



coreboot

Cristian Măgherușan
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A bit of history

- v1 – 1999 - “Keyboard error, press F1 to continue” on some 500 cluster nodes
 - LinuxBIOS
 - Used a Linux kernel for hardware init & system boot(kexec)
- v2 – redesign/rewrite (the kernel was too big)
- v3 – playground where many goodies were born
 - Failed due to poor hardware support
 - Most features were merged back into v2(mainline)
- 2007 – LinuxBIOS is renamed coreboot
 - No dependence on the Linux kernel



coreboot Operation

- coreboot contains only hardware init code
 - No PC BIOS routines
- Runs a so-called payload (static ELF binary)
 - OS kernels: Linux, Plan9
 - PC BIOS emulation: SeaBIOS
 - Bootloaders: FILO, GRUB2, Etherboot, gPXE
 - Utilities: Memtest, coreinfo
 - UEFI
 - Payload selector: Bayou
 - Games :-)
- May run optional ROMs (like VGA BIOS code)



coreboot Facts

- Modular and versatile stack for system startup
- Fast boot
 - About 3 seconds to Linux prompt
 - SMP startup on some systems
- Decent hardware support
 - About 200 motherboards
 - many CPUs and chipsets are supported (many of those with public datasheets)
 - hard to keep up with the hardware vendors
- Free Software (GPL)
- Commercial support is available
- Some big names are involved (AMD, VIA, MSI...)



Internals

- Written in C almost completely
 - A tiny fraction is in ASM
- 32bit mode almost from the start
- RAM init is maybe the hardest part
 - needs do be done using SMBUS
 - only after the Southbridge, SuperIO and the RAM controller were already initialized
 - Early init (anything that happens before RAM is initialized) is tricky to do in C
 - The C language needs a stack
 - How do you make a stack when there's no RAM?
 - ROMCC - Compiles C into binary code that only uses the CPU registers
 - CAR - uses the CPU cache instead of real RAM, if supported by hardware
- CBFS Filesystem-like layout for the flash image (archive)



Use cases

- Anywhere flexibility really matters
- Embedded/custom/hobbyist systems
- Instant-on applications
- HPC Clusters
- Cool applications (Linux-based)
 - Xvesa Linux environment payload
- Free-Software-only applications
 - FSF uses it extensively



Porting to new hardware

- Porting to a new desktop motherboard
 - relatively easy to do if the components are already supported
- Porting to a new CPU/chipset
 - low level hardware datasheets are needed
 - much harder, usually takes more than 6 months
- Laptops are troublesome



Summary

- coreboot
 - PC BIOS replacement (if configured), and not only
- Technical advantages over legacy BIOSes
- More info
 - <http://coreboot.org>



Köszönöm!