

System Boot

 THE **LINUX** FOUNDATION

GRUB

- Virtually all x86-based physical Linux systems (outside the embedded sphere) today use **GRUB** (**GR**and **U**nified **B**ootloader) to handle the early phases of system startup
- Other platforms may have other equivalents, such as ELILO used on IA64 (Itanium), and Das U-Boot used on many embedded configurations
- Some important features of GRUB are:
 - Alternative operating systems can be chosen at boot time
 - Alternative kernels and/or initial ramdisks can be chosen at boot time for a given operating system
 - Boot parameters can be easily changed at boot time without having to edit configuration files in advance

GRUB (Cont.)

- Older Linux distributions (such as RHEL6) use older GRUB versions (1.0 or below), while newer ones are based on GRUB 2; while details are different between the versions, the basic philosophy is the same
- In GRUB 2 the basic configuration file is **`/boot/grub/grub.cfg`** or **`/boot/grub2/grub.cfg`**
- This file is auto-generated when you run **`update-grub`** or **`grub2-mkconfig`** (depending on distribution), based on files in the **`/etc/grub.d`** and **`/etc/default/grub`**; it should not be edited by hand
- On some purely EFI systems, this file might be found in a directory like **`/boot/efi/EFI/redhat/grub.cfg`**
- The essential configuration file contains some global information, and then a **stanza** for each operating system or kernel configured

Boot

- On x86 systems, boot begins with the **BIOS** identifying and initializing all system and attached peripheral devices
- If permitted by BIOS settings, the system can then boot off a peripheral device such as a CD, DVD, floppy, or USB drive, or through network PXE; more likely it will boot off the configured hard disk
- The **MBR** (Master Boot Record) contains both the **partition table** and the **boot loader**, a short program that is responsible for loading the operating system, and thus has to have at least sufficient smarts to locate and load the kernel from disk
- This kernel can have any name; usually on Linux systems it is called something like **vmlinux-4.18.0** which includes the kernel version number
 - The **z** in **vmlinux** indicates the kernel is compressed; it self-decompresses upon loading
 - In most circumstances it is placed in the **/boot** directory which is often on its own partition

