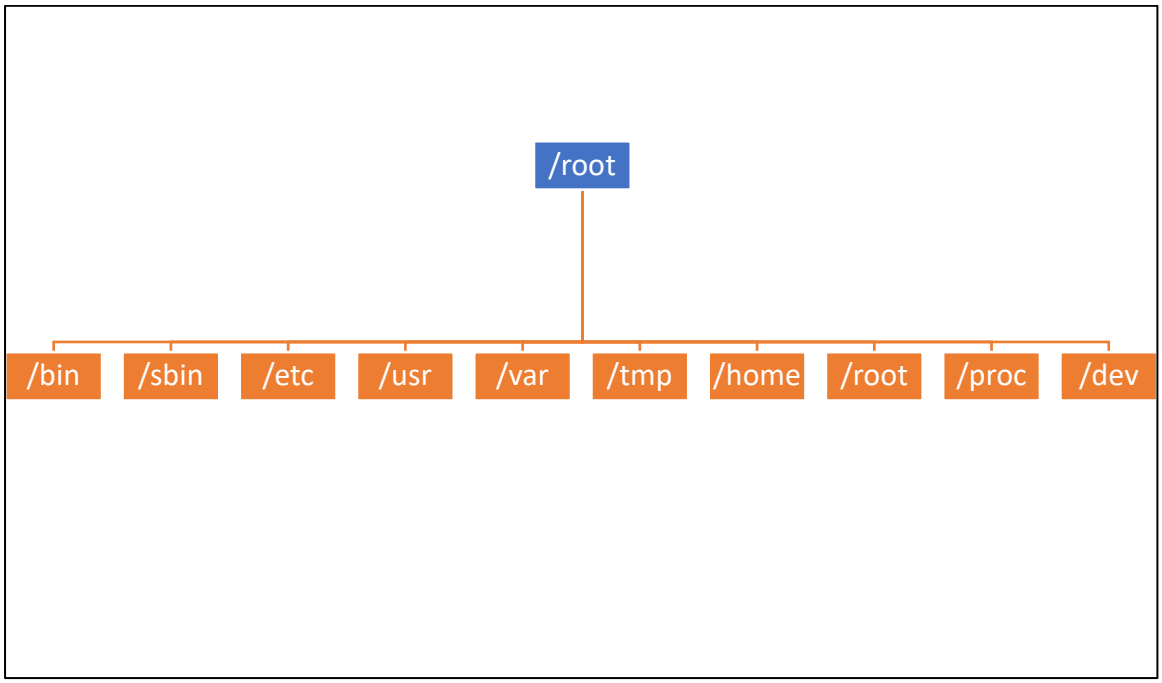
Linux File System

What is Linux File System Structure

- In Linux, the file system is organized **into a hierarchical structure**.
- At the top of the tree is the root directory, represented by a forward slash (/).
- All other directories and files are contained within the root directory or its subdirectories.



Explanation:

- **/bin (Binaries):**
  - This directory contains ***binary executables that are needed by both the system and the users***.
  - Most of the Linux commands that you execute on day to day basis like cp,ls,mkdir , mv etc are stored in /bin
- **/sbin (System binaries Not for User):**
  - This directory contains binary executables **that are needed by the system**, but not by the users.
  - These include programs such as init, fdisk, and mount.
  - init stands for initialization. In simple words the role of init is to create processes. Init is a ***daemon*** process that continues running until the system is shut down.

A daemon is a long-running background process that answers requests for services.

- **/etc:**
  - The miscellaneous configuration files for linux
  - This directory contains configuration files for the system and its applications. These include files such as ***passwd, fstab, and crontab***.

- **/usr**:
  - This directory contains user-level programs, libraries, and other resources. It is often used **to store shared resources that are used by multiple users on the system.**

- **/var:**
  - This directory contains variable data such as logs, spool files, and temporary files.

- **/tmp:**
  - This directory contains temporary files that are created by the system or by users.

- **/home:**
  - This directory contains the home directories for the users of the system. Each user has their own subdirectory within /home, where they can store their personal files and configurations.

- **/root**:
  - This is the home directory for the system's administrator, also known as the "root" user.

- **/proc:**
  - the /proc directory is a virtual filesystem that provides information about the system's processes and kernel.
  - It is not a real filesystem, but rather a representation of the kernel's data structures that is provided to the user for inspection.
  - Some of the key files and directories within /proc include:
    - **/proc/cpuinfo:** This file contains information about the system's CPU, including its model, speed, and other details.
    - **/proc/meminfo:** This file contains information about the system's memory, including the total amount of memory, the amount of free memory, and the amount of memory used by the system.
    - **/proc/mounts:** This file lists the filesystems that are currently mounted on the system, along with the mount points and other details.

- **/proc/partitions:** This file lists the partitions on the system's disks, along with their sizes and other details.
- **/proc/sys:** This directory contains a number of files that allow you to view and modify various kernel parameters.
- **/proc/<pid>:** Each process on the system has its own directory within /proc, identified by its process ID (PID). These directories contain a number of files that provide information about the process, such as its status, memory usage, and other details.

The /proc filesystem is a powerful tool for inspecting and monitoring the system and its processes.

It is often used by system administrators and developers to troubleshoot issues and understand how the system is behaving.

- /dev :
  - the /dev directory is a ***special filesystem that contains device files.***
  - Device files are a way for the system to access hardware devices such as disks, printers, and network interfaces.
  - The /dev directory contains a number of device files, each of which corresponds to a **specific hardware device on the system**. These device files can be accessed just like regular files, but they are used to ***communicate with the hardware devices instead of storing data.***
  - Some examples of device files in the /dev directory include:
    - /dev/sda: This is the device file for the first hard disk on the system.
    - /dev/tty0: This is the device file for the system console.
    - /dev/lp0: This is the device file for the first parallel printer on the system.
    - /dev/eth0: This is the device file for the first Ethernet interface on the system.
    - **The /dev directory is managed by the kernel and is populated with device files automatically as the system boots**