Linux top level directory structure

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How are they organized in our OS?

What is a directory?

- A **directory** in computing is a **way of organising files and folders**.
- It also refers to **a container that holds other directories and files.**
- A directory is also known as a 'folder' and a directory inside another directory is called a **'subdirectory'** or a **'subfolder'**.
- Directories **in a hierarchical structure are logically organised**, which makes it **easier to find them on the Hard drive.**

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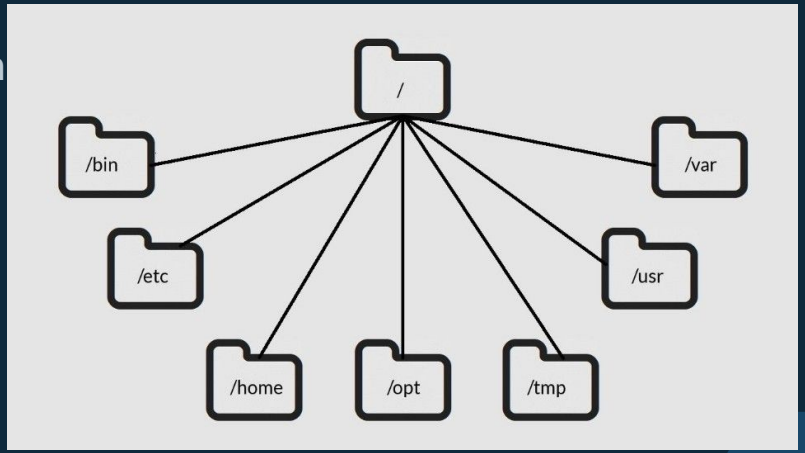
Directory structure in Linux

How are directories organized in a Linux system?

Directory structure in Linux

- The **Linux directory structure** can be visually represented as an **upside-down tree** with a
  - **root**(base directory),
  - **branches**(subdirectories)
  - and **leaves** (files)
- The **directory separator in Linux is the forward slash (/).**



Directory structure in Linux

- While all file systems have a **root directory**, it may be labeled differently depending on the operating system.
  - In **Windows** for example, the default root directory is **C:\.**
  - **On Unix systems, the root directory is typically labeled simply /** (a single forward slash).
- As you move up directories within a file system, **you will automatically reach the root directory.**

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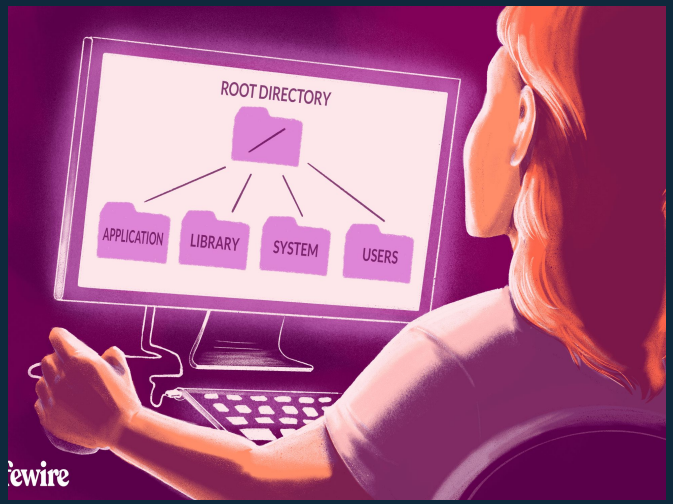
The ROOT (/) directory

Starting point in a Linux directory structure?



The ROOT of the system

Is the starting point of the file system hierarchy

The ROOT directory in Linux

- Everything on your Linux system is located under the **/** directory, known as the **root directory**.
- It is the **starting point for the file system hierarchy**. Note that this is not related to the **root user** (**superuser**) **account**.
- It is the **top level directory** in your system and all the rest of the directory structure emanates from it like branches from the root of a tree.
- Simply put, **it contains all other folders and files of the system**

Let's look at some important subdirectories of the root

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The ROOT (/) subdirectories

Let’s check some important direct subdirectories of the / in LInux

Root subdirectories: /bin

/bin – Essential User Binaries

- The **/bin** directory contains the **essential user binaries (programs)** that are used in a **single user system**. For multi-users system, these binaries are usually stored in the **/usr/bin** directory
- Important system programs and utilities such as the **bash shell** are located in **/bin.**
- Commands like **chmod** or **ls** are usually directed to one of these two directories where the program exists.

Root subdirectories: /boot and /dev

/boot – Static Boot Files

- The **/boot** directory contains the files needed **to boot up the system**.
- Loader's files and your Linux kernel files are stored here.

/dev – Device Files

- It contains a number of special files that represent **devices**. These files are required for **interfacing with the Hardware**

Root subdirectories: /etc

/etc – Configuration Files

- The **/etc** directory contains **configuration files**, which can generally be edited in a text editor. This files are local to the machine.
- Note that the **/etc** directory contains system-wide configuration files. **That is user-specific configuration files are located in each user's home directory!**

Root subdirectories: /home

/home – Home Folders

- The **/home** directory contains a **home folder for each user account.**
- **That is, each user created by the administrator will have a directory in the /home with the name of the user account.**

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 need to **switch to the root user to make some operations.**

Root subdirectories: /lib

/lib – Essential Shared Libraries

- The **/lib** directory contains libraries needed by the essential binaries in the **/bin** and **/sbin** folder.
- Shared libraries needed at bootup, or which need to be run by top level commands are stored here.
- Libraries which support users are usually located in **/usr/lib**.

Root subdirectories: /mnt

/mnt – Temporary Mount Points

- It is an optional but very popular directory that contains mount points for external storage devices.
- To access a floppy disk drive you **cd** to **mnt/floppy.**
- Once an external drive is accessed, its file system is mounted to the host system in **/mnt** directory

Root subdirectories: /opt

/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
- **Example:** a proprietary program might dump its files in **/opt/application** when you install it.

Root subdirectories: /proc

/proc – Kernel & Process Files

- The **/proc** contains a virtual file system created and used by the currently running Kernel.
- Here you can also obtain informations on current running processes.

Root subdirectories: /lost+found

/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.
- Also, When the file system cannot properly identify files, the respective files are placed in this directory

Root subdirectories: /root

/root – Root Home Directory

- The **/root** directory is the home directory of the root user.That is, it contains configuration files for 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.

Root subdirectories: /sbin and /tmp

/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.

/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 some utilities.

Root subdirectories: /usr

/usr – User Binaries & Read-Only Data

- It is design to store **static, sharable read only data**
- The **/usr** directory contains programs and files used by all users
- Data which results from these programs is usually stored elsewhere (often in folders like **/var)**

Root subdirectories: /var

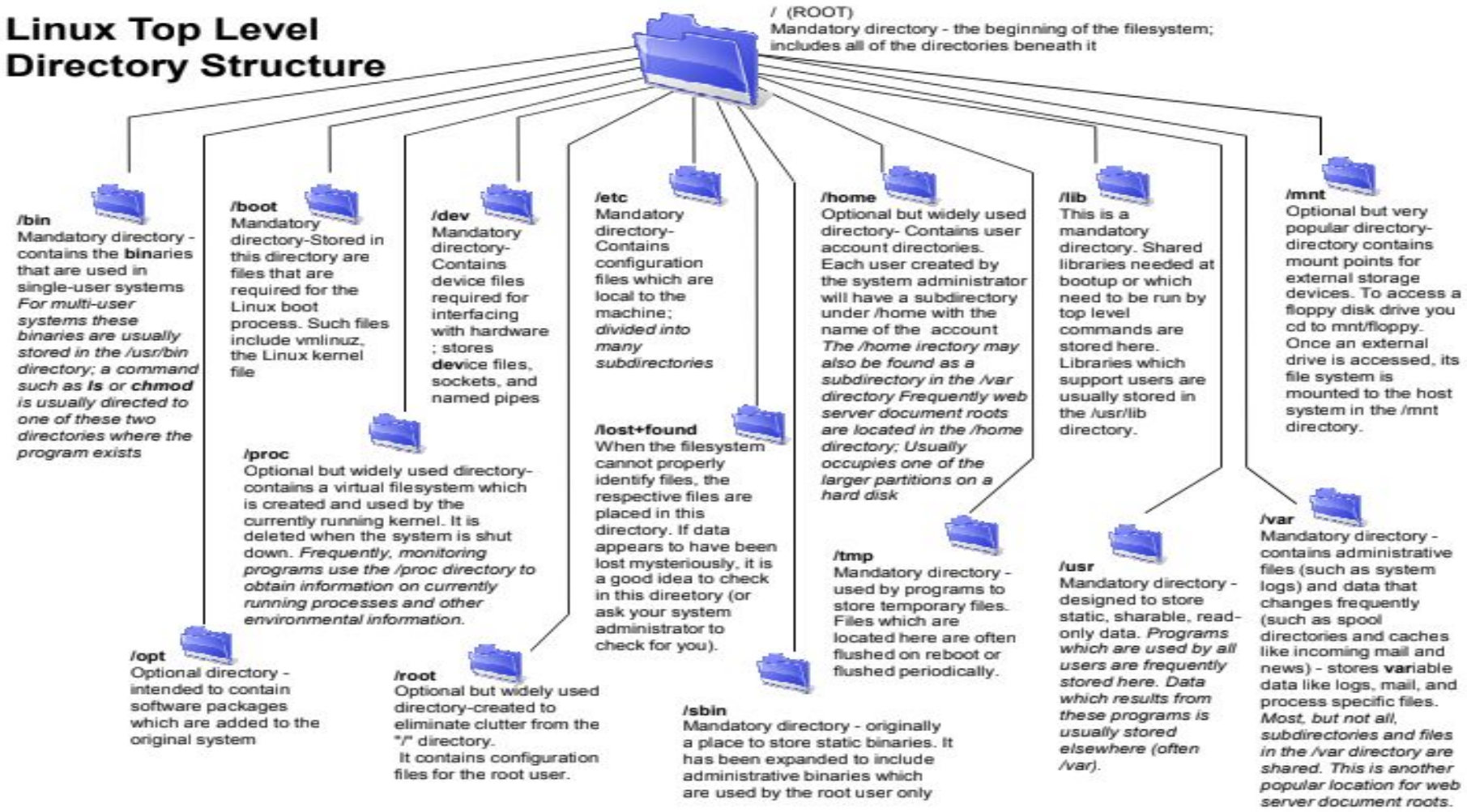
/var – Variable Data Files

- The **/var** contains administrative files such as system logs, and data that changes frequently
- Most, but not all files in this directory are shared
- It is also another popular location for web server document roots
- you'll find log files in **/var/log**

There are many other directories in the Linux system such as: **/selinux, /run** ...

You can look for them to know what they contain and their function in the overall system directory structure.

Linux Top Level Directory Structure



Thanks!

Any questions?

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