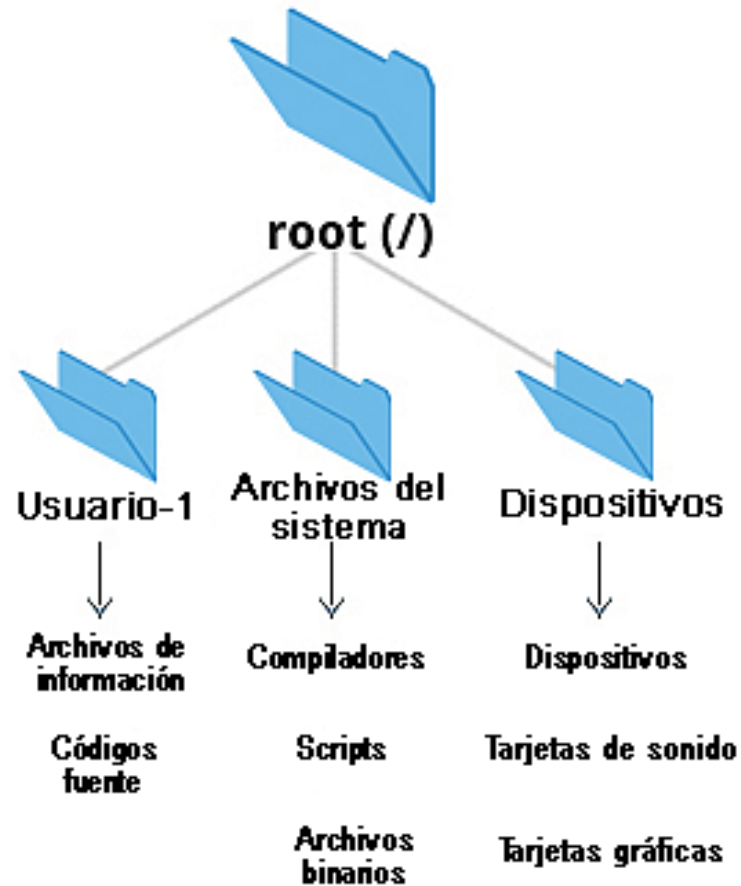


Introducción a Linux

Sistemas de archivos

Sistemas de archivos



Tipos de sistemas de archivos


- Nativos de LINUX: ext3, ext4, squashfs, btrfs,
- De Windows: NTFS, vfat
- MacOS (hfs, hfs+)
- De otros fabricantes SGI (xfs), IBM (jfs)
- De sistemas antiguos: fat

Los más avanzados son de tipo **journaling**: ext4, xfs, btrfs, jfs

Particiones en Linux

/dev/sda - GParted

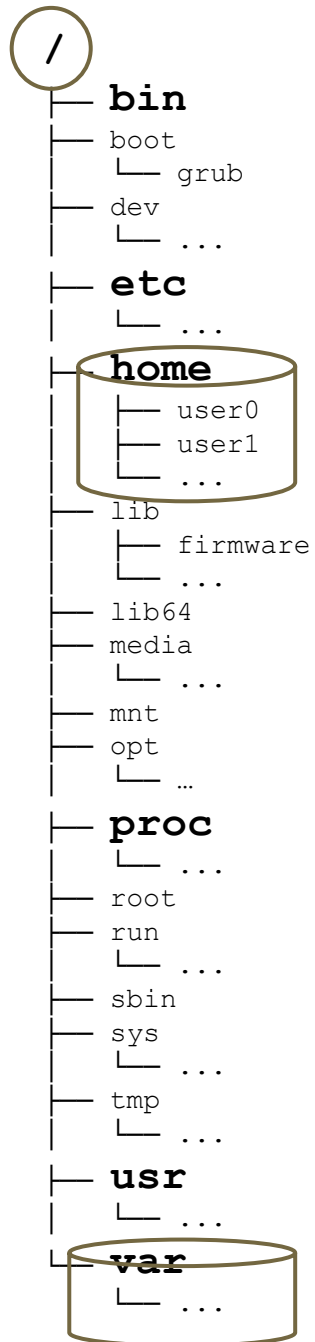
GParted Edit View Device Partition Help

 /dev/sda (476.94 GiB) ▼

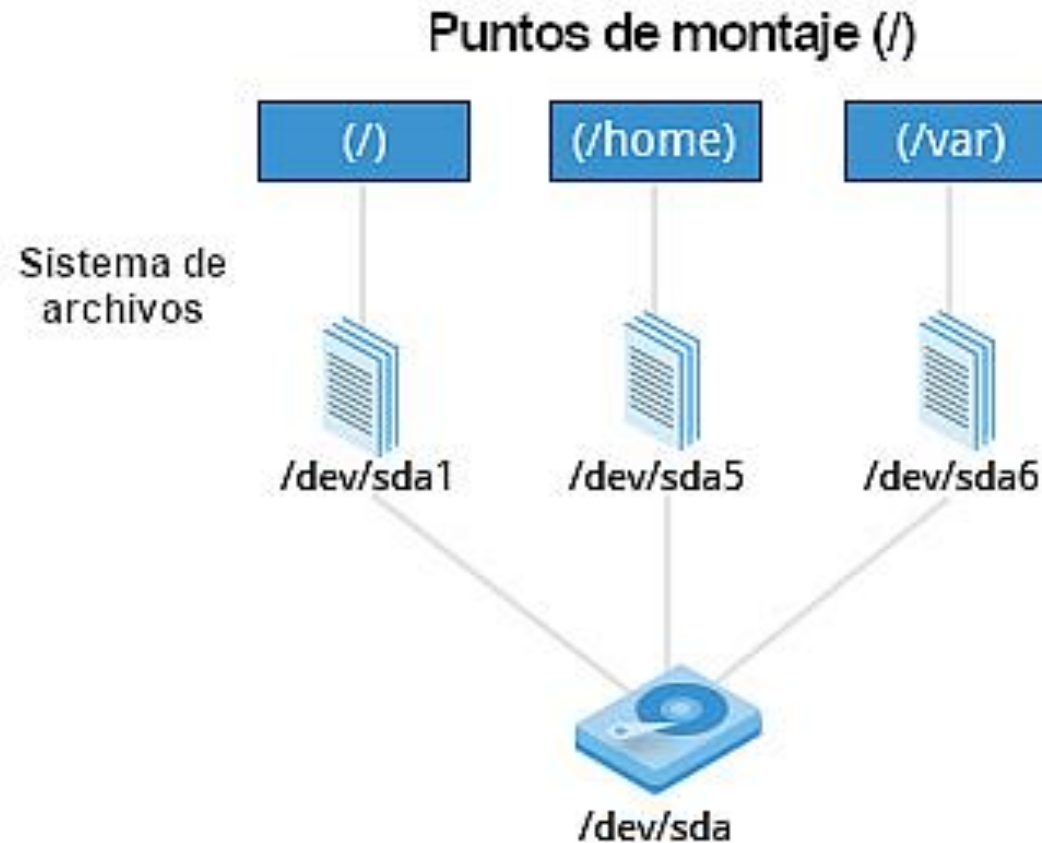
/dev/sda6
394.98 GiB

Partition	Name	File System	Mount Point	Label	Size	Used	Unused	Flags
/dev/sda1	EFI System Partition	fat32	/CENTOS7/...	SYSTEM	260.00 MiB	57.91 MiB	202.09 MiB	boot, hidden, esp
/dev/sda2	Microsoft reserved partition	unknown			16.00 MiB	---	---	msftres
/dev/sda3	Basic data partition	ntfs		Windows	39.96 GiB	---	---	msftdata
/dev/sda6		ext4	/ALL, /CEN...	CENTOS7	394.98 GiB	291.90 GiB	103.08 GiB	
/dev/sda7	EFI System Partition	fat16	/boot/efi		200.00 MiB	7.11 MiB	192.89 MiB	boot, esp
/dev/sda8		ext4	/	RHEL8	25.91 GiB	9.85 GiB	16.06 GiB	
/dev/sda5		ext4	/UBUNTU	UBUNTU	14.65 GiB	9.46 GiB	5.19 GiB	
/dev/sda4	Basic data partition	ntfs		WinRE_DRV	1000.00 MiB	---	---	hidden, diag

0 operations pending



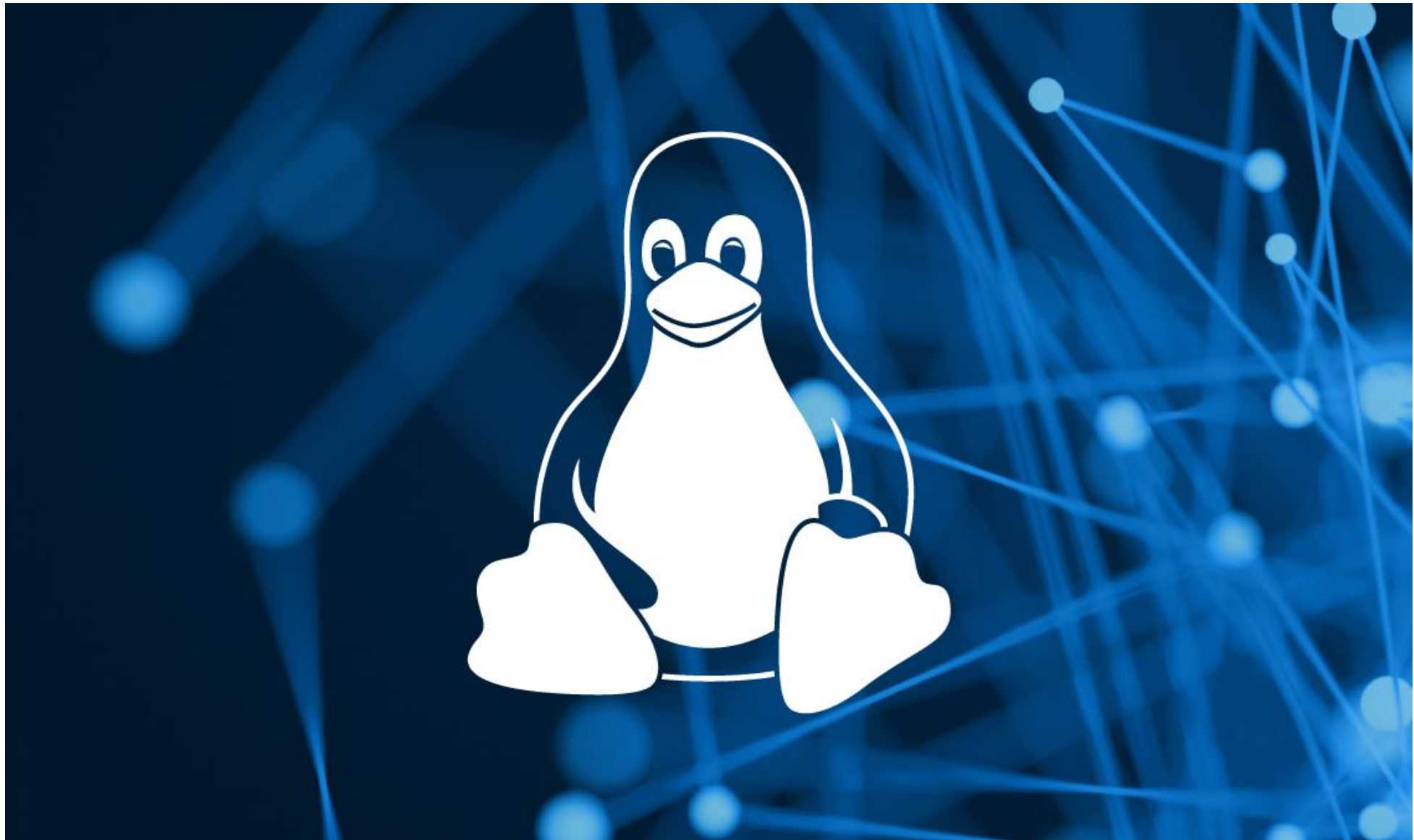
Montaje de un sistema de archivos





Introducción a Linux

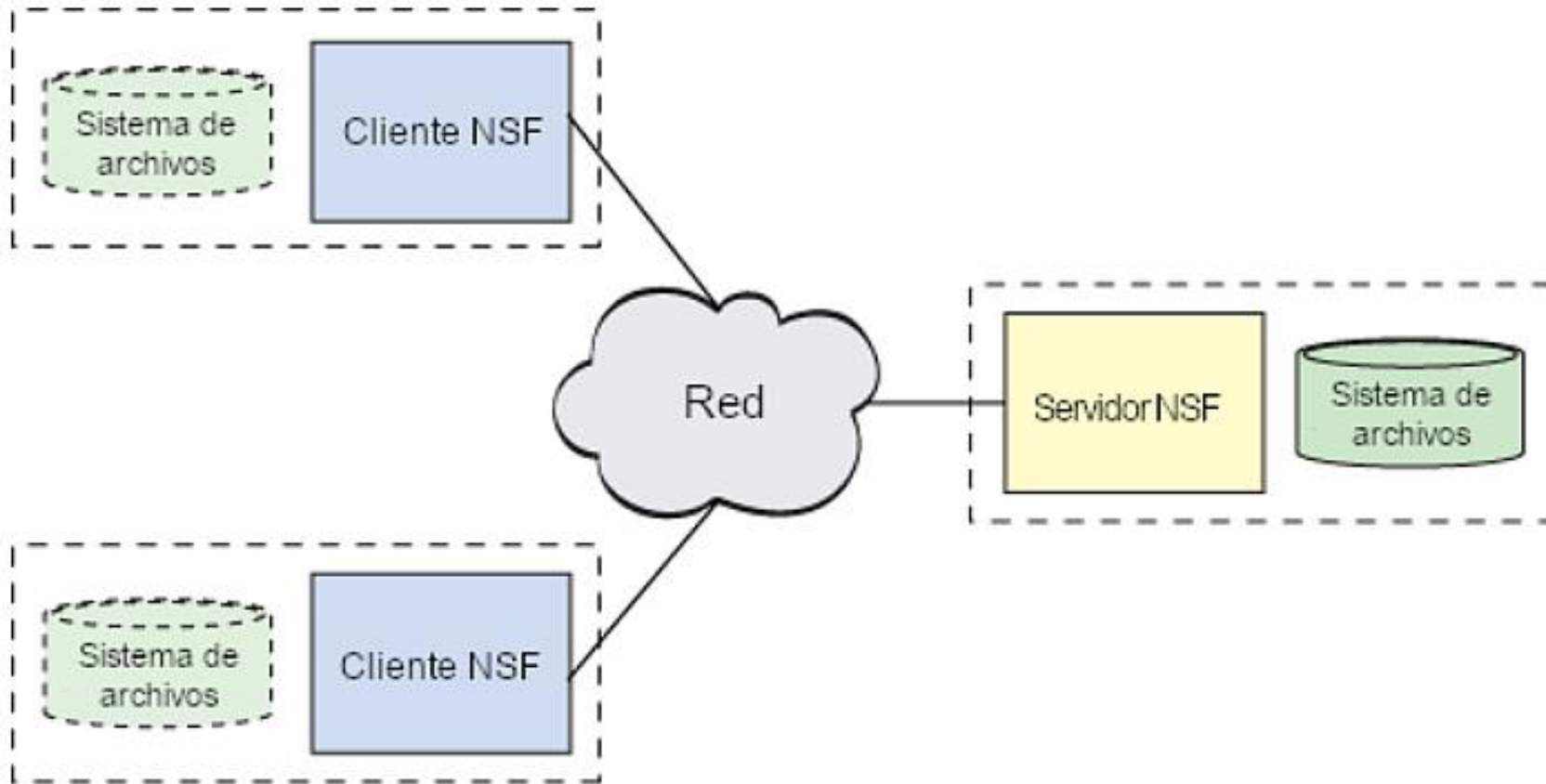
Sistemas de archivos



Introducción a Linux

NFS Sistema de archivos de red

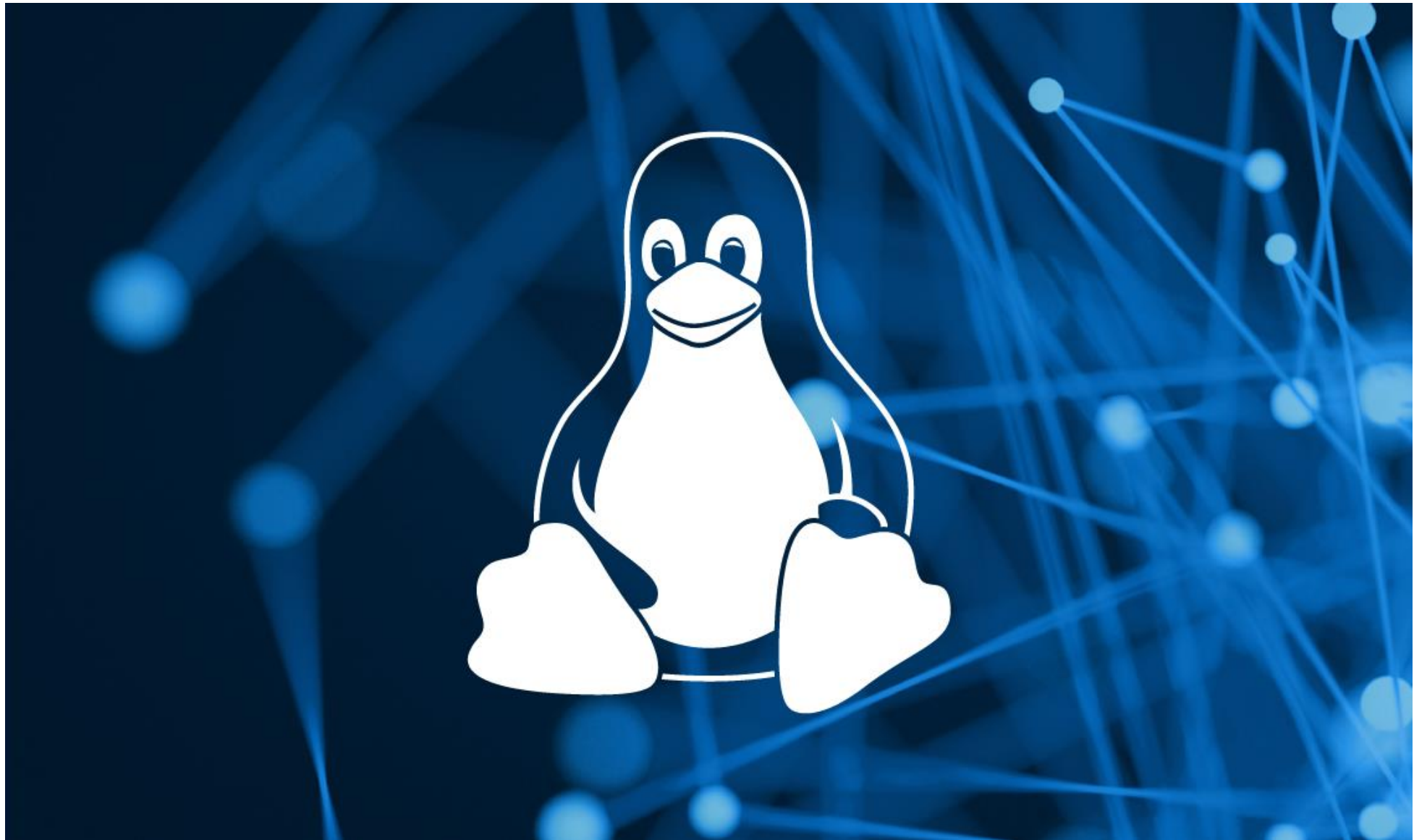
NFS: Sistemas de archivo de red





Introducción a Linux

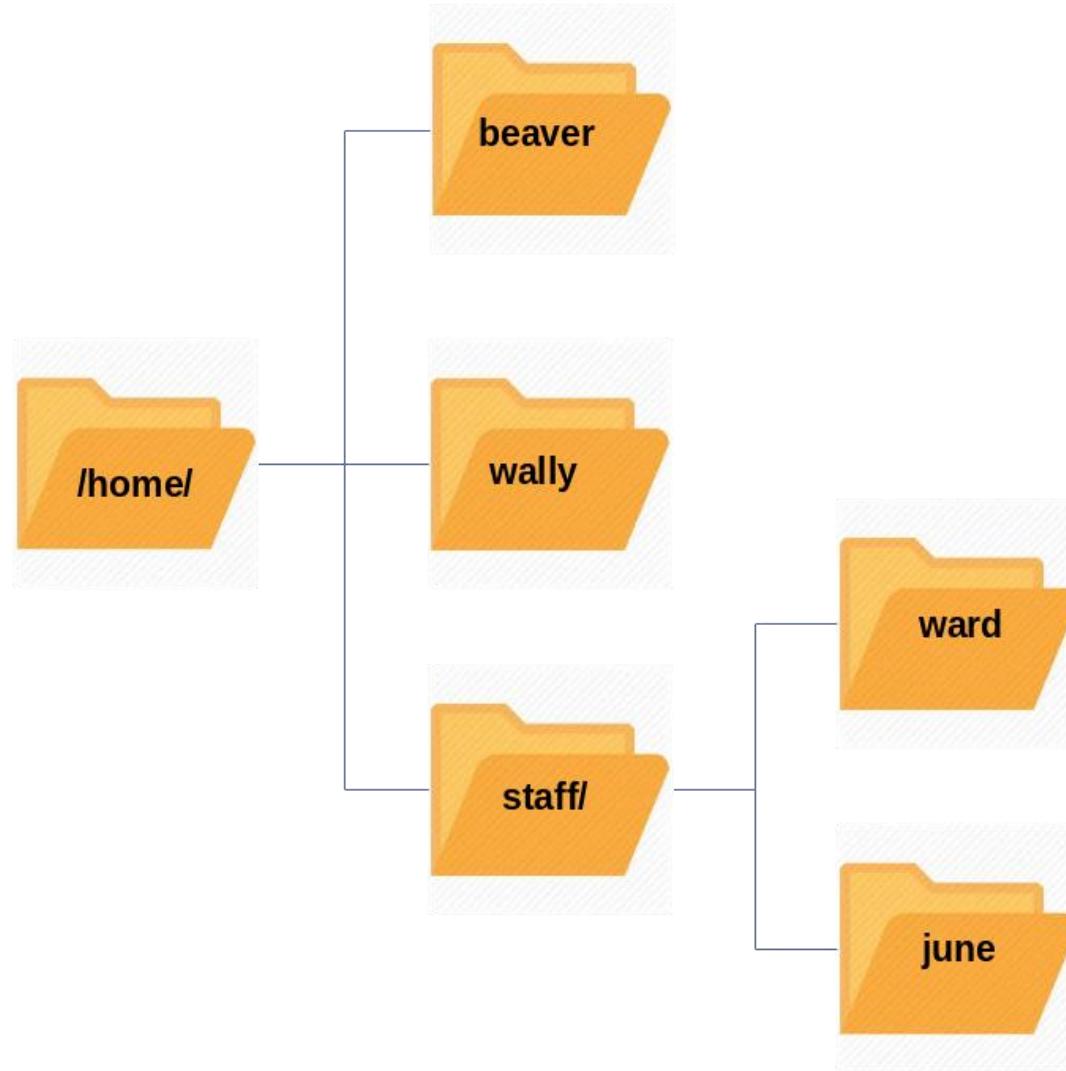
NFS Sistema de archivos de red



Introducción a Linux

Directorios del sistema

Directorios de usuario



Los directorios /bin y /sbin

```
File Virtual Machine Help
student@ubuntu: ~
student@ubuntu:~$ ls -F /bin
bash*      date*      lesskey*   ntfsfix*   systemd-ask-password*
btrfs*     dd*        lesspipe*  ntfsinfo*  systemd-escape*
btrfs-calc-size* df*        ln*        ntfsls*    systemd-hwdb*
btrfsck@   dir*       loadkeys*  ntfsmove*  systemd-inhibit*
btrfs-convert* dmesg*    login*     ntfstruncate* systemd-machine-id-setup*
btrfs-debug-tree* dnsdomainname@ loginctl*   ntfswipe*  systemd-notify*
btrfs-find-root* domainname@ lowntfs-3g* open@       systemd-tmpfiles*
btrfs-image*  dumpkeys*  ls*        openvt*    systemd-tty-ask-password-agent*
btrfs-map-logical* echo*      lsblk*     pidof@     tailf*
btrfs-select-super* ed*        lsmod@     ping*      tar*
btrfs-show-super* efibootmgr* mkdir*      ping6*     tempfile*
btrfstune*   egrep*     mkfs.btrfs* touch*
btrfs-zero-log* false*     mknod*     ps*        true*
bunzip2*    fgconsole* mktemp*    pwd*       udevadm*
busybox*    fgrep*     more*      rbash@     unlockmgr_server*
bzip2*      findmnt*   mount*     readlink*  umount*
bzcat*      fsck.btrfs* mountpoint* rm*         uname*
bzcmp@      fuser*     mt@        rmdir*     uncompress*
bzdiff*     fusermount* mv*         rnano@     unicode_start*
bzegrep@    getfacl*  nano*      run-parts* vdir*
bzexe*      grep*      nc@        sed*        vmouse_detect*
bzfgrep@   gunzip*   nc.openbsd* setfacl*   wdctl*
bzgrep*    gzip*     netcat@    setfont*   which*
bzip2*     gzexe*    netstat*   setupcon*  whiptail*
bzip2recover* hciconfig* netctl*    sh@        ypdomainname@
bzless@    hostname* networkctl* sh.distrib@ zcat*
bzmore*    ip*       ntfs-3g*   sleep*     zcmp*
cat*       journalctl* ntfs-3g.probe* ss*        zdiff*
chacl*     kbd_mode*  ntfs-3g.secaudit* static-sh@  zegrep*
chgrp*     keyctl*    ntfs-3g.usermap* stty*      zfgrep*
chmod*     kill*      ntfscluster*  su*        zforce*
chown*     knod*      ntfsctl*    sync*      zgrep*
chvt*      less*      ntfscluster* zless*
cp*        lessecho*  ntfsctl*    systemdctl* zmore*
cpio*      lessfile@  ntfsfallocate* systemd@   znew*
dash*
student@ubuntu:~$
```

To release input, press Ctrl+Alt

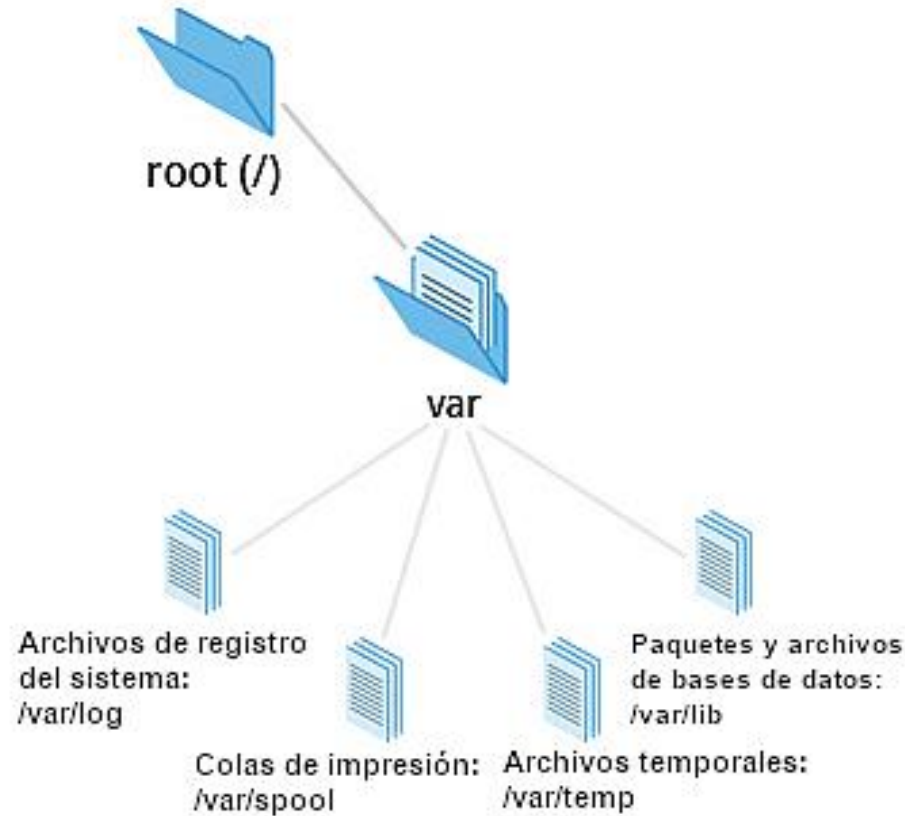
Los pseudo-filesystems montados en /proc

```
File Virtual Machine Help
Activities Terminal Wed 14:41
student@openSUSE:~
File Edit View Search Terminal Help
student@openSUSE:~> ls /proc
1      15      2210    2393    2557    314     347     497     73      interrupts  pagetypeinfo
10     16      2215    2398    262     315     348     5       783      iomem       partitions
1027   17      2227    2403    263     316     349     503     8       ioports     sched_debug
1036   1721   2280    2408    267     32      35      5413    9       irq         schedstat
11     18      2281    2413    27       320     350     5585    acpi     kallsyms    scsi
1150   1922   2282    2420    2730    322     351     5631    asound   kcore       self
1152   1937   2283    2432    2745    33      352     5655    buddyinfo keys         slabinfo
1161   1944   2291    2438    2783    332     353     58      bus      key-users   softirqs
1172   1947   2296    2446    2789    333     36      5828    cgroups  kmsg        stat
1180   1956   23      2451    28       334     37      5832    cmdline  kpagecgroup swaps
1195   1969   2305    2454    2800    335     38      5874    config.gz kpagecount  sys
1197   2      2310    2457    282     336     387     5901    consoles kpageflags  sysrq-trigger
12     20      2312    2459    283     337     39      5908    cpuinfo  latency_stats sysvipc
1202   2044   2328    2464    284     338     40      5919    crypto   loadavg     thread-self
1205   2078   2340    2465    29       339     4074    5920    devices  locks       timer_list
1216   2087   2343    2467    3        340     4075    60      diskstats meminfo     timer_stats
1258   21      2345    2479    30       341     4077    6095    dma       misc        tty
1261   2119   2350    2495    300      342     414     6102    driver    modules     uptime
1264   2132   2355    25      307      343     428     6129    execdomains mounts       version
1267   22      2362    2528    31       344     43      62      fb        mpt         vmallocinfo
1270   2201   2372    2531    310      345     44      63      filesystems mtrr        vmstat
13     2206   2383    2550    313      346     45      7       fs        net         zoneinfo
student@openSUSE:~>
To release input, press Ctrl+Alt
```

Directorio /dev

```
File Edit View Search Terminal Help
c7:/tmp>ls /dev
autofs          dm-5            kmsg            ptmx            sdb7            tty14           tty30           tty47           tty63           vcsa3
block           dm-6            log             ptp0            sequencer       tty15           tty31           tty48           tty7            vcsa4
bsg             dm-7            loop0           pts             sequencer2      tty16           tty32           tty49           tty8            vcsa5
bus             dm-8            loop-control    random          sg0             tty17           tty33           tty5            tty9            vcsa6
char            dm-9            lp0             raw             sg1             tty18           tty34           tty50           urandom         VG
console         dri             lp1             rtc             shm             tty19           tty35           tty51           usb             VG2
core            fb0             lp2             rtc0            snapshot        tty2            tty36           tty52           v4l            vga_arbiter
cpu            fd             lp3             sda             snd             tty20           tty37           tty53           vboxusb         video0
cpu_dma_latency full            mapper          sda1            stderr          tty21           tty38           tty54           vcs            vmci
disk           fuse           mem            sda2            stdin           tty22           tty39           tty55           vcs1           vmmon
dm-0           hidraw0        memory_bandwidth sda3            stdout          tty23           tty4            tty56           vcs2           vmlnet0
dm-1           hidraw1        mqueue         sda5            tty             tty24           tty40           tty57           vcs3           vmlnet1
dm-10          hidraw2        network_latency sda6            tty0            tty25           tty41           tty58           vcs4           vmlnet8
dm-11          hidraw3        network_throughput sdb             tty1            tty26           tty42           tty59           vcs5           vsock
dm-12          hpet          null           sdb1            tty10           tty27           tty43           tty6            vcs6           zero
dm-2           hugepages     nvram          sdb2            tty11           tty28           tty44           tty60           vcsa
dm-3           initctl       pktdvd         sdb5            tty12           tty29           tty45           tty61           vcsa1
dm-4           input         port           sdb6            tty13           tty3            tty46           tty62           vcsa2
```


Directorio /var



```
coop@x8:/var
x8:/var>ls -lF
total 80
drwxr-xr-x. 2 root root 4096 Aug 27 16:35 account/
drwxr-xr-x. 2 root root 4096 Aug 12 2018 adm/
drwxr-xr-x. 17 root root 4096 Aug 29 08:00 cache/
drwxr-xr-x. 2 root root 4096 Aug 8 21:50 crash/
drwxr-xr-x. 3 root root 4096 Aug 27 16:35 db/
drwxr-xr-x. 3 root root 4096 Aug 27 16:35 empty/
drwxr-xr-x. 3 root root 4096 Aug 27 17:23 ftp/
drwxr-xr-x. 2 root root 4096 Aug 12 2018 games/
drwxr-xr-x. 2 root root 4096 Aug 12 2018 gopher/
drwxr-xr-x. 3 root root 4096 Sep 23 12:47 kerberos/
drwxr-xr-x. 69 root root 4096 Nov 5 07:59 lib/
drwxr-xr-x. 2 root root 4096 Aug 12 2018 local/
lrwxrwxrwx. 1 root root 11 Aug 27 16:32 lock -> ../run/lock/
drwxr-xr-x. 25 root root 4096 Dec 3 10:40 log/
lrwxrwxrwx. 1 root root 10 Aug 12 2018 mail -> spool/mail/
drwxr-xr-x. 2 root root 4096 Aug 12 2018 nis/
drwxr-xr-x. 2 root root 4096 Aug 12 2018 opt/
drwxr-xr-x. 2 root root 4096 Aug 12 2018 preserve/
lrwxrwxrwx. 1 root root 6 Aug 27 16:32 run -> ../run/
drwxr-xr-x. 12 root root 4096 Aug 27 17:23 spool/
drwxrwxrwt. 8 root root 4096 Dec 3 10:47 tmp/
lrwxrwxrwx. 1 root root 14 Nov 30 09:52 www -> /usr/local/www/
drwxr-xr-x. 5 root root 4096 Sep 2 10:36 www_1st/
drwxr-xr-x. 2 root root 4096 Aug 12 2018 yp/
x8:/var>
```

Directorio /etc

```
File Virtual Machine Help
Applications ▾ Terminal ▾ Thu 11:01
student@debian: /etc x
File Edit View Search Terminal Help
student@debian:/etc$ ls -F
adduser.conf      cups/             group             libao.conf        NetworkManager/  rc6.d/            sudoers.d/
adjtime           cupshelpers/     group-           libaudit.conf     networks          rcS.d/            sysctl.conf
aliases          dbus-1/          grub.d/          libnl-3/          newt/             reportbug.conf    sysctl.d/
aliases.db        debconf.conf     gshadow          libpaper.d/       nsswitch.conf     request-key.conf  sysfs.conf
alternatives/    debian_version   gshadow-        libreoffice/      openal/           request-key.d/    sysfs.d/
anacrontab        default/         gss/            libvirt/          opt/              resolvconf/       sysstat/
analog.cfg        deluser.conf     gtk-2.0/        locale.alias      os-release@       resolv.conf@      systemd/
apache2/          dhcp/            gtk-3.0/        locale.gen        PackageKit/       rmt*              terminfo/
apg.conf          dictionaries-common/ diffuserc        localtime@        pam.conf          rsyslog.conf      texmf/
apm/              discover.conf.d/  hdparm.conf     logcheck/         pam.d/            rsyslog.d/        timezone
apparmor.d/       discover-modprobe.conf host.conf        login.defs        papersize         rygel.conf        timidity/
appstream.conf    dleyna-server-service.conf hostname        logrotate.conf    passwd            sane.d/            tmpfiles.d/
apt/              dovecot/         hosts           ltrace.conf       passwd-           sasl2/            tpmvlp.conf
asciidoc/         dpkg/           hosts.allow     lvm/              perl/             screenrc          ucf.conf
avahi/            drirc           hosts.deny      lynx/             pnm/             securetty         udev/
bash.bashrc       emacs/          hotplug/        machine-id        pnm2ppa.conf     security/         udisks2/
bash_completion  emacs24/        hp/             magic             polkit-1/         selinux/          ufw/
bash_completion.d/ environment     icedtea-web/    magic.mime        postfix/          sensors3.conf     updatedb.conf
bindresvport.blacklist exports          idmapd.conf      mailcap           profile           sensors.d/        UPower/
binfmt.d/         firefox-esr/    ifplugd/        mailcap.order     protocols         sestatus.conf     usb_modeswitch.conf
bluetooth/        foomatic/       ImageMagick-6/  mail.rc           python/           sgml/             usb_modeswitch.d/
bogofilter.cf     fuse.conf       init/           manpath.config    python2.7/        shadow            vdpau_wrapper.cfg
ca-certificates/  gai.conf        initramfs-tools/ mc/               python3/          shadow-           vim/
ca-certificates.conf fstab           inserv.conf.d/  mdadm/            python3.5/        shells            vmware-tools/
calendar/         ftpusers        iproute2/       mime.types        pythond/         skel/             vsftpd.conf
chatscripts/      fuse.conf       issue           mke2fs.conf       qemu-ifdown*     sml.conf          warnquota.conf
chromium/         gconf/          java/           modprobe.d/       qemu-ifup*       speech-dispatcher/ wgetrc
collectl.conf     gdb/            java-8-openjdk/ modules-load.d/  quotagradmin     ssh/              wildmidi/
console-setup/    gdm3/           kernel/         modules-load.d/  quotatab          ssl/              wireshark/
cracklib/         geoclue/        kernel-img.conf ksysguarddrc     staff-group-for-usr-local subgid            wodim.conf
cron.d/           ghostscript/    ld.so.cache     ld.so.conf.d/    subgid            xdg/              wpa_supplicant/
cron.daily/       gimp/           ld.so.conf      ld.so.conf.d/    subuid            xnl/
cron.hourly/      gitweb.conf     ld.so.conf.d/   ld.so.conf.d/    subuid
cron.monthly/     gnome/          ld.so.conf.d/   ld.so.conf.d/    subuid
crontab           gnome-chess/    groff/          groff/
cron.weekly/
cryptsetup-initramfs/
crypttab
student@debian:/etc$
```

To release input, press Ctrl+Alt

Directorio /boot

```
c8:/teaching/LFCW/IMAGES>cd /boot
c8:/boot>ls -l
total 410340
-rw-r--r-- 1 root root 189500 Oct 16 12:52 config-4.18.0-240.1.1.el8_3.x86_64
-rw-r--r-- 1 root root 135708 Dec 7 07:25 config-5.10.0-rc7
-rw-r--r-- 1 root root 134919 Dec 2 06:33 config-5.9.12
-rw-r--r-- 1 root root 134919 Dec 8 06:55 config-5.9.13
drwxr-xr-x 3 root root 4096 Jun 21 2019 efi
-rw-r--r-- 1 root root 184380 Aug 12 2018 elf-memtest86+-5.01
drwxr-xr-x 2 root root 4096 May 30 2020 extlinux
drwx----- 4 root root 4096 Aug 31 05:50 grub2
-rw----- 1 root root 66208244 Jun 21 2019 initramfs-0-rescue-ce0c82382a8a4c80bbd6931a917a2f1c.img
-rw----- 1 root root 50661253 Nov 12 07:57 initramfs-4.18.0-240.1.1.el8_3.x86_64.img
-rw----- 1 root root 46681740 Nov 24 17:04 initramfs-5.10.0-rc5CLANG.img
-rw----- 1 root root 46710403 Dec 7 07:25 initramfs-5.10.0-rc7.img
-rw----- 1 root root 46664749 Dec 2 06:33 initramfs-5.9.12.img
-rw----- 1 root root 46664757 Dec 8 06:55 initramfs-5.9.13.img
drwxr-xr-x 3 root root 4096 Jun 26 06:23 loader
-rw-r--r-- 1 root root 182704 Aug 12 2018 memtest86+-5.01
lrwxrwxrwx 1 root root 23 Dec 8 06:55 System.map -> /boot/System.map-5.9.13
-rw-r--r-- 1 root root 6261778 Aug 29 15:03 System.map-..
-rw----- 1 root root 4032815 Oct 16 12:52 System.map-4.18.0-240.1.1.el8_3.x86_64
-rw-r--r-- 1 root root 6201597 Nov 24 17:04 System.map-5.10.0-rc5CLANG
-rw-r--r-- 1 root root 6585217 Dec 7 07:25 System.map-5.10.0-rc7
-rw-r--r-- 1 root root 6306990 Dec 2 06:33 System.map-5.9.12
-rw-r--r-- 1 root root 6306990 Dec 8 06:55 System.map-5.9.13
lrwxrwxrwx 1 root root 20 Dec 8 06:55 vmlinuz -> /boot/vmlinuz-5.9.13
-rw-r--r-- 1 root root 12353136 Aug 29 15:03 vmlinuz-..
-rwxr-xr-x 1 root root 7872864 Jun 21 2019 vmlinuz-0-rescue-ce0c82382a8a4c80bbd6931a917a2f1c
-rwxr-xr-x 1 root root 9514352 Oct 16 12:52 vmlinuz-4.18.0-240.1.1.el8_3.x86_64
-rw-r--r-- 1 root root 12920416 Nov 24 17:04 vmlinuz-5.10.0-rc5CLANG
-rw-r--r-- 1 root root 12556048 Dec 7 07:25 vmlinuz-5.10.0-rc7
-rw-r--r-- 1 root root 12327808 Dec 2 06:33 vmlinuz-5.9.12
-rw-r--r-- 1 root root 12327488 Dec 8 06:55 vmlinuz-5.9.13
c8:/boot>
```

Directorios /lib y /lib64

```
File Edit View Search Terminal Help
c7:/>ls -lF lib lib64
lrwxrwxrwx 1 root root 7 Nov  3 2016 lib -> usr/lib/
lrwxrwxrwx 1 root root 9 Nov  3 2016 lib64 -> usr/lib64/
c7:/>
```

```
student@ubuntu: ~
student@ubuntu:~$ ls -lh /lib/modules
total 16K
drwxr-xr-x 3 root root 4.0K Apr 26 05:34 5.12.0
drwxr-xr-x 2 root root 4.0K May 21 07:20 5.8.0-50-generic
drwxr-xr-x 5 root root 4.0K May 21 07:14 5.8.0-53-generic
drwxr-xr-x 5 root root 4.0K Jun  4 05:53 5.8.0-55-generic
student@ubuntu:~$ du -shc /lib/modules/*
394M    /lib/modules/5.12.0
1.2M    /lib/modules/5.8.0-50-generic
289M    /lib/modules/5.8.0-53-generic
289M    /lib/modules/5.8.0-55-generic
972M    total
student@ubuntu:~$
```

Soportes extraíbles /media, /run, /mnt



```
coop@x8:/run
coop@x8:/teaching/LFS101x
coop@x8:/run
x8:/run>ls -F /run
alsactl.pid      dmeventd-client|  libvirt/        ppp/            sssd.pid
atd.pid          dmeventd-server|  libvirtd.pid    radvd/          sudo/
auditd.pid       dovecot/          lock/           rhsm/           svnserve/
avahi-daemon/    faillock/         log/            rpcbind/        systemd/
blkid/           firewallld/       lsm/            rpcbind.sock=   tmpfiles.d/
boltd/           gdm/              lvm/            rsyslogd.pid    tuned/
chrony/          gssproxy.pid      mdadm/          samba/          udev/
cockpit/         gssproxy.sock=    media/          screen/         udisks2/
console/         httpd/            mount/          sepermit/       user/
criu/            initctl|          NetworkManager/ setrans/        utmp
cron.reboot      initramfs/        pesign/         setrouleshoot/  vmblock-fuse/
cryptsetup/      iptraf-ng/        pluto/          sm-notify.pid   vmware/
cups/            ksmtune.pid       plymouth/       spice-vdagentd/
dbus/            libgpod/          podman/         sshd.pid
x8:/run>
```

Directorios adicionales en /:

Nombre de directorio	Uso
<code>/opt</code>	paquetes de software de aplicaciones opcionales
<code>/sys</code>	Seudossistema virtual de archivos que proporciona información sobre el sistema y el hardware Se puede utilizar para modificar los parámetros del sistema y con fines de depuración
<code>/srv</code>	Datos específicos del sitio proporcionados por el sistema Raramente utilizado
<code>/tmp</code>	Archivos temporales; en algunas distribuciones se borran tras un reinicio y/o pueden un disco RAM en la memoria
<code>/usr</code>	Aplicaciones, utilidades y datos multiusuario

Árbol de directorios /usr

Nombre de directorio	Uso
<code>/usr/include</code>	Archivos de encabezado utilizados para compilar aplicaciones
<code>/usr/lib</code>	Bibliotecas para programas en <code>/usr/bin</code> y <code>/usr/sbin</code>
<code>/usr/lib64</code>	Bibliotecas de 64 bits para programas de 64 bits en <code>/usr/bin</code> y <code>/usr/sbin</code>
<code>/usr/sbin</code>	Binarios de sistema no esenciales, como los daemons del sistema
<code>/usr/share</code>	Datos compartidos utilizados por las aplicaciones, generalmente independientes de la arquitectura
<code>/usr/src</code>	Código fuente, normalmente para el kernel de Linux
<code>/usr/local</code>	Datos y programas específicos del equipo local; los subdirectorios incluyen <code>bin</code> , <code>sbin</code> , <code>lib</code> , <code>share</code> , <code>include</code> , etc.
<code>/usr/bin</code>	Este es el directorio principal de comandos ejecutables del sistema.



Introducción a Linux

Directorios del sistema