Eco-Awareness in today's datacenters

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Overview

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- Power usage keeps rising
- Implications for datacenters
- Recent chips
- Theory vs real-life?
- Eco-awareness: is only money at play?
- Discussion?

Power usage of CPUs

- Evolution (Intel / AMD):
  - 1989: 486DX: 4W
  - 1993: Pentium: 16W
  - 1996: Pentium Pro: 25W
  - 1999: first Pentium 4: 67W
  - 2003: Opteron-240: 84W
  - 2005: P4-660: 115W
  - 2005: Xeon-3.2Ghz: 120W
  - 2005: Xeon 7020 (2 cores): **173W**
  - 2006: PD-940 (2 cores): 130W

Datacenter situation

- A lot of datacenters are only built for 8 to 16A per cabinet
- Three years ago: no problem! Full cabinet, about 30 servers, about 10-12A
- Now: 10 servers = 16A
  - Blade technology: even worse!
- So datacenters are limited by power-capacity instead of floorspace
- Only 30% of all power used by a datacenter, goes to the actual servers! 33% goes to HAVC

Power costs

- Elements
  - Power usage
  - Power infrastructure (UPS, Gensets, PDUs, ...)
  - Cooling infrastructure and power usage
- Actual figures, Q3 2006 in Belgium: between 50 and 85 EUR per month per A!
  - So a 2000 EUR Dell server which consumes 1.2A when idle, costs more than 1000 EUR per year, just in power!

New CPUs

- Chipbuilders realised increasing power usage has to stop
- For the first time, new chips use less power!
  - 2005: Sun Sparc T1 (8 cores): 71W
  - 2006: Opteron-2210 (2 cores): 95W
  - 2006: Core 2 Duo E6600 (2 cores): 65W
  - 2006: Xeon 5110 (2 cores): 65W
  - 2006: Xeon 5148 (2 cores): 40W

All serverbuilders use the same chips ...

... but not all serverbuilders are as good!

New vs Old Xeons

- new "Woodcrest" CPUs use 30 - 40% less power
  - Fujitsu Siemens 1U server: 1.9A to 1.2A: -37% (tested by Tweakers)
  - Dell Blade chassis fully loaded: 19A to 13A: -32% (source: Dell)
  - Dell 1U server: 1.9A to **2.0A**: +5%! (source: Dell)
    - WTF?

Only driven by cost?

- Sun and Supermicro clearly playling the "enviroment" card
  - In some parts of the USA, 700-1000 USD if you replace old servers by Sun
- The Green Grid (thegreengrid.org): major players want to lower power consumption
  - Publishing guidelines, whitepapers, ...
- XS4All NL
  - Heat pump for chilling: -30%
  - Electrical power: "green" power
  - They compensate! So costs don't rise!
- Easynet NL
  - CO2 neutral

Conclusions

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- For the first time, power usage is an issue for chipbuilders
  - This is a major event
- Is it only driven costreduction?
- Is it all about image and marketing?
- Or are chip- and serverbuilders responding to more eco-aware clients?
- Do you care? What's your motivation?

Q & A

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