

The Boot Process in GNU/Linux

LKCAMP





Summary

1. Introduction
2. System startup
3. Firmware
4. Bootloader
5. Kernel



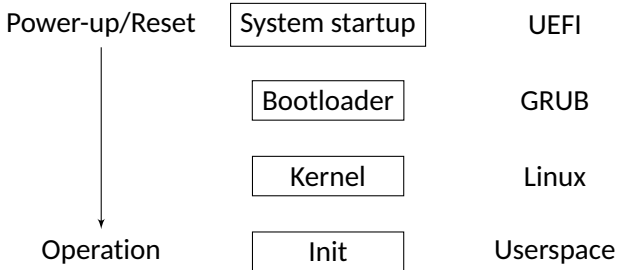
Challenges during startup

What must be done to go from the power on to the login screen?

- Which devices are on the system?
- Which partition to boot?
- Where is the kernel?
- How to call the kernel?
- Which SO to load?

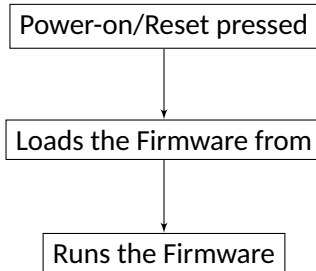


Overall





System startup





Firmware

- The first program loaded.
- Platform specific.
- Do low-level specialization.
- Knows how to call the bootloader from a disk.
- Ex: UEFI, BIOS and others.



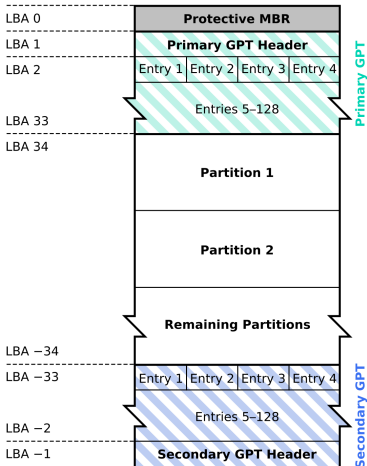
Partition Table

- Ex: MBR, GPT, SGI, BSD, ...
- Organize a disk in partitions.
- Knows how to boot a system in a partition.
- The firmware should know how to read the partition table.



GPT

GUID Partition Table Scheme





Bootloader

- Also know as IPL (initial program loader)
- Knows how to load the kernel
- Knows how to read the filesystem
- Ex: GRUB, LILO, Das U-BOOT, ...



bzImage

- A compressed kernel image
- Auto extracts to RAM
- Calls the `start_kernel()` (`linux/init/main.c`)



start_kernel()

1. Setup C environment
2. Initialized memory
3. Setup the interruption table
4. Load initramfs
5. Change to userspace



initramfs

1. Mount a temporary root filesystem into memory
2. Load modules to mount the real rootfs
3. Load modules necessary for initialize
4. Mount the rootfs
5. Call `pivot_root` && `execv /init`



The end

Login Screen!



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