

The logo features the text "LinuxBIOS" in a bold, 3D-style font with a red-to-yellow gradient and a drop shadow. A large, stylized "X" is superimposed over the text, composed of two intersecting, semi-transparent, multi-colored shapes (red, orange, yellow) that resemble folded paper or fabric.

# LinuxBIOS

**Debajit Adhikary**

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LINUX BIOS

# WHAT IS LINUXBIOS?

- 🌐 Open source firmware for PC systems replacing a normal PC BIOS
- 🌐 Started by Ronald Minnich in 1999 at the Los Alamos National Laboratory (LANL)

## Purpose

- Smaller, faster, less complex and cheaper than a PC BIOS
- Well suited for embedded systems
- Makes it easier to manage large computing clusters

# WHAT DOES A PC BIOS DO?

- Initializes the hardware
- Loads the operating system
- Provides a simple I/O interface to the operating system and applications:

INT 10h — Video

INT 13h — Disk

INT 15h — System Information

Today operating systems have their own drivers.

BIOS is only used to load the OS.





LINUX BIOS

# PROBLEMS WITH THE BIOS



- Closed source
- Performs a function we no longer need — supporting DOS
- Limited nature of BIOS imposed in the old days of 8KB EPROMS
- New mainboard NVRAMs can accommodate a real operating system directly on the mainboard



LINUX BIOS

# DISADVANTAGES OF A PC BIOS

- Much duplicated functionality:
  - ⊗ PCI scan done twice
  - ⊗ Slow IDE probe done twice
  - ⊗ Drivers in BIOS, drivers in OS
- No remote management
- Screen and keyboard needed to do configuration
- Large and complex due to backward compatibility
- Often has bugs



# LINUX BIOS

## THE LINUXBIOS WAY

- Only do minimal hardware initialization to get the CPU and chipset started and enter 32 bit mode as soon as possible.
- Copy the Linux kernel from flash to RAM
- Jump to the Linux kernel entry point
- Let Linux do the rest of the hardware initialization
- Use a full Linux system to load the OS





LINUX BIOS

# LINUXBIOS TODAY



- LinuxBIOS has evolved since the beginning and has become more complex
- The hardware initialization does a PCI scan and can probe for IDE hard drives
- Fills in the **LinuxBIOS table** with information that the operating system will need. Memory size etc.
- Gives better separation from the OS
- Loads the OS into memory and jumps to its entry point



LINUX BIOS

# OPERATING SYSTEMS SUPPORTED

## Currently Supported

- Linux
- Plan 9
- OpenBSD
- Windows 2000
- Windows CE

## In the works

- Windows XP
- FreeBSD



# LINUX BIOS COMPARISON

LinuxBIOS	PC BIOS
Small <32kB	Large 256kB
Fast	Slow
Customizable	Rigid
Mostly written in C, clean and portable	Much assembly language
No license fees	Per unit license fees
Less manufacturer support	Better manufacturer support
Nonstandard	De facto standard



