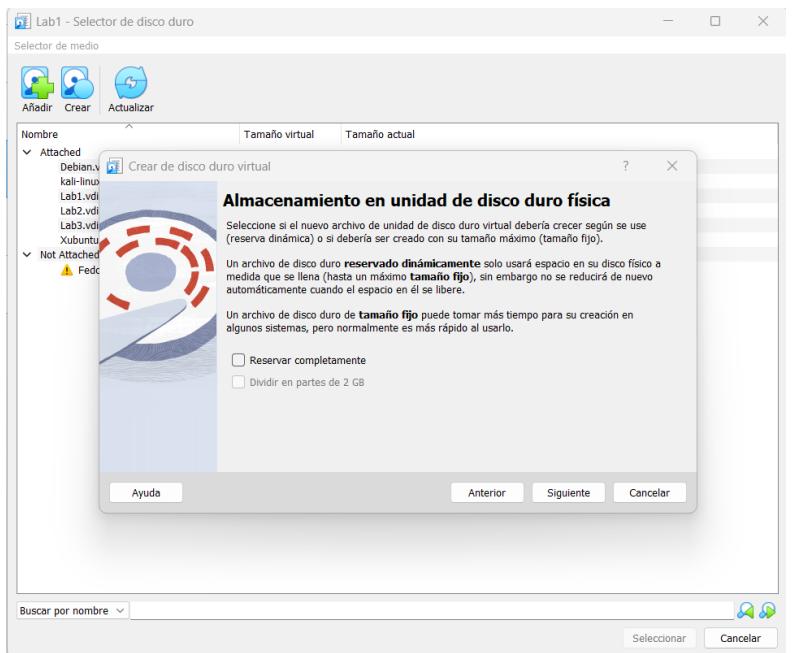
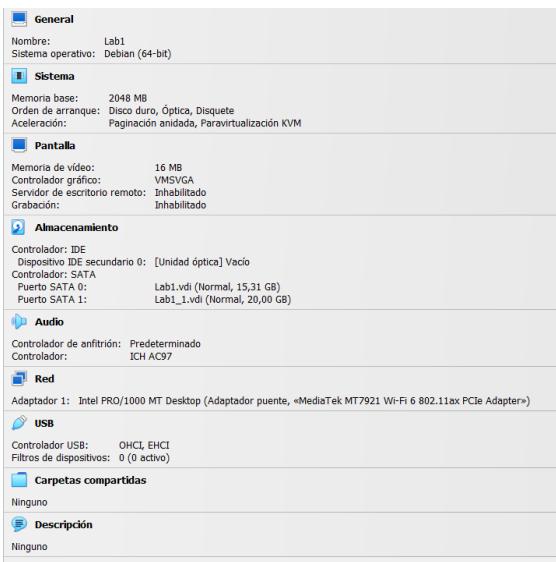


Añada un disco duro a su máquina virtual.

Se siguió el tutorial de YouTube de El profe del pasillo (2022):







Una vez añadido el disco nuevo investigue la funcionalidad del comando fdisk.

FDISK es una herramienta externa disponible en MS-DOS, Windows y Linux que sirve para gestionar discos duros. Permite formatear, crear particiones o eliminar partes del disco, y se usa principalmente para preparar y configurar su estructura. (Awati, 2023)

### 1. Divida el disco en dos particiones. 20pts

Se siguieron los tutoriales de Aleksic (2024) y Tucakov (2020):

```

laboratorio@Lab1:~$ sudo fdisk -l
[sudo] password for laboratorio:
Disk /dev/sda: 15.31 GiB, 16439009280 bytes, 32107440 sectors
Disk model: VBOX HARDDISK
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xf9f4c0da

Device      Boot   Start     End   Sectors  Size Id Type
/dev/sdal    *      2048 30347263 30345216 14.5G 83 Linux
/dev/sda2          30349310 32106495 1757186  858M f W95 Ext'd (LBA)
/dev/sda5          30349312 32106495 1757184  858M 82 Linux swap / Solaris

Disk /dev/sdb: 20 GiB, 21474836480 bytes, 41943040 sectors
Disk model: VBOX HARDDISK
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
laboratorio@Lab1:~$ █

```

Creación partición 1

```
laboratorio@Lab1:~  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
laboratorio@Lab1:~$ sudo fdisk /dev/sdb  
  
Welcome to fdisk (util-linux 2.41).  
Changes will remain in memory only, until you decide to write them.  
Be careful before using the write command.  
  
Device does not contain a recognized partition table.  
Created a new DOS (MBR) disklabel with disk identifier 0x9e2d675f.  
  
Command (m for help): n  
Partition type  
    p   primary (0 primary, 0 extended, 4 free)  
    e   extended (container for logical partitions)  
Select (default p): p  
Partition number (1-4, default 1): 1  
First sector (2048-41943039, default 2048):  
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-41943039, default 41943039):  
+10G  
  
Created a new partition 1 of type 'Linux' and of size 10 GiB.  
  
Command (m for help): ■
```

Creación partición 2:

```
laboratorio@Lab1:~  
Partition type  
    p   primary (0 primary, 0 extended, 4 free)  
    e   extended (container for logical partitions)  
Select (default p): p  
Partition number (1-4, default 1): 1  
First sector (2048-41943039, default 2048):  
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-41943039, default 41943039):  
+10G  
  
Created a new partition 1 of type 'Linux' and of size 10 GiB.  
  
Command (m for help): n  
Partition type  
    p   primary (1 primary, 0 extended, 3 free)  
    e   extended (container for logical partitions)  
Select (default p): p  
Partition number (2-4, default 2): 2  
First sector (20973568-41943039, default 20973568):  
Last sector, +/-sectors or +/-size{K,M,G,T,P} (20973568-41943039, default 41943039):  
  
Created a new partition 2 of type 'Linux' and of size 10 GiB.  
  
Command (m for help):
```

Confirmar la creación de las particiones:

```
laboratorio@Lab1:~  
p  primary (1 primary, 0 extended, 3 free)  
e  extended (container for logical partitions)  
Select (default p): p  
Partition number (2-4, default 2): 2  
First sector (20973568-41943039, default 20973568):  
Last sector, +/-sectors or +/-size{K,M,G,T,P} (20973568-41943039, default 41943039):  
  
Created a new partition 2 of type 'Linux' and of size 10 GiB.  
  
Command (m for help): p  
Disk /dev/sdb: 20 GiB, 21474836480 bytes, 41943040 sectors  
Disk model: VBOX HARDDISK  
Units: sectors of 1 * 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disklabel type: dos  
Disk identifier: 0x9e2d675f  
  
Device      Boot   Start     End   Sectors  Size Id Type  
/dev/sdb1          2048 20973567 20971520  10G 83 Linux  
/dev/sdb2        20973568 41943039 20969472  10G 83 Linux  
  
Command (m for help): laboratorio@Lab1:~$ sudo fdisk -l /dev/sdb  
Disk /dev/sdb: 20 GiB, 21474836480 bytes, 41943040 sectors  
Disk model: VBOX HARDDISK  
Units: sectors of 1 * 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disklabel type: dos  
Disk identifier: 0x9e2d675f  
  
Device      Boot   Start     End   Sectors  Size Id Type  
/dev/sdb1          2048 20973567 20971520  10G 83 Linux  
/dev/sdb2        20973568 41943039 20969472  10G 83 Linux  
laboratorio@Lab1:~$
```

2. Formatee cada partición en formato ext4. 20pts

```
laboratorio@Lab1:~$ sudo mkfs -t ext4 /dev/sdb1
mke2fs 1.47.2 (1-Jan-2025)
Creating filesystem with 2621440 4k blocks and 655360 inodes
Filesystem UUID: 3d225931-d371-4a13-8868-b5d4d7600a60
Superblock backups stored on blocks:
            32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632

Allocating group tables: done
Writing inode tables: done
Creating journal (16384 blocks): done
Writing superblocks and filesystem accounting information: done

laboratorio@Lab1:~$ sudo mkfs -t ext4 /dev/sdb2
mke2fs 1.47.2 (1-Jan-2025)
Creating filesystem with 2621184 4k blocks and 655360 inodes
Filesystem UUID: 3fa31b8a-2668-4f1f-9ec8-c542b4d9c128
Superblock backups stored on blocks:
            32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632

Allocating group tables: done
Writing inode tables: done
Creating journal (16384 blocks): done
Writing superblocks and filesystem accounting information: done

laboratorio@Lab1:~$
```

3. Monte cada partición en un directorio de su árbol de directorios usando el comando mount. Discuta para qué sirve el comando mount y si las particiones siguen montadas al reiniciar la computadora. 10pts

Se siguió el tutorial de GeeksforGeeks (2025):

```
laboratorio@Lab1:~$ sudo mkdir /mnt/part1
laboratorio@Lab1:~$ sudo mkdir /mnt/part2
laboratorio@Lab1:~$ sudo mount /dev/sdb1 /mnt/part1
laboratorio@Lab1:~$ sudo mount /dev/sdb2 /mnt/part2
....      ....
laboratorio@Lab1:~$ lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda     8:0    0 15.3G  0 disk
└─sda1  8:1    0 14.5G  0 part /
└─sda2  8:2    0    1K  0 part
└─sda5  8:5    0  858M  0 part [SWAP]
sdb     8:16   0   20G  0 disk
└─sdb1  8:17   0   10G  0 part /mnt/part1
└─sdb2  8:18   0   10G  0 part /mnt/part2
sr0    11:0   1 1024M 0 rom
laboratorio@Lab1:~$
```

¿Para qué sirve el comando mount?

El comando mount en Linux permite acceder a sistemas de archivos (como discos o unidades) asociándolos a una carpeta del sistema en una ubicación concreta. Al hacerlo, los archivos de ese sistema aparecen en la carpeta seleccionada. También se puede usar para desmontarlos cuando no se necesiten. (infoLinux, s. f.)

Después de reiniciar ya no aparece montado:

```

laboratorio@Lab1:~$ lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda     8:0    0 15.3G  0 disk
└─sda1  8:1    0 14.5G  0 part /
└─sda2  8:2    0   1K   0 part
└─sda5  8:5    0  858M  0 part [SWAP]
sdb     8:16   0   20G  0 disk
└─sdb1  8:17   0   10G  0 part
└─sdb2  8:18   0   10G  0 part
sr0    11:0   1 1024M 0 rom
laboratorio@Lab1:~$ █

```

4. Modifique la tabla de particiones de su máquina virtual modificando el archivo fstab de forma que sus particiones se monten automáticamente al iniciar el sistema.

20pts

Se siguió el tutorial de Rapoyil (2025):

```

laboratorio@Lab1:~$ sudo blkid
[sudo] password for laboratorio:
/dev/sdb2: UUID="3fa31b8a-2668-4f1f-9ec8-c542b4d9c128" BLOCK_SIZE="4096" TYPE="ext4" PARTUUID="9e2d675f-02"
/dev/sdb1: UUID="3d225931-d371-4a13-8868-b5d4d7600a60" BLOCK_SIZE="4096" TYPE="ext4" PARTUUID="9e2d675f-01"
/dev/sda5: UUID="14acbf9a-79a7-4592-8fcc-bf6a358f8dc8" TYPE="swap" PARTUUID="f9f4c0da-05"
/dev/sda1: UUID="f81dab10-e11f-444b-93dd-ce97071ba994" BLOCK_SIZE="4096" TYPE="ext4" PARTUUID="f9f4c0da-01"
laboratorio@Lab1:~$ █

```

Se agregaron las dos últimas líneas:

```

GNU nano 8.4                               /etc/fstab *
# /etc/fstab: static file system information.
#
# Use 'blkid' to print the universally unique identifier for a
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# systemd generates mount units based on this file, see systemd.mount(5).
# Please run 'systemctl daemon-reload' after making changes here.
#
# <file system> <mount point> <type> <options>      <dump> <pass>
# / was on /dev/sda1 during installation
UUID=f81dab10-e11f-444b-93dd-ce97071ba994 /          ext4    errors=remount-ro 0      1
# swap was on /dev/sda5 during installation
UUID=14acbf9a-79a7-4592-8fcc-bf6a358f8dc8 none      swap      sw      0      0
/dev/sr0       /media/cdrom0 udf,iso9660 user,noauto  0      0
UUID=3fa31b8a-2668-4f1f-9ec8-c542b4d9c128 /mnt/part1 ext4 defaults 0 2
UUID=3d225931-d371-4a13-8868-b5d4d7600a60 /mnt/part2 ext4 defaults 0 2

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

```

```

laboratorio@Lab1:~$ sudo nano /etc/fstab
laboratorio@Lab1:~$ sudo nano /etc/fstab
laboratorio@Lab1:~$ sudo nano /etc/fstab
laboratorio@Lab1:~$ sudo mount -a
mount: (hint) your fstab has been modified, but systemd still uses
        the old version; use 'systemctl daemon-reload' to reload.
laboratorio@Lab1:~$ systemctl daemon-reload

```

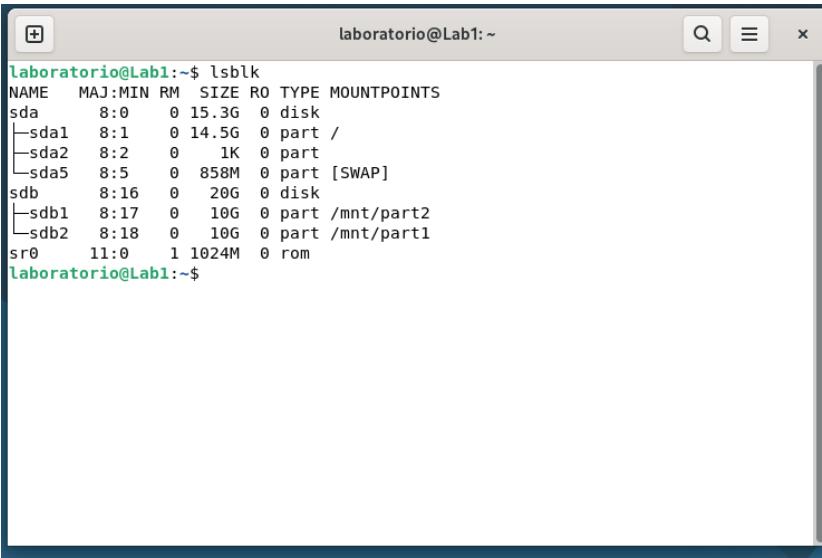
Ya sale montado

```

laboratorio@Lab1:~$ systemctl daemon-reload
laboratorio@Lab1:~$ sudo mount -a
laboratorio@Lab1:~$ lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda     8:0    0 15.3G  0 disk
└─sda1  8:1    0 14.5G  0 part /
└─sda2  8:2    0   1K   0 part
└─sda5  8:5    0  858M  0 part [SWAP]
sdb     8:16   0   20G  0 disk
└─sdb1  8:17   0   10G  0 part /mnt/part2
└─sdb2  8:18   0   10G  0 part /mnt/part1
sr0    11:0   1 1024M 0 rom
laboratorio@Lab1:~$ █

```

Al reiniciar aparece ahora si montado:

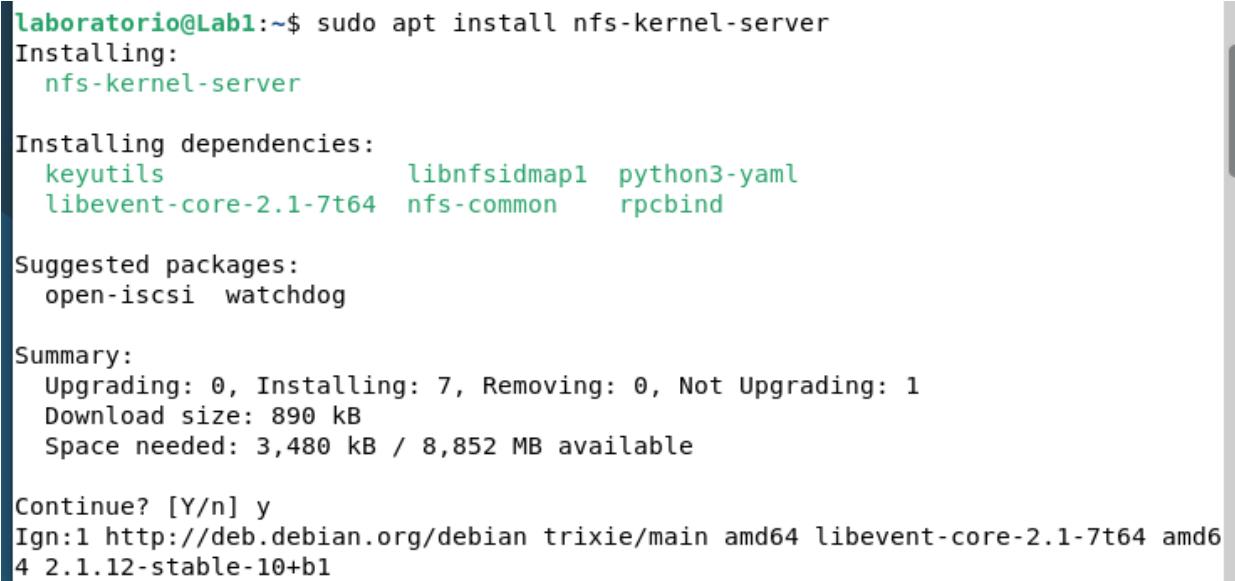


```
laboratorio@Lab1:~$ lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda      8:0    0 15.3G  0 disk
└─sda1   8:1    0 14.5G  0 part /
└─sda2   8:2    0    1K  0 part
└─sda5   8:5    0  858M  0 part [SWAP]
sdb      8:16   0   20G  0 disk
└─sdb1   8:17   0   10G  0 part /mnt/part2
└─sdb2   8:18   0   10G  0 part /mnt/part1
sr0     11:0   1 1024M 0 rom
laboratorio@Lab1:~$
```

5. En una máquina virtual (Lab1) instale un servidor NFS y en otra máquina virtual (Lab2) instale el cliente para NFS, configúrelos de forma que una de sus particiones de Lab1 se monte como una unidad de red en Lab2 y esté habilitada al iniciar el sistema. 30pts

Se siguió el tutorial de Boucheron y Vinayak Baranwal (2025).

En la máquina virtual 1:



```
laboratorio@Lab1:~$ sudo apt install nfs-kernel-server
Installing:
  nfs-kernel-server

Installing dependencies:
  keyutils          libnfsidmap1  python3-yaml
  libevent-core-2.1-7t64  nfs-common  rpcbind

Suggested packages:
  open-iscsi  watchdog

Summary:
  Upgrading: 0, Installing: 7, Removing: 0, Not Upgrading: 1
  Download size: 890 kB
  Space needed: 3,480 kB / 8,852 MB available

Continue? [Y/n] y
Ign:1 http://deb.debian.org/debian trixie/main amd64 libevent-core-2.1-7t64 amd64 2.1.12-stable-10+b1
```

Se siguieron pasos adicionales del tutorial de Whitaker (2020):

laboratorio@Lab1: ~

```
GNU nano 8.4 /etc/exports
# /etc/exports: the access control list for filesystems which may be exported
# to NFS clients. See exports(5).
#
# Example for NFSv2 and NFSv3:
# /srv/homes      hostname1(rw,sync,no_subtree_check) hostname2(ro,sync,no_subtree_check)
#
# Example for NFSv4:
# /srv/nfs4      gss/krb5i(rw,sync,fsid=0,crossmnt,no_subtree_check)
# /srv/nfs4/homes  gss/krb5i(rw,sync,no_subtree_check)
#
/mnt/part1 192.168.0.0/24(rw,sync,no_subtree_check)
/mnt/part2 192.168.0.0/24(rw,sync,no_subtree_check)
```

[ Read 12 lines ]

**^G Help** **^O Write Out** **^F Where Is** **^K Cut** **^T Execute** **^C Location**  
**^X Exit** **^R Read File** **^V Replace** **^U Paste** **^J Justify** **^/ Go To Line**

laboratorio@Lab1: ~

```
laboratorio@Lab1:~$ sudo systemctl restart nfs-kernel-server
laboratorio@Lab1:~$ sudo mount 192.168.0.108:/var/nfs/general /nfs/general
mount.nfs: access denied by server while mounting 192.168.0.108:/var/nfs/general
laboratorio@Lab1:~$ sudo nano /etc/exports
laboratorio@Lab1:~$ 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 brd 00:00:00:00:00:00 scope host lo
        valid_lft forever preferred_lft forever
    inet 192.168.0.1/24 brd 192.168.0.255 scope global dynamic noprefixroute enp0s5
        valid_lft 6557sec preferred_lft 6557sec
        inet6 fe80::a00:27ff:feb8:86bc/64 brd ff:ff:ff:ff:ff:ff scope link noprefixroute
            valid_lft forever preferred_lft forever
2: enp0s5 <NOEJECT,BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1280 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:00:27:f1:b8:bc brd ff:ff:ff:ff:ff:ff
    altname enx000027f1b8bc
    inet 192.168.0.108/24 brd 192.168.0.255 scope global dynamic noprefixroute enp0s5
        valid_lft 6557sec preferred_lft 6557sec
        inet6 fe80::a00:27ff:feb1:b8bc/64 brd ff:ff:ff:ff:ff:ff scope link noprefixroute
            valid_lft forever preferred_lft forever
laboratorio@Lab1:~$ sudo nano /etc/exports
laboratorio@Lab1:~$ sudo exports -a
exports: Failed to stat /var/nfs/general: No such file or directory
laboratorio@Lab1:~$ sudo exports -ra
sudo systemctl restart nfs-kernel-server
sudo exports -v
exports: Failed to stat /var/nfs/general: No such file or directory
/var/nfs/general
laboratorio@Lab1:~$ 192.168.0.0/24(sync,wdelay,hide,no_subtree_check,sec=sys,rw,secure,root_squash,no_all_squash)
laboratorio@Lab1:~$ sudo mkdir -p /var/nfs/general
sudo chown nobody:nogroup /var/nfs/general
sudo chmod 777 /var/nfs/general
laboratorio@Lab1:~$ sudo exports -v
laboratorio@Lab1:~$ 192.168.0.0/24(sync,wdelay,hide,no_subtree_check,sec=sys,rw,secure,root_squash,no_all_squash)
laboratorio@Lab1:~$ sudo systemctl restart nfs-kernel-server
laboratorio@Lab1:~$ sudo exports -v
laboratorio@Lab1:~$ 192.168.0.0/24(sync,wdelay,hide,no_subtree_check,sec=sys,rw,secure,root_squash,no_all_squash)
laboratorio@Lab1:~$ sudo nano /etc/exports
laboratorio@Lab1:~$ sudo exports -ra
laboratorio@Lab1:~$ sudo systemctl restart nfs-kernel-server
laboratorio@Lab1:~$ sudo exportsfs -v
sudo: exportsfs: command not found
laboratorio@Lab1:~$ sudo exportfs -v
laboratorio@Lab1:~$ 192.168.0.0/24(sync,wdelay,hide,no_subtree_check,sec=sys,rw,secure,root_squash,no_all_squash)
/mnt/part1   192.168.0.0/24(sync,wdelay,hide,no_subtree_check,sec=sys,rw,secure,root_squash,no_all_squash)
/mnt/part2   192.168.0.0/24(sync,wdelay,hide,no_subtree_check,sec=sys,rw,secure,root_squash,no_all_squash)
laboratorio@Lab1:~$
```

En la máquina virtual 2:

```

laboratorio@Lab2:~$ ping -c 4 192.168.0.108
PING 192.168.0.108 (192.168.0.108) 56(84) bytes of data.
64 bytes from 192.168.0.108: icmp_seq=1 ttl=64 time=3.80 ms
64 bytes from 192.168.0.108: icmp_seq=2 ttl=64 time=9.67 ms
^C
--- 192.168.0.108 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1015ms
rtt min/avg/max/mdev = 3.795/6.732/9.670/2.937 ms
laboratorio@Lab2:~$ sudo apt update
[sudo] password for laboratorio:
Hit:1 http://deb.debian.org/debian trixie InRelease
Hit:2 http://security.debian.org/debian-security trixie-security InRelease
Hit:3 http://deb.debian.org/debian trixie-updates InRelease
1 package can be upgraded. Run 'apt list --upgradable' to see it.
Building dependency tree... 0%

```

```

auth-rpcgss-module.service is a disabled or a static unit, not starting it.
nfs-idmapd.service is a disabled or a static unit, not starting it.
nfs-utils.service is a disabled or a static unit, not starting it.
proc-fs-nfsd.mount is a disabled or a static unit, not starting it.
rpc-gssd.service is a disabled or a static unit, not starting it.
rpc-statd-notify.service is a disabled or a static unit, not starting it.
rpc-statd.service is a disabled or a static unit, not starting it.
rpc-svcgssd.service is a disabled or a static unit, not starting it.
Processing triggers for man-db (2.13.1-1) ...
Processing triggers for libc-bin (2.41-12) ...
laboratorio@Lab2:~$ sudo mkdir -p /mnt/remoto
laboratorio@Lab2:~$ showmount -e 192.168.0.108
bash: showmount: command not found
laboratorio@Lab2:~$ sudo mkdir -p /mnt/remoto
laboratorio@Lab2:~$ sudo mount 192.168.0.108:/var/nfs/general /mnt/remoto
laboratorio@Lab2:~$ df -h | grep nfs
192.168.0.108:/var/nfs/general 15G 5.3G 8.2G 40% /mnt/remoto
laboratorio@Lab2:~$ sudo umount /mnt/remoto
laboratorio@Lab2:~$ sudo mount 192.168.0.108:/mnt/part2 /mnt/remoto
laboratorio@Lab2:~$ sudo mount 192.168.0.108:/mnt/part1 /mnt/remoto
laboratorio@Lab2:~$ df -h | grep remoto
192.168.0.108:/mnt/part2 9.8G 2.3M 9.3G 1% /mnt/remoto
192.168.0.108:/mnt/part1 9.8G 2.3M 9.3G 1% /mnt/remoto
laboratorio@Lab2:~$ 

```

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