Linux Basic Commands and File Systems

Explanation of common Linux directories, along with what you can typically find in each one. These directories are part of the root file system structure and are vital for the system's operation.

1. / (Root Directory)

- The base of the Linux filesystem. All other directories stem from this directory.

2. /bin (Binary)

- Contains essential user command binaries (like ls, cp, mv, etc.) needed to start the system and handle basic operations.

3. /boot

- Holds files necessary for booting the system, like the kernel (vmlinuz), boot loader files (grub), and initial RAM disk (initrd).

4. /dev (Devices)

- Contains special device files that represent hardware devices (e.g., hard drives as /dev/sda, USB devices, etc.). These files allow the system to interact with hardware components.

5. /etc (Configuration Files)

- Contains all the configuration files for the system and services. Examples:
  - /etc/passwd: User account information (encrypted passwords are usually stored in /etc/shadow).
  - /etc/fstab: Disk partition information (what is mounted where).
  - /etc/hostname: System's hostname.
  - /etc/network/: Network configuration files.

6. /home (User Home Directories)

- Contains home directories for individual users (e.g., /home/username). Each user can store personal files here.

7. /lib (Libraries)

- Holds essential shared libraries needed by binaries in /bin and /sbin, like libc.so or kernel modules.

8. /media (Removable Media)

- Mount points for removable devices (e.g., USB drives, CD-ROMs) that are automatically mounted when inserted.

9. /mnt (Mount)

- Temporarily used for mounting filesystems. You might mount a USB drive, an external disk, or a network share here manually.

10. /opt (Optional Packages)

- Contains software packages that are manually installed and are not part of the default distribution. You'll find third-party software or custom programs installed here.

11. /proc (Process Information)

- A virtual filesystem that provides information about running processes and kernel data.
  - /proc/cpuinfo: CPU details.
  - /proc/meminfo: Memory usage.
  - /proc/[pid]: Information about a process with that process ID.

12. /root (Root User's Home)

- The home directory for the root (superuser). Different from /home, this is only accessible by the root user.

13. /run

- Contains runtime data for processes started since the last boot. Often used by system services for process IDs, lock files, etc.

14. /sbin (System Binaries)

- Holds essential system binaries used by the root user for system administration (e.g., fdisk, iptables, ifconfig).

15. **/srv (Service Data)**

- Contains data for services provided by the system. For example, web servers or FTP servers may store their data here.

16. **/sys**

- Another virtual filesystem that provides information about hardware and the kernel. It is related to /proc but focuses more on devices and hardware configuration.

17. **/tmp (Temporary Files)**

- Used for temporary files created by programs. Files here are often deleted automatically after a system reboot or after they are no longer needed.

18. **/usr (User Binaries and Data)**

- /usr/bin: Contains most user-level commands.
- /usr/sbin: Contains non-essential system binaries for the superuser.
- /usr/lib: Contains libraries for /usr/bin and /usr/sbin.
- /usr/local: Local, manually installed software. Often used for software that isn't managed by the system's package manager.

19. **/var (Variable Data)**

- Contains files that vary as the system runs, like logs, caches, or spool files.
  - /var/log/: System log files (e.g., syslog, dmesg).
  - /var/spool/: Holds data that is waiting to be processed, like print jobs or mail queues.
  - /var/www/: Web server files.

Practicing Basic Commands

```
centos — vagrant@Aakansha:~ — ssh ◂ vagrant ssh — 67×17

Last login: Fri Sep 20 16:46:44 on ttys000
Aakansha@DevOps ~ %cd Desktop/vms/centos
Aakansha@DevOps ~/Desktop/vms/centos %ls
Vagrantfile
Aakansha@DevOps ~/Desktop/vms/centos %vagrant up > /dev/null
Aakansha@DevOps ~/Desktop/vms/centos % vagrant ssh
Last login: Wed Sep 18 04:38:01 2024 from 172.16.196.1
[vagrant@Aakansha ~]$
```
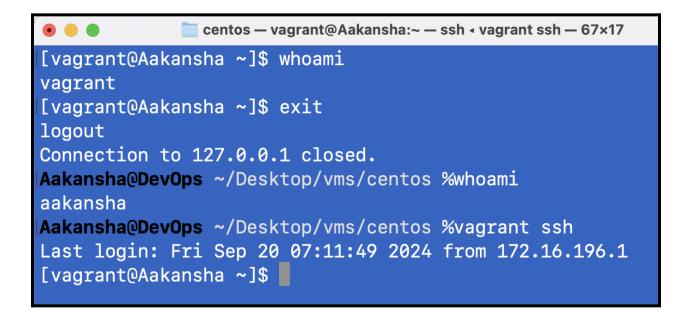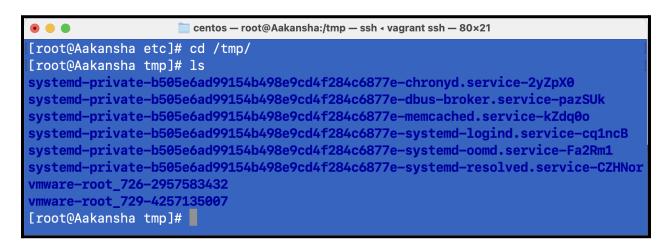
```
centos — vagrant@Aakansha:~ — ssh ◂ vagrant ssh — 67×17

[vagrant@Aakansha ~]$ whoami
vagrant
[vagrant@Aakansha ~]$ exit
logout
Connection to 127.0.0.1 closed.
Aakansha@DevOps ~/Desktop/vms/centos %whoami
aakansha
Aakansha@DevOps ~/Desktop/vms/centos %vagrant ssh
Last login: Fri Sep 20 07:11:49 2024 from 172.16.196.1
[vagrant@Aakansha ~]$
```

```
centos — vagrant@Aakansha:~ — ssh ‹ vagrant ssh — 96×28

[vagrant@Aakansha ~]$ whoami
vagrant
[vagrant@Aakansha ~]$ pwd
/home/vagrant
[vagrant@Aakansha ~]$ ls
[vagrant@Aakansha ~]$ cat /etc/os-release
NAME="Fedora Linux"
VERSION="35 (Thirty Five)"
ID=fedora
VERSION_ID=35
VERSION_CODENAME=""
PLATFORM_ID="platform:f35"
PRETTY_NAME="Fedora Linux 35 (Thirty Five)"
ANSI_COLOR="0;38;2;60;110;180"
LOGO=fedora-logo-icon
CPE_NAME="cpe:/o:fedoraproject:fedora:35"
HOME_URL="https://fedoraproject.org/"
DOCUMENTATION_URL="https://docs.fedoraproject.org/en-US/fedora/f35/system-administrators-guide/"
SUPPORT_URL="https://ask.fedoraproject.org/"
BUG_REPORT_URL="https://bugzilla.redhat.com/"
REDHAT_BUGZILLA_PRODUCT="Fedora"
REDHAT_BUGZILLA_PRODUCT_VERSION=35
REDHAT_SUPPORT_PRODUCT="Fedora"
REDHAT_SUPPORT_PRODUCT_VERSION=35
PRIVACY_POLICY_URL="https://fedoraproject.org/wiki/Legal:PrivacyPolicy"
[vagrant@Aakansha ~]$
```

```
centos — root@Aakansha:/sbin — ssh ‹ vagrant ssh — 68×21

[root@Aakansha ~]# whoami
root
[root@Aakansha ~]# pwd
/root
[root@Aakansha ~]# ls
anaconda-ks.cfg  original-ks.cfg
[root@Aakansha ~]# cd /
[root@Aakansha /]# pwd
/
[root@Aakansha /]# ls
bin   dev   home   lib64   mnt   proc   run   srv   tmp   var
boot   etc   lib   media   opt   root   sbin   sys   usr
[root@Aakansha /]# cd /sbin/
[root@Aakansha sbin]# ls
accessdb
addgnupghome
addpart
adduser
agetty
alternatives
applygnupgdefaults
```

```
[root@Aakansha sbin]# cd /etc/
[root@Aakansha etc]# ls
adjtime                 issue.d              rc4.d
aliases                 issue.net            rc5.d
alternatives            kernel               rc6.d
audit                   krb5.conf            rc.d
bash_completion.d       krb5.conf.d          reader.conf.d
bashrc                  ld.so.cache          redhat-release
bindresvport.blacklist  ld.so.conf           resolv.conf
binfmt.d                ld.so.conf.d         rhashrc
chkconfig.d             libaudit.conf        rpc
chrony.conf             libibverbs.d         rpm
chrony.keys             libnl                rsyncd.conf
cifs-utils              libreport            rwtab.d
crypto-policies         libssh               sasl2
```

```
[root@Aakansha etc]# cat /etc/hostname
Aakansha.DevOps
[root@Aakansha etc]#
```

```
[root@Aakansha etc]# cd /tmp/
[root@Aakansha tmp]# ls
systemd-private-b505e6ad99154b498e9cd4f284c6877e-chronyd.service-2yZpX0
systemd-private-b505e6ad99154b498e9cd4f284c6877e-dbus-broker.service-pazSUk
systemd-private-b505e6ad99154b498e9cd4f284c6877e-memcached.service-kZdq0o
systemd-private-b505e6ad99154b498e9cd4f284c6877e-systemd-logind.service-cq1ncB
systemd-private-b505e6ad99154b498e9cd4f284c6877e-systemd-oomd.service-Fa2Rm1
systemd-private-b505e6ad99154b498e9cd4f284c6877e-systemd-resolved.service-CZHNor
vmware-root_726-2957583432
vmware-root_729-4257135007
[root@Aakansha tmp]#
```

```
centos — root@Aakansha:/boot — ssh ‹ vagrant ssh — 80×21

[root@Aakansha tmp]# cd /boot/
[root@Aakansha boot]# ls
config-5.16.9-200.fc35.aarch64
dtb
dtb-5.16.9-200.fc35.aarch64
efi
grub2
initramfs-0-rescue-4f71f025163c4e6c8e94339e2a04e5ba.img
initramfs-5.16.9-200.fc35.aarch64.img
loader
symvers-5.16.9-200.fc35.aarch64.gz
System.map-5.16.9-200.fc35.aarch64
vmlinuz-0-rescue-4f71f025163c4e6c8e94339e2a04e5ba
vmlinuz-5.16.9-200.fc35.aarch64
[root@Aakansha boot]#
```

```
centos — root@Aakansha:/boot/grub2 — ssh ‹ vagrant ssh — 80×21

[root@Aakansha boot]# cd grub2/
[root@Aakansha grub2]# ls
fonts   grub.cfg   grubenv
[root@Aakansha grub2]#
```

```
[root@Aakansha grub2]# pwd
/boot/grub2
[root@Aakansha grub2]# cd
[root@Aakansha ~]# pwd
/root
[root@Aakansha ~]# cd /proc/
[root@Aakansha proc]# ls
1     125   186   28    532   679   761        buddyinfo    loadavg
10    126   19    29    533   68    762        bus          locks
100   127   192   3     534   680   764        cgroups      mdstat
101   128   193   30    535   681   77         cmdline      meminfo
102   129   2     31    536   682   776        consoles     misc
103   13    21    32    537   684   78         cpuinfo      modules
104   130   2187  33    538   685   79         crypto       mounts
105   131   22    34    539   686   8          devices      net
```

```
[root@Aakansha proc]# cd
[root@Aakansha ~]# uptime
 07:29:56 up 19 min,  1 user,  load average: 0.00, 0.00, 0.00
[root@Aakansha ~]# cat /proc/uptime
1149.99 2272.83
[root@Aakansha ~]# free -m
              total        used        free      shared  buff/cache   available
Mem:            946         212         546           0         186         717
Swap:           945           0         945
[root@Aakansha ~]# ls
anaconda-ks.cfg  original-ks.cfg
[root@Aakansha ~]#
```

```
[root@Aakansha ~]# exit
logout
[vagrant@Aakansha ~]$ exit
logout
Connection to 127.0.0.1 closed.
Aakansha@DevOps ~/Desktop/vms/centos %
```

Summary

Each directory has a specific purpose, helping to organize the Linux operating system's components in a clear and efficient way.

- **System binaries: `/bin`, `/sbin`**
- **Configuration files: `/etc`**
- **Device files: `/dev`**
- **Process info: `/proc`, `/sys`**
- **User files: `/home`, `/root`**
- **Logs and temporary files: `/var`, `/tmp`**
- **Removable media: `/media`, `/mnt`**
- **Custom and optional software: `/opt`, `/usr/local`**