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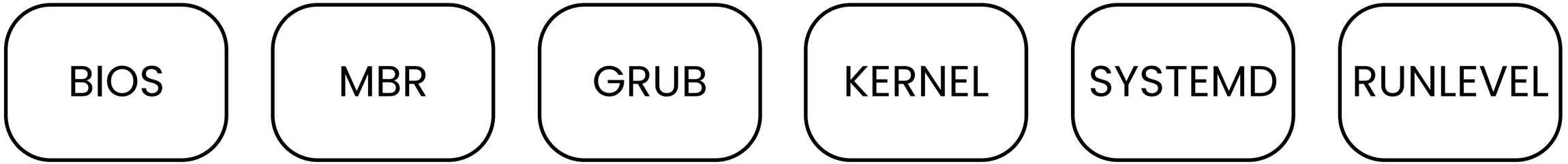
UNDERSTANDING THE BOOT PROCESS

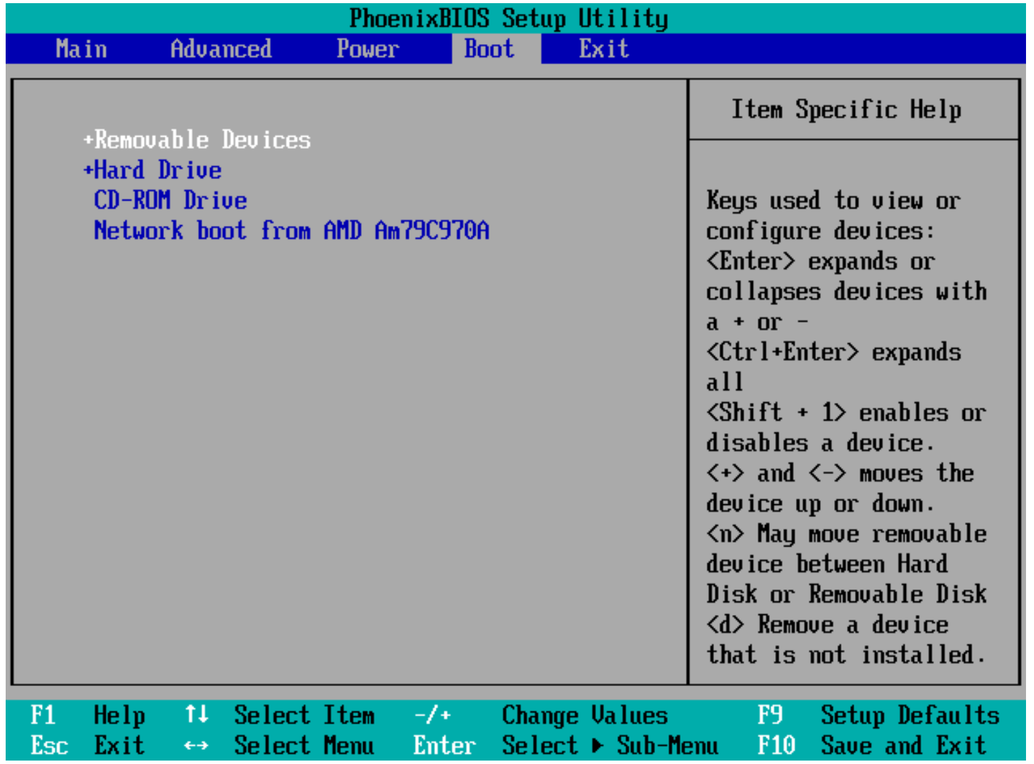
OVERVIEW OF THE BOOT PROCESS



BIOS

BASIC INPUT OUTPUT SYSTEM

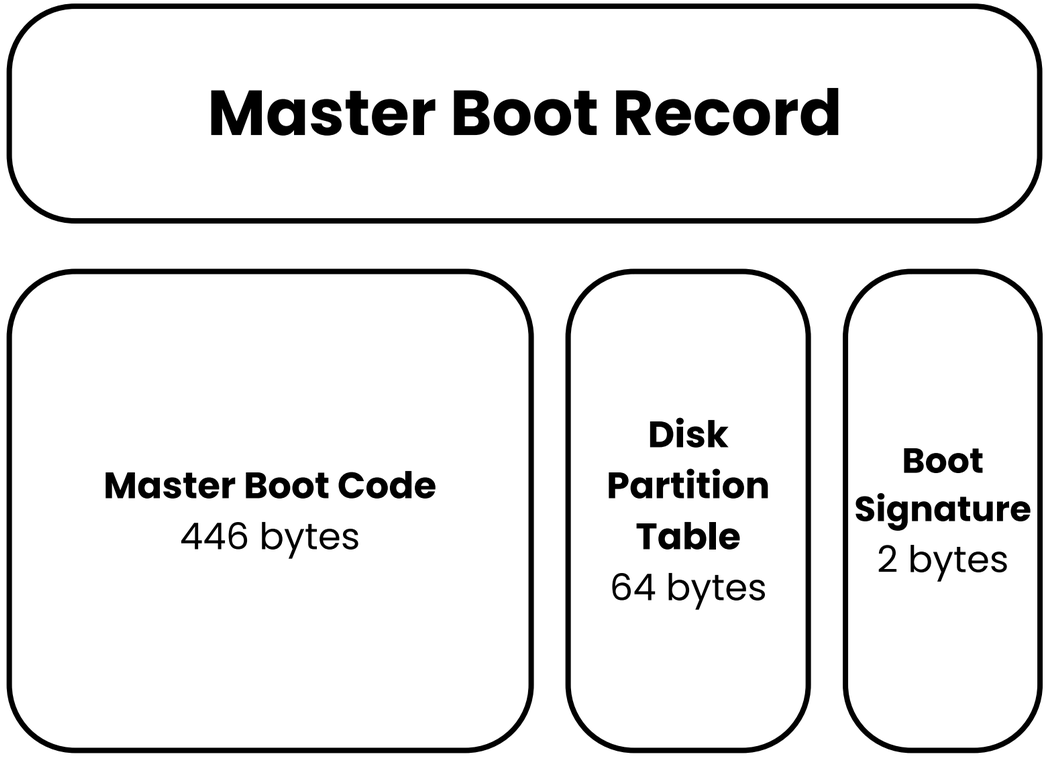
- Perform the **POST** (Power-on self-test).
- Run from **ROM** and **INDEPENDENT** from the operating system.
- Searches, loads, and executes the **MBR** to boot the operating system.



MBR

MASTER BOOT RECORD

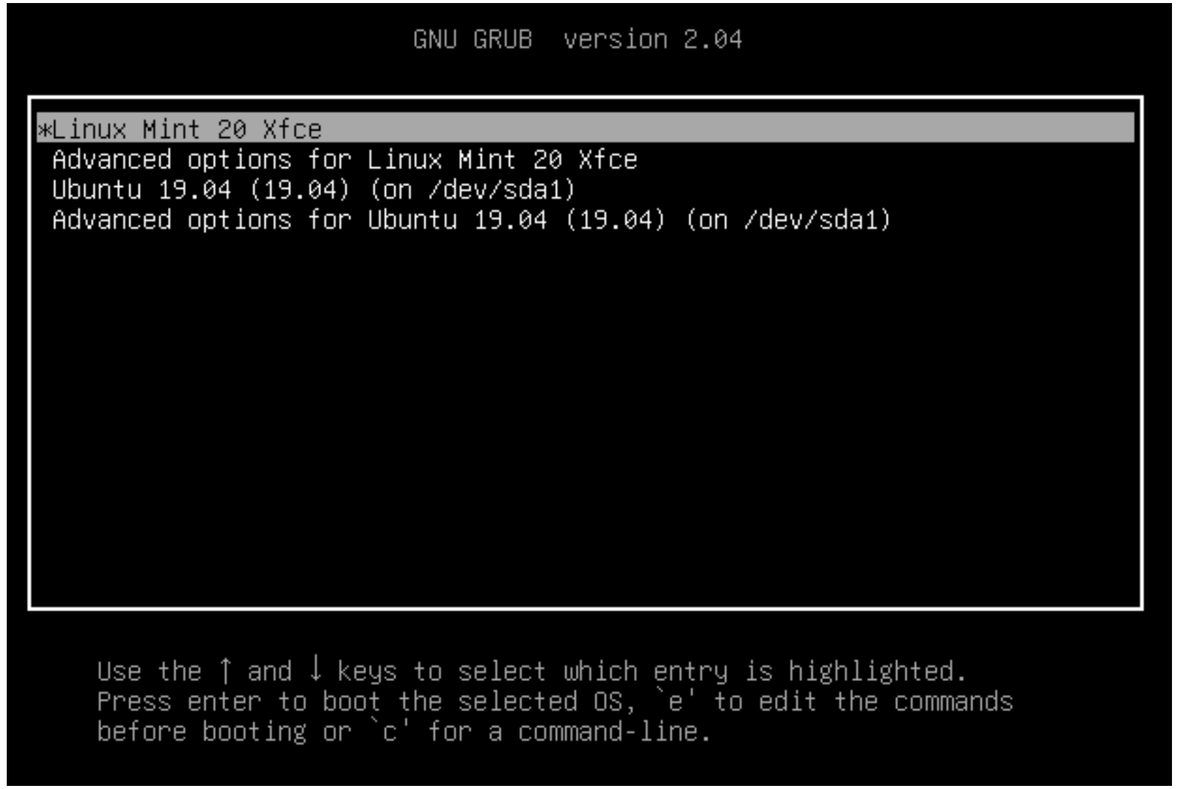
- Responsible for loading and executing the **GRUB** boot loader.
- Located in the **1st** sector of the bootable disk
- Is less than **512 bytes** in size.
- Contains the **GRUB** program and informations about the disk partitions.



GRUB

GNU GRAND UNIFIED BOOTLOADER

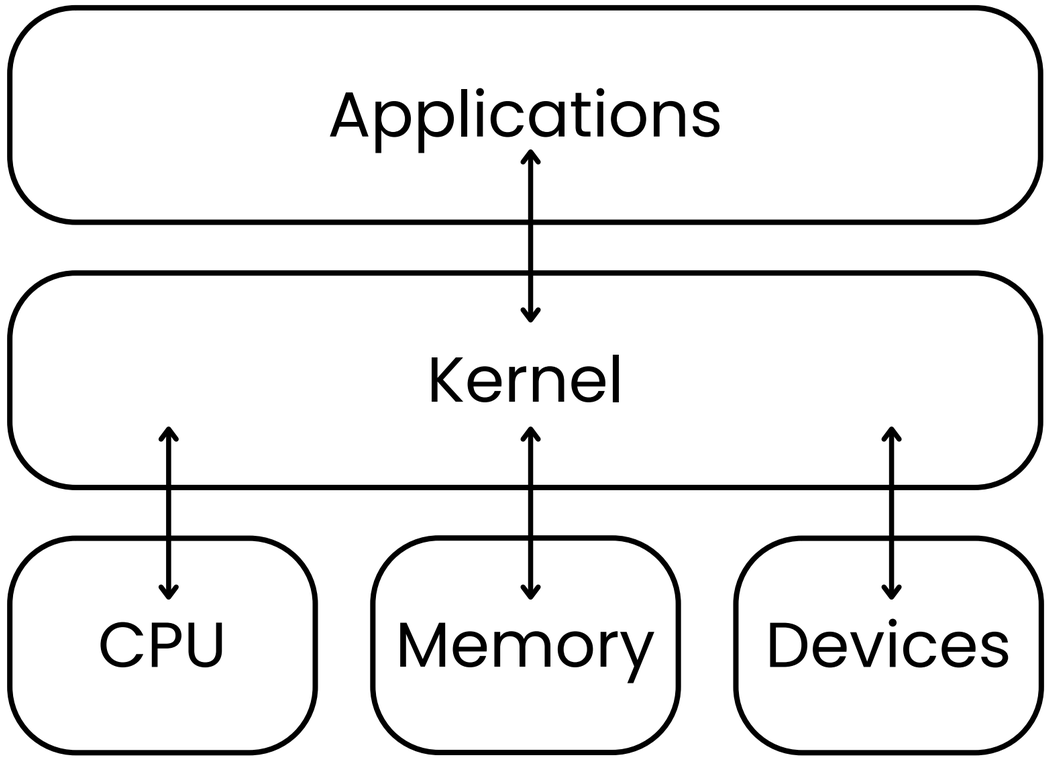
- **LILO** (Linux Loader) in very old system.
- Displays a splash screen to choose which kernel image installed to be executed.
- **GRUB** configuration file is located:
  - **/boot/grub/grub.conf**
  - **/etc/grub.conf**
- Load kernel into memory.



KERNEL

- Core of the operating system and has total control over the system.
- Mounts the root file system in **grub.conf**.

- Follow predefined procedures:
  a. decompress itself in place (vmlinuz vs vmlinux)
  b. perform hardware checks
  c. gain access to vital peripheral hardware
  d. run the **init process** (PID 1)



SYSTEMD

- The parent process initiated by the **kernel's init process**.
- Previously known as **SysVinit** process.

- Performs a range of tasks:
    a. probe all remaining hardware
    b. mount filesystems
    c. initiate and terminate services
    d. manage essential system processes like user login
    e. run a desktop environment

- Lastly, decide the **target** or **state** the linux system boots into.

RUNLEVEL

CURRENT STATE OF THE OS

- Defining which system services are running.
- Previously, **SysVinit** identified run levels by number.
- .target files now replace run levels in **Systemd**.

Let’s check our default target:

$ sudo systemctl get-default

To change boot target :

$ sudo systemctl set-default <target>

RUNLEVEL

- You can change the target (run level) while the system runs.

For example, to switch to run level 3 from run level 5, we can run the following command:

$ sudo systemctl isolate multi-user.target

Then, to take the system to run level 5, let's run the command:

$ sudo systemctl isolate graphical.target

poweroff.target	run level 0	turn off (shut down) the computer
rescue.target	run level 1	initiate a rescue shell process
multi-user.target	run level 3	configure the system as a non-graphical (console) multi-user environment
graphical.target	run level 5	establish a graphical multi-user interface with network services
reboot.target	run level 6	restart the machine