CERN openlab collaboration with Intel

Andrzej Nowak

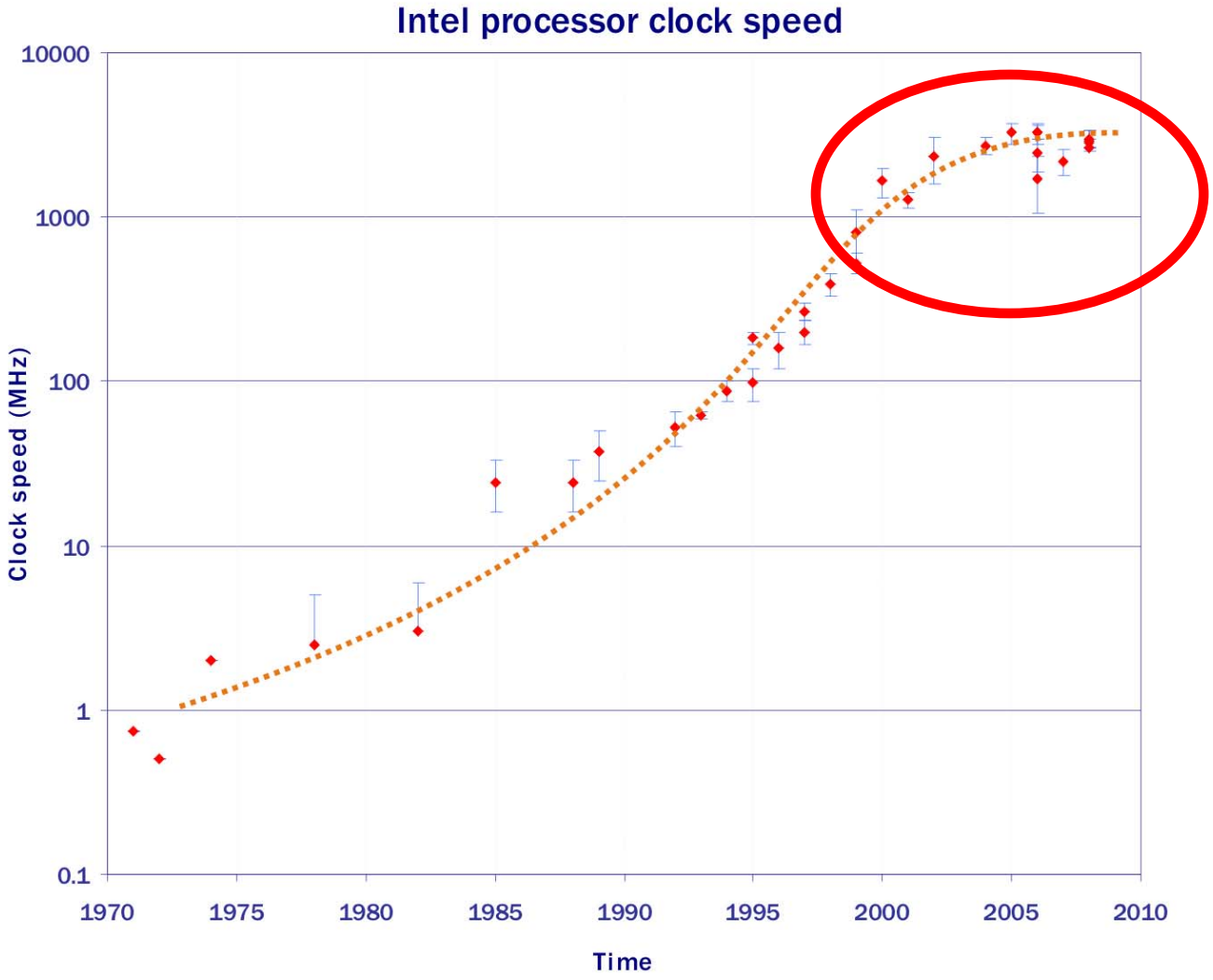
July 1st 2009

ISEF visit @ CERN

CERN openlab

- **A framework for collaboration of CERN (research) and private companies (industry)**
  - HP
  - Intel
  - Oracle
  - Siemens
- **Not a university, neither a private company**
  - A very interesting place to be

The multi-core crisis



Multi-core is here

The situation today

- **In short, analogy to cars:**
  - Newly produced cars can take more and more people but drive only 40 mph. How do you find more passengers and how do you set up the route?
- **Multi-core is prevalent**
  - You have 2 cores in your iPod!
  - Several “cores” or “processors” in your Playstation3, XBOX 360
  - How do you create programs which run well in many “copies” (threads)?
- **24 “processors” inside a computer today**
- **64 by the end of the year**
- **The way you write software will become completely different!**

Multi-core at openlab

- openlab performs investigations of experimental threaded software
- Great potential benefit to CERN and High Energy Physics computing in general
- Numerous associated issues need to be solved

Larrabee wafer shot

Squeezing more performance from today's computers

- **A computer program is written initially in a human-readable language**
- **It needs to be translated later to computer language using a compiler**
- **openlab investigates compilers to better understand how to help the machine understand us**
  - One example: using vectors – i.e. performing an operation on many items at once
  - Imagine scanning all your articles in a supermarket at once
- **Performance tuning – like tuning a car but:**
  - You can do well with one wrench (and a screwdriver)
  - You don't need all those expensive parts!

An example of what we don't do

Teaching (1)

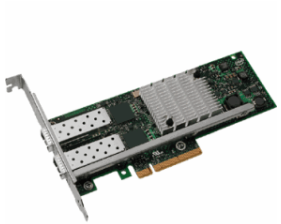
- **Regular workshops are organized in collaboration with Intel**
  - How to tune performance (making programs run faster)
  - How to write programs for multi-core processors
- **More than a hundred attendees every year**

Teaching (2)

Teaching (3)

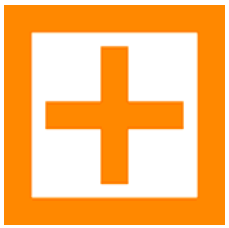
Some “new directions”

- **We have the opportunity to perform many exciting experiments with new hardware**
  - i.e. Atom processor
  - Can you power your computing center with iPods or Netbooks?
  - 10 Gigabit networking – 10’000 faster than your old 1 mbit ADSL connection – get a DVD in seconds
  - Can you use graphics cards to speed up HPC computing? Which ones?



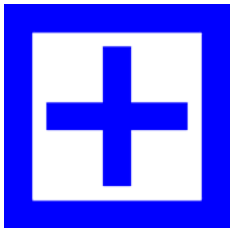
Benefits for openlab and CERN

- **Work with top of the class people and state of the art hardware**
- **Collaboration with the Industry on a daily basis**
  - Instant access to expert engineers
  - Work on future/unannounced products
- **Interesting and prospective projects**
- **A chance to adapt quickly to the ever changing computing landscape**



Benefits for Intel

- Instant access to expert computing engineers
- View on computing from a scientific perspective
- Instant access to a vast and diverse computing environment
- Feedback on Intel's products and their behavior
- A chance to see how Intel's products behave "in production" - deployed



Q & A

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