GLOBAL EDGE
Intelligence Of Things™

# Booting Process

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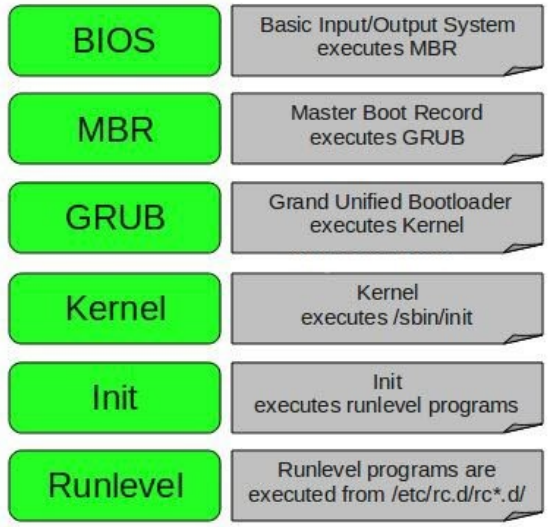
# What is Booting?

- The procedure of starting a computer by loading a kernel is known as booting.
- After pressing power button, the motherboard sends a signal to the power supply unit(SMPS).
- After receiving power OK signal the computer can boot.
- Otherwise, reset signal is sent and computer cannot boot.

# Booting Steps



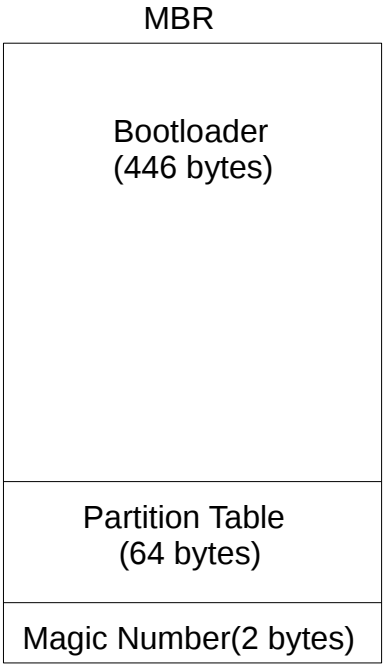
- After CPU receives power OK signal, the CPU resets its registers with a predefined value.
- The register value is set with 0xFFFF0000 which is an address location in ROM.
- This address location has another instruction which is a jump instruction.
- Jump instruction points to BIOS.

# BIOS

- BIOS is a software stored on a small memory chip on motherboard.
- The most important use of BIOS is POST(Power on Self Test).
- POST
  - Checks and tests the hardware.
- The BIOS settings are stored on the CMOS chip.
- BIOS looks for boot order in CMOS settings.
- After successful completion of POST, BIOS looks for MBR at a permanent location on the harddisk.

# MBR(Master Boot Record)

- MBR has two components:
  - Bootloader information (446 btyes)
  - Partition table information (64 bytes)



# GRUB (Grand Unified Bootloader)

- GRUB is the default bootloader for many linux distributions.
- The desired Operating System can be selected from the grub menu.
- GRUB requires the harddisk number, partition number and the filename of kernel.
- GRUB loads the kernel and initrd.

# GRUB Configuration file

```
default=0
timeout=5
splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title CentOS (2.6.18-238.12.1.el5)
        root (hd0,0)
        kernel /vmlinuz-2.6.18-238.12.1.el5 ro root=LABEL=/ rhgb rhgb quiet
        initrd /initrd-2.6.18-238.12.1.el5.img
```

# Kernel

- Kernel is present in RAM until the system shutdown.
- It communicates with hardware and manages resources such as RAM and CPU.
- Kernel executes init process.

# Init

- Init is the first process executed by kernel.
- PID of init is 1.
- Init is the parent of all processes and is responsible for starting other processes.
- Init loads all the programs from the default runlevel.
- /etc/inittab file contains the default runlevel.
- runlevel command can be used to check the default runlevel.

# Runlevels

0. System Shutdown
1. Single User Mode
2. Multiuser mode without networking
3. Multiuser mode with networking
4. Not used
5. Multiuser mode + Display Manager(GUI)
6. Reboot

- Runlevel programs can be found in the directories /etc/rc.d/rc*.d/

- The processes are associated with two flags:
  - K(Kill)
  - S(Start)

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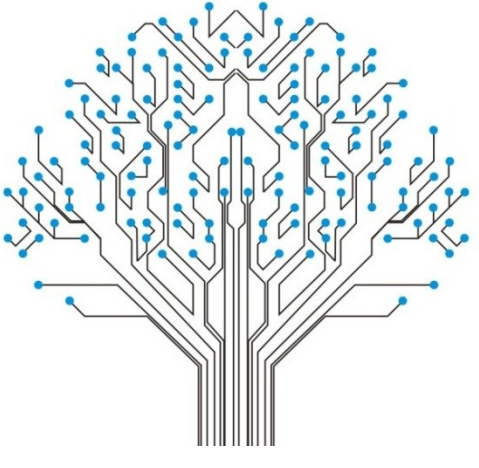
# Thank you



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