

# LINUX

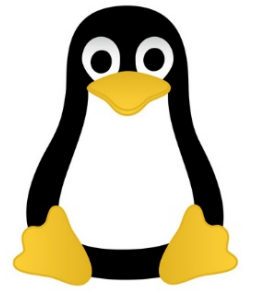


## KHỞI ĐỘNG HỆ THỐNG

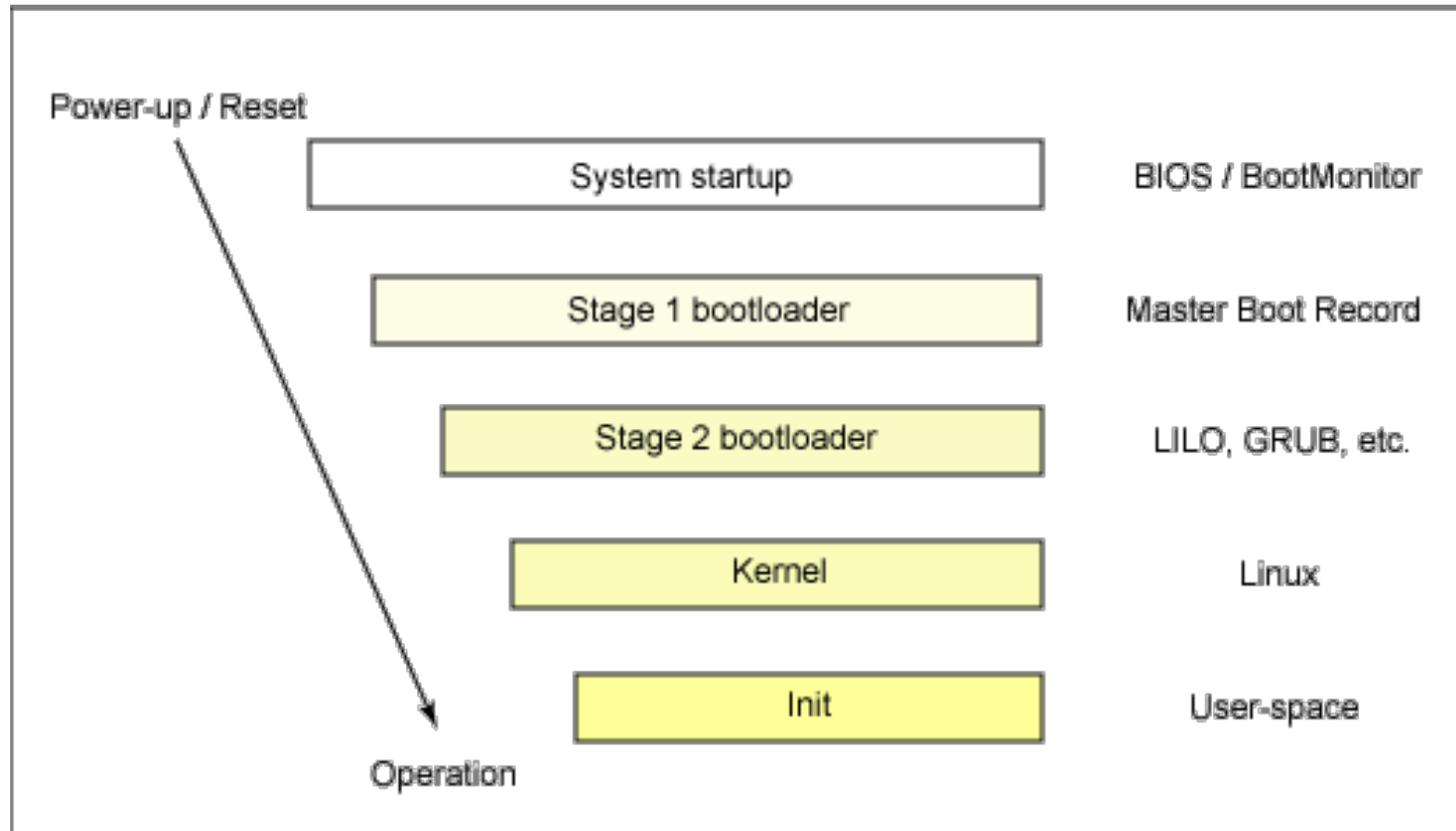
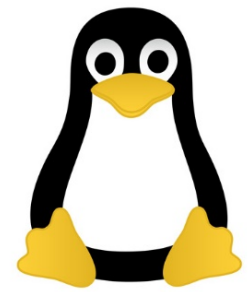


Freedom. Choices. Beautiful.

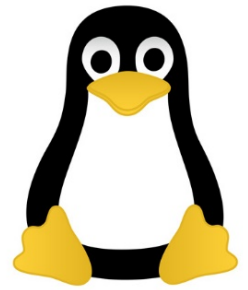
# Outline



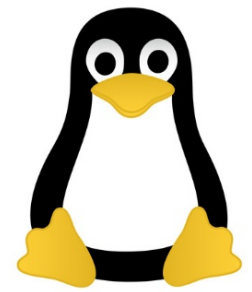
# Overview



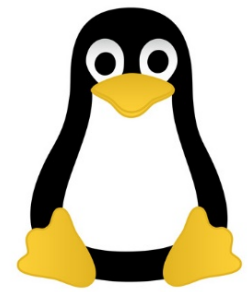
# System startup



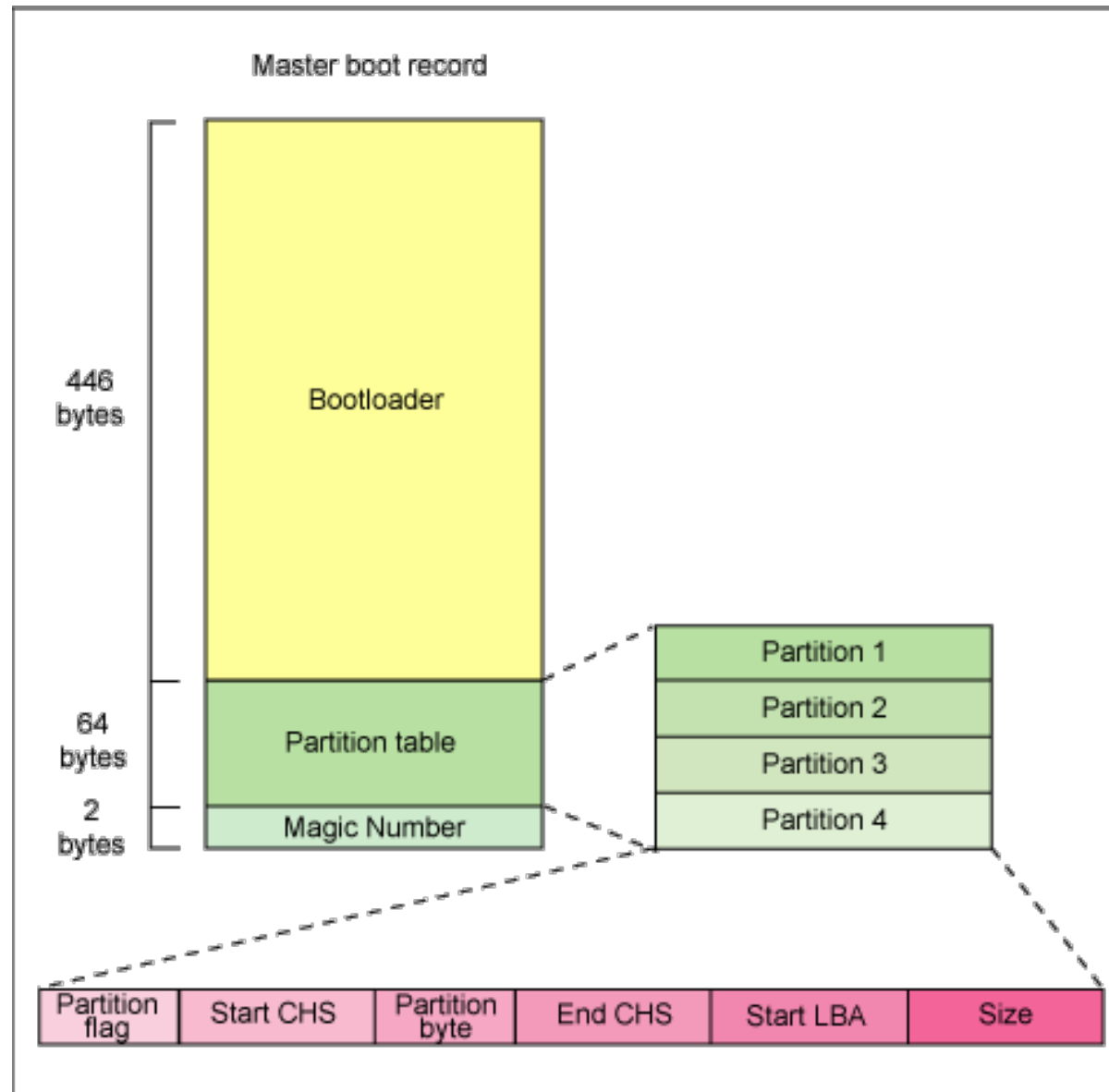
- booting Linux begins in the BIOS at address 0xFFFF0.
- The first step of the BIOS is the power-on self test (POST). The job of the POST is to perform a check of the hardware.
- The second step of the BIOS is local device enumeration and initialization.



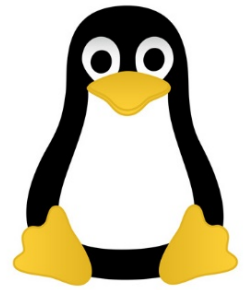
- the BIOS is made up of two parts:
  - the POST code (the power-on self test)
  - runtime services: searches for devices that are both active and bootable (a floppy disk, a CD-ROM, a partition on a hard disk, a device on the network, or even a USB flash memory stick)
- Commonly, Linux is booted from a hard disk, where the Master Boot Record (MBR) contains the primary boot loader. The MBR is a 512-byte sector, located in the first sector on the disk (sector 1 of cylinder 0, head 0). After the MBR is loaded into RAM, the BIOS yields control to it.



# Stage 1 boot loader

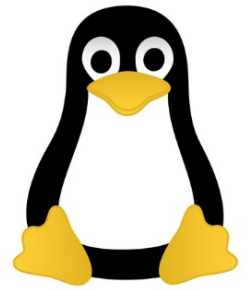


# Stage 2 boot loader



- It's a kernel loader
- The first- and second-stage boot loaders combined are called Linux Loader (LILO) or GRand Unified Bootloader (GRUB) in the x86 PC environment.
- Instead of using raw sectors on the disk, as LILO does, GRUB can load a Linux kernel from an ext2 or ext3 file system.

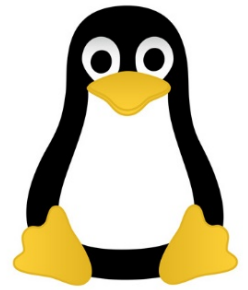
# GRUB



- Stage 1 (MBR) boots a stage 1.5 boot loader that understands the particular file system containing the Linux kernel image.
- Examples include *reiserfs\_stage1\_5* (to load from a Reiser journaling file system) or *e2fs\_stage1\_5* (to load from an ext2 or ext3 file system).
- Stage 2: the default kernel image and *initrd* image are loaded into memory.
- With the images ready, the stage 2 boot loader invokes the kernel image.

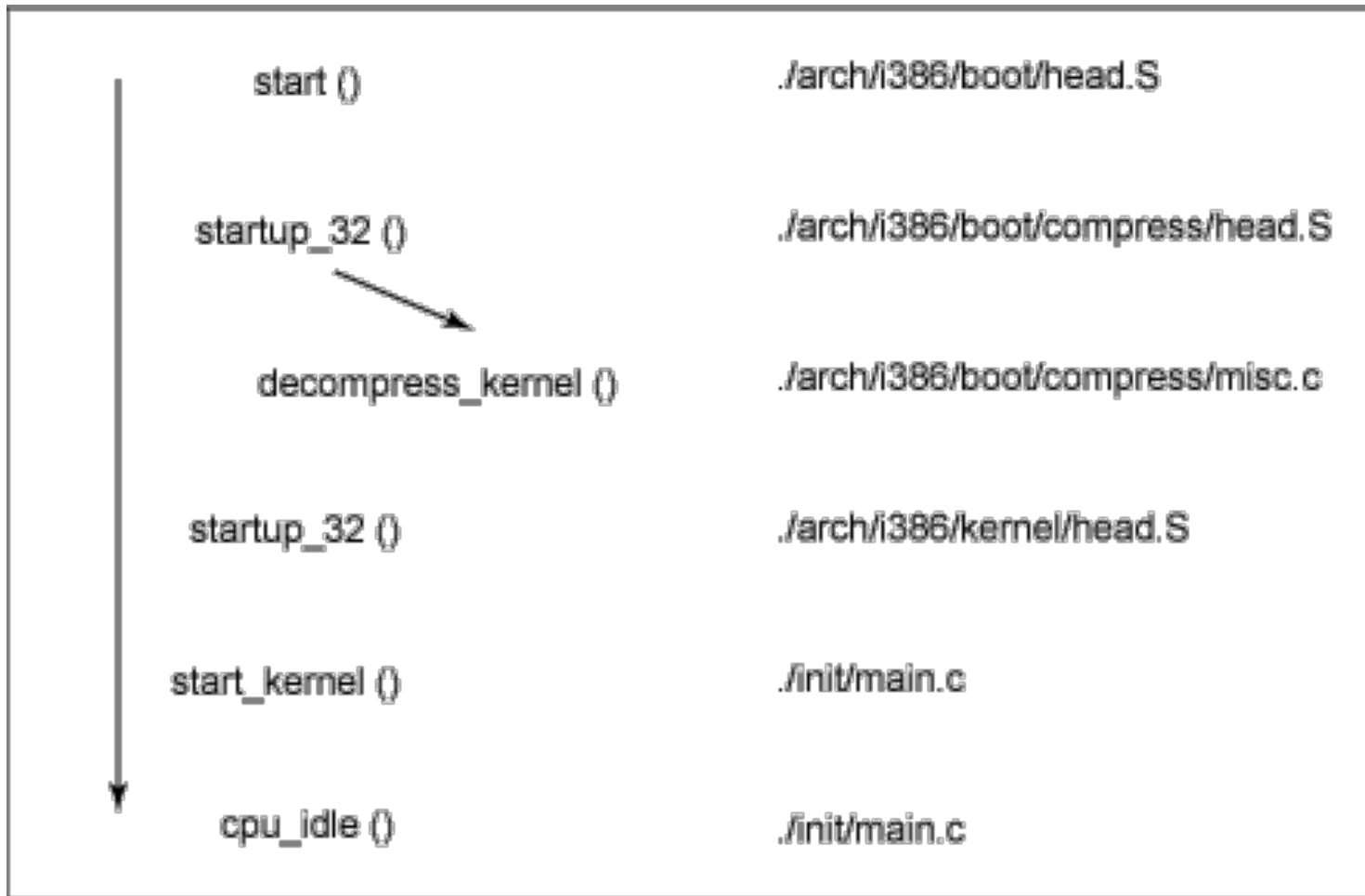
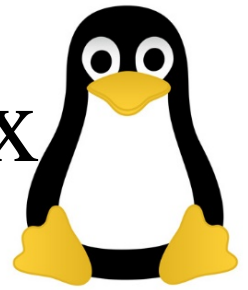


# Kernel

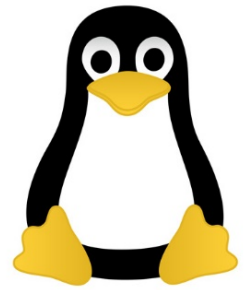


- With the kernel image in memory and control given from the stage 2 boot loader, the kernel stage begins.
- Typically this is a zImage (compressed image, less than 512KB) or a bzImage (big compressed image, greater than 512KB)

# Major functions flow for the Linux kernel i386 boot



# Init



- After the kernel is booted and initialized, the kernel starts the first user-space application. This is the first program invoked that is compiled with the standard C library.
- In a desktop Linux system, the first application started is commonly `/sbin/init`. But it need not be. Rarely do embedded systems require the extensive initialization provided by `init` (as configured through `/etc/inittab`)