

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 .lesshtst 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:/$ cd /bin
megha@ubuntu1:/bin$ ls
'['
aa-enabled          head                resizecons
aa-exec             HEAD               resizepart
aa-exec             heif-thumbnailer  resolvectl
aa-features-abi     help2tags          rev
aconnect            hex2hcd             rfcomm
acpidbg             hexdump             rgrep
add-apt-repository  hipercdecode        rm
addpart             host                rmdir
addr2line           hostid              rnano
airsnscan-discover  hostname            routel
alsabat             hostnamectl          rpcgen
alsaloop            hp-align            rrsync
alsamixer           hp-check            rstart
alsatplg            hp-clean            rstartd
alsaucm             hp-colorcal         rsync
amidi               hp-config_usb_printer rsync-ssl
amixer              hp-doctor            rtla
apg                 hp-firmware         rtstat
apgbfm             hp-info             runcon
aplay              hp-levels            run-parts
aplaymidi           hp-logcapture        run-with-aspell
apport-bug          hp-makeuri           rview
apport-cli          hp-pkcservice        rygel
apport-collect      hp-plugin            sadf
apport-unpack       hp-plugin-ubuntu     sane-find-scanner
appres              hp-probe             sar
appstreamcli        hp-query             sar.svcsstat
```

/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 aircan-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     14154 Apr  8  2024 appstreamcli
1441811 lrwxrwxrwx 1 root root           6 Apr  8  2024 appropst -> 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  1.5M  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
btmtp             dmesg.0                fontconfig.log       lastlog              sysstat

megha@ubuntu1:/var/log$ cd /
megha@ubuntu1:/ $ cd /tmp
bash: cd: /tmp: No such file or directory
megha@ubuntu1:/ $ cd /tmp
megha@ubuntu1:/tmp$ ls
snap-private-tnp
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-0Ug2Hp
systemd-private-e328f98ce54c496395a741036d6b60b5-systemd-logind.service-pMLVlt
systemd-private-e328f98ce54c496395a741036d6b60b5-systemd-oond.service-GWrnZk
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                       vmlinuz-6.14.0-37-generic
initrd.img               memtest86+ia32.bin          memtest86+x64.efi
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-tnp
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-0Ug2Hp
systemd-private-e328f98ce54c496395a741036d6b60b5-systemd-logind.service-pMLVlt
systemd-private-e328f98ce54c496395a741036d6b60b5-systemd-oond.service-GWrnZk
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                       vmlinuz-6.14.0-37-generic
initrd.img               memtest86+ia32.bin          memtest86+x64.efi
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           rfcill          tty11           tty29           tty46           tty63           ttyS21          uhid            vcsa5
bsg             hpet           loop6           rtc             tty12           tty3            tty47           tty7            ttyS22          input          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           sda1            tty15           tty32           tty5            ttyprintk       ttyS25          userio          vcsu2
char            initctl         loop-control    sda2            tty16           tty33           tty50           ttyS0           ttyS26          vboxguest       vcsu3
console         input           mapper          sg0             tty17           tty34           tty51           ttyS1           ttyS27          vboxuser        vcsu4
core            kmsg           mcelog          sg1             tty18           tty35           tty52           ttyS10          ttyS28          vcs             vcsu5
cpu             log             mem            shm             tty19           tty36           tty53           ttyS11          ttyS29          vcs1            vcsu6
cpu_dma_latency loop0           queue          snapshot        tty2            tty37           tty54           ttyS12          ttyS3           vcs2            vfio
cpu             loop1           ram             sdd             tty20           tty38           tty55           ttyS13          ttyS30          vcs3            vcs-arbiters

```