Architecture of Linux operating system

The architecture of Linux is composed of kernel, shell and application programs that is softwares.



HARDWARE: physical parts of a computer, such as central processing unit (CPU), monitor, mouse, keyboard, hard disk and other connected devices to CPU.

KERNEL: A kernel is a computer program and is the central, core part of an operating system. It manages the operations of the computer and the hardware, most notably memory and CPU time. It is an integral part of any operating system.

SHELL: Shell is an environment in which we can run our commands, programs, and shell scripts. It is a user interface for access to an operating system's services. (User interface program execution, file system manipulation, input/output operations, communication, resource allocation, error detection, security and protection)

The diagram of kernel shell user relationship is as below:

THE KERNEL

- 1. Kernel is core (main) part of Linux operating system.
- It is collection of routine communicate with hardware directly.
- 3. It loads into memory when Linux is booted.
- 4. Kernel provides support to user programs through system call.
- 5. Kernel manages Computer memory, schedules processes, decides priorities of processes and performs other tasks.
- Kernel does lot of work even if no application software is running.
- 7. Hence kernel often called as application software gateway to the computer resources.
- 8. Kernel is represented by /boot/vmlinuz.

Shell

- 1. Shell is interface between user and kernel.
- 2. It is outer part of operating system.
- 3. A shell is a user interface for access to an operating system's services Shell is an environment in which we can run our commands, programs, softwares and shell scripts.
- 4. Computers do not have any inherent (मूळची) capability (क्षमता) of translating commands into actions, it is done by Shell.
- 5. There can be many shells in action one shell for each user who logged in.



How Shell works?

When we enter commands through the keyboard, it gathers input from you and executes programs based on that input. When a program finishes executing, it displays that program's output. **OR** the shell thoroughly examines the keyboard input for special characters. If it finds any, it rebuilds a simplified command-line, and finally communicate with the Kernel to see that the command is executed.

To know the running shell, use echo \$SHELL command in terminal.

Application programs/software

An application, or application program, is a software program that runs on your computer. It is excited by user. Some inbuilt application programs in Linux are terminal, Firefox browser, Libre office

System calls

There are over a thousand commands available in Linux operating system. These all

commands use a function to communicate with kernel - and it is called as system call.

System call is the interface between a process and an operating system or System

calls are the only entry points into the kernel system.

Ex. 1) a typical Linux writes a file with write system call. Same system call can access both a file and device.

2) Open system call opens both file and device. These system calls are built into kernel. And interaction through the system calls represents and efficient means of communication with operating system.