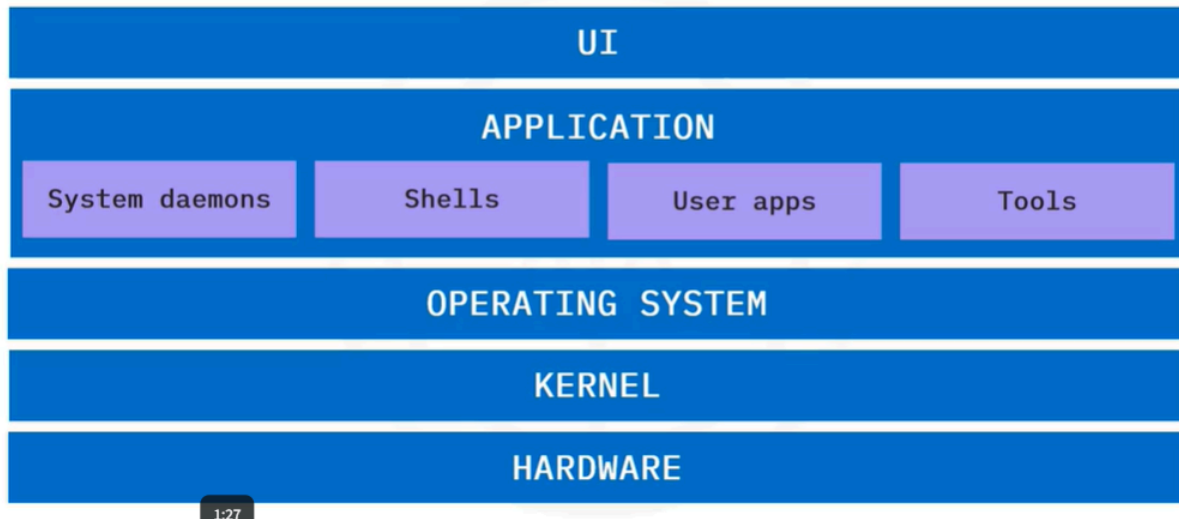


# Linux Architecture

## Five layers of Linux



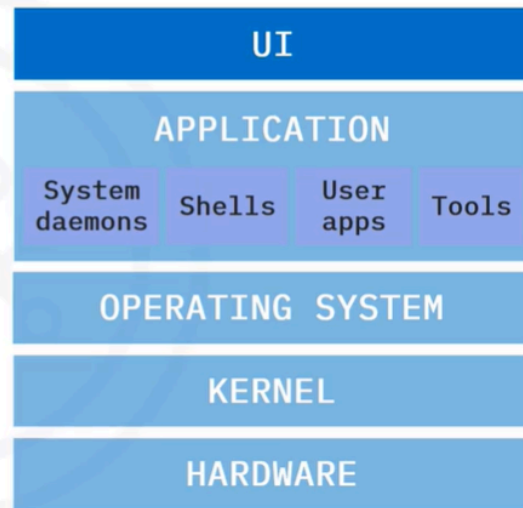
- The Linux system comprises five distinct layers. The outermost layer of the Linux architecture is the UI, or user interface, which allows users to interact with the system using a keyboard or mouse. The application layer includes system daemons, shells, user apps, and tools used to perform tasks in a Linux system. The applications communicate with the operating system to perform tasks. The OS is responsible for jobs that are vital for system stability such as job scheduling and keeping track of time. All Linux operating systems are built on top of the Linux kernel, which performs the most vital lower-level jobs. The kernel is the core component of the operating system and is responsible for managing memory, processing, and security. The kernel interacts with the hardware layer, which includes all the physical or electronic devices in the computer such as processors, memory modules, input devices, and storage.

# User interface

- Allows users to interact with the machine
- GUI

Tasks include:

- Using a Web browser to send an email
- Using a music player to listen to a song



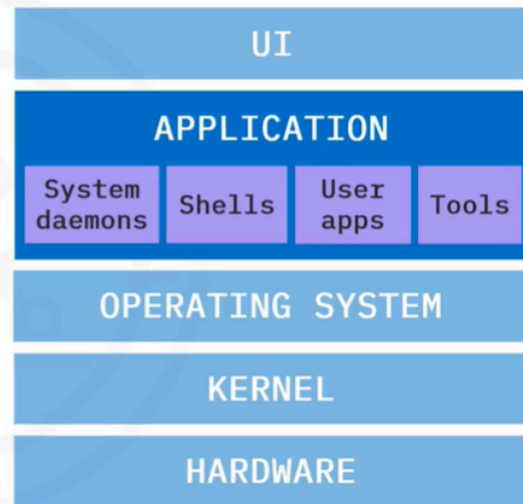
- The first layer in a Linux system is the user interface. The UI allows users to perform tasks by controlling applications with the keyboard. Desktop versions of Linux include a Graphical User Interface, or GUI layer, which is similar to Microsoft Windows. This extends the UI functionality to other control devices, such as a mouse. You might use a Linux machine to: Use a web browser to send your friend an email. Or use a music player to listen to your favorite song.

# Applications

Any software that lets you perform a task

Applications include:

- System tools
- Programming languages
- Shells
- User apps (such as browsers, text editors, games)



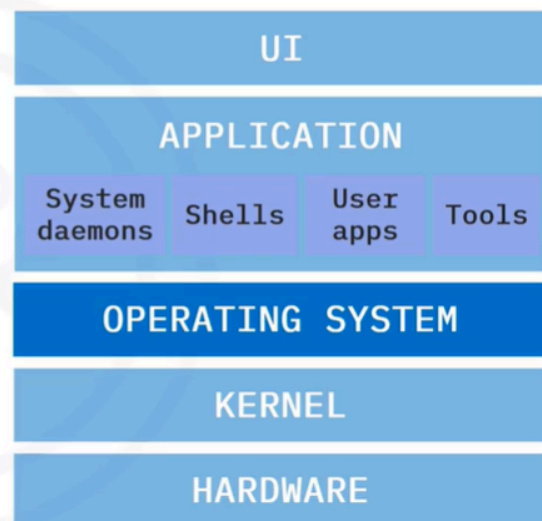
- Applications are the software that enables a user to perform a task in a Linux system. Applications can include the following: System tools, such as compilers. Programming languages. Shells, which are special applications that are often part of the operating system itself. And user apps, which can be any kind of applications, from browsers, to text editors, to games.

# Operating system

Controls the jobs and programs vital to health and stability

Functions:

- Assigns software to users
- Helps detect errors and prevent failures
- Performs file management tasks



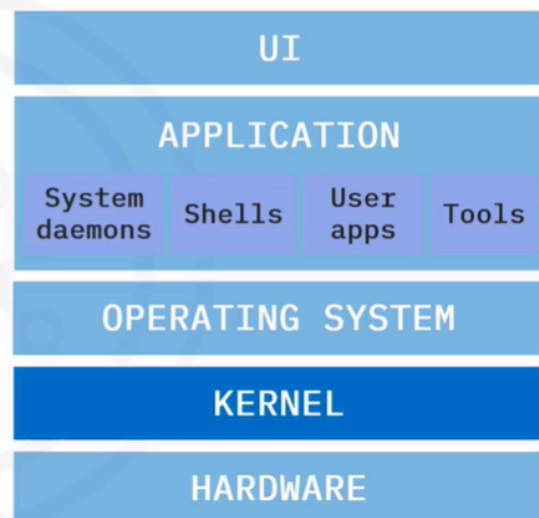
- The operating system controls the jobs and programs that are vital to system health and stability. Its functions also include: Assigning software to users, Detecting errors and implementing measures to prevent complete system failures, And performing file management.

## Kernel

- Performs vital operations
- Lowest-level software
- Starts on boot
- Bridge between apps and hardware

### Key jobs:

- Memory management
- Process management
- Device drivers
- Security



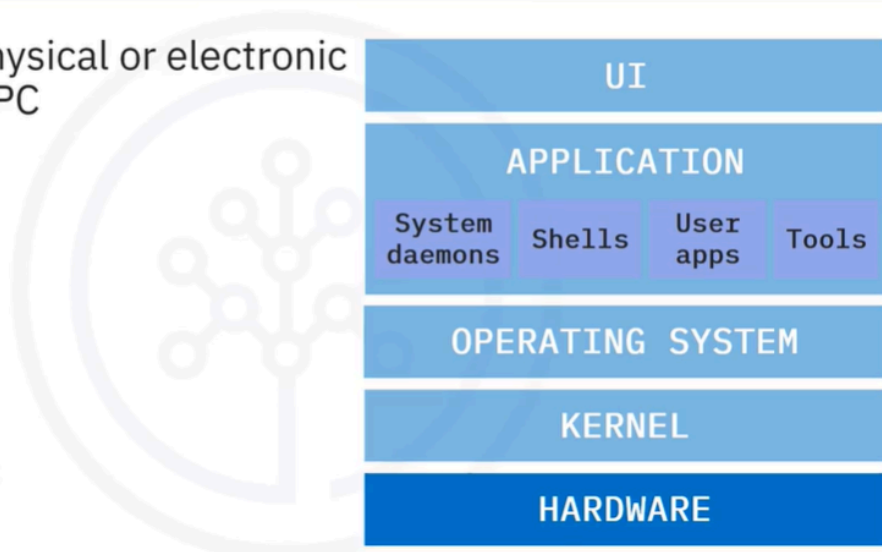
- In a Linux system, the operating system is built on top of the Linux kernel, which performs the most vital operations. The kernel is the lowest-level software in a Linux system and has complete control of the system. It starts as soon as your computer boots and remains in your computer's memory while the system is running. It also acts as a bridge between your apps and your machine hardware, enabling the two to communicate effectively using "system calls." The kernel has four key jobs: Memory management, Process management, Managing device drivers for proper hardware support, And assuring the system remains secure.

# Hardware

Consists of all physical or electronic devices on your PC

- Includes:

- CPU
- RAM
- Storage
- Screen
- USB devices

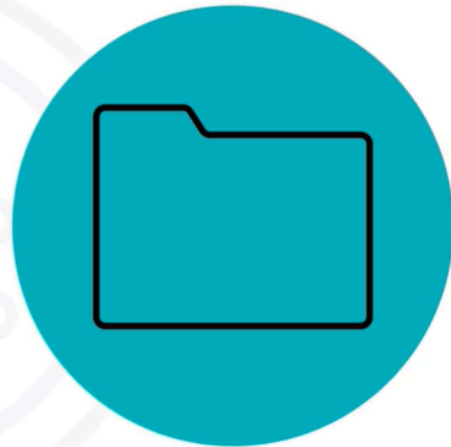


- The final layer in the Linux system is the hardware, consisting of the physical or electronic devices that make up your computer. This layer can include the following: The central processing unit, or CPU, which is responsible for executing most calculations. The random access memory, or RAM, which is a fast storage unit used to hold the temporary information your applications need to run. Storage for data that needs to persist when your computer is powered off. Your computer's screen. And any USB devices such as a keyboard, mouse, or USB drive.

# Linux filesystem

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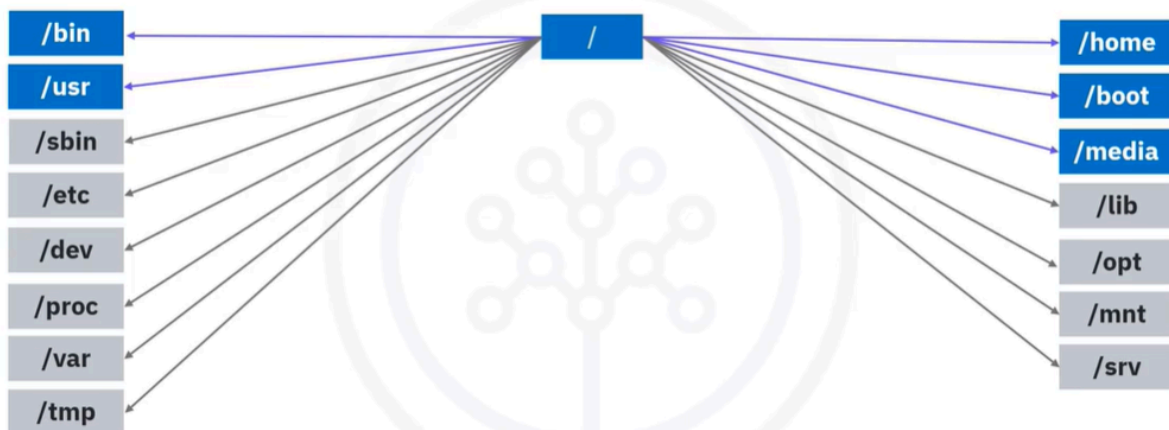
- Collection of files in your machine
- Begins at root directory (/)
- Tree-like structure
- Assigns appropriate access rights



- The Linux filesystem is the collection of files on your machine. It includes the files needed to run the machine and applications as well as your own files containing your work. The top level of the filesystem is the root directory, symbolized by a forward slash (/). Below this is a tree-like structure of the directories and files in the system. And the filesystem assigns appropriate access rights to the directories and files.

## Linux filesystem

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- The very top of the Linux filesystem is the root directory, which contains many other directories and files.
- One of the key directories is `/bin`, which contains user binary files. Binary files contain the code your machine reads to run programs and execute commands. It's called "slash bin" to signify that it exists directly below the root directory.
- Other key directories include `/usr`, which contains user programs, `/home`, which is your personal working directory where you should store all your personal files, `/boot`, which contains your system boot files, the instructions vital for system startup, and `/media`, which contains files related to temporary media such as CD or USB drives that are connected to the system.
- There are several other directories in the root directory, but you will not need to access them during this course. All the files and directories in a Linux system are organized into one of these designated folders, depending on the purpose of the file or directory.

## Recap

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In this video, you learned that:

- A Linux system consists of five key layers
- The user interface is the layer that enables the user to interact with applications using control devices
- Applications enable users to perform certain tasks within the system
- The operating system runs on top of the Linux kernel and is vital for system health and stability
- The kernel is the lowest-level software and enables applications to interact with your hardware
- Hardware includes all the physical or electronic components of your PC