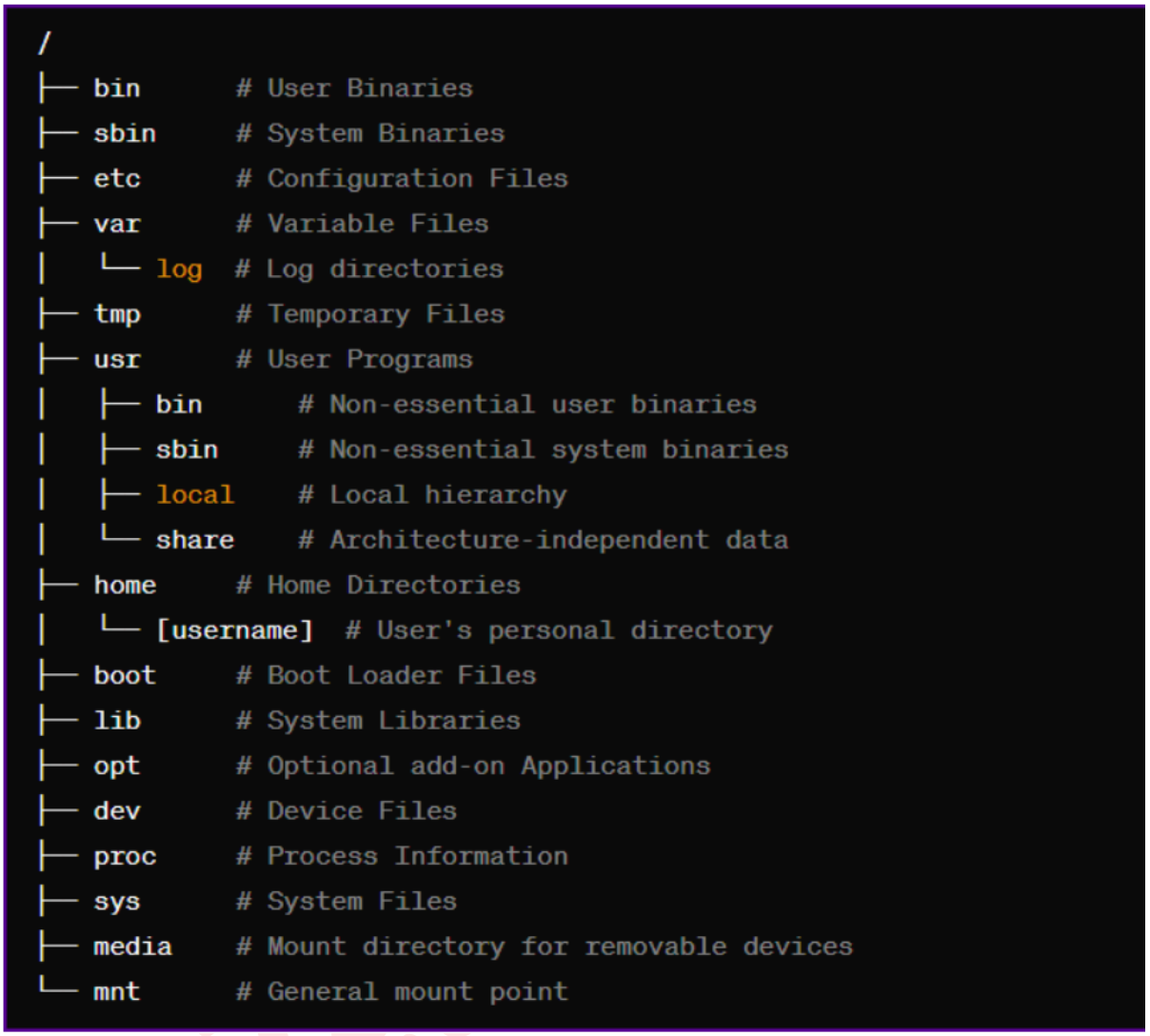
Linux Directories Structure & Explanation



The Linux file system is organized in a hierarchical structure, starting from the root directory (/). Below is a detailed explanation of the key directories within a typical Linux file system, their uses, and examples of what you might find in each.

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1. / - Root Directory

Everything on your Linux system is located under the root directory, even if they are stored on different physical or virtual devices. This is the top-level directory of the file system.

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2. /bin - User Binaries

Contains binary executables that are essential for the system's operation, available to all users.
- **Example:** `/bin/ls` - Lists directory contents.

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3. /sbin - System Binaries
Like /bin, this directory holds essential binaries, but these are generally intended for system administration purposes, used by the root user.
- **Example:** `/sbin/reboot` - Reboots the system.

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4. /etc - Configuration Files
Contains configuration files required by all programs. This directory only contains static configuration files which do not change without administrator intervention.
- **Example: `/etc/passwd`** - Contains user account information.

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5. /var - Variable Files
/var contains files to which the system writes data during the course of its operation. This includes things like logs, spool files, and cached data.
- **Example:** `/var/log` - Directory containing log files.

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6. /tmp - Temporary Files
Used to store temporary files created by the system and users. Files under this directory are usually deleted whenever the system is rebooted.
- **Example:** Files created by applications for temporary storage of data.

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7. /usr - User Programs
Contains the majority of user utilities and applications, with binaries, libraries, documentation, etc.
- **Subdirectories:**
  - **/usr/bin** - Non-essential binaries for general users.
  - **/usr/sbin** - Non-essential system binaries, usually for system administration.
  - **/usr/local** - Local hierarchy where locally compiled applications install to.

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8. /home - Home Directories

Home directories for all the user accounts. Each user has a directory within /home for personal storage.

- Example: `/home/username` - User's personal directory.

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9. /boot - Boot Loader Files

Contains files needed to boot the system, such as the Linux kernel itself, and the boot loader.

- Example: `/boot/grub/grub.cfg` - GRUB boot loader configuration file.

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10. /lib - System Libraries

Contains library files that support the binaries located in /bin and /sbin.

- Example: `/lib/libncurses.so` - Library for controlling writing to the console.

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11. /opt - Optional Add-on Applications

/opt is reserved for all the software and add-on packages that are not part of the default installation.

- Example: `/opt/chrome` - Google Chrome browser.

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12. /dev - Device Files

Contains device files. These include terminal devices, USB, or any device attached to the system.

- Example: `/dev/sda` - First hard disk drive.

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13. /proc - Process Information

A virtual filesystem providing process and kernel information as files. In Linux, processes are treated as files.

- Example: `/proc/cpuinfo` - Shows CPU information.

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14. /sys - System Files

Another virtual filesystem that contains information about the system, and configurations (similar to /proc but for system hardware).

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- **Example:** `/sys/class/net` - Network device information.

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15. /media and /mnt - Mount Directories

- **/media** - Temporary mount directory for removable devices.
- **/mnt** - Temporary mount directory for mounting file systems.
- **Example:** `/media/cdrom` or `/mnt/mydisk`.

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