Q 2. Architecture of Linux.

Architecture of Linux

Let's first start with the basic knowledge of the Linux operating system.

Linux operating system

An operating system can be described as an interface among the computer hardware and the user of any computer. It is a group of software that handles the resources of the computer hardware and facilitates basic services for computer programs.

An operating system is an essential component of system software within a computer system. The primary aim of an operating system is to provide a platform where a user can run any program conveniently or efficiently.

On the other hand, Linux OS is one of the famous versions of the UNIX OS. It is developed to provide a low-cost or free OS for several personal computer system users. Remarkably, it is a complete OS Including an **X Window System, Emacs editor, IP/TCP, GUI** (graphical user interface), etc.

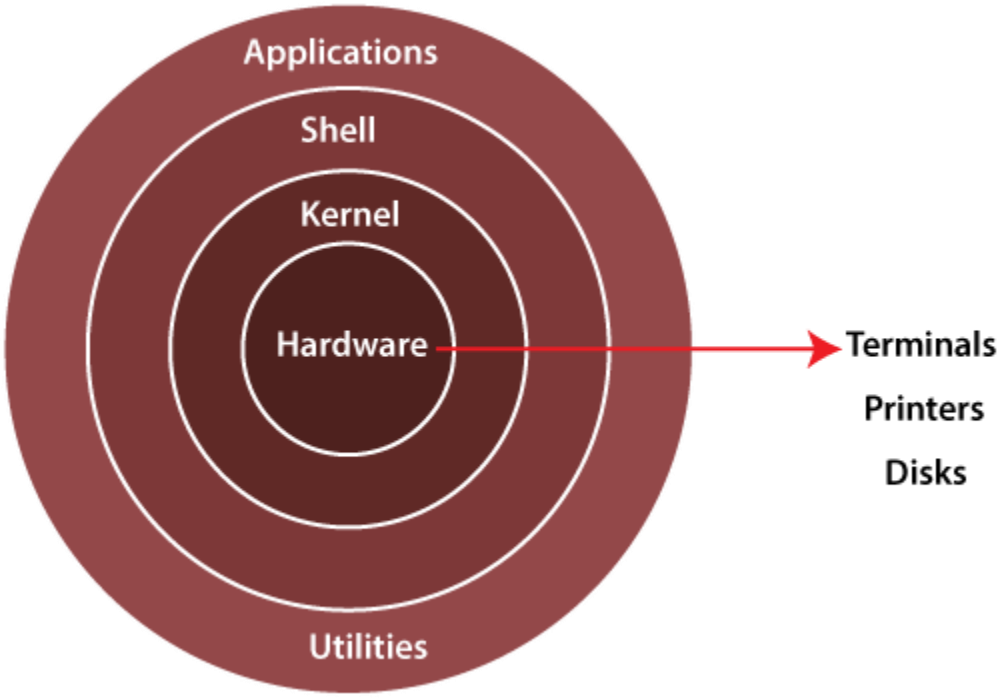
Linux operating system history

In 1991, the Linux history started with the starting of a particular project by the Finland student **Linus Torvalds** for creating a new free **OS kernel**. The final Linux Kernel was remarked by continuous development throughout the history since then.

- Linux was proposed by the Finland student Linus Torvalds in 1991.
- HP-UX (**Hewlett Packard**) 8.0 version was published.
- Hewlett Packard 9.0 version was published in 1992.
- FreeBSD 1.0 version and **NetBSD**8 version was released in 1993.
- Red Hat Linux was proposed in 1994. Caldera was detected by Ransom love and Bryan Sparks and NetBSD 1.0 version published.
- HP-UX 10.0 version and FreeBSD 2.0 version was released in 1995.
- K Desktop Environment was established by **Matthias Ettrich** in 1996.
- HP-UX 11.0 version was released in 1997.
- The IRIX 6.5 version, i.e., the fifth SGI UNIX generation, Free BSD 3.0 version, and Sun Solaris 7 OS was released in 1998.
- The **Caldera System** agreement with professional services division and SCO server software division was released in 2000.
- **Linus Torvalds** published the Linux version 2.4 source code in 2001.
- **Microsoft** filed the Trademark collection against Lindows.com in 2001.
- Lindows name was modified to Linspire in 2004.
- The first publication of **Ubuntu** was published in 2004.
- The openSUSE project started a free distribution from the community of **Novell** In 2005.

- **Oracle** published its Red Hat distribution in 2006.
- **Dell** begun laptop distribution with Ubuntu which was pre-installed on it in 2007.
- Linux kernel version 3.0 was released in 2011.
- Linux-based android of Google insisted 75% of the market share of the Smartphone, based on the number of phones exported in 2013.
- Ubuntu insisted on 20000000+ users in 2014.

Architecture of Linux system



The Linux operating system's architecture mainly contains some of the components: **the Kernel, System Library, Hardware layer, System,** and **Shell utility**.

1. Kernel:- The kernel is one of the core section of an operating system. It is responsible for each of the major actions of the Linux OS. This operating system contains distinct types of modules and cooperates with underlying hardware directly. The kernel facilitates required abstraction for hiding details of low-level hardware or application programs to the system. There are some of the important kernel types which are mentioned below:

- Monolithic Kernel
- Micro kernels
- Exo kernels
- Hybrid kernels

2. System Libraries:- These libraries can be specified as some special functions. These are applied for implementing the operating system's functionality and don't need code access rights of the modules of kernel.

3. System Utility Programs:- It is responsible for doing specialized level and individual activities.

4. Hardware layer:- Linux operating system contains a hardware layer that consists of several peripheral devices like CPU, HDD, and RAM.

5. Shell:- It is an interface among the kernel and user. It can afford the services of kernel. It can take commands through the user and runs the functions of the kernel. The shell is available in distinct types of OSes. These operating systems are categorized into two different types, which are the **graphical shells** and **command-line shells**.

The graphical line shells facilitate the graphical user interface, while the command line shells facilitate the command line interface. Thus, both of these shells implement operations. However, the graphical user interface shells work slower as compared to the command-line interface shells.

There are a few types of these shells which are categorized as follows:

- Korn shell
- Bourne shell
- C shell
- POSIX shell