

# Booting Process of operating systems

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**Abstract**— This paper gives a brief idea about Windows, LINUX and UNIX and about other operating systems. An operating system is system software that manages computer hardware software resource and provides common service for computer programs. The Windows operating system is a graphical user interface almost found in every computer system, so we can say that OS acts as a manager for handling all the task of the computer. Booting process is the OS. As every operating system have to initially do the booting, after this the process execution starts so this paper is highlighting the various types of operating system and their booting process.

**Keywords**— Booting Process, Windows OS & LINUX, UNIX.

## INTRODUCTION

An operating system is system software that manages computer hardware and software resources and provides for computer programs. It is the main handles the entire task between the various resources of the computer. The windows operating system is a graphical user interface created by Microsoft and found on almost every computer system. It provides easy “point and click” operations between the user and the different files and programs with which they want to work. Operating system is a component of the system software in a computer system Application. Programs usually require an operating system to function.

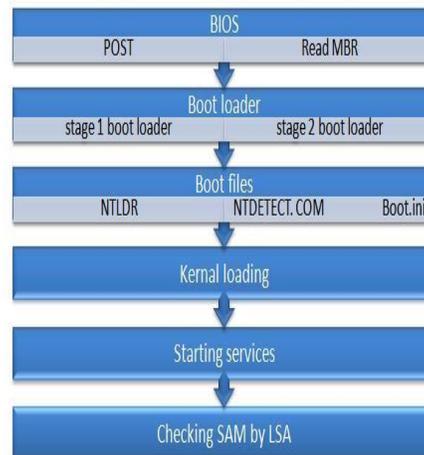
## WINDOWS OPERATING SYSTEM

Windows is a series of operating system developed by Microsoft. Each version of Windows includes a graphical user interface (GUI), with a desktop that allows users to view files and folders in windows. Now a day Windows has been the most widely used operating system for personal computers PCs Microsoft Windows is designed for both home computing and professional purposes. Microsoft Windows was first introduced with version 1.0 on November 10, 1983 since its release; there have been over a dozen versions of Windows. The most current version of Windows for end users is windows10.

### **Booting procedure of Windows operating system**

Booting is just the process of restarting of computer systems. In windows the booting process includes the following steps.

## WINDOWS BOOTING PROCEDURE



### **(A) POST**

POST stands for Power on Self Test. POST checks all the hardware devices connected to a computer like RAM, Hard disk etc. and make sure that the system can run smoothly. If the POST is a failure the system then it gives an error message to the system.

### **(B) BIOS**

BIOS stand for Basic Input Output System. It is a group of programs embedded on the ROM chip of computer main board. It saves the most important basic input and output programs of computer, system settings and the self-checking programs. It provides the hardware setting and control.

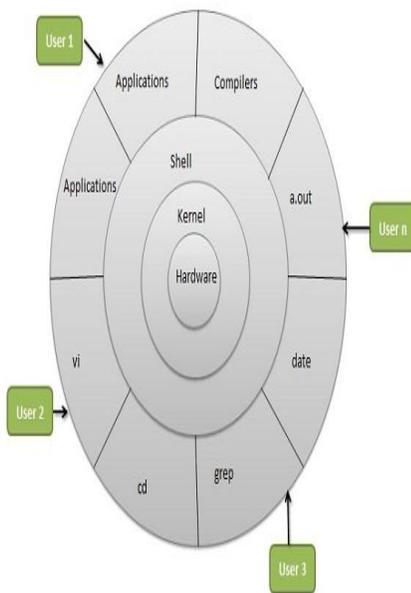
### **(C) MBR**

MBR is a Master Boot Record. It is the first sector on the harddisk. When DOS reads hard disk MBR help to check

whether the partition is legal or not. It holds the information on how the logical partitions, containing file systems, are organized on that medium. It also contains executable code to function as a loader.

**LINUX**

LINUX is the software on a computer that enables application and the computer operator to access the device on the computer to perform desired function. It is an open source OS designed for personal computer. The main feature of Linux over the other OS is that it provides high security levels. This operating system is free from viruses also.



**Hardware layer**

Hardware consists of all peripheral devices like RAM, Hardisk, CPU, Keyboard & Mouse.

**Kernel**

Kernel is the component of operating system it deals with input/output device and it interacts directly with the hardware.

**Shell/GCC**

An interface between the user & the kernel. It takes command from user and executes kernel's functions.

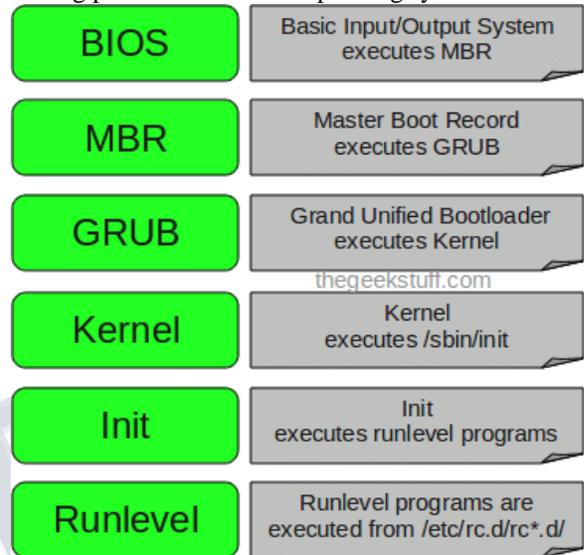
**Application Software**

Utility programs giving user most of the functionality of an operating system.

**Users**

System users, who interacts directly with the system and application software.

**Bootling procedure of Linux operating system**



**(A) BIOS**

It is basic input- output system. It performs some integrity checks. It searches, locates and executes the boot loader program. When boot loader program is detected and loaded into memory BIOS gives its control to it. It loads and executes the MBR loader.

**(B) MBR**

It makes boot record, located in the first sectors of hard disk. It has 3 partitions like primary boot loader, partition table & MBR Validation check. It executes, loads the GRUB Boot Loader.

**(C) GRUB**

It stands for grand unified boot loader. When you have multiple kernel images on your system, it will choose one to execute. It has full knowledge of the file system. It loads and executes kernel and initrd images.

**(D) Kernel**

It mounts the root file system as "root=" in grub.conf. It executes the init programs. initrd (initial RAMDISK) is used by kernel as temporary root file until kernel is booted and the real root file system is found.

**(E) Init**

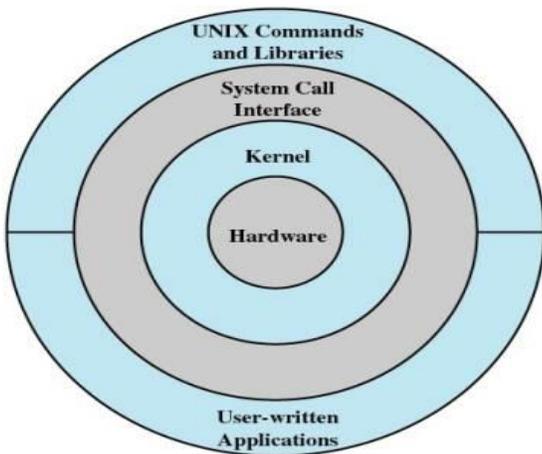
Init identifies the default init level from init lab and uses that to load as appropriate program. It executes grep init default on the system to identify the run level it has run levels from 0 to 6.

**(F)Runlevel**

Runlevel program are executed from/etc/rc.d/rc\*.d/.

**UNIX**

UNIX is a multiuser operating system developed in 1970's at the bell labs by Thompson & Dennis & Ritchie. UNIX provides the services of multi user, multi tasking system for servers, desktop and laptop. It is based on graphical user interface (GUI) similar to Microsoft window which provides on easy to use environments.Everything in UNIX is either a file or a process.



**The kernel**

The kernel is the hub of UNIX operating system.It allocates time and memory to program.It is provide a way that the shell and kernel works together.

**The Shell**

The shell acts as an interface between the user and kernel. The shell is a command line interpreter. It is keeps list of commands.

**The Program**

In UNIX everything is a file or a process.A process is a executable program.The text of the program written in some high level programming language.

**Booting procedure of UNIX operating system**

- ❖ Provides detection like memory, disk, keyboard, and mouse.
- ❖ Executing the system initialization program.
- ❖ Locating and running the initial boot program usually from a predetermined location on disk.

This program performs additional hardware checks prior to loading the kernel.

- ❖ Locating and starting the UNIX kernel by the first stage boot program.
- ❖ The kernel image file to execute may be determined automatically or via input to the boot program.
- ❖ Locating and starting the UNIX kernel (by the first-stage boot program).The kernel image file to execute may be determined automatically or via input to the boot program.
- ❖ The kernel initializes itself and then performs final, high-level hardware checks, loading device drivers and/or kernel modules as required.
- ❖ The kernel starts the init process, which in turn starts system processes (daemons)and initializes all active subsystems.When everything is ready, the system begins accepting user logins.

**Comparison between Windows, LINUX and UNIX booting process.**

| Operating system comparison | Window     | LINUX | UNIX   |
|-----------------------------|------------|-------|--------|
| BOIS                        | YES        | YES   | YES    |
| POST                        | YES        | YES   | YES    |
| BOOT LOADER                 | NLTDR      | GRUB  | LILO   |
| KERNEL                      | NTOSKERNEL | INIT  | INITRD |

**CONCLUSION**

In this paper we compare the booting process of different operating systems. Like booting process of window,LINUX and UNIX.This experiment gives the idea about the similarities and differences of different operating system.At last we reach the final conclusion that every operating system has the POST process which is power on self test.This experiment gives the idea about the different boot loader and kernel used by the operating system during the booting process of individual operating system.

**REFERENCES**

- [1]. Silberschatz, A., P.B. Galvin and G. Gagne;
- [2]. Operating Systems Concepts.7th Edn. ; John Wiley.
- [3].[http://en.wikipedia.org/wiki/ Linux\\_startup\\_process](http://en.wikipedia.org/wiki/Linux_startup_process).
- [4].[https://en.wikipedia.org/wiki/Linux\\_kernel](https://en.wikipedia.org/wiki/Linux_kernel).
- [5].<http://www.ee.surrey.ac.uk/Teaching/Unix/unixintro.htm>
- [6].<http://www.ee.surrey.ac.uk/Teaching/Unix/unixintro.html>
- [7]. [www.ijrcct.org](http://www.ijrcct.org)
- [8]. Joe Cabrera; "Linux vs. Windows: A comparative study" "Technical Writing – N4 Spring 2009.

