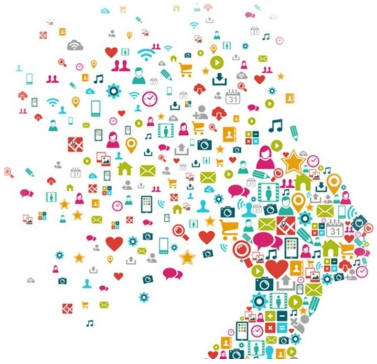

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Bootloaders

Poojashree M

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Booting process

- Steps in booting
  - Power supply and SMPS
  - BIOS

    POST
  - MBR
  - GRUB
  - Loading the kernel Image

Booting process(cont ...)

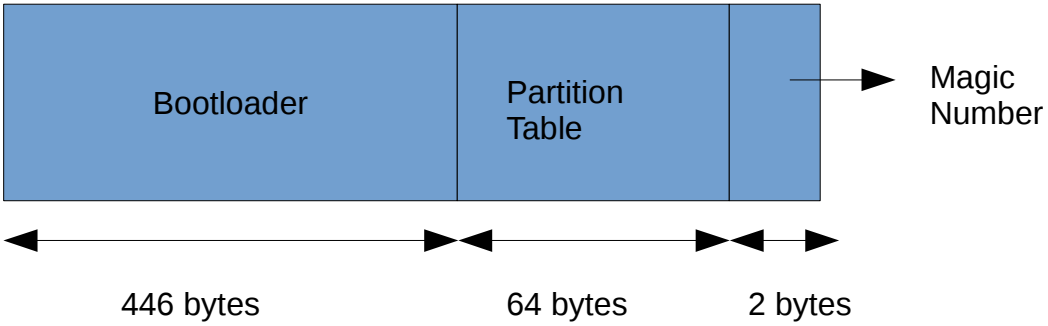
- SMPS(Switched Mode Power Supply)
- Converts AC to DC
- Provides the perfect required voltage level to the motherboard and other computer components
- If the voltage is perfect SMPS sends POWER GOOD signal to motherboard timer.
- On receiving POWER GOOD signal motherboard timer stops sending reset signal

Booting process(cont ...)

- BIOS (Basic input output system)
- BIOS code is present in ROM
- POST (Power on Self Test) - confirms the proper functioning of different hardware components attached to the computer.
- Boot order – user defined order which tells where to look for the operating system

Booting process(cont ...)

- MBR (Master Boot Record)
- First sector of hard disk
- 512 bytes



Booting process (cont ...)

- GRUB (Grand Unified Bootloader)
- Stages in GRUB
  - GRUB stage 1
  - GRUB stage 1.5
  - GRUB stage 2

GRUB stage 1.5 contains file system drivers.

Booting process (cont …)

- Loading kernel Image
  - GRUB stage 2 loads the kernel image into RAM
  - /boot/grub/grub.cfg
  - Initrd (initial RAM disk) – Initial root file system
  - Kernel executes the /sbin/init – first user space program

Booting process (cont ...)

- /etc/init.d contains executables used by run-levels
- /etc/rc*.d/ contains symbolic links

Run-Level	Usage
0	System Halt/Shut Down
1	Single User Mode
2	Local Multiuser with Networking but without network service (like NFS)
3	Full Multiuser Mode
4	Unused
5	GUI/X11
6	Reboot

Features of GRUB

- Supports multi boot
- Supports multiple hardware architecture and operating systems
- Offers interactive command line interface
- Ability to boot over the network

LILO

- LILO (Linux Loader)
- LILO does not offer interactive command line interface
- No support for booting from a network

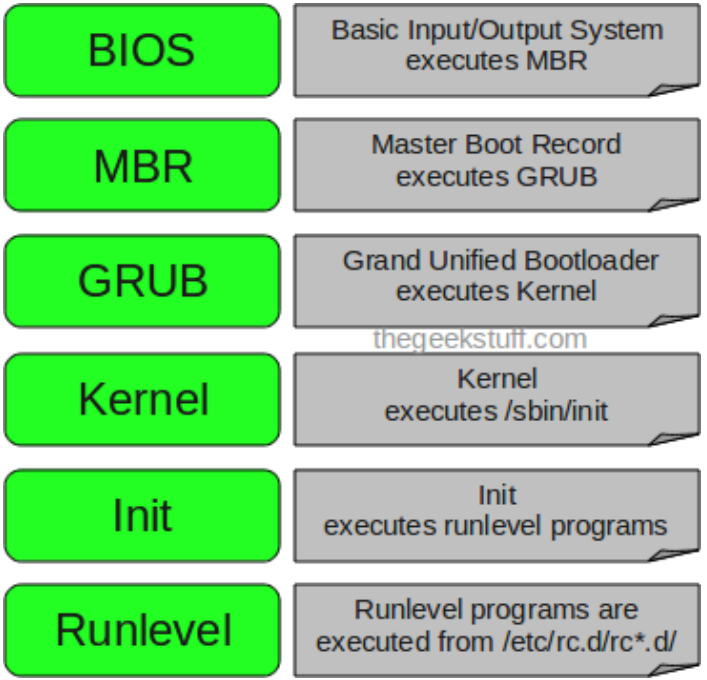
U-Boot

- Open source, primary bootloader used in embedded devices.
- U-Boot split into 2 stages
- SPL – Secondary program loader
- Provides command shell
- Capable of booting through TFTP(Trivial File Transfer Protocol) over a network

Red Boot

- Complete bootstrap environment environment for embedded systems
- Ethernet download and debug support is included
- Interactive command line interface
- Reliable, compact, portable

Summary


BIOS
Basic Input/Output System executes MBR
MBR
Master Boot Record executes GRUB
GRUB
Grand Unified Bootloader executes Kernel
thegeekstuff.com
Kernel
Kernel executes /sbin/init
Init
Init executes runlevel programs
Runlevel
Runlevel programs are executed from /etc/rc.d/rc*.d/

References

- https://www.slashroot.in/linux-booting-process-step-step-tutorial-understanding-linux-boot-sequence
- https://www.thegeekstuff.com/2011/02/linux-boot-process

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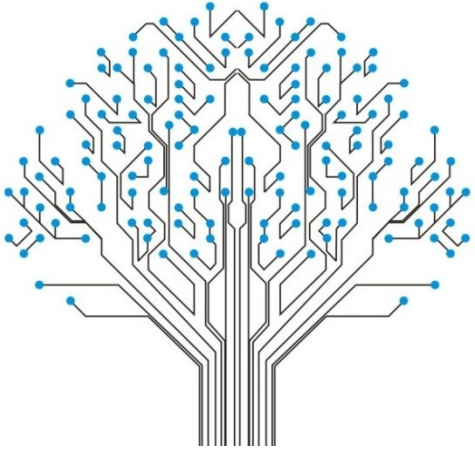
Thank you



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