

Linux File System & Command Demonstration

Home Directory & Basic Commands

This screenshot shows the use of basic Linux commands like pwd, ls, and cd. The pwd command displays the present working directory. The ls command lists files and directories, while cd is used to navigate between directories.

```
megha@ubuntu1: $ pwd
/home/megha
megha@ubuntu1: $ cd
megha@ubuntu1: $ ls
.a.out .bashrc Desktop file .local pg21.c Pictures Public .sudo_as_admin_successful
.bash_history .cache Documents File Music pg3.c .profile snap Templates
.bash_logout .config Downloads .lessht pg0.c pg4.c program2.c .ssh Videos
megha@ubuntu1: $ ls
.a.out Documents file Music pg21.c pg4.c program2.c snap Videos
Desktop Downloads File pg0.c pg3.c Pictures Public Templates
megha@ubuntu1: $ cd /
megha@ubuntu1: $ pwd
/
megha@ubuntu1: $ ls
bin boot dev home lib64 lost+found mnt proc run sbin usr-is-merged srv tmp var
bin usr-is-merged cdrom etc lib lib usr-is-merged media opt root sbin snap sys usr
```

Root Directory Structure

This screenshot explains the Linux root (/) directory. Directories such as /bin, /etc, /home, /tmp, and /var are system directories. Each directory has a specific purpose in the Linux operating system.

```
megha@ubuntu1:/bin$ cd /
megha@ubuntu1: $ ls
bin boot dev home lib64 lost+found mnt proc run sbin usr-is-merged srv tmp var
bin usr-is-merged cdrom etc lib lib usr-is-merged media opt root sbin snap sys usr
megha@ubuntu1:/bin$ ls
['aa-enabled', 'aa-exec', 'aa-features-abi', 'aconnect', 'acpidbg', 'add-apt-repository', 'addpart', 'addr2line', 'airscan-discover', 'alsabat', 'alsaloop', 'alsamixer', 'alsatplg', 'alsaucm', 'amidi', 'amixer', 'apg', 'apgbfm', 'aplay', 'aplaymidi', 'apport-bug', 'apport-cli', 'apport-collect', 'apport-unpack', 'appres', 'apostreamcli', 'head', 'HEAD', 'heif-thumbnailer', 'helpztags', 'hex2hcd', 'hexdump', 'hipercdecode', 'host', 'hostid', 'hostname', 'hostnamectl', 'hp-align', 'hp-check', 'hp-clean', 'hp-colorcal', 'hp-config_usb_printer', 'hp-doctor', 'hp-firmware', 'hp-info', 'hp-levels', 'hp-logcapture', 'hp-makeuri', 'hp-pkbservice', 'hp-plugin', 'hp-plugin-ubuntu', 'hp-probe', 'hp-query', 'resizecons', 'resizelpart', 'resovectl', 'rev', 'rfcomm', 'rgrep', 'rm', 'rmdir', 'rnano', 'routel', 'rpctgen', 'rrsync', 'rstart', 'rstartd', 'rsync', 'rsync-ssl', 'rtla', 'rtstat', 'runcon', 'run-parts', 'run-with-aspell', 'rview', 'rygel', 'sadf', 'sane-find-scanner', 'sar', 'sar.svssstat']
```

/bin Directory & Inodes

The /bin directory contains essential binary executable commands like ls, cp, rm, and cat. The ls -li command displays inode numbers, permissions, ownership, and file size.

```
ls: cannot access '/': No such file or directory
megha@ubuntu1:/bin$ ls -li
total 223056
1442301 -rwxr-xr-x 1 root root      55744 Apr  5  2024 '['
1442302 -rwxr-xr-x 1 root root     18744 Mar 19  2025 aa-enabled
1442303 -rwxr-xr-x 1 root root     18744 Mar 19  2025 aa-exec
1442304 -rwxr-xr-x 1 root root     18736 Mar 19  2025 aa-features-abi
1442305 -rwxr-xr-x 1 root root    22912 Apr  7  2024 aconnect
1491582 -rwxr-xr-x 1 root root     1622 Nov 18 11:26 acpidbg
1442306 -rwxr-xr-x 1 root root    16422 Feb 18  2025 add-apt-repository
1442307 -rwxr-xr-x 1 root root    14720 Jun  5  2025 addpart
1491906 lrwxrwxrwx 1 root root      26 Dec  3 15:01 addr2line -> x86_64-linux-gnu-addr2line
1442308 -rwxr-xr-x 1 root root    158576 Apr  8  2024 airscan-discover
1442309 -rwxr-xr-x 1 root root     47552 Apr  7  2024 alsabat
1442310 -rwxr-xr-x 1 root root     85328 Apr  7  2024 alsaloop
1442311 -rwxr-xr-x 1 root root     82216 Apr  7  2024 alsamixer
1442312 -rwxr-xr-x 1 root root     76160 Apr  7  2024 alsatplg
1442313 -rwxr-xr-x 1 root root     31576 Apr  7  2024 alsaucm
1442314 -rwxr-xr-x 1 root root     31112 Apr  7  2024 amidi
1442315 -rwxr-xr-x 1 root root     63952 Apr  7  2024 amixer
1442316 -rwxr-xr-x 1 root root      274 Apr  8  2024 apg
1442317 -rwxr-xr-x 1 root root     26784 Apr  8  2024 apgbfm
1442318 -rwxr-xr-x 1 root root     84400 Apr  7  2024 aplay
1442319 -rwxr-xr-x 1 root root    27016 Apr  7  2024 aplaymidi
1442320 -rwxr-xr-x 1 root root     2322 Apr 18  2024 apport-bug
1442321 -rwxr-xr-x 1 root root    13625 Jul  8  2025 apport-cli
1441810 lrwxrwxrwx 1 root root      10 Jul  8  2025 apport-collect -> apport-bug
1442322 -rwxr-xr-x 1 root root     3790 Jul  8  2025 apport-unpack
1442323 -rwxr-xr-x 1 root root    14648 Mar 31 2024 appres
1442324 -rwxr-xr-x 1 root root    141544 Apr  8  2024 appstreamcli
1442325 lrwxrwxrwx 1 root root      6 Apr  8  2024 aptconf -> whatis
```

File Creation & File Information

This screenshot demonstrates file creation using touch and writing data using echo. The stat command displays detailed information about a file including inode number, size, permissions, and timestamps.

```
megha@ubuntu1:~$ touch File.txt
megha@ubuntu1:~$ echo hello > File.txt
megha@ubuntu1:~$ cat File.txt
hello
megha@ubuntu1:~$ stat file.txt
  File: file.txt
  Size: 6          Blocks: 8           IO Block: 4096   regular file
Device: 8,2      Inode: 1311226      Links: 1
Access: (0664/-rw-rw-r--)  Uid: ( 1000/  megha)  Gid: ( 1000/  megha)
Access: 2026-01-07 07:04:01.570026916 +0000
Modify: 2026-01-07 07:03:51.663990059 +0000
Change: 2026-01-07 07:03:51.663990059 +0000
 Birth: 2026-01-07 07:03:38.540940851 +0000
megha@ubuntu1:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
tmpfs        837M   1M  836M   1% /run
/dev/sda2      25G   7.0G  17G  30% /
tmpfs        4.1G    0  4.1G   0% /dev/shm
tmpfs        5.0M   8.0K  5.0M   1% /run/lock
tmpfs        837M  124K  837M   1% /run/user/1000
megha@ubuntu1:~$ ls -l
total 88
-rwxrwxr-x 1 megha megha 16096 Jan  5 05:21 a.out
drwxr-xr-x 2 megha megha  4096 Dec 17 15:10 Desktop
drwxr-xr-x 2 megha megha  4096 Dec 17 15:10 Documents
drwxr-xr-x 2 megha megha  4096 Dec 17 15:10 Downloads
-rw-rw-r-- 1 megha megha     1 Jan  7 06:40 file
-rw-rw-r-- 1 megha megha     0 Jan  6 07:37 File
-rw-rw-r-- 1 megha megha     6 Jan  7 07:03 file.txt
-rw-rw-r-- 1 megha megha     6 Jan  7 07:05 File.txt
-rw-rw-r-- 1 megha megha     6 Jan  7 06:40 hello
drwxr-xr-x 2 megha megha  4096 Dec 17 15:10 Music
```

Tree Command & Directory Hierarchy

The tree command displays directories and subdirectories in a hierarchical structure. It helps visualize the file system layout and symbolic links.

```
megha@ubuntu1:~$ tree
.
├── a.out
├── Desktop
├── Documents
├── Downloads
├── file
├── File
├── file.txt
├── File.txt
├── hello
├── Music
├── pg0.c
├── pg21.c
├── pg3.c
├── pg4.c
├── Pictures
├── program2.c
└── Public
    └── snap
        ├── firefox
        │   ├── 7559
        │   │   └── common
        │   │       └── current -> 7559
        ├── firmware-updater
        │   ├── 210
        │   │   └── common
        │   │       └── current -> 210
        └── snapd-desktop-integration
            ├── 315
            │   ├── Desktop -> /home/megha/Desktop
            │   └── Documents
```

/var and Log Files

The /var directory stores variable data such as log files. System logs like syslog, auth.log, and dmesg help in system monitoring and troubleshooting.

```
pg21.c
pg3.c
pg4.c
Pictures
program2.c
Public
snap
    firefox
        7559
            common
            current -> 7559
    firmware-updater
        210
            common
            current -> 210
    snapd-desktop-integration
        315
            Desktop -> /home/megha/Desktop
            Documents
            Downloads -> /home/megha/Downloads
            Music -> /home/megha/Music
            Pictures -> /home/megha/Pictures
            Public -> /home/megha/Public
            Templates -> /home/megha/Templates
            Videos -> /home/megha/Videos
            common
            current -> 315
Templates
Videos

30 directories, 11 files
```

/tmp and /boot Directories

The /tmp directory stores temporary files created by the system and users. The /boot directory contains boot loader files, kernel images, and initrd files required during system startup.

```

megha@ubuntu1:/var$ cd /var/log
megha@ubuntu1:/var/log$ ls
alternatives.log  cloud-init.log      dmesg.1.gz     gdm3          openvpn        unattended-upgrades
apport.log        cloud-init-output.log dmesg.2.gz    gpu-manager.log private       vboxpostinstall.log
apt              cups                  dmesg.3.gz    hp             README        wtmp
auth.log          cups-browsed        dmesg.4.gz    installer      speech-dispatcher
boot.log          dist-upgrade       dpkg.log      journal       sssd
bootstrap.log     dmesg               faillog      kern.log      syslog
btmp              dmesg.0             fontconfig.log lastlog      sysstat
megha@ubuntu1:/var/log$ cd /
megha@ubuntu1:$ cd /temp
bash: cd: /temp: No such file or directory
megha@ubuntu1:$ cd /tmp
megha@ubuntu1:/tmp$ ls
snap-private-tmp
systemd-private-e328f98ce54c496395a741036d6b60b5-colord.service-pVM2Qy
systemd-private-e328f98ce54c496395a741036d6b60b5-ModemManager.service-xXQNd6
systemd-private-e328f98ce54c496395a741036d6b60b5-polkit.service-xEHRah
systemd-private-e328f98ce54c496395a741036d6b60b5-power-profiles-daemon.service-AALYSU
systemd-private-e328f98ce54c496395a741036d6b60b5-switcheroo-control.service-0Ug2Hrp
systemd-private-e328f98ce54c496395a741036d6b60b5-systemd-logind.service-pMLVlt
systemd-private-e328f98ce54c496395a741036d6b60b5-systemd-oomd.service-GWnRzk
systemd-private-e328f98ce54c496395a741036d6b60b5-systemd-resolved.service-qjyVz2
systemd-private-e328f98ce54c496395a741036d6b60b5-systemd-timesyncd.service-hsTPoY
systemd-private-e328f98ce54c496395a741036d6b60b5-upower.service-mMd57r
megha@ubuntu1:/tmp$ cd /boot
megha@ubuntu1:/boot$ ls
config-6.14.0-37-generic  initrd.img-6.14.0-37-generic  memtest86+ia32.efi  System.map-6.14.0-37-generic  vmlinuz.old
grub                      initrd.img.old                memtest86+x64.bin    vmlinuz
initrd.img                 memtest86+ia32.bin            memtest86+x64.efi   vmlinuz-6.14.0-37-generic
megha@ubuntu1:/boot$ cd /

```

/dev Directory

The /dev directory contains device files representing hardware and virtual devices. Examples include storage devices, terminals, and random number generators.

```

megha@ubuntu1:$ cd /tmp
megha@ubuntu1:/tmp$ ls
snap-private-tmp
systemd-private-e328f98ce54c496395a741036d6b60b5-colord.service-pVM2Qy
systemd-private-e328f98ce54c496395a741036d6b60b5-ModemManager.service-xXQNd6
systemd-private-e328f98ce54c496395a741036d6b60b5-polkit.service-xEHRah
systemd-private-e328f98ce54c496395a741036d6b60b5-power-profiles-daemon.service-AALYSU
systemd-private-e328f98ce54c496395a741036d6b60b5-switcheroo-control.service-0Ug2Hrp
systemd-private-e328f98ce54c496395a741036d6b60b5-systemd-logind.service-pMLVlt
systemd-private-e328f98ce54c496395a741036d6b60b5-systemd-oomd.service-GWnRzk
systemd-private-e328f98ce54c496395a741036d6b60b5-systemd-resolved.service-qjyVz2
systemd-private-e328f98ce54c496395a741036d6b60b5-systemd-timesyncd.service-hsTPoY
systemd-private-e328f98ce54c496395a741036d6b60b5-upower.service-mMd57r
megha@ubuntu1:/tmp$ cd /boot
megha@ubuntu1:/boot$ ls
config-6.14.0-37-generic  initrd.img-6.14.0-37-generic  memtest86+ia32.efi  System.map-6.14.0-37-generic  vmlinuz.old
grub                      initrd.img.old                memtest86+x64.bin    vmlinuz
initrd.img                 memtest86+ia32.bin            memtest86+x64.efi   vmlinuz-6.14.0-37-generic
megha@ubuntu1:/boot$ cd /
megha@ubuntu1:$ cd /dev
megha@ubuntu1:/dev$ ls
autofs        fuse      loop4      random      tty10      tty28      tty45      tty62      ttyS20      udmabuf      vcsa4
block        hidraw0   loop5      rfkill      tty11      tty29      tty46      tty63      ttyS21      uhid       vcsa5
bsg          hpet      loop6      rtc         tty12      tty3      tty47      tty7       ttyS22      uinput      vcsa6
btrfs-control hugepages  loop7      rtc0        tty13      tty30      tty48      tty8       ttyS23      urandom      vcsu
bus          hwrng    loop8      sda         tty14      tty31      tty49      tty9       ttyS24      userfaultfd  vcsu1
cdrom        i2c-0    loop9      sdal        tty15      tty32      tty5      ttyprintk  ttyS25      userio      vcsu2
char          initctl   loop-control sda2        tty16      tty33      tty50      tty50      ttyS26      vboxguest   vcsu3
console      input     mapper    sg0         tty17      tty34      tty51      tty51      ttyS27      vboxuser    vcsu4
core          kmsg     mcelog    sg1         tty18      tty35      tty52      tty510     ttyS28      vcs       vcsu5
cpu           log      mem      shm         tty19      tty36      tty53      tty511     ttyS29      vcs1       vcsu6
cpu_dma_latency loop0    mqueue   snapshot   tty2       tty37      tty54      tty512     ttyS3      vcs2       vfl0
cpufreq      loop1    mmcblk0  sd1         tty38      tty39      tty55      tty513     ttyS4      vcs3       vcsu7

```