Linux Power Management One Step Ahead!

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Linux Power Management One Step Ahead!

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- → The Powersave Architecture
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- → Live Demo
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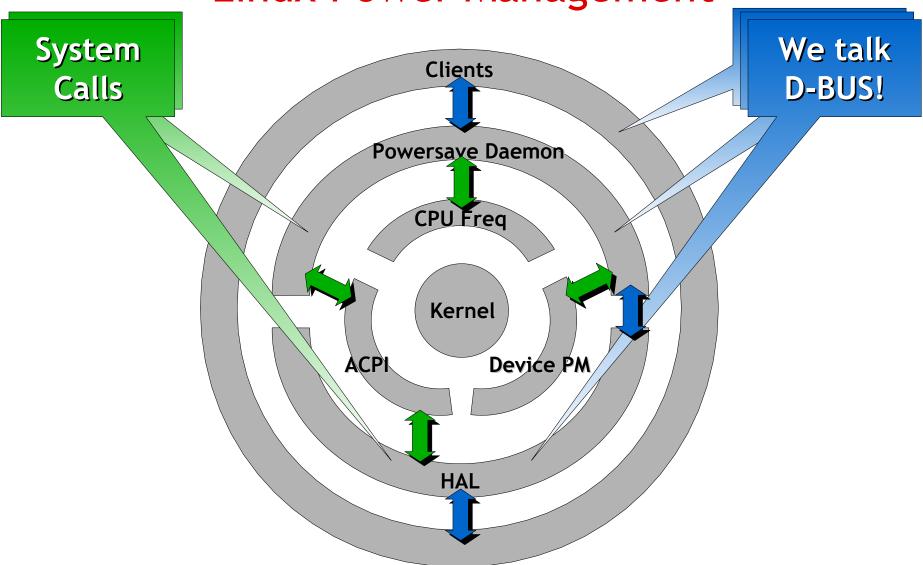








Linux Power Management



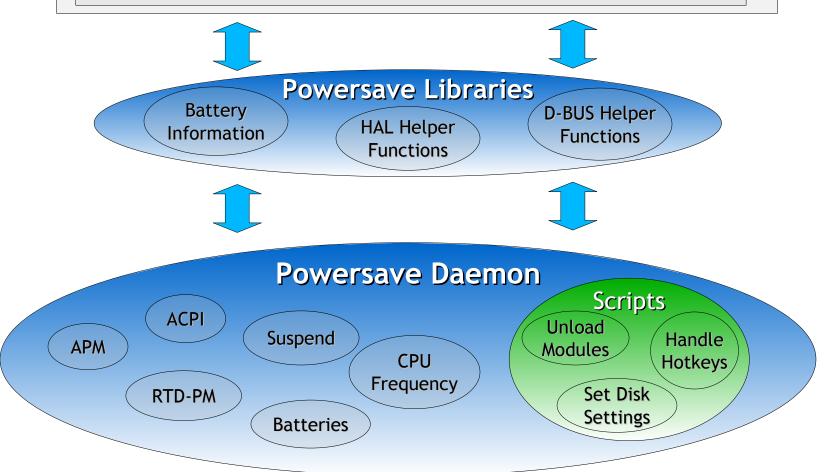
Powersave Architecture

Clients (KPowersave, wmpowersave, gkrellm-powersave)



Client implements: Auto-Suspend, Lock Screen, Event Notifications (...)

Daemon interaction: Trigger Suspend, Set CPU frequency, Set Schemes





Throttling

50 %

Brightness:

Low

Scheme Architecture

CPU Freq.: CPU Freq.: dynamic High Scheme Scheme Throttling: »Performance« »Powersave« 0 % CPU Freq.: Throttling **IDE** Disk High 50 % Settings CPU Freq.: Throttling: RTD-PM Brightness: 0 % dynamic High Brightness: Brightness: High Low IDE Disk RTD-PM Settings

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Validated Distributions

• SUSE Linux



• Fedora Core



• ALT Linux



• Debian



• Ubuntu



• Kubuntu



Gentoo





Runtime Device Power Management (RTD-PM)

- Today, we can:
 - switch the global system state and CPU frequency
 - adjust LCD brightness
- What do we get?
 - Save time (suspend and resume cycle)
 - Save power consumption at the expense of performance
- Next:
 - Runtime Device Power Management (RTD-PM)
- What do we get?
 - Extend battery lifetime by switching off unnecessary subsystems or devices (LAN, WLAN, USB, Modem, ...)



Runtime Device Power Management

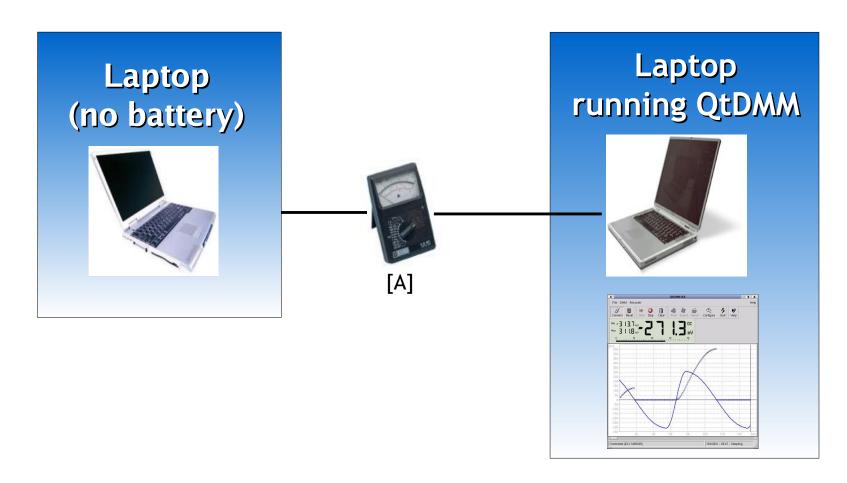
- Power States According to ACPI
 - D0 (fully-on, mandatory)
 - D1, D2 (depending on device class, optional)
 - D3 (off, device context lost, mandatory)
- Switch Device Power State
 - 1. Identify (e.g. lspci)
 - 2. echo -n [0-3] > \$SYSFS_PATH

```
$ lspci |grep Ethernet
02:0e.0 Ethernet controller: Broadcom Ethernet
$ echo -n 3 > /sys/bus/pci/devices/0000:02:0e.0/power/state
```

- We should not require users to use echo
- UI required, enhance Powersave Daemon clients

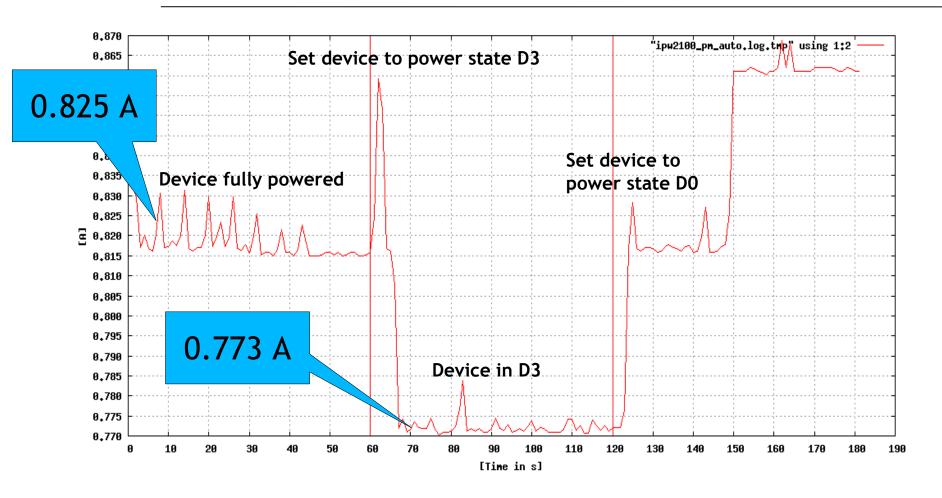


Test Environment





Example: IPW 2100



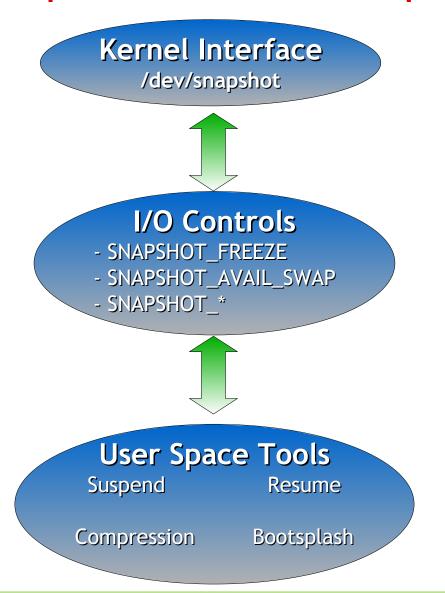






What's Next?

User Space Software Suspend





Dynticks

- Skip timer ticks if CPU is idle
 - Make HZ dynamic
 - HZ is arch depending
- → Allow the CPU to enter C3 more often
- Problems
 - Losing interrupts

Running Out of Time'w Battery.

Open Discussion

Thanks for coming!





Resources of Interest

- http://powersave.sourceforge.net/pm-report/
- http://www.opensuse.org/Projects_Powersave
- http://powersave.sourceforge.net
- http://sourceforge.net/Projects/Powersave
- Mailing lists:
 - powersave-users@forge.novell.com
 - powersave-devel@forge.novell.com