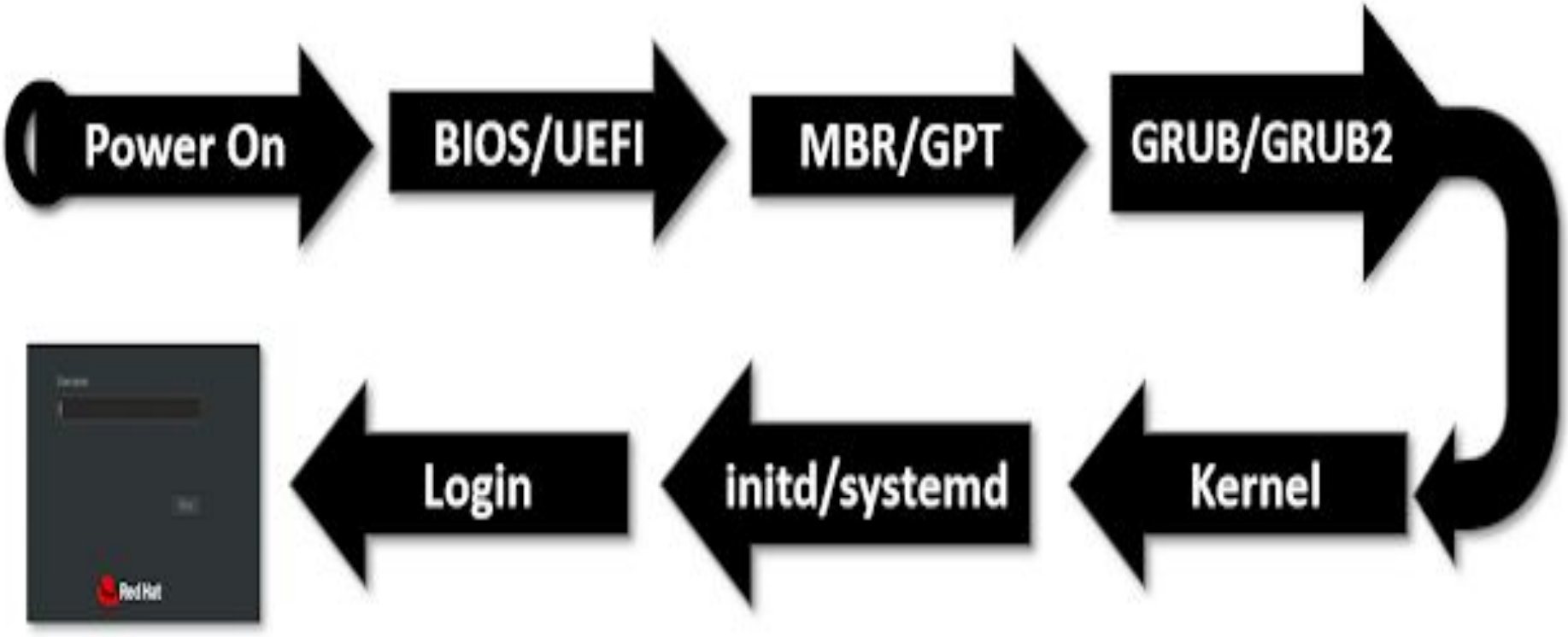
Booting process

Presented By: NISHITH KUMAR SINHA

PROCESS


Power On
BIOS/UEFI
MBR/GPT
GRUB/GRUB2
Kernel
initd/systemd
Login
Red Hat

Stage 1: BIOS

- BIOS- Basic input/Output System.
- Boot Firmware designed to run at startup.
- POST- (Power on Self Test)
  - Identifies, tests and initializes system devices
- Run Time Services
  - Initial configurations
  - Selects which devices to boot from
- Loads the MBR(Master Boot Record) to RAM.

POST (Power on Self Test)

- One of the first processes that a computer undergoes when booting.
- POST tests the computer to ensure that it is working as it is supposed to.
- POST can detect some errors with the processor, motherboard,RAM and other memory,as well as the video card.
- Most BIOS chips use a system of beep codes to indicate the POST status to the user and each BIOS chipset uses a different code.
- The IBM pc BIOS code standard, for example, uses one short beep to indicate a successful POST and two short beeps to indicate a POST error.

Stage 2: MBR (Master Boot Record)

- ★ After the POST the BIOS to root up an Operating System, which must be found somewhere: hard drives, CD-ROM drives floppy disk etc.
- ★ the the actual order in which the BIOS seeks a boot device is called boot sequence and is user configurable.If there is no suitable boot device the BIOS halts with a complaint like "Non-system disk or Disk Error.
- ★ The master boot record is always located at cylinder 0, head 0 and Sector 0, the first sector on the disk.
- ★ The BIOS now reads the first 512 byte sector of the hard disk.
- ★ This is called Master boot record.

GRUB-(Grand Unified Bootloader)

- ★ If you have multiple kernel images installed on your system, you can choose which one to be executed.
- ★ GRUB displays a splash screen, waits for few seconds, if you don’t enter anything, it loads the default kernel image as specified in the grub configuration file.
- ★ GRUB has the knowledge of the filesystem (the older Linux loader LILO didn’t understand filesystem).

Kernal

- ★ Mounts the root file system as specified in the “root=” in grub.conf
- ★ Kernel executes the /sbin/init program
- ★ Since init was the 1st program to be executed by Linux Kernel, it has the process id (PID) of 1. Do a ‘ps -ef | grep init’ and check the pid.
- ★ initrd stands for Initial RAM Disk

Init Step

- Looks at the /etc/inittab file to decide the Linux run level.
- Following are the available run levels
  - 0 – halt
  - 1 – Single user mode
  - 2 – Multiuser, without NFS
  - 3 – Full multiuser mode
  - 4 – unused
  - 5 – X11
  - 6 – reboot
- Init identifies the default init level from /etc/inittab and uses that to load all appropriate program.
- Execute ‘grep initdefault /etc/inittab’ on your system to identify the default run level.

Run Level Programs

- Under the /etc/rc.d/rc*.d/ directories, you would see programs that start with S and K.
- Programs starts with S are used during startup. S for startup.
- Programs starts with K are used during shutdown. K for kill.
- There are numbers right next to S and K in the program names. Those are the sequence number in which the programs should be started or killed.
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ThaNK
YOU