Understanding the Architecture of a Linux System

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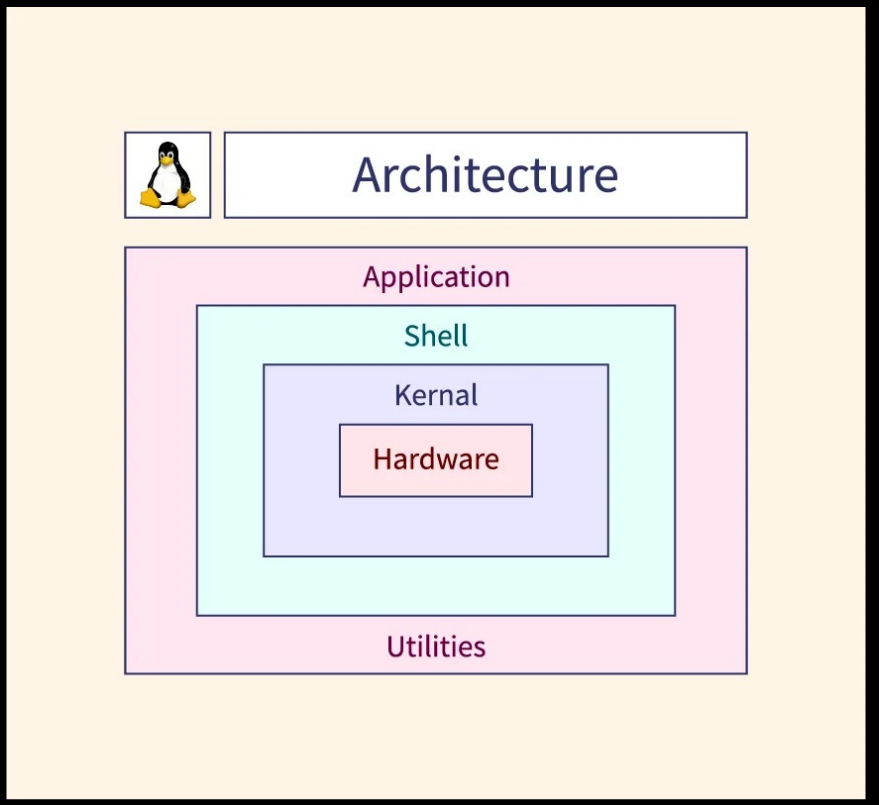
Linux System Components

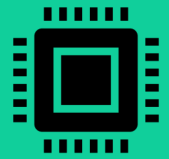
- Kernal
- Shell
- Utilities
- File System
- Graphical User Interface (GUI)



Kernel

Definition: core component

Role: manages hardware resources, schedules tasks, and provides essential functionalities



Core Subsystems of the Linux Kernel are as follows:

- The Process Scheduler
- Memory Management Unit
- The Virtual File System
- The Networking Unit
- Inter-Process Communication Unit

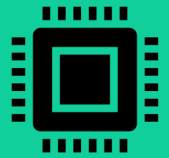
Shell

Definition: Command-line interface that interprets user commands and executes them

Types: Bash (Bourne Again Shell)

Zsh (Z Shell)

Fish (Friendly Interactive Shell), etc.



Shell acts as an intermediary between users and the kernel.

Utilities

Definition: Broad range of software tools and applications that provide essential functionality for users and system administrators

Three examples of the different type of utilities:

System Management (`apt`, `yum`)

Command-Line Tools (`cp`, `grep`, `ping`, etc)

Graphical User Interface (GUI) (LibreOffice, Control Center, Thunderbird)

File System

Definition: Hierarchical structure of the linux file system

Description of important directories and their purposes:

- /bin: Essential system binaries.
- /etc: System configuration files.
- /home: User home directories.
- /usr: User-related programs and data.
- /var: Variable files (e.g., log files, mail).
- /tmp: Temporary files.
- /dev: Device files.
- /proc: Virtual file system providing process and system information.

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Graphical User Interface (GUI)

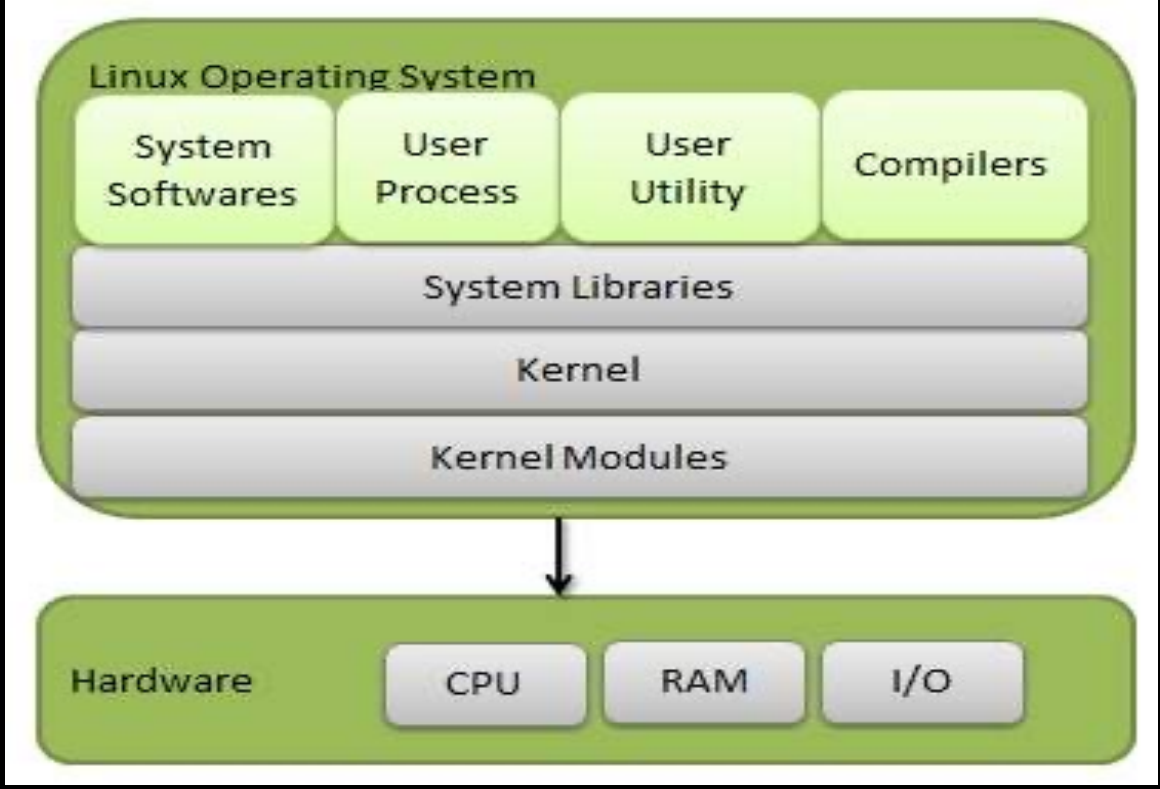
Definition: Provides a visual way to interact with the operating system

Components:

- Window manager
- Panel
- Desktop icons
- File Manager
- Settings Manager

Hardware Layer

Linux Operating system contains a hardware layer that consists of several peripherals like CPU, HDD, RAM



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