Linux File Hierarchy Structure

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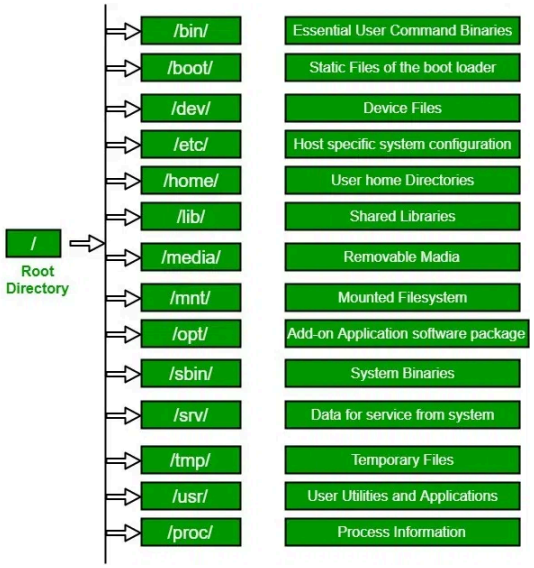
The Linux File Hierarchy Structure or the Filesystem Hierarchy Standard (FHS) defines the directory structure and directory contents in Unix-like operating systems. It is maintained by the Linux Foundation.

- In the FHS, all files and directories appear under the root directory /, even if they are stored on different physical or virtual devices.
- Some of these directories only exist on a particular system if certain subsystems, such as the X Window System, are installed.
- Most of these directories exist in all UNIX operating systems and are generally used in much the same way; however, the descriptions here are those used specifically for the FHS and are not considered authoritative for platforms other than Linux.

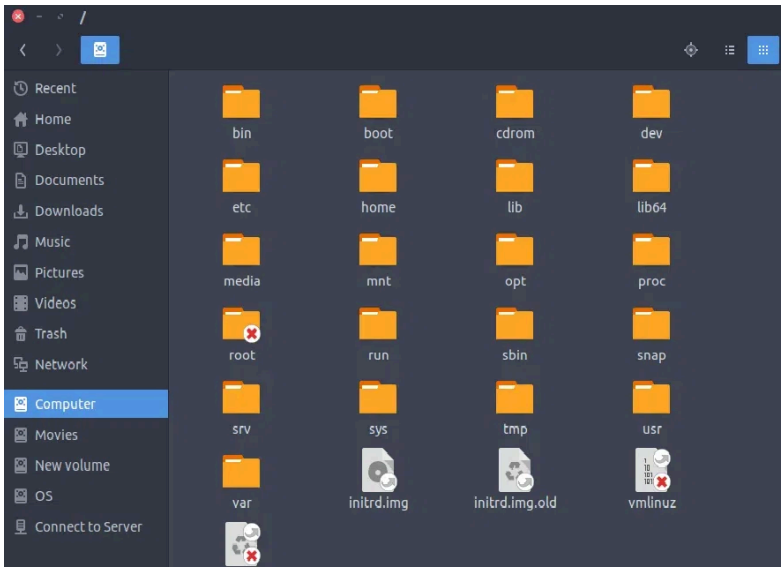


linux-directory

1. / (Root):

Primary hierarchy root and root directory of the entire file system hierarchy.

- Every single file and directory start from the root directory.
- The only root user has the right to write under this directory.
- /root is the root user's home directory, which is not the same as /

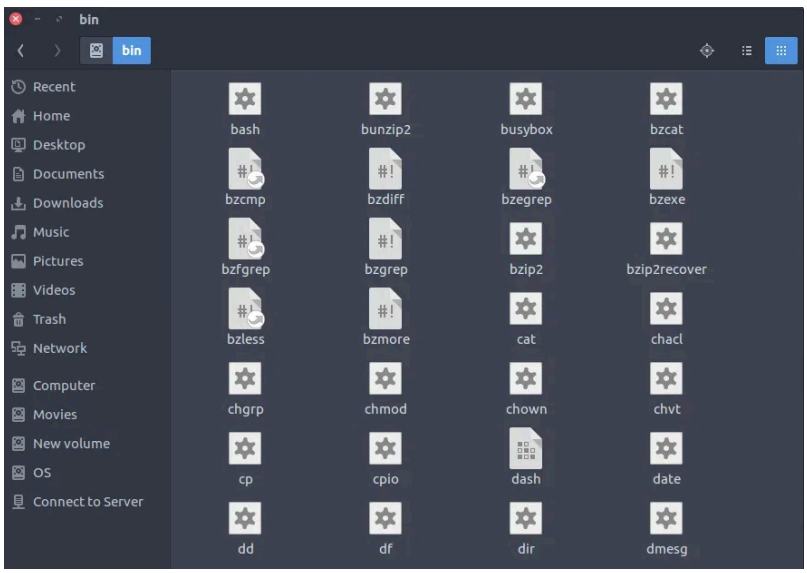


root-linux-directory

2. /bin :

Essential command binaries that need to be available in single-user mode; for all users, e.g., cat, ls, cp.

- Contains binary executables.
- Common linux commands you need to use in single-user modes are located under this directory.
- Commands used by all the users of the system are located here e.g. ps, ls, ping, grep, cp

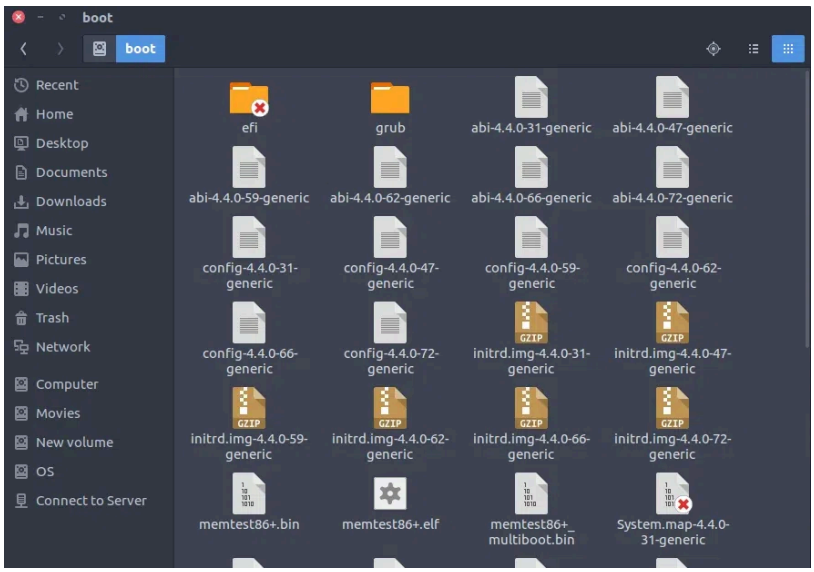


bin-linux-directory

3. /boot :

Boot loader files, e.g., kernels, initrd.

- Kernel initrd, vmlinux, grub files are located under /boot
- Example: initrd.img-2.6.32-24-generic, vmlinuz-2.6.32-24-generic

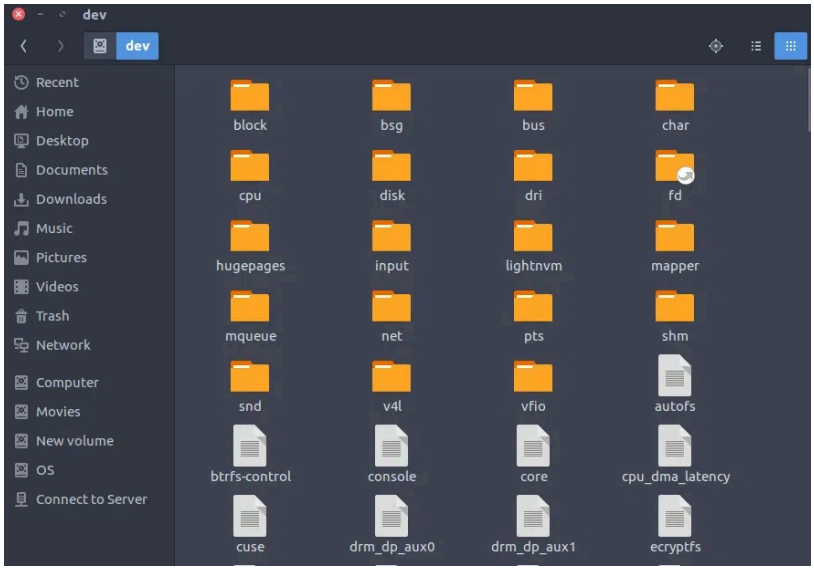


boot-linux-directory

4. /dev :

Essential device files, e.g., /dev/null.

- These include terminal devices, usb, or any device attached to the system.
- Example: /dev/tty1, /dev/usbmon0

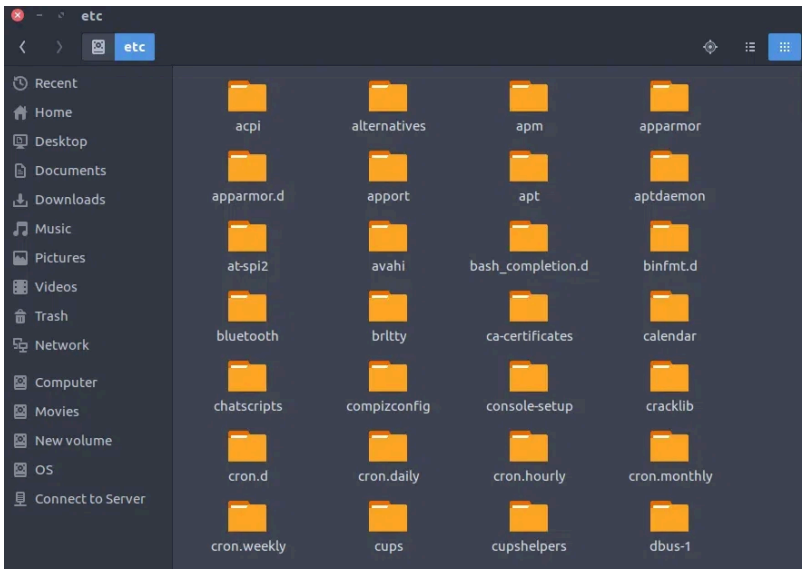


dev-linux-directory

5. /etc :

Host-specific system-wide configuration files.

- Contains configuration files required by all programs.
- This also contains startup and shutdown shell scripts used to start/stop individual programs.
- Example: /etc/resolv.conf, /etc/logrotate.conf.

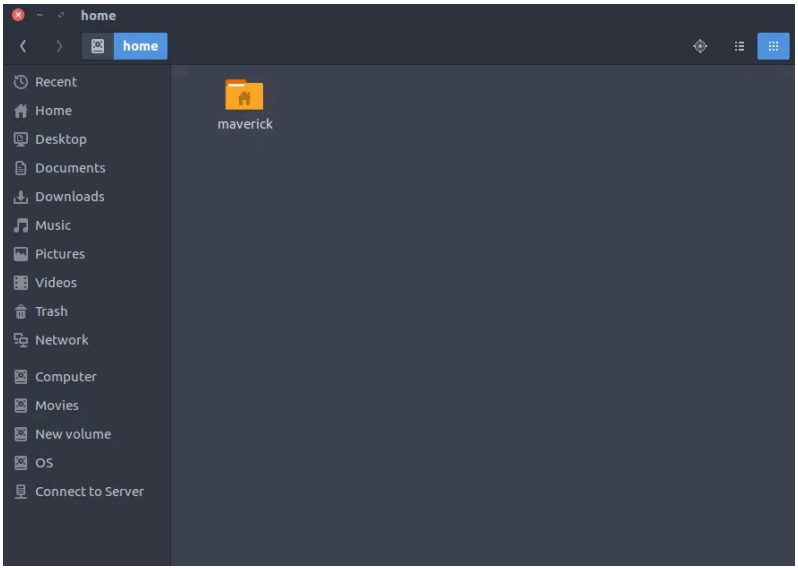


etc-linux-directory

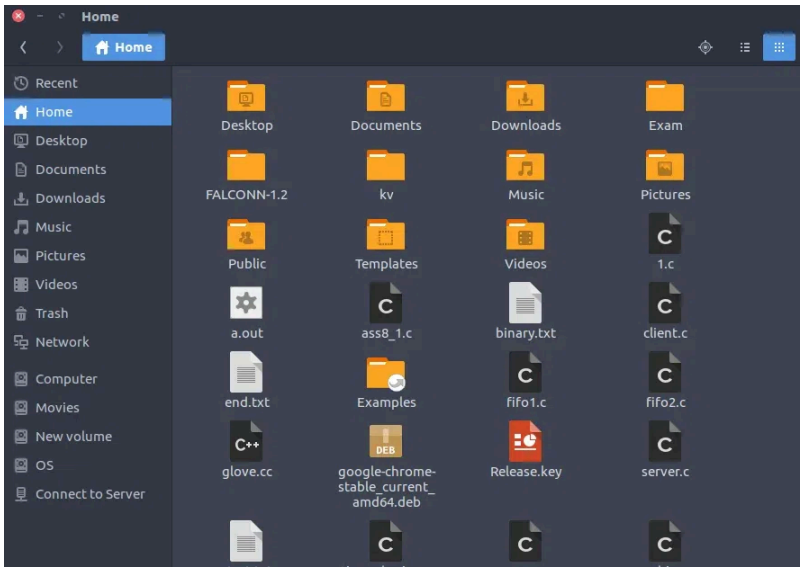
6. /home :

Users' home directories, containing saved files, personal settings, etc.

- Home directories for all users to store their personal files.
- example: /home/kishlay, /home/kv



home-linux-directory

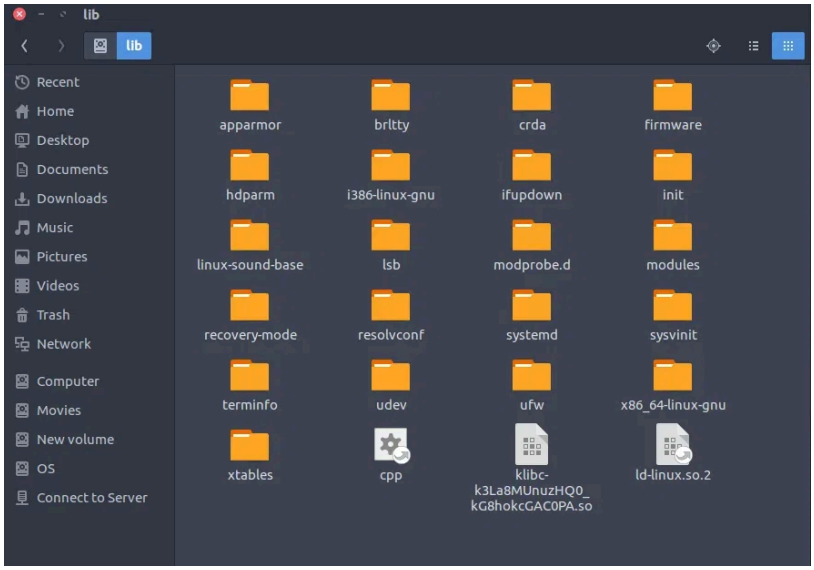


home-linux-directory

7. /lib:

Libraries essential for the binaries in /bin/ and /sbin/.

- Library filenames are either ld* or lib*.so.*
- Example: ld-2.11.1.so, libncurses.so.5.7



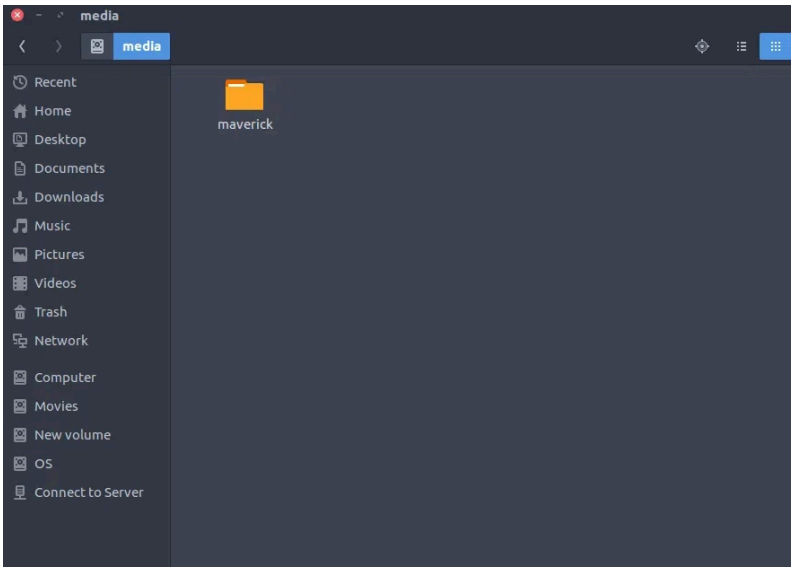
lib-linux-directory

8. /media:

Mount points for removable media such as CD-ROMs (appeared in FHS-2.3).

- Temporary mount directory for removable devices.

- Examples, /media/cdrom for CD-ROM; /media/floppy for floppy drives; /media/cdrecorder for CD writer

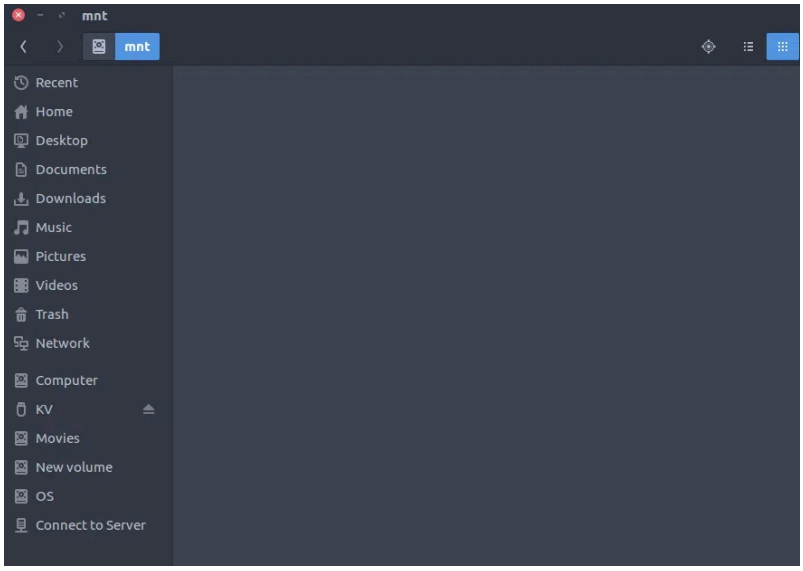


media-linux-directory

9. /mnt :

Temporarily mounted filesystems.

- Temporary mount directory where sysadmins can mount filesystems.



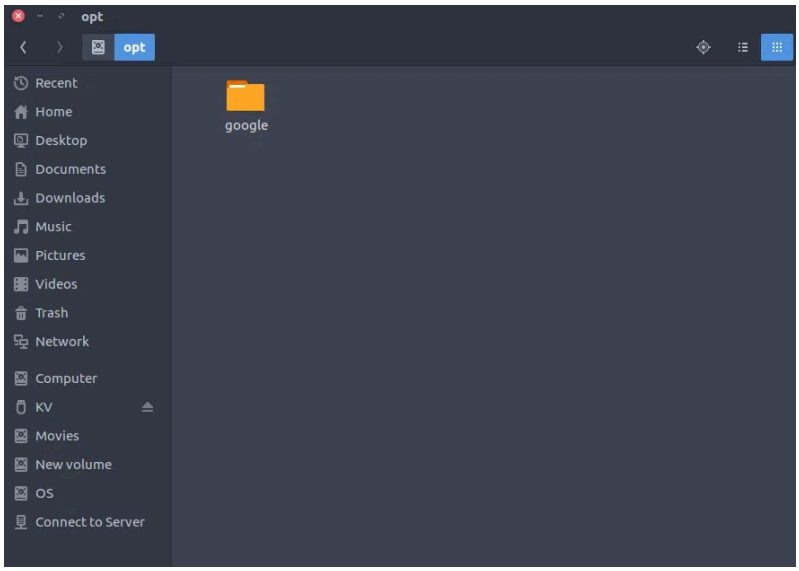
mnt-linux-directory

10. /opt :

Optional application software packages.

- Contains add-on applications from individual vendors.

- Add-on applications should be installed under either /opt/ or /opt/ sub-directory.

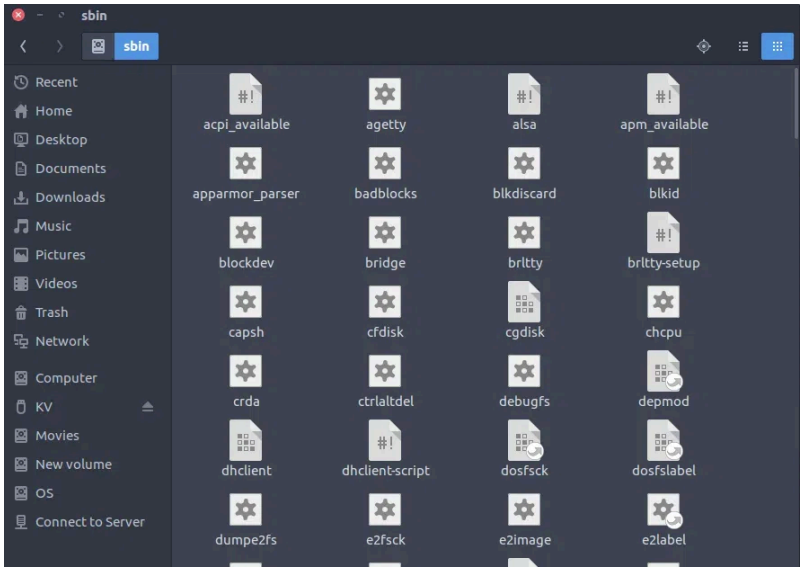


opt-linux-directory.

11. /sbin :

Essential system binaries, e.g., fsck, init, route.

- Just like /bin, /sbin also contains binary executables.
- The linux commands located under this directory are used typically by system administrators, for system maintenance purposes.
- Example: iptables, reboot, fdisk, ifconfig, swapon

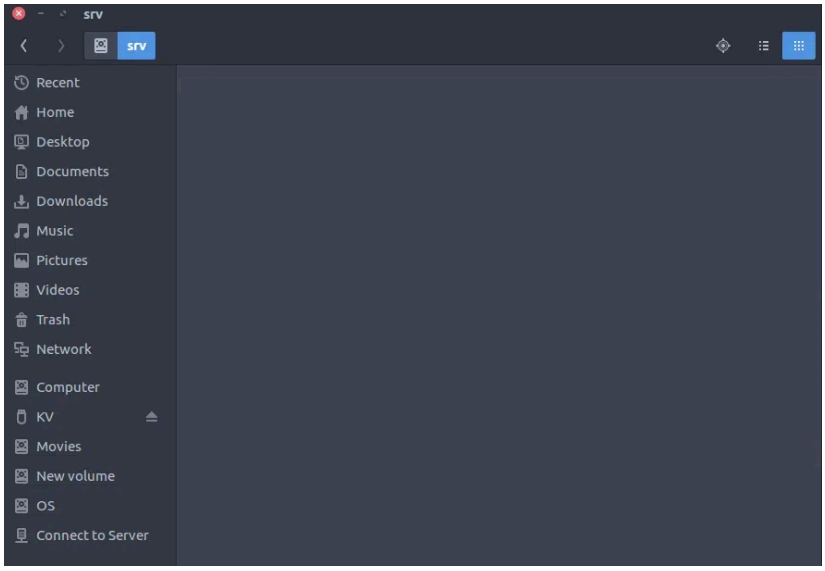


sbin-linux-directory

12. /srv :

Site-specific data served by this system, such as data and scripts for web servers, data offered by FTP servers, and repositories for version control systems.

- srv stands for service.
- Contains server specific services related data.
- Example, /srv/cvs contains CVS related data.

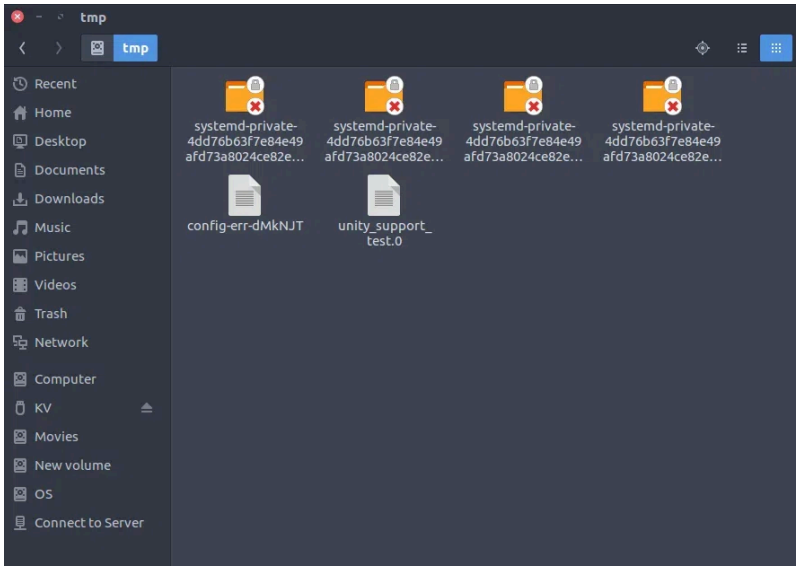


srv-linux-directory

13. /tmp :

Temporary files. Often not preserved between system reboots and may be severely size restricted.

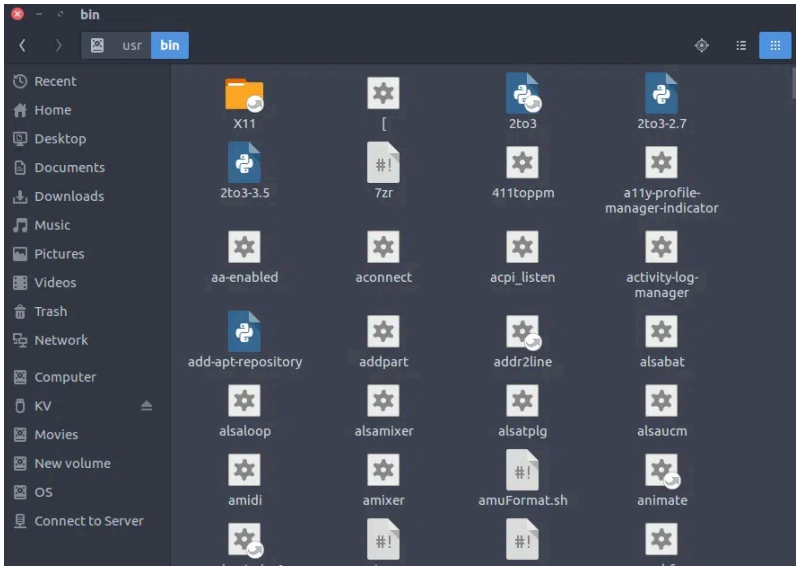
- Directory that contains temporary files created by system and users.
- Files under this directory are deleted when the system is rebooted.



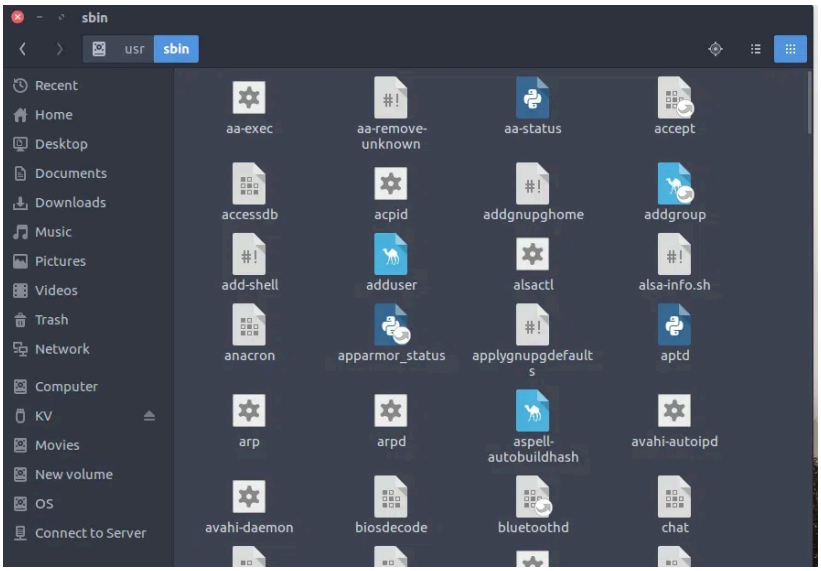
14. /usr :

Secondary hierarchy for read-only user data; contains the majority of (multi-)user utilities and applications.

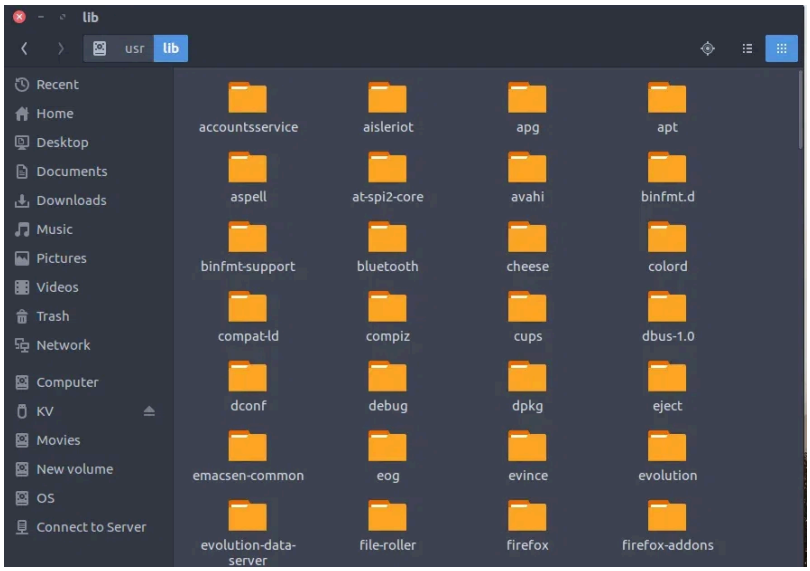
- Contains binaries, libraries, documentation, and source-code for second level programs.
- /usr/bin contains binary files for user programs. If you can't find a user binary under /bin, look under /usr/bin. For example: at, awk, cc, less, scp
- /usr/sbin contains binary files for system administrators. If you can't find a system binary under /sbin, look under /usr/sbin. For example: atd, cron, sshd, useradd, userdel
- /usr/lib contains libraries for /usr/bin and /usr/sbin
- /usr/local contains user's programs that you install from source. For example, when you install apache from source, it goes under /usr/local/apache2
- /usr/src holds the Linux kernel sources, header-files and documentation.



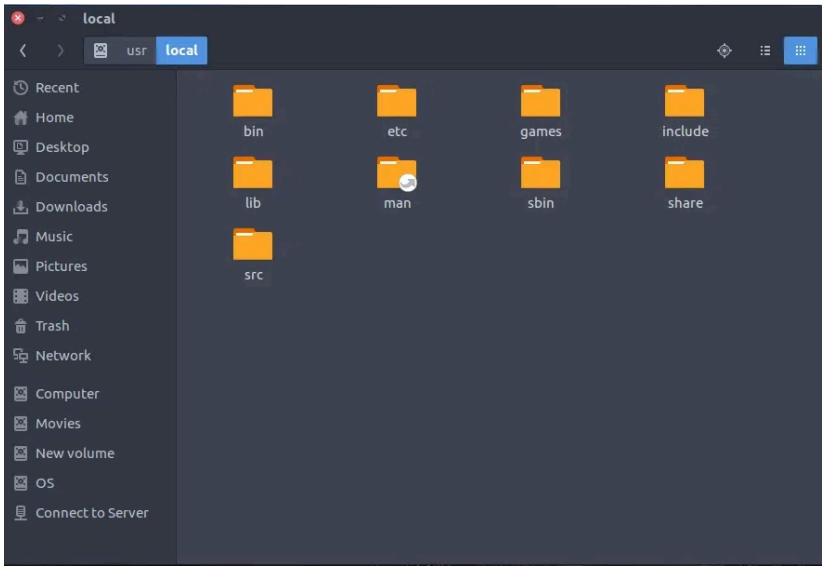
usr_bin-linux-directory



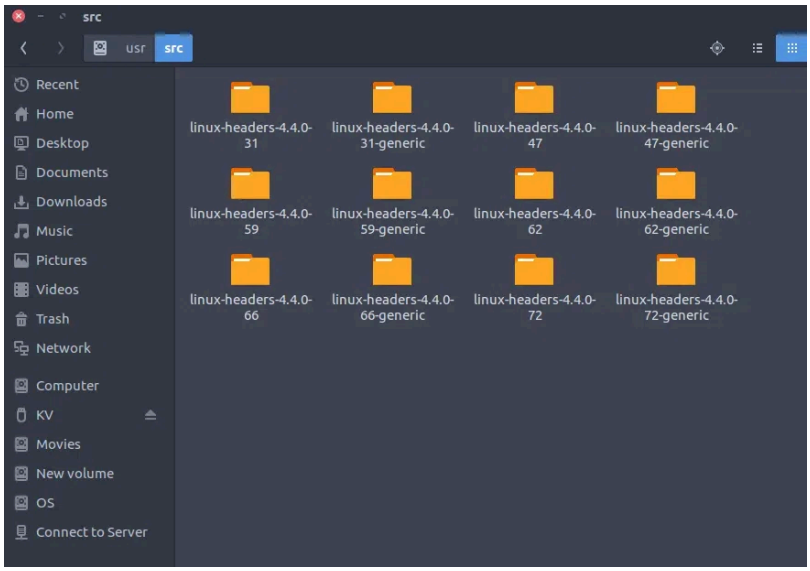
usr_sbin-linux-directory



usr_lib-linux-dirctory



usr_local-linux-directory

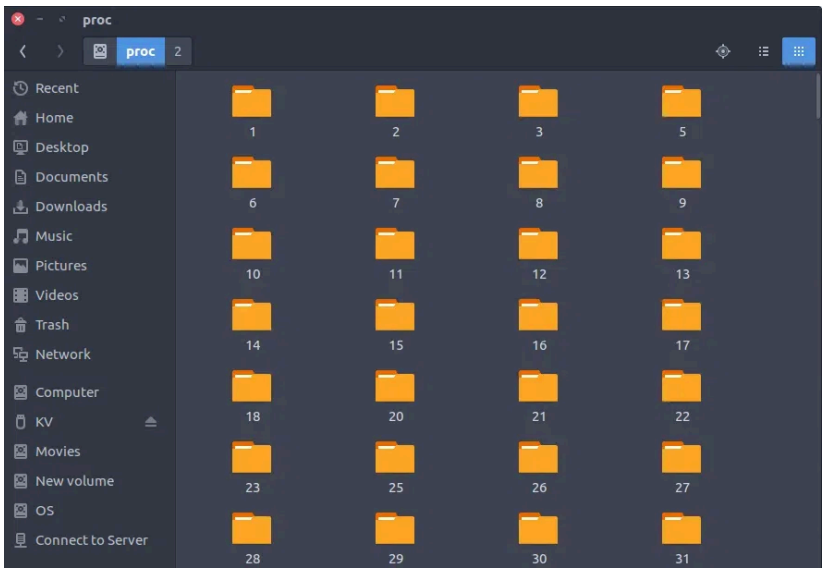


usr_src-linux-directory

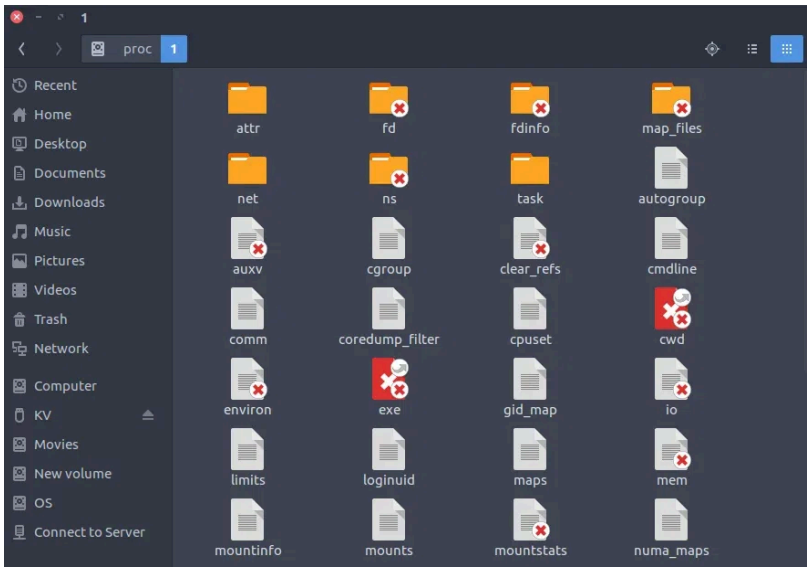
15. /proc:

Virtual filesystem providing process and kernel information as files. In Linux, it corresponds to a procs mount. Generally, automatically generated and populated by the system, on the fly.

- Contains information about system process.
- This is a pseudo filesystem that contains information about running processes. For example: /proc/{pid} directory contains information about the process with that particular pid.
- This is a virtual filesystem with text information about system resources. For example: /proc/uptime



proc-linux-directory



proc-linux-directory

Modern Linux distributions include a /run directory as a temporary filesystem (tmpfs) which stores volatile runtime data, following the FHS version 3.0. According to the FHS version 2.3, such data were stored in /var/run but this was a problem in some cases because this directory is not always available at early boot. As a result, these programs have had to resort to trickery, such as using /dev/.udev, /dev/.mdadm, /dev/.systems or /dev/.mount directories, even though the device directory isn't intended for such data.Among other advantages, this makes the system easier to use normally with the root filesystem mounted read-only. For example, below are the changes Debian made in its 2013 Wheezy release:

- /dev/.* ? /run/*
- /dev/shm ? /run/shm
- /dev/shm/* ? /run/*
- /etc/* (writable files) ? /run/*
- /lib/init/rw ? /run
- /var/lock ? /run/lock
- /var/run ? /run
- /tmp ? /run/tmp