

## How-To Geek

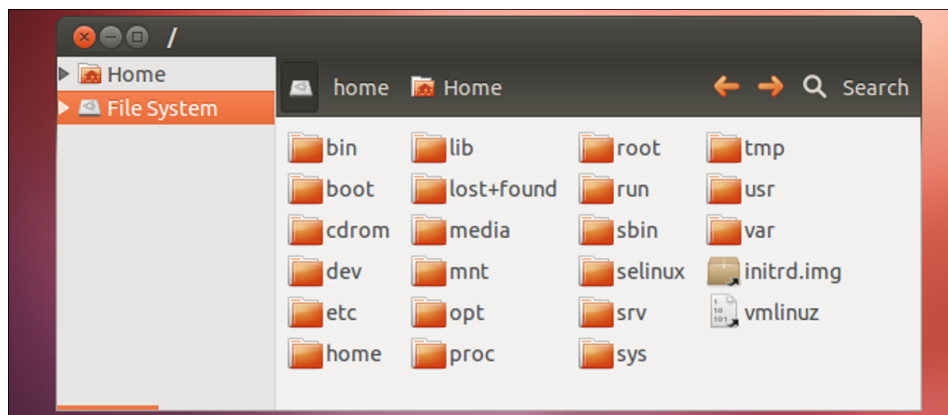
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# The Linux Directory Structure, Explained



CHRIS HOFFMAN [@chrisbhoffman](#)

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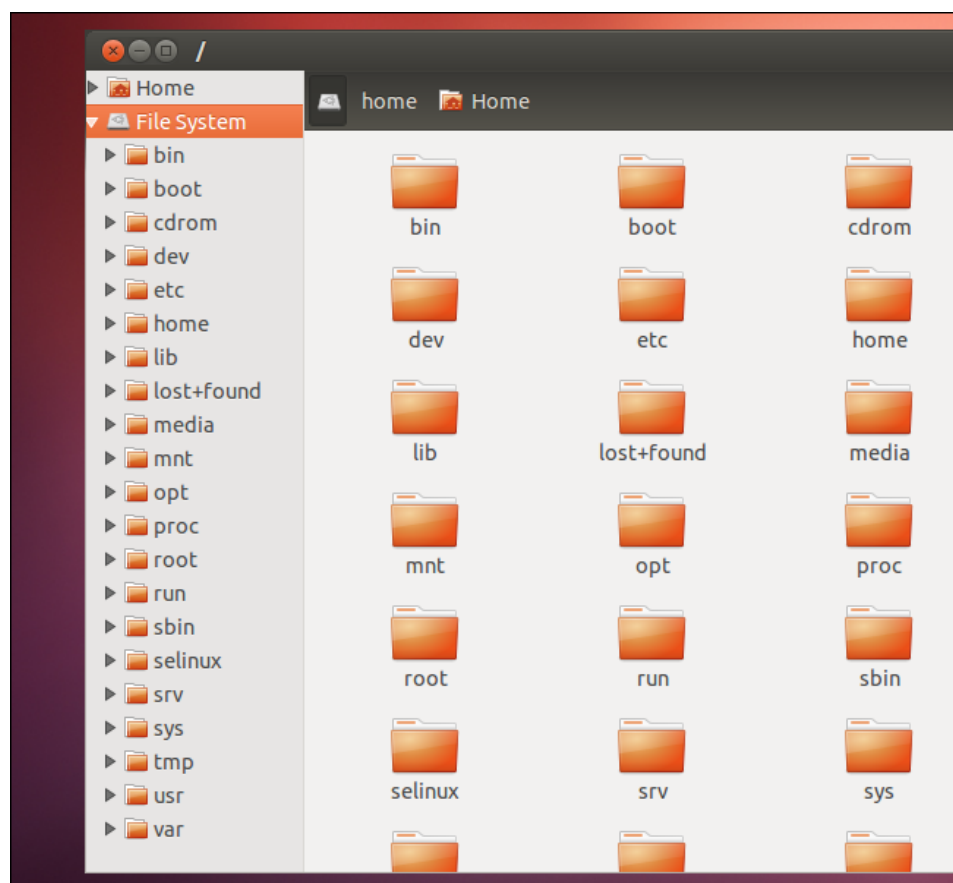


If you're coming from Windows, the Linux file system structure can seem particularly alien. The C:\ drive and drive letters are gone, replaced by a / and cryptic-sounding directories, most of which have three letter names.

The Filesystem Hierarchy Standard (FHS) defines the structure of file systems on Linux and other UNIX-like operating systems. However, Linux file systems also contain some directories that aren't yet defined by the standard.

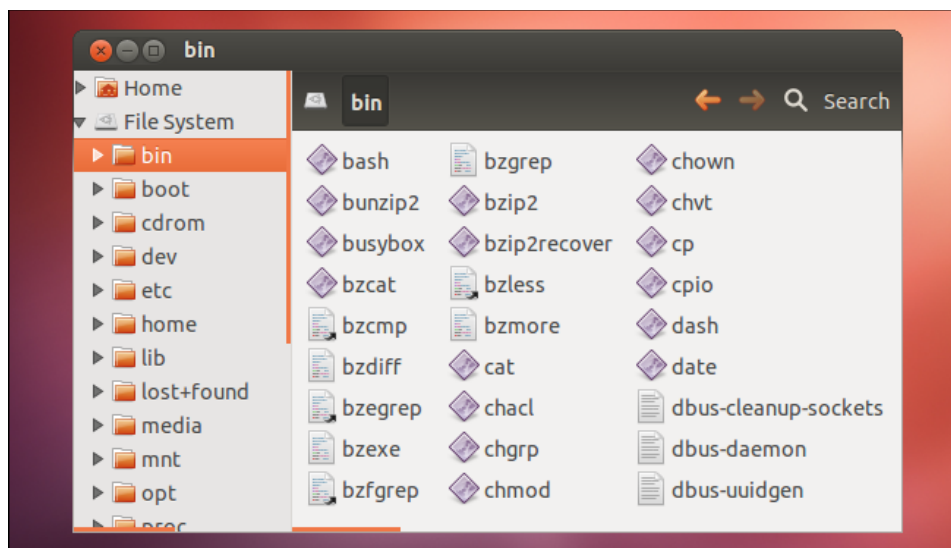
## / – The Root Directory

Everything on your Linux system is located under the / directory, known as the root directory. You can think of the / directory as being similar to the C:\ directory on Windows – but this isn't strictly true, as Linux doesn't have drive letters. While another partition would be located at D:\ on Windows, this other partition would appear in another folder under / on Linux.



## /bin — Essential User Binaries

The /bin directory contains the essential user binaries (programs) that must be present when the system is mounted in single-user mode. Applications such as Firefox are stored in /usr/bin, while important system programs and utilities such as the bash shell are located in /bin. The /usr directory may be stored on another partition — placing these files in the /bin directory ensures the system will have these important utilities even if no other file systems are mounted. The /sbin directory is similar — it contains essential system administration binaries.



## **/boot – Static Boot Files**

The `/boot` directory contains the files needed to boot the system – for example, the GRUB boot loader’s files and your Linux kernels are stored here. The boot loader’s configuration files aren’t located here, though – they’re in `/etc` with the other configuration files.

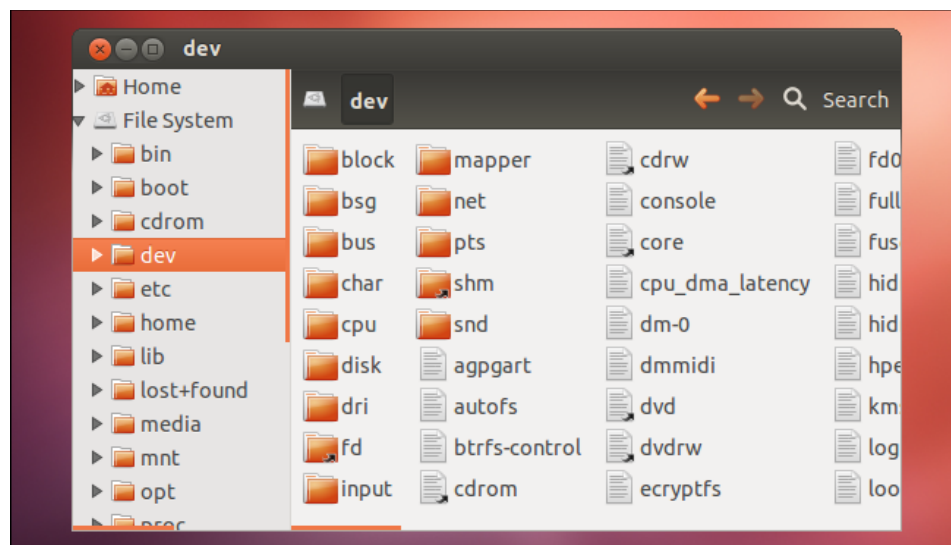
## /cdrom – Historical Mount Point for CD-ROMs

The `/cdrom` directory isn't part of the FHS standard, but you'll still find it on Ubuntu and other operating systems. It's a temporary location for CD-ROMs inserted in the system. However, the standard location for temporary media is inside the `/media` directory.

## /dev – Device Files

Linux exposes devices as files, and the `/dev` directory contains a number of special files that represent devices. These are not actual files as we know them, but they appear as files — for example, `/dev/sda` represents the first SATA drive in the system. If you wanted to partition it, you could start a partition editor and tell it to edit `/dev/sda`.

This directory also contains pseudo-devices, which are virtual devices that don't actually correspond to hardware. For example, `/dev/random` produces random numbers. `/dev/null` is a special device that produces no output and automatically discards all input – when you pipe the output of a command to `/dev/null`, you discard it.

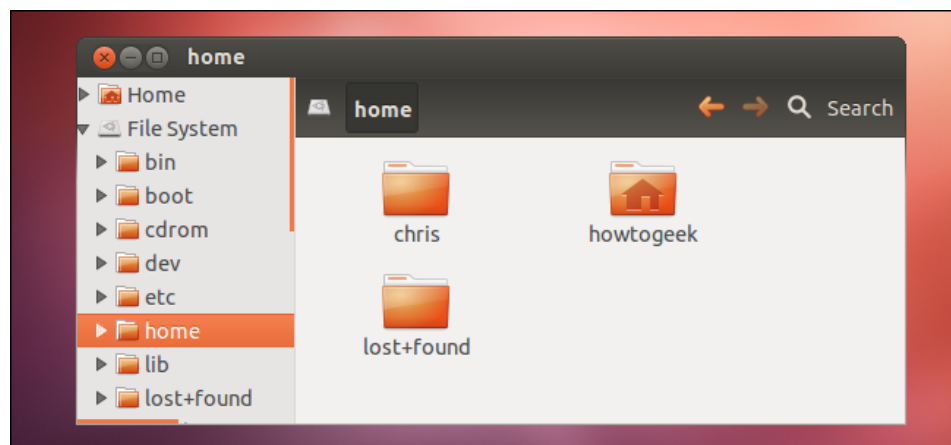


## **/etc – Configuration Files**

The `/etc` directory contains configuration files, which can generally be edited by hand in a text editor. Note that the `/etc/` directory contains system-wide configuration files – user-specific configuration files are located in each user's home directory.

## **/home – Home Folders**

The `/home` directory contains a home folder for each user. For example, if your user name is bob, you have a home folder located at `/home/bob`. This home folder contains the user's data files and user-specific configuration files. Each user only has write access to their own home folder and must obtain elevated permissions (become the root user) to modify other files on the system.



## /lib – Essential Shared Libraries

The /lib directory contains libraries needed by the essential binaries in the /bin and /sbin folder. Libraries needed by the binaries in the /usr/bin folder are located in /usr/lib.

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## /lost+found – Recovered Files

Each Linux file system has a lost+found directory. If the file system crashes, a file system check will be performed at next boot. Any corrupted files found will be placed in the lost+found directory, so you can attempt to recover as much data as possible.

## /media – Removable Media

The /media directory contains subdirectories where removable media devices inserted into the computer are mounted. For

example, when you insert a CD into your Linux system, a directory will automatically be created inside the /media directory. You can access the contents of the CD inside this directory.

## /mnt – Temporary Mount Points

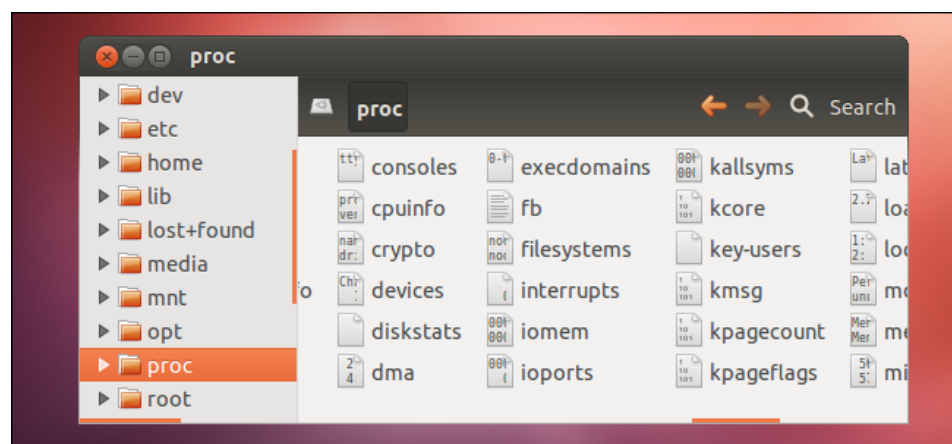
Historically speaking, the /mnt directory is where system administrators mounted temporary file systems while using them. For example, if you're mounting a Windows partition to perform some file recovery operations, you might mount it at /mnt/windows. However, you can mount other file systems anywhere on the system.

## /opt – Optional Packages

The /opt directory contains subdirectories for optional software packages. It's commonly used by proprietary software that doesn't obey the standard file system hierarchy – for example, a proprietary program might dump its files in /opt/application when you install it.

## /proc – Kernel & Process Files

The /proc directory is similar to the /dev directory because it doesn't contain standard files. It contains special files that represent system and process information.



## /root — Root Home Directory

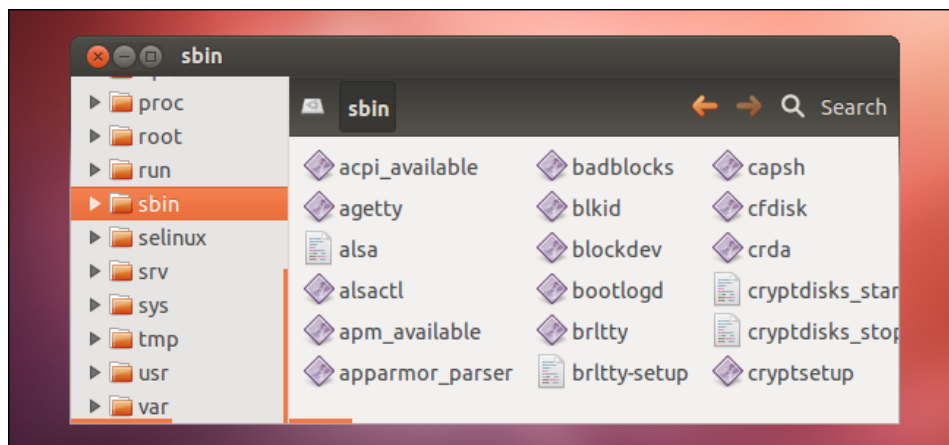
The /root directory is the home directory of the root user. Instead of being located at /home/root, it's located at /root. This is distinct from /, which is the system root directory.

## /run — Application State Files

The /run directory is fairly new, and gives applications a standard place to store transient files they require like sockets and process IDs. These files can't be stored in /tmp because files in /tmp may be deleted.

## /sbin — System Administration Binaries

The /sbin directory is similar to the /bin directory. It contains essential binaries that are generally intended to be run by the root user for system administration.



## /selinux — SELinux Virtual File System

If your Linux distribution uses SELinux for security (Fedora and Red Hat, for example), the /selinux directory contains special files used by SELinux. It's similar to /proc. Ubuntu doesn't use SELinux, so the presence of this folder on Ubuntu appears to be a bug.

## /srv — Service Data

The /srv directory contains “data for services provided by the system.” If you were using the Apache HTTP server to serve a website, you’d likely store your website’s files in a directory inside the /srv directory.

**RELATED:** [How to Find Your Apache Configuration Folder](#)

## /tmp — Temporary Files

Applications store temporary files in the /tmp directory. These files are generally deleted whenever your system is restarted and may be deleted at any time by utilities such as tmpwatch.

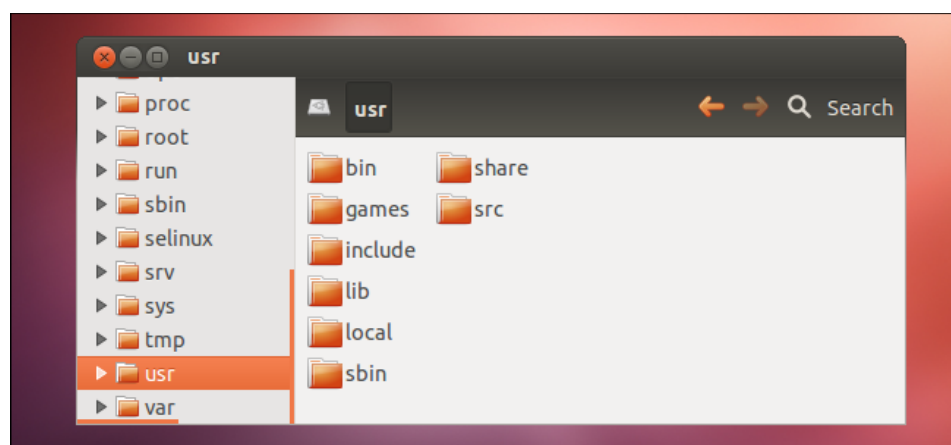
## /usr — User Binaries & Read-Only Data

The /usr directory contains applications and files used by users, as opposed to applications and files used by the system. For example, non-essential applications are located inside the /usr/bin directory instead of the /bin directory and non-essential system administration binaries are located in the /usr/sbin directory instead of the /sbin directory. Libraries for each are located inside the /usr/lib directory. The /usr directory also contains other directories — for example, architecture-independent files like graphics are located in /usr/share.

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The `/usr/local` directory is where locally compiled applications install to by default – this prevents them from mucking up the rest of the system.



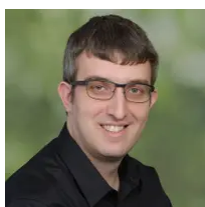
## **`/var` – Variable Data Files**

The `/var` directory is the writable counterpart to the `/usr` directory, which must be read-only in normal operation. Log files and everything else that would normally be written to `/usr` during normal operation are written to the `/var` directory. For example, you'll find log files in `/var/log`.

For more detailed technical information about the Linux file system hierarchy, consult the [Filesystem Hierarchy Standard documentation](#).

	Linux Commands
Files	<a href="#">tar</a> · <a href="#">pv</a> · <a href="#">cat</a> · <a href="#">tac</a> · <a href="#">chmod</a> · <a href="#">grep</a> · <a href="#">diff</a> · <a href="#">sed</a> · <a href="#">ar</a> · <a href="#">man</a> · <a href="#">pushd</a> · <a href="#">popd</a> · <a href="#">fsck</a> · <a href="#">testdisk</a> · <a href="#">seq</a> · <a href="#">fd</a> · <a href="#">pandoc</a> · <a href="#">cd</a> · <a href="#">\$PATH</a> · <a href="#">awk</a> · <a href="#">join</a> · <a href="#">jq</a> · <a href="#">fold</a> · <a href="#">uniq</a> · <a href="#">journalctl</a> · <a href="#">tail</a> · <a href="#">stat</a> · <a href="#">ls</a> · <a href="#">fstab</a> · <a href="#">echo</a> · <a href="#">less</a> · <a href="#">chgrp</a> · <a href="#">chown</a> · <a href="#">rev</a> · <a href="#">look</a> · <a href="#">strings</a> · <a href="#">type</a> · <a href="#">rename</a> · <a href="#">zip</a> · <a href="#">unzip</a> · <a href="#">mount</a> · <a href="#">umount</a> · <a href="#">install</a> · <a href="#">fdisk</a> · <a href="#">mkfs</a> · <a href="#">rm</a> · <a href="#">rmdir</a> · <a href="#">rsync</a> · <a href="#">df</a> · <a href="#">gpg</a> · <a href="#">vi</a> · <a href="#">nano</a> · <a href="#">mkdir</a> · <a href="#">du</a> · <a href="#">ln</a> · <a href="#">patch</a> · <a href="#">convert</a> · <a href="#">rclone</a> · <a href="#">shred</a> · <a href="#">srm</a>
Processes	<a href="#">alias</a> · <a href="#">screen</a> · <a href="#">top</a> · <a href="#">nice</a> · <a href="#">renice</a> · <a href="#">progress</a> · <a href="#">strace</a> · <a href="#">systemd</a> · <a href="#">tmux</a> · <a href="#">chsh</a> · <a href="#">history</a> · <a href="#">at</a> · <a href="#">batch</a> · <a href="#">free</a> · <a href="#">which</a> · <a href="#">dmesg</a> · <a href="#">chfn</a> · <a href="#">usermod</a> · <a href="#">ps</a> · <a href="#">chroot</a> · <a href="#">xargs</a> · <a href="#">tty</a> · <a href="#">pinky</a> · <a href="#">lsof</a> · <a href="#">vmstat</a> · <a href="#">timeout</a> · <a href="#">wall</a> · <a href="#">yes</a> · <a href="#">kill</a> · <a href="#">sleep</a> · <a href="#">sudo</a> · <a href="#">su</a> · <a href="#">time</a> · <a href="#">groupadd</a> · <a href="#">usermod</a> · <a href="#">groups</a> · <a href="#">lshw</a> · <a href="#">shutdown</a> · <a href="#">reboot</a> · <a href="#">halt</a> · <a href="#">poweroff</a> · <a href="#">passwd</a> · <a href="#">lscpu</a> · <a href="#">crontab</a> · <a href="#">date</a> · <a href="#">bg</a> · <a href="#">fg</a>
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## CHRIS HOFFMAN

Chris Hoffman is Editor-in-Chief of How-To Geek. He's written about technology for over a decade and was a PCWorld columnist for two years.

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