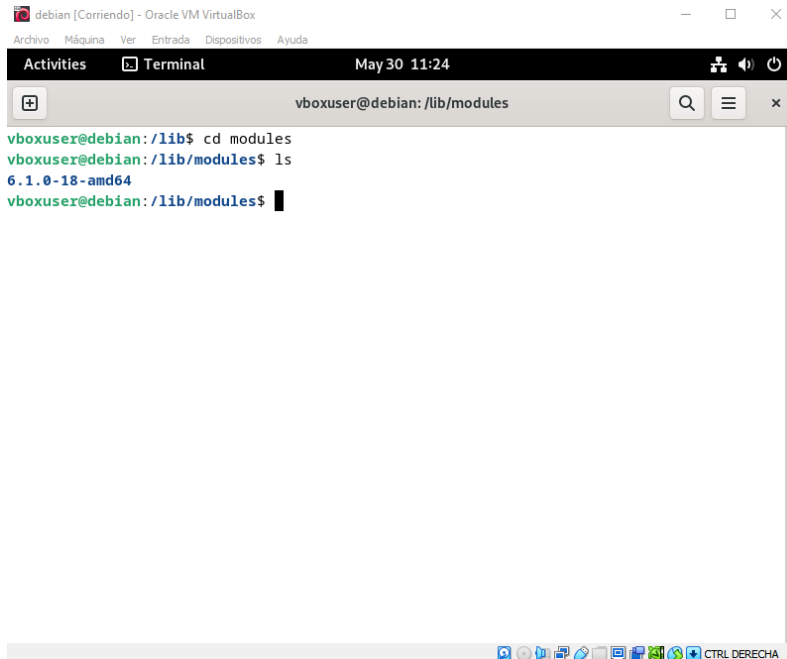


## Taller 6

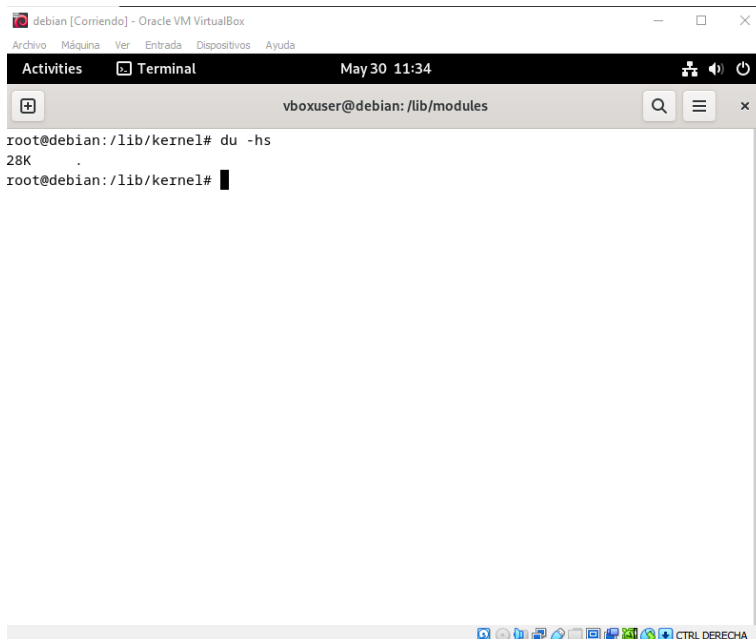
Nombre: Juan Jiménez

Fecha: 30/05/2024

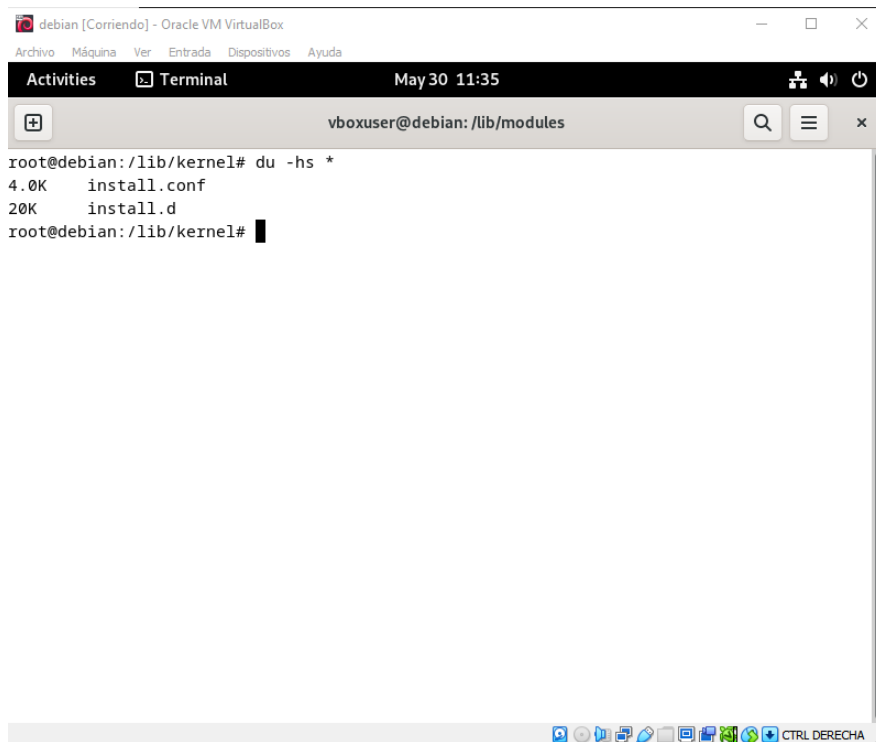


```
debian [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Activities  Terminal  May 30 11:24
vboxuser@debian: /lib/modules
vboxuser@debian:/lib$ cd modules
vboxuser@debian:/lib/modules$ ls
6.1.0-18-amd64
vboxuser@debian:/lib/modules$
```

Usamos los comandos “cd lib” y el “cd modules” para ingresar a la carpeta lib y modules el comando “ls” es para ver el contenido de la carpeta.



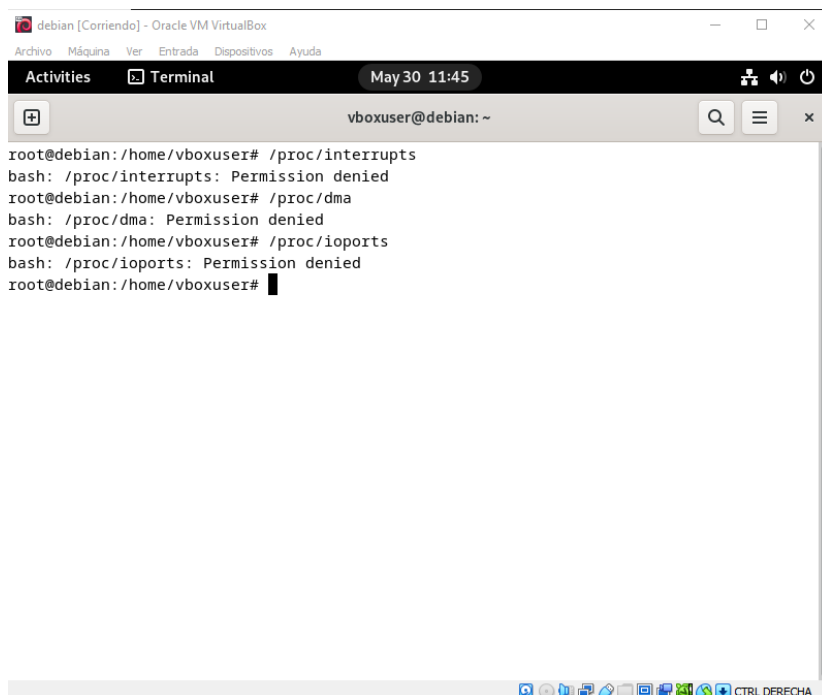
```
debian [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Activities  Terminal  May 30 11:34
vboxuser@debian: /lib/modules
root@debian:/lib/kernel# du -hs
28K
root@debian:/lib/kernel#
```



```
debian [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Activities  Terminal  May 30 11:35
vboxuser@debian: /lib/modules

root@debian:/lib/kernel# du -hs *
4.0K    install.conf
20K     install.d
root@debian:/lib/kernel#
```

El comando “du -hs \*” nos muestra el contenido de la carpeta y el peso de cada uno de los archivos.



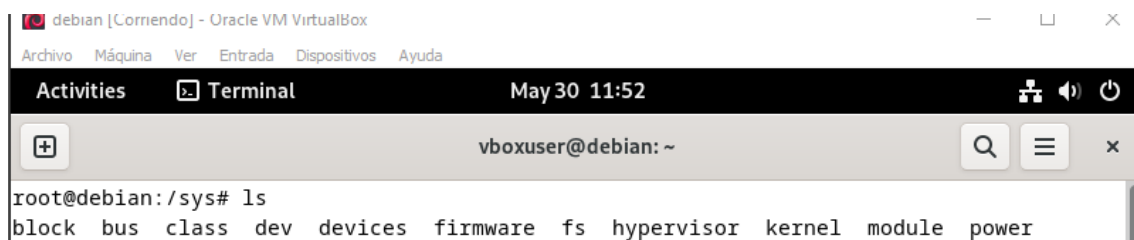
```
debian [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Activities  Terminal  May 30 11:45
vboxuser@debian: ~

root@debian:/home/vboxuser# /proc/interrupts
bash: /proc/interrupts: Permission denied
root@debian:/home/vboxuser# /proc/dma
bash: /proc/dma: Permission denied
root@debian:/home/vboxuser# /proc/ioports
bash: /proc/ioports: Permission denied
root@debian:/home/vboxuser#
```

El comando “/proc/interrupts” envía una petición a la cpu que gestione una petición de hardware.

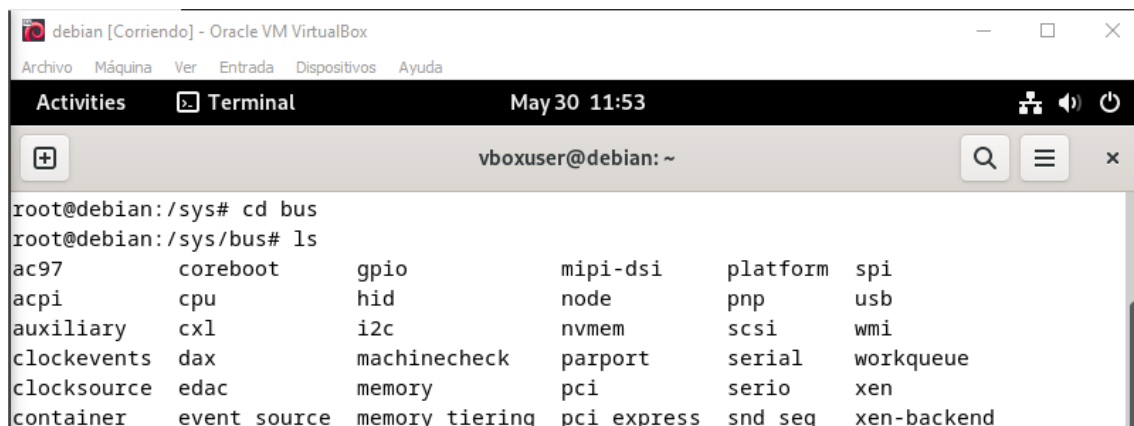
El comando “/proc/dma” nos permite acceder a los bloques de la memoria sin que sea necesaria la CPU.

El comando “/proc/ioports” nos permite ver los trozos de memoria que hay para la comunicación entre los dispositivos y la CPU.



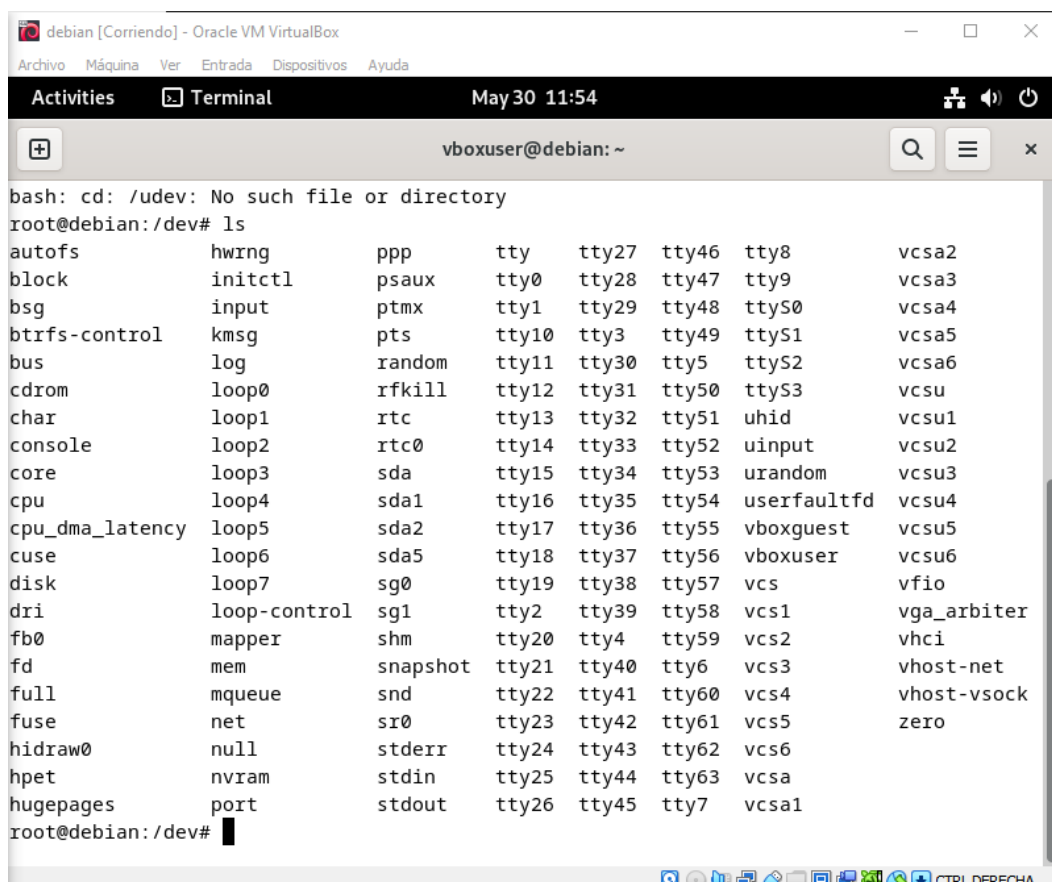
```
root@debian:/sys# ls
block bus class dev devices firmware fs hypervisor kernel module power
```

El comando “/sys/” nos permite acceder a donde se encuentran los dispositivos.



```
root@debian:/sys# cd bus
root@debian:/sys/bus# ls
ac97          coreboot      gpio          mipi-dsi      platform      spi
acpi          cpu           hid           node          pnp           usb
auxiliary     cxl           i2c           nvmem         scsi          wmi
clockevents   dax           machinecheck  parport       serial        workqueue
clocksource   edac          memory        pci           serio         xen
container     event_source  memory_tiering pci_express   snd_seq       xen-backend
```

El comando “cd bus” nos permite visualizar las comunicaciones entre los dispositivos y los eventos entre estos.



```
bash: cd: /udev: No such file or directory
root@debian:/dev# ls
autofs      hwrng      ppp        tty        tty27      tty46      tty8        vcса2
block       initctl    psaux      tty0       tty28      tty47      tty9        vcса3
bsg         input     ptmx       tty1       tty29      tty48      ttyS0       vcса4
btrfs-control kmsg      pts        tty10      tty3       tty49      ttyS1       vcса5
bus         log        random     tty11      tty30      tty5       ttyS2       vcса6
cdrom       loop0      rfkill     tty12      tty31      tty50      ttyS3       vcсу
char        loop1      rtc        tty13      tty32      tty51      uhid        vcсу1
console     loop2      rtc0       tty14      tty33      tty52      uinput      vcсу2
core        loop3      sda        tty15      tty34      tty53      urandom     vcсу3
cpu         loop4      sda1       tty16      tty35      tty54      userfaultfd vcсу4
cpu_dma_latency loop5      sda2       tty17      tty36      tty55      vboxguest   vcсу5
cuse        loop6      sda5       tty18      tty37      tty56      vboxuser    vcсу6
disk        loop7      sg0        tty19      tty38      tty57      vcs         vfio
dri         loop-control sg1        tty2       tty39      tty58      vcs1        vga_arbiter
fb0         mapper     shm        tty20      tty4       tty59      vcs2        vhci
fd          mem        snapshot   tty21      tty40      tty6       vcs3        vhost-net
full        mqueue     snd        tty22      tty41      tty60      vcs4        vhost-vsock
fuse        net        sr0        tty23      tty42      tty61      vcs5        zero
hidraw0     null       stderr     tty24      tty43      tty62      vcs6
hpet        nvram      stdin      tty25      tty44      tty63      vcса
hugepages   port       stdout     tty26      tty45      tty7       vcса1
```

En el comando “cd /dev” nos permite ver los archivos, donde se crearán o eliminaran ficheros que representan los dispositivos que se encuentren conectados.

```
debian [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Activities Terminal May 30 11:58
vboxuser@debian: ~

root@debian:/dev# cd
root@debian:~# lspci
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)
00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01)
00:02.0 VGA compatible controller: VMware SVGA II Adapter
00:03.0 Ethernet controller: Intel Corporation 82540EM Gigabit Ethernet Controller (rev 02)
00:04.0 System peripheral: InnoTek Systemberatung GmbH VirtualBox Guest Service
00:05.0 Multimedia audio controller: Intel Corporation 82801AA AC'97 Audio Controller (rev 01)
00:06.0 USB controller: Apple Inc. KeyLargo/Intrepid USB
00:07.0 Bridge: Intel Corporation 82371AB/EB/MB PIIX4 ACPI (rev 08)
00:0b.0 USB controller: Intel Corporation 82801FB/FBM/FR/FW/FRW (ICH6 Family) USB2 EHCI Controller
00:0d.0 SATA controller: Intel Corporation 82801HM/HEM (ICH8M/ICH8M-E) SATA Controller [AHCI mode] (rev 02)
root@debian:~# lspci -v
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)
    Flags: fast devsel

00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
    Flags: bus master, medium devsel, latency 0

00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01) (prog-if 8a [
```

El comando “lspci” nos sirve para mostrar los buses pci y los dispositivos conectados.

```
debian [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Activities Terminal May 30 12:01
vboxuser@debian: ~

root@debian:~# lspci -vv
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)
    Control: I/O- Mem- BusMaster- SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DisINTx-
    Status: Cap- 66MHz- UDF- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort- <MAbort-
    >SERR- <PERR- INTx-

00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DisINTx-
    Status: Cap- 66MHz- UDF- FastB2B- ParErr- DEVSEL=medium >TAbort- <TAbort- <MAbort-
    >SERR- <PERR- INTx-
    Latency: 0

00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01) (prog-if 8a [
ISA Compatibility mode controller, supports both channels switched to PCI native mode,
supports bus mastering])
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DisINTx-
    Status: Cap- 66MHz- UDF- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort- <MAbort-
    >SERR- <PERR- INTx-
    Latency: 64
    Region 0: I/O ports at 01f0 [size=8]
    Region 1: I/O ports at 03f4
```

El poner -v o -vv nos mostrara más información de cada uno de los dispositivos.

```
debian [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Activities  Terminal  May 30 12:01
vboxuser@debian: ~

root@debian:~# lspci -s
lspci: option requires an argument -- 's'
Usage: lspci [<switches>]

Basic display modes:
-mm          Produce machine-readable output (single -m for an obsolete format)
-t          Show bus tree

Display options:
-v          Be verbose (-vv or -vvv for higher verbosity)
-k          Show kernel drivers handling each device
-x          Show hex-dump of the standard part of the config space
-xxx       Show hex-dump of the whole config space (dangerous; root only)
-xxxx      Show hex-dump of the 4096-byte extended config space (root only)
-b          Bus-centric view (addresses and IRQ's as seen by the bus)
-D          Always show domain numbers
-P          Display bridge path in addition to bus and device number
-PP         Display bus path in addition to bus and device number

Resolving of device ID's to names:
-n          Show numeric ID's
-nn         Show both textual and numeric ID's (names & numbers)
-q          Query the PCI ID database for unknown ID's via DNS
-qq         As above, but re-query locally cached entries
```

El poner `-s` “número del dispositivo” este nos mostrara la información única del dispositivo que seleccionemos.

```
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Activities  Terminal  May 30 12:02
vboxuser@debian: ~

root@debian:~# lsusb
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 002: ID 80ee:0021 VirtualBox USB Tablet
Bus 002 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
root@debian:~# lsusb -v

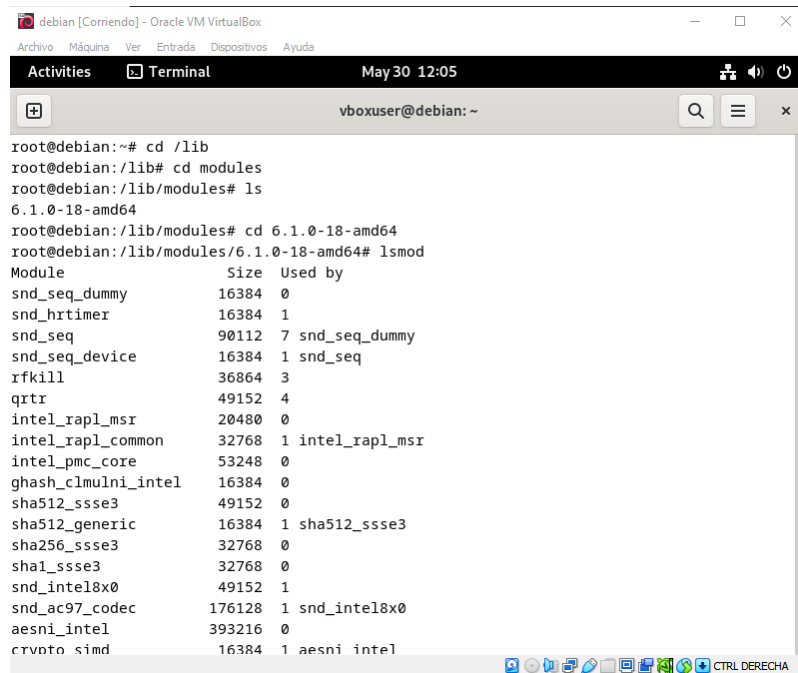
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Device Descriptor:
  bLength                18
  bDescriptorType         1
  bcdUSB                  2.00
  bDeviceClass            9 Hub
  bDeviceSubClass         0
  bDeviceProtocol         0 Full speed (or root) hub
  bMaxPacketSize0         64
  idVendor                0x1d6b Linux Foundation
  idProduct               0x0002 2.0 root hub
  bcdDevice               6.01
  iManufacturer           3 Linux 6.1.0-18-amd64 ehci_hcd
  iProduct                2 EHCI Host Controller
  iSerial                 1 0000:00:0b.0
  bNumConfigurations      1
Configuration Descriptor:
  bLength                 9
```

El comando `lsusb` nos permite ver los buses y los dispositivos conectados por usb.

El poner `-v`, `-vv` e `-s` realizara la misma función que con el `lspci`

```
root@debian:~# lsusb -t
': Bus 02.Port 1: Dev 1, Class=root_hub, Driver=ohci-pci/12p, 12M
  |__ Port 1: Dev 2, If 0, Class=Human Interface Device, Driver=usbhid, 12M
': Bus 01.Port 1: Dev 1, Class=root_hub, Driver=ehci-pci/12p, 480M
root@debian:~#
```

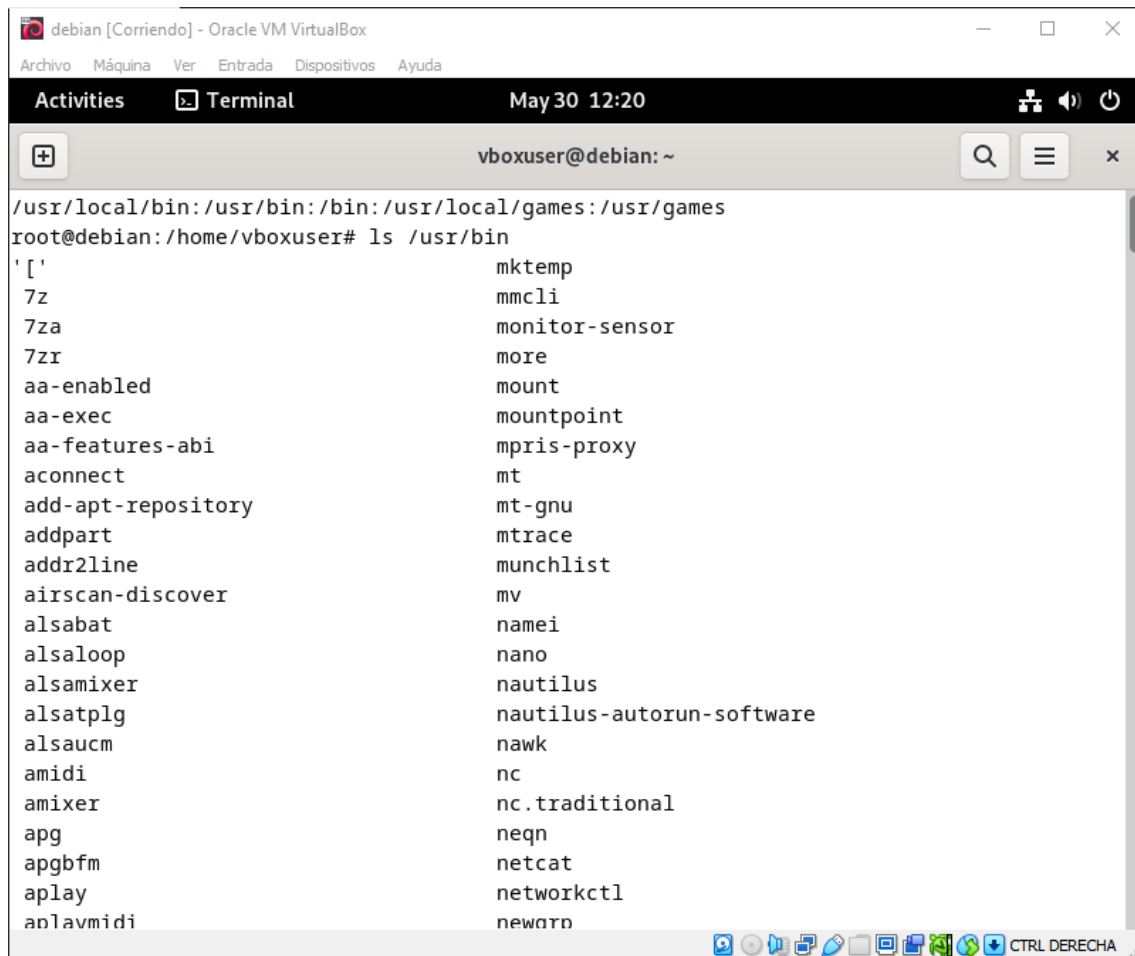
El poner “lsusb -t” nos mostrara la velocidad de los puertos y el árbol de los mismos.



The screenshot shows a terminal window titled "debian [Corriendo] - Oracle VM VirtualBox". The terminal output shows the user navigating to the kernel modules directory and listing them. The output of the `lsmod` command is as follows:

```
root@debian:~# cd /lib
root@debian:/lib# cd modules
root@debian:/lib/modules# ls
6.1.0-18-amd64
root@debian:/lib/modules# cd 6.1.0-18-amd64
root@debian:/lib/modules/6.1.0-18-amd64# lsmod
Module                Size  Used by
snd_seq_dummy         16384  0
snd_hrtimer            16384  1
snd_seq               90112  7 snd_seq_dummy
snd_seq_device        16384  1 snd_seq
rfkill                36864  3
qrtr                  49152  4
intel_rapl_msr        20480  0
intel_rapl_common     32768  1 intel_rapl_msr
intel_pmc_core        53248  0
ghash_clmulni_intel   16384  0
sha512_ssse3          49152  0
sha512_generic        16384  1 sha512_ssse3
sha256_ssse3          32768  0
sha1_ssse3            32768  0
snd_intel8x0          49152  1
snd_ac97_codec        176128  1 snd_intel8x0
aesni_intel          393216  0
crvnto_simd           16384  1 aesni_intel
```

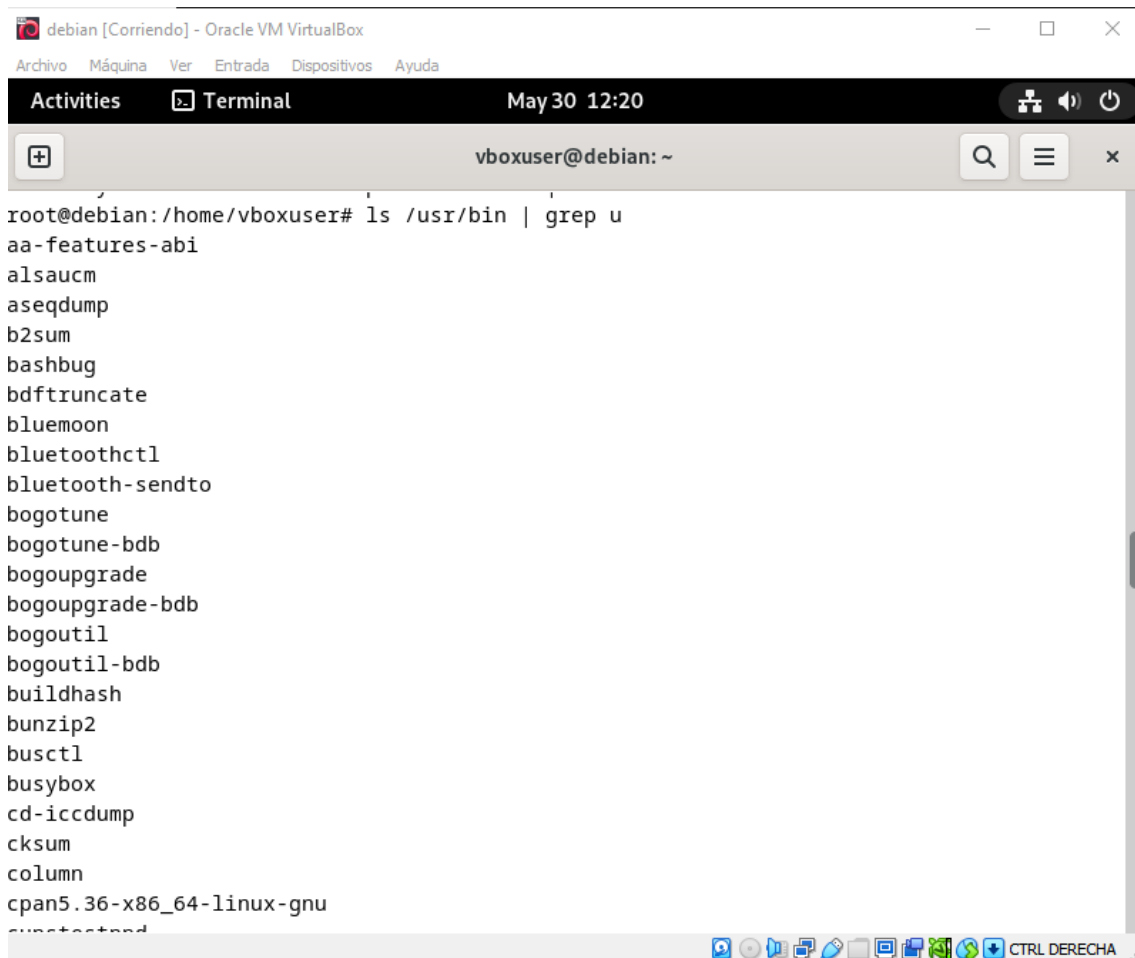
Primero ingresamos a la carpeta del módulo con el comando “/lib/modules/versión\_del\_kernel/” con el comando “cd module” para ver los módulos que están en el equipo.



The image shows a terminal window titled "debian [Corriendo] - Oracle VM VirtualBox". The window has a menu bar with "Archivo", "Máquina", "Ver", "Entrada", "Dispositivos", and "Ayuda". Below the menu bar is a header bar with "Activities", "Terminal", and the date/time "May 30 12:20". The terminal itself has a title bar "vboxuser@debian: ~" and a search icon. The command prompt is "root@debian:/home/vboxuser#". The command entered is "ls /usr/bin". The output is a list of files in two columns:

```
/usr/local/bin:/usr/bin:/bin:/usr/local/games:/usr/games
root@debian:/home/vboxuser# ls /usr/bin
 '['                                mktemp
 7z                                mmcli
 7za                              monitor-sensor
 7zr                              more
 aa-enabled                      mount
 aa-exec                        mountpoint
 aa-features-abi                mpris-proxy
 aconnect                       mt
 add-apt-repository             mt-gnu
 addpart                       mtrace
 addr2line                     munchlist
 aircan-discover               mv
 alsabat                       namei
 alsaloop                      nano
 alsamixer                    nautilus
 alsatplg                     nautilus-autorun-software
 alsaucm                      awk
 amidi                         nc
 amixer                       nc.traditional
 apg                          neqn
 apgbfm                      netcat
 aplay                       networkctl
 anlvmidi                    newgrp
```

con este comando entramos a los archivos que se encuentran dentro del equipo.



The image shows a terminal window titled "debian [Corriendo] - Oracle VM VirtualBox". The window has a menu bar with "Archivo", "Máquina", "Ver", "Entrada", "Dispositivos", and "Ayuda". Below the menu bar is a header bar with "Activities", "Terminal", and the date/time "May 30 12:20". The terminal prompt is "root@debian:/home/vboxuser#". The command entered is "ls /usr/bin | grep u". The output is a list of executables in /usr/bin that contain the letter 'u' in their name. The list includes: aa-features-abi, alsaucm, aseqdump, b2sum, bashbug, bdftruncate, bluemoon, bluetoothctl, bluetooth-sendto, bogotune, bogotune-bdb, bogoupgrade, bogoupgrade-bdb, bogoutil, bogoutil-bdb, buildhash, bunzip2, busctl, busybox, cd-iccdump, cksum, column, cpan5.36-x86\_64-linux-gnu, and cuntested. The terminal window has a search bar and a close button in the top right corner. The bottom of the window shows a taskbar with various application icons and the text "CTRL DERECHA".

```
root@debian:/home/vboxuser# ls /usr/bin | grep u
aa-features-abi
alsaucm
aseqdump
b2sum
bashbug
bdftruncate
bluemoon
bluetoothctl
bluetooth-sendto
bogotune
bogotune-bdb
bogoupgrade
bogoupgrade-bdb
bogoutil
bogoutil-bdb
buildhash
bunzip2
busctl
busybox
cd-iccdump
cksum
column
cpan5.36-x86_64-linux-gnu
cuntested
```

y con este comando visualizamos todos los módulos que están en el equipo.



```
debian [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Activities  Terminal  May 30 12:22
vboxuser@debian: ~
e2undo          mount.lowntfs-3g  usb_modeswitch
e4crypt         mount.ntfs        usb_modeswitch_dispatcher
e4defrag        mount.ntfs-3g     usbmuxd
exfat2img       NetworkManager   useradd
exfatlabel      newusers          userdel
faillock        nft               usermod
fatlabel        nologin           validlocale
fdisk           ntfsclone         vcstime
filefrag        ntfsclp           vdpd
findfs          ntfslabel         vigr
fixparts        ntfsresize        vipw
fsck            ntfsundelete      visudo
fsck.cramfs     ownership         vpddecode
fsck.exfat      pam-auth-update   wipefs
fsck.ext2       pam_getenv        wpa_action
fsck.ext3       pam_namespace_helper wpa_cli
fsck.ext4       pam_timestamp_check wpa_supplicant
fsck.fat        paperconfig       zic
fsck.minix      parted            zramctl
fsck.msdo      partprobe
fsck.vfat       pivot_root
root@debian:/home/vboxuser# ls /usr/sbin | grep modinfo
modinfo
root@debian:/home/vboxuser#
```

Y con esto vemos la información del módulo