

## **PROCESS OF BOOTING IN DIFFERENT OPERATING SYSTEMS**

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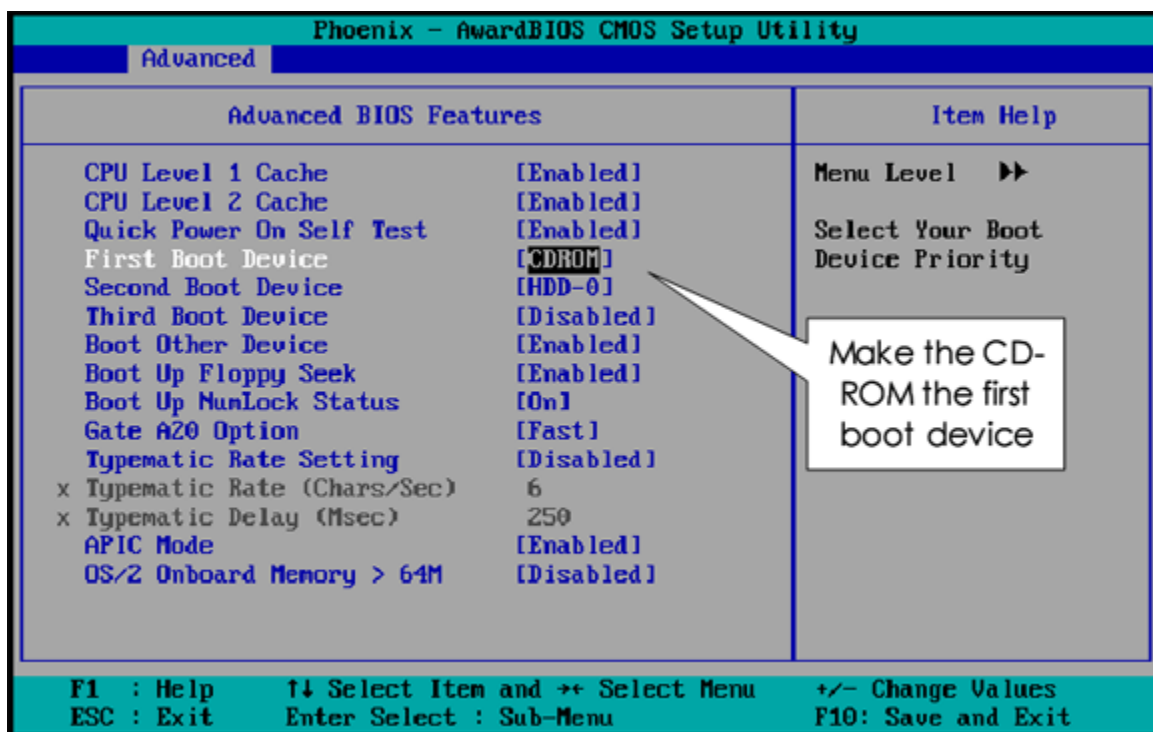
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### **INTRODUCTION**

Booting is that the method that starts operational systems once then the user activates an ADPS. A boot sequence is that the set of operations the pc performs once it's switched on to load associate software package. Most pc systems will solely execute code found within the memory (RAM or ROM). Fashionable operational systems area unit hold on arduous disks, or sometimes on Live CDs, USB flash drives, or different memory devices. Once a pc is initial supercharged on, it doesn't have associate software package in memory. The computer's hardware alone cannot perform complicated actions like loading a program from disk, thus a plain contradiction in terms exists: to load the software package into memory, one seems to want to possess associate software package already loaded. The answer is to use a special tiny program, known as a bootstrap loader, bootstrap or boot loader. In fashionable computers the bootstrapping method begins with the C.P.U. execution package contained in storage (for example, the BIOS of associate IBM PC) at a predefined address (the C.P.U. is meant to execute this package once reset while not outside help). This package contains rudimentary practicality to go looking for devices eligible to participate in booting, and cargo a tiny low program from a special section (most usually the boot sector) of the foremost promising device. It's sometimes attainable to put together the BIOS in order that solely a particular device are often shoed from and /or to convey priority to some devices over others (a CD or optical disk drive is sometimes given priority over a tough disk, for instance). the method is complete once the pc is prepared to act with the user or the software package is capable of running normal applications. Typical fashionable PCs boot in a couple of minute (of that concerning fifteen seconds area unit taken by a Power-on self check (POST) and also the preliminary boot loaders, and also the rest by loading the operational system), whereas giant servers might take server minutes in addition and to start out all services. to make sure high convenience, they bring about up some services before others. Most embedded systems should boot at once. as an example, waiting a moment for a digital

TV to come back up isn't acceptable. So they need their complete software package in storage or non-volatile storage, thus it are often dead directly.



BIOS Setup

## TYPES OF REBOOTING

1. **Cold Reboot:** - A chilly revive (also referred to as a tough revive, cold boot or cold start) is once power to a pc is cycled (turned off and so on) or a special reset signal to the processor is triggered. This restarts the pc while not playing any shut-down procedure. It should be caused by power outage, be done inadvertently, or be done deliberately.
2. **Warm Reboot:** - A heat revive (also referred to as a soft reboot) is restarting a pc below package management, while not removing power or (directly) triggering a reset line. It usually, though' not forever, refers to associate orderly ending and restarting of the machine. The Ctrl-Alt-Del key combination is meant to permit a heat revive for a faster and a lot of convenient restart than powering the pc utterly down.

## DUAL BOOTING

Now there are a unit variety of operational systems and hottest PCs provide the user to figure on 2 operational systems on one system. For example, you'll install each the Windows and UNIX operating system on your computer and may work at the same time. Once the pc starts, it shows you a screen of selections to start out

with software package you wish at that time of your time. However, there's one primary software package that you just aren't needed to decide on if you would like to be loaded. If mechanically starts once a couple of seconds.

## THE MS-DOS BOOT PROCESS

Once the BIOS have completed its testing and system configuration, it begins the method of loading the software package. The BIOS accomplishes this by looking out the put in drives for a Master Boot Record during which is contained a boot code. Once found, the boot code is dead and also the system is shoed into the software package. Once probing for this Master Boot Record, the BIOS can rummage around for boot devices (drivers) within the order per the BIOS configuration settings dominant this facet of the boot sequence. If the software package is disk operating system, or any variant of Windows aside from Window NT or Windows 2000, that starts out by constant booting method as that of DOS, then a selected software package load sequence commences, that is noted because the DOS Boot method. If you're booting in to Windows, further steps area unit performed once the underlying disk operating system software package has loaded. The steps below take you thru the boot method from the disk. If you were in addition from a diskette, the steps would solely disagree slightly within the initial few steps, because the diskette structures area unit slightly completely different. Floppies can't be divided, and therefore don't have any master boot record or partitions. This implies that the master boot record problems area unit skipped.

The BIOS have completed its check and setup functions, masses the boot code found within the Master Boot Record (MBR) and so transfers management of the system to that. At that time, master boot record code is dead. If the boot device could be a diskette, the method skips to step seven below.

- The next step within the method is that the master boot code examining the master partition table. Initial it should verify if there's associate extended DOS partition, then it should verify if there's a bootable partition per the partition table.
- If the master boot code locates associate extended partition on the disk, it masses the extended partition table that describes the primary logical volume within the extended partition. This extended partition table is examined to envision if it purpose to extended partition table. If it does, this second table is examined for info concerning the second logical volume within the extended partition. Logical volumes within the extended partition have their extended partition table bound along one to subsequent. This method continues till all of the extended partition are loaded and recognized by the system.
- Once at the extended partition info has been loaded, the boot code makes an attempt to start out the first partition that's marked active, noted because the boot partition. If no boot partition area unit marked active, then the boot method can terminate with a slip. The error message is commonly constant as that

that happens if the BIOS couldn't find a boot device, typically shown on screen as 'No boot device', however can also show up as 'NO storage BASIC – SYSTEM HALTED'. If there's a primary partition marked active associated there's a put in software package, the boot code can boot it.

- At this stage, master or volume boot sector is loaded in to memory and tested, and also the boot code that it contains is given management of the rest of the boot method.
- The boot code examines the disk structures to make sure that everything is correct. If not, the boot method can finish in a slip here.
- During subsequent step, the boot code searches the basis directory of the device being shoed for the software package files that contains the software package. For MS-DOS, there are a unit the files 'IO.SYS', 'MSDOS.SYS' and 'COMMAND.COM'.
- If no software package files area unit found, the boot program can show a slip message kind of like 'Non-system disk or hardware error – Replace and press any key once ready'. Confine mind that this message doesn't means that, that the system was ne'er shoed. It implies that the BIOS examined the diskette, as an example, associated simply rejected it as a result of it couldn't boot a software package. The quantity boot code was so loaded and dead, as that's what posts the message, once it cannot realize the software package files.
- In the ultimate stages of the boot method, presuming that the software package files area unit found, the boot program can load those software package files into memory and transfer management to them. In MS-DOS, the primary is IO.SYS and its code is dead. IO.SYS can then execute MSDOS.SYS. Then the a lot of complete software package code masses and initializes the remainder of the software package structures starting with the command interpreter COMMAND.COM and so the execution of the CONFIG.SYS and AUTOEXEC.BAT files. At this time, the software package code itself has management of the pc.

If any of the Windows 95/98/ME versions were being started, the higher than would solely is the start of the startup method. once disk operating system starts in anticipation of loading these Windows versions, there are a unit more routines that area unit loaded and dead as a part of the boot method, which has tasks like reading the system written account, initializing hardware devices and beginning the graphical interface or software package shell. Before understanding this method, we have a tendency to should understand that booting sequence may vary from version to version of Windows

## THE WINDOWS 98 BOOT PROCESS

- When you boot the machine, POST (Power-On Self Test) happens even as it will for BIOS (Basic Input/Output System) that's not Plug\_and\_play.

- The Plug and Play (PnP) BIOS begins by staring at the hardware devices on the system and determining which of them area unit PnP grievance. The BIOS initial allows the devices that aren't Plug and Play, and also the tries to create the PnP devices use the leftover resources.
- The basic Input / Output System appearance for devices containing the software package (OS) and masses Windows ninety eight, creating info concerning the present allocation of resources out there to the OS.
- Just like DOS, the Master Boot Record MBR executes the boot record on the disk drive, that appearance for the initial hidden files of Windows ninety eight, called IO.SYS.
- Again, even as with DOS, IO.SYS loads. If fact, io.sys is actually a tiny low core DOS module. IO.SYS appearance for CONFIG.SYS file, and, if found, the CONFIG.SYS file executes. The CONFIG.SYS file isn't needed for Windows ninety eight. Several of its functions are eliminated and incorporated into Windows ninety eight. However you'll use the CONFIG.SYS file to load device drives, if you would like. However, the motive force loaded in CONFIG.SYS are going to be a sixteen bit driver and it'll be slower that the thirty two bit drivers that Windows ninety eight uses.
- After CONFIG.SYS is complete, IO.SYS searches for MSDOS.SYS. The role of MSDOS.SYS differs greatly in Windows ninety eight from that in DOS. In Windows ninety eight, MSDOS.SYS could be a hidden file with settings wont to customize the boot method.
- The functions of the primary few entries in MSDOS.SYS appear as if the following:
  - WinDir = (Location of the Windows 9x directory)
  - WinBootDir = (Location of the Windows 9x startup files)
  - HostWinBootDrv = (Drive that's the Windows boot drive)
  - BootGUI = (BootGUI=1, automatic graphical startup into Windows 9x is enabled.  
BootGUI= 0, the system boots to a command prompt)
- Next, COMMAND.COM masses even as with DOS. COMMAD.COM is employed to supply a command interface for users associated to execute an AUTOEXEC.BAT file, if it's gift.
- If AUTOEXEC.BAT is found it currently executes.
- The heart of Windows ninety eight currently masses, providing a desktop from that you'll execute application package.

## THE WINDOWS XP BOOT PROCESS

Like different Windows software package, once you activate your computer, it goes through associate elaborate boot up method. It begins once the pc performs the POST (power-on self test), followed by the POST for every adapter card that encompasses a BIOS, as an example, your video card. The BIOS then reads the MBR (Master Boot Record) that is within the initial sector of the primary disk and transfers management to the code within

the MBR that is formed by the XP Setup. This can be wherever Windows takes over the startups.

- The MBR reads the boot sector that is that the initial sector of the active partition. This sector contains the code that starts ntldr that is that the boot strap loader for Windows XP. the primary role of ntldr is to permit full memory addressing, begin the filing system, read boot.ini and place up the boot menu. It's noteworthy that ntldr should be placed in root folder of the active partition at the side of ntddetect.com, bootsect.dos (for twin booting) and ntbootdd.sys (needed with some port adapters).
- Selecting XP from the boot menu causes ntldr to run ntddetect.com to induce info concerning put in hardware. ntldr then uses the ARC path per the boot.ini to search out the boot partition. The one wherever Windows XP is put in. it would appear as if this:
  - default=multi (0) partition (2) WINDOWS
  - [operating system]
  - Multi(0)disk(0)partition(2)WINDOWS="Microsoft Windows XP Home" /fast detect
 Ntldr, then, masses the 2 files that frame the core of XP: ntoskrnl.exe and hal.dll. There files should be placed within the %systemRoot%system32 folder.
- Ntldr reads the written account files, selects a hardware profile, management set and masses device drivers, therein order.
- Then, **ntoskrnl.exe** takes over and starts Winlogon.exe which starts Lsass.exe (Local Security Administration), this is the program that displays the Welcome screen (if Professional Edition-the Windows Log On dialog box), and allows the user to log on with his/her user name and password.

## THE LINUX BOOT PROCESS

In Linux, the flow of control during a boot is from BIOS, to boot loader, to kernel. The kernel then starts the scheduler (to allow multi-tasking) and runs init (which sets up the user environment and allows user interaction and login), at which point the kernel goes idle unless called externally.

- ❖ The BIOS performs platform (rather than OS) specific startup tasks.
- ❖ The BIOS loads and executes the partition boot code from the designated boot device, which contains phase 1 of a Linux boot loader. Phase 1 loads phase 2 (the bulk of the boot loader code). Some loaders may use an intermediate stage to achieve this (known as phase 1.5) since modern large disks may not be fully readable without further code.
- ❖ The boot loader often presents the user with a menu of possible boot options. It then loads the kernel, which decompresses into memory, and sets up system functions such as essential hardware and memory paging, before calling start\_kernel().

- ❖ Start\_kernel() then performs the majority of system setup (interrupts, the rest of memory management, device initialization, drivers, etc) before spawning separately, the idle process and scheduler, and the init process (which is executed in user space).
- ❖ The scheduler effectively takes control of the system management, as the kernel goes dormant (idle).
- ❖ The init process executes script as needed that set up all non-kernel services and structures in order to allow a user environment to be created, and then present the user with a login screen.

On shutdown, init is called to close down all user space functionality in a controlled manner, again via scripted directions, following which init terminates and the kernel executes its own shutdown.

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