

# Linux Power Management One Step Ahead!

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**Novell.**



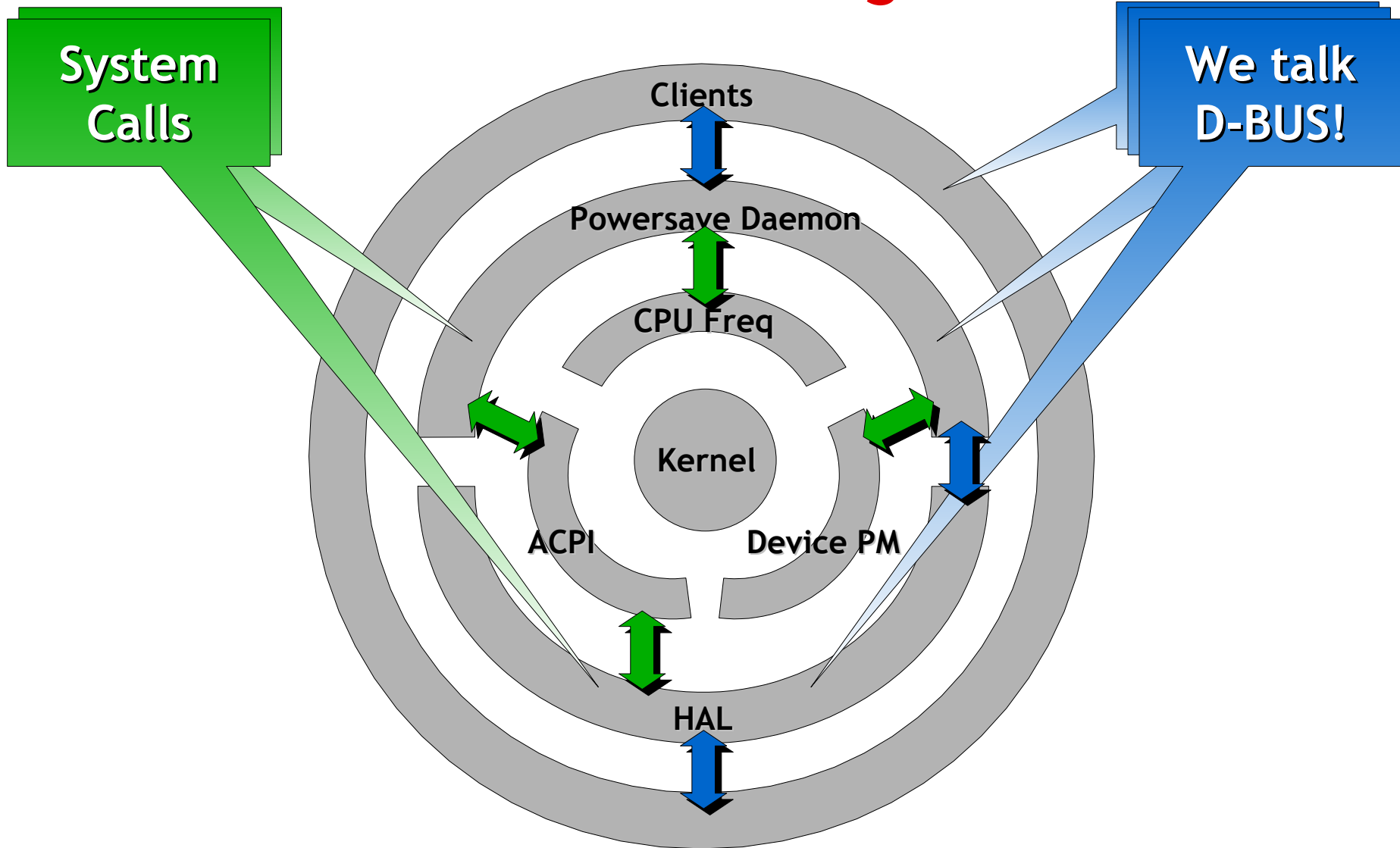
# Linux Power Management One Step Ahead!

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- Linux Power Management
- The Powersave Architecture
- Runtime Device Power Management (RTD-PM)
- Live Demo
- What's Next?



# Linux Power Management

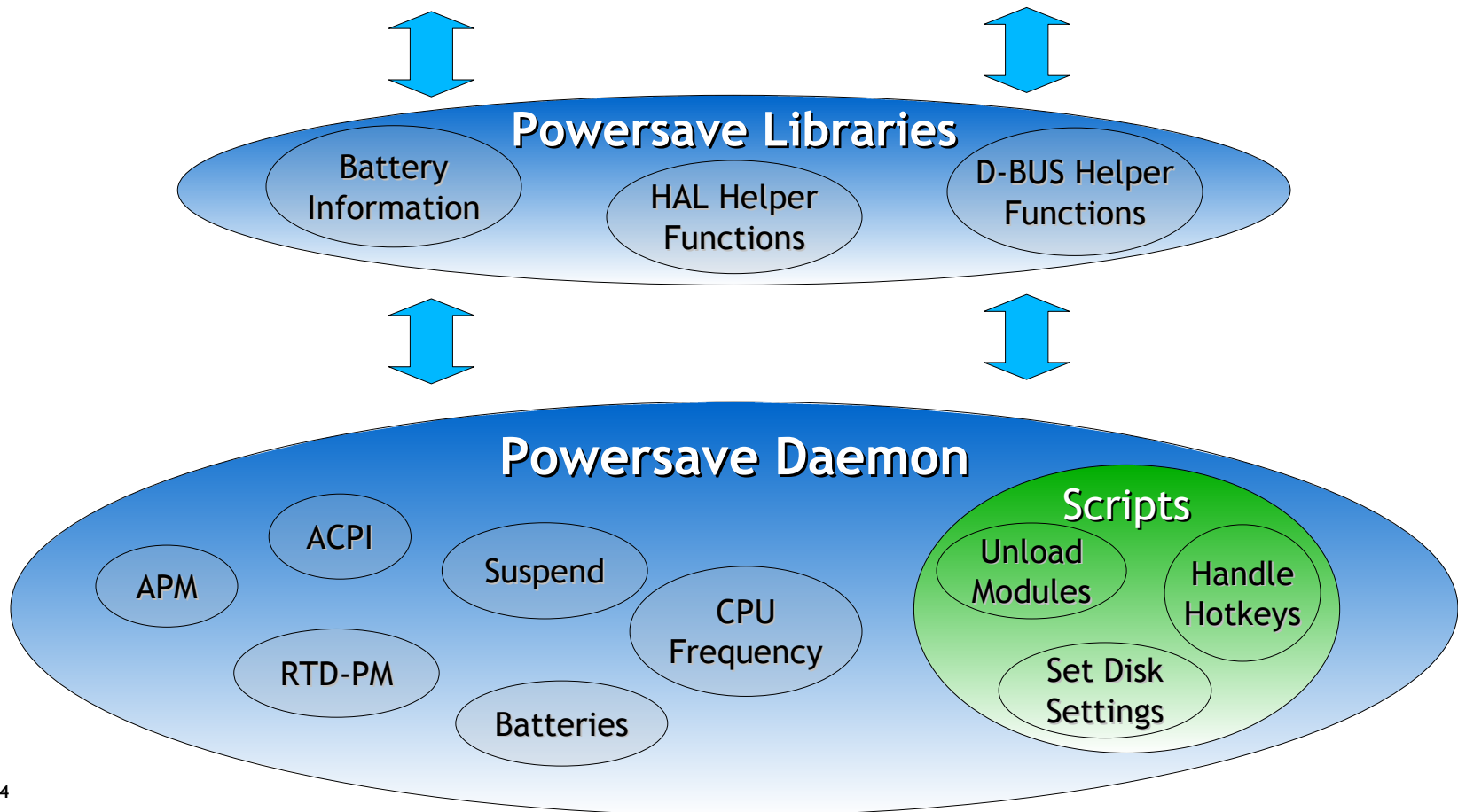


# Powersave Architecture

Clients (KPowerSave, wmpowersave, gkrellm-powersave) 

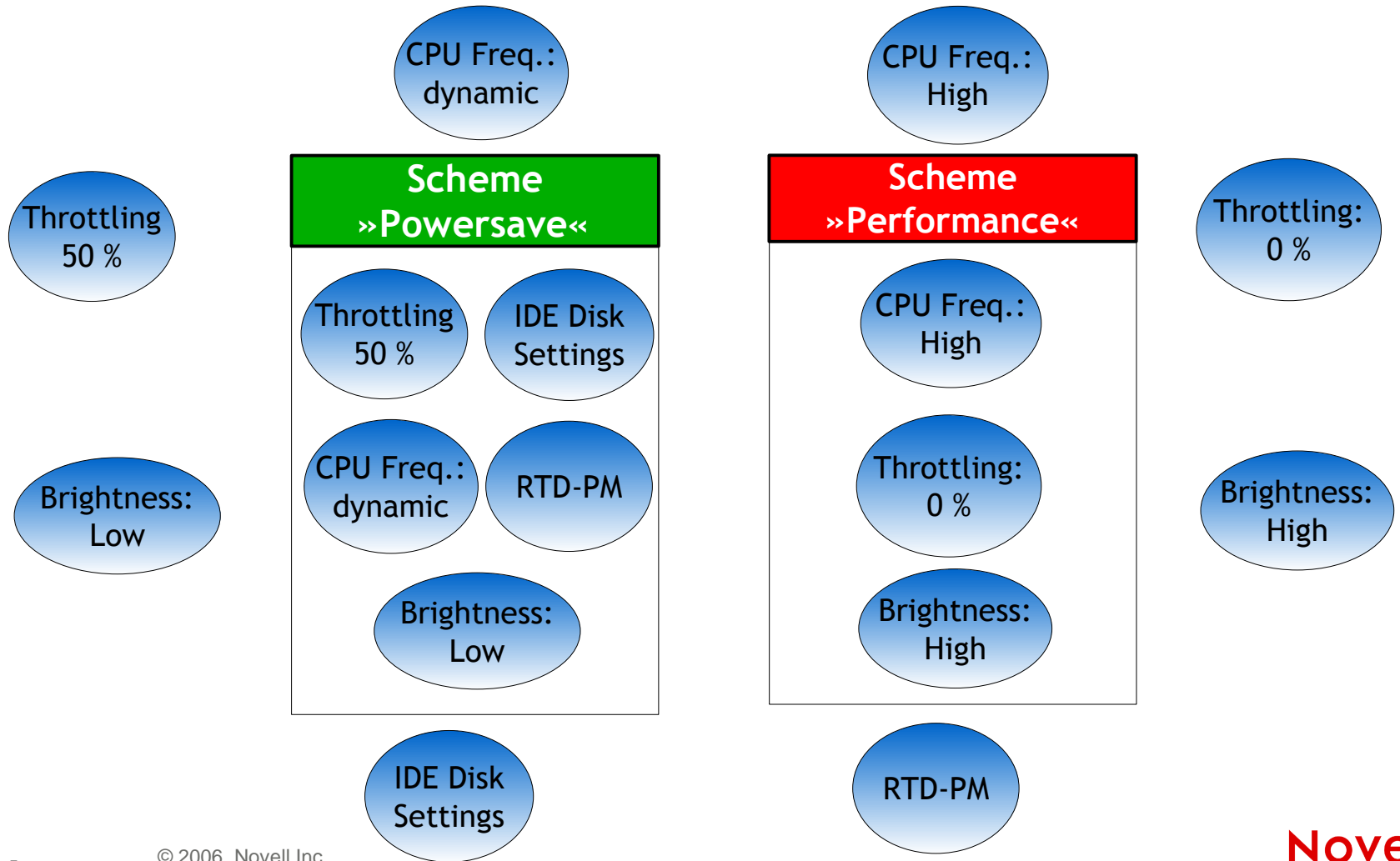
Client implements: Auto-Suspend, Lock Screen, Event Notifications (...)

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





# Scheme Architecture





# Validated Distributions

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- SUSE Linux
- Fedora Core
- ALT Linux
- Debian
- Ubuntu
- Kubuntu
- Gentoo





# Runtime Device Power Management (RTD-PM)

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- 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



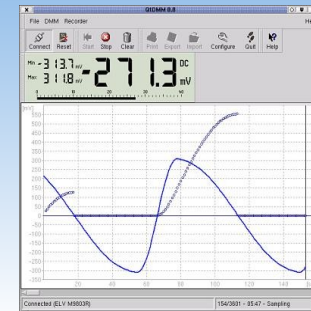
# Test Environment

Laptop  
(no battery)



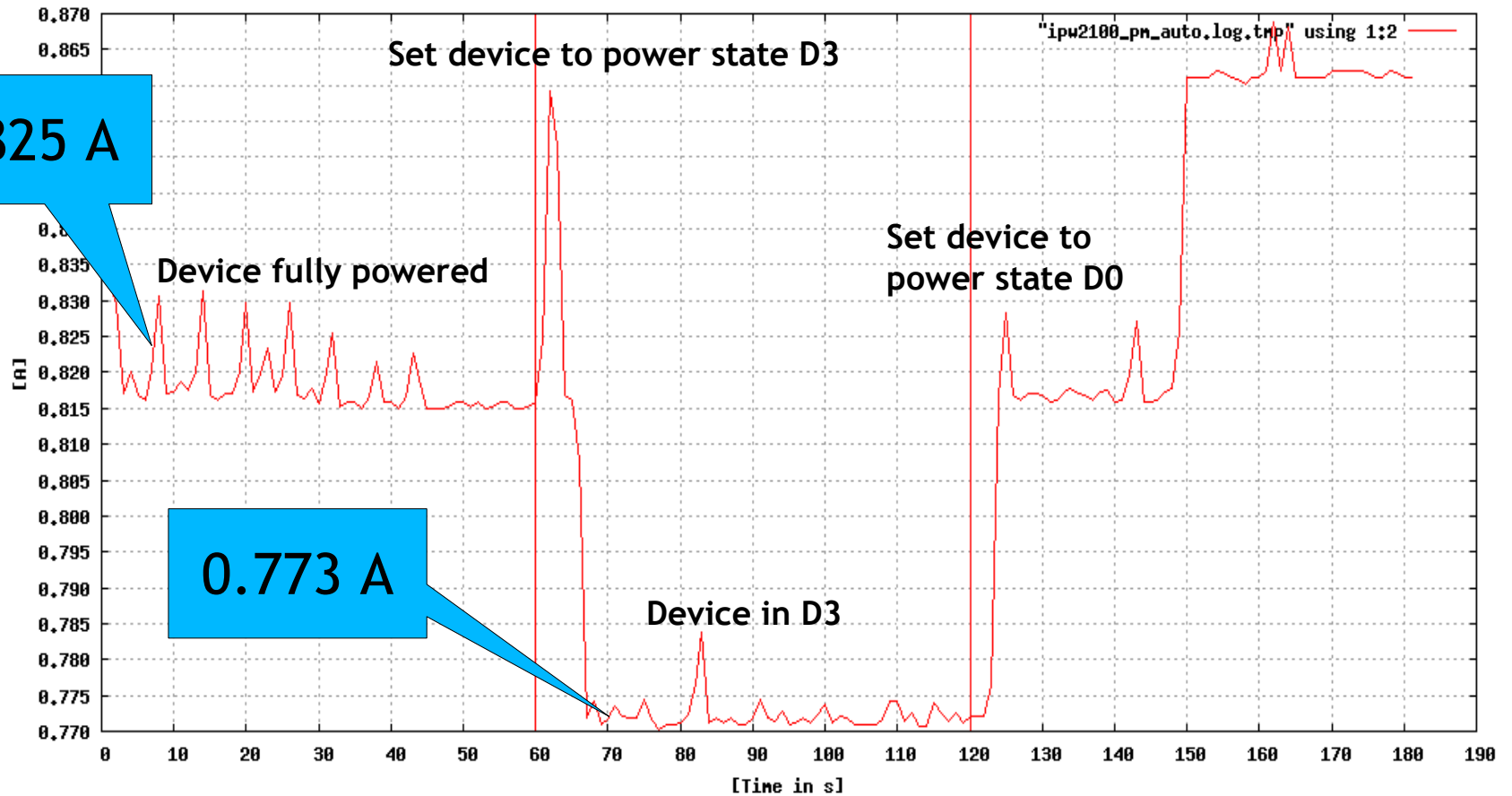
[A]

Laptop  
running QtDMM





# Example: IPW 2100



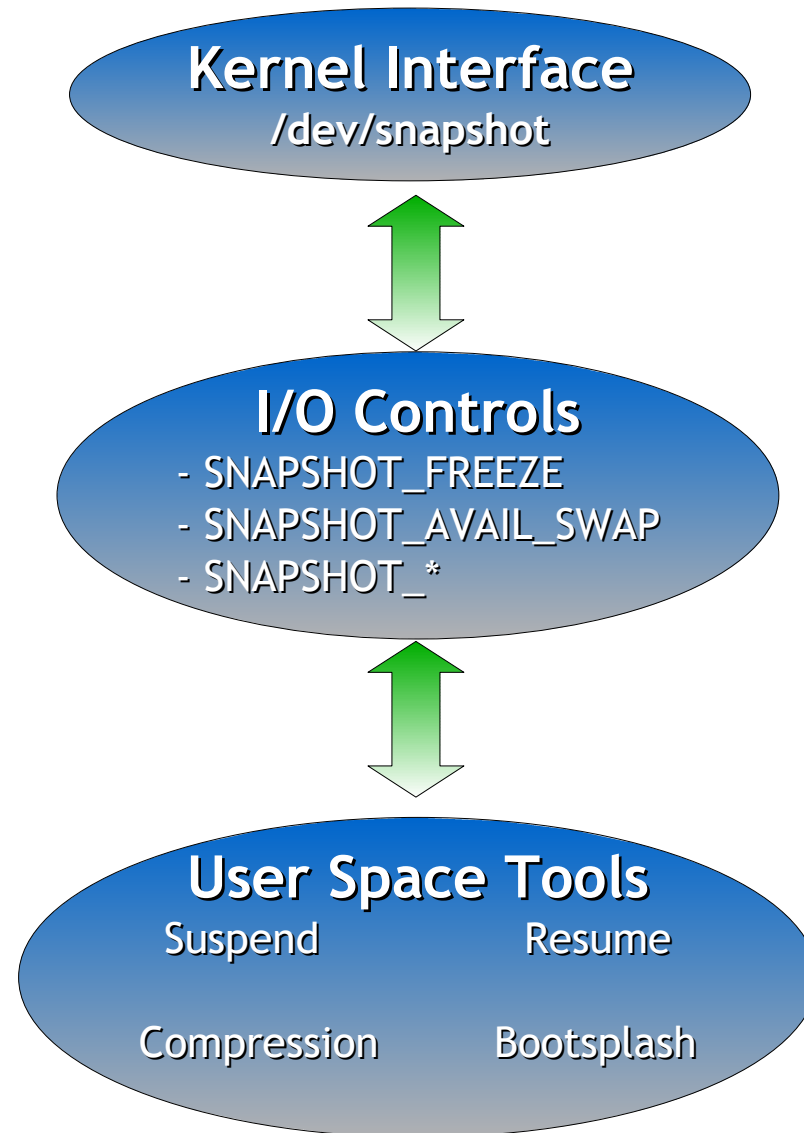


# Live Demo

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What's Next?

# User Space Software Suspend





# Dynticks

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- 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<sup>w</sup> Battery.

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Open Discussion

Thanks for coming!



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# Resources of Interest

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- <http://powersave.sourceforge.net/pm-report/>
- [http://www.opensuse.org/Projects\\_Powersave](http://www.opensuse.org/Projects_Powersave)
- <http://powersave.sourceforge.net>
- <http://sourceforge.net/Projects/Powersave>
- Mailing lists:
  - [powersave-users@forge.novell.com](mailto:powersave-users@forge.novell.com)
  - [powersave-devel@forge.novell.com](mailto:powersave-devel@forge.novell.com)