Intel and CERN

” years of innovation together”

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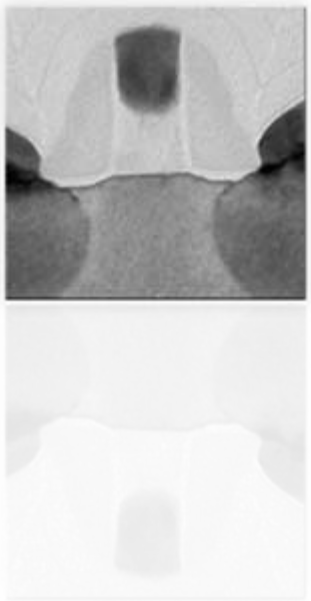
Agenda

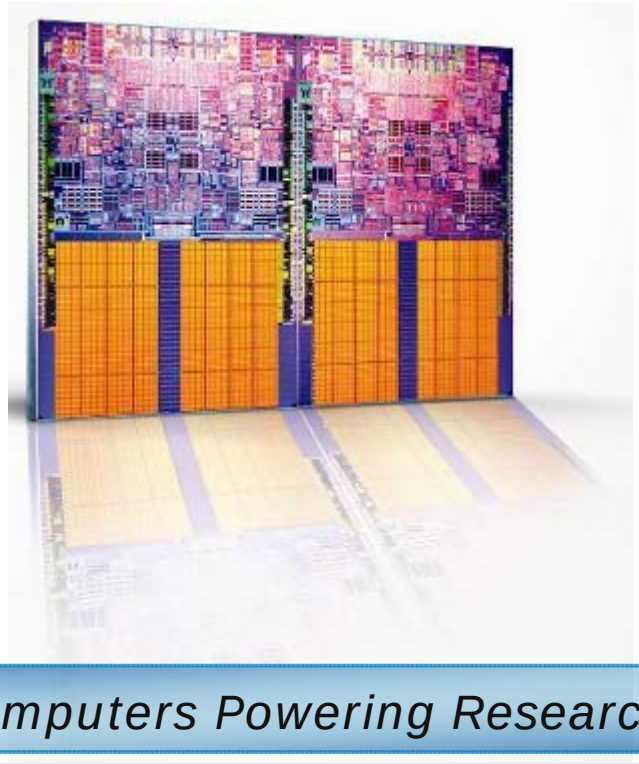
- Intel in HPC
- Intel and CERN – Driving Innovation
- OpenLab I and II
- Future

Why Intel?

Process Technology



Microprocessor Design

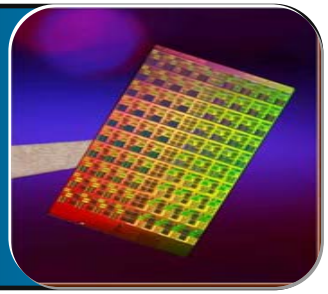


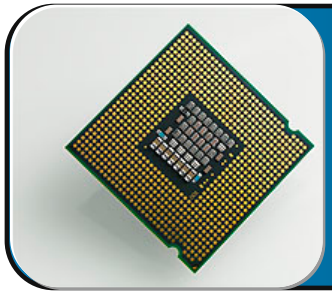
Factory Network

Intel Based Supercomputers Powering Research Breakthroughs **!**

Intel in High Performance Computing

Advanced HPC R&D





Leading performance, performance / watt

Dedicated, renowned expertise

Large scale clusters for test & optimization

Broad SW tools portfolio

Defined HPC application platform

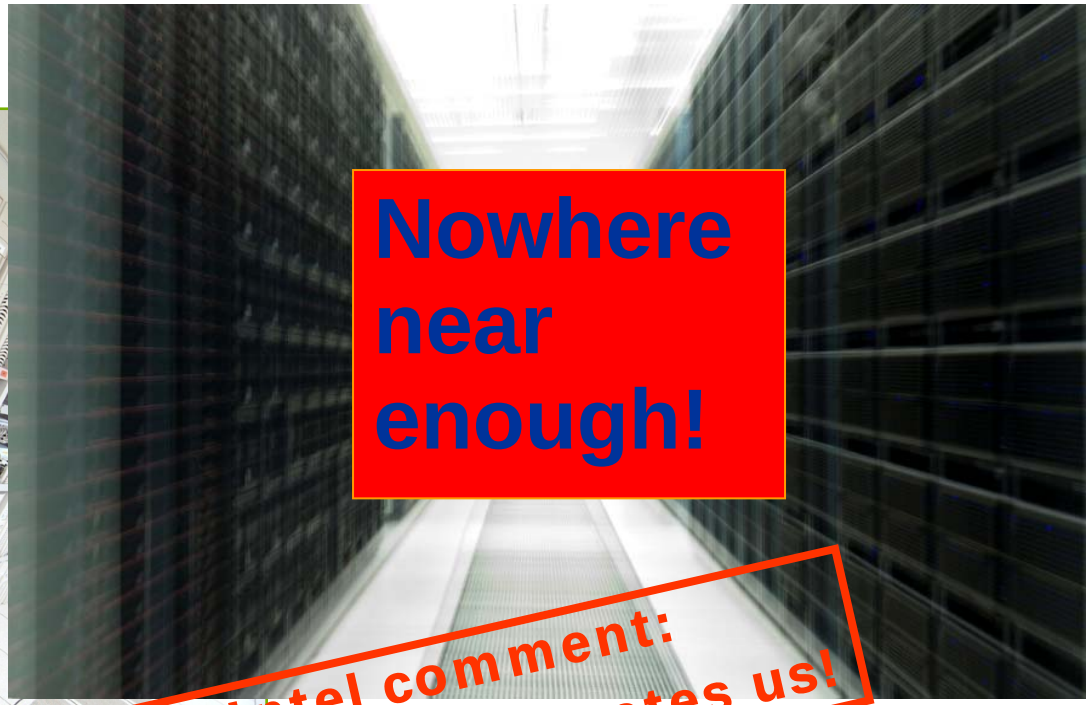
intel Cluster Ready

Intel Connects Cables

Platform building blocks

A long term commitment to HPC

Computing at CERN today



Nowhere near enough!

Intel comment: Guess that motivates us!

- High-throughput computing based on reliable “commodity” technology
- About 3000 dual-socket “PC” servers running Linux
- More than 5 Petabytes of data on tape; 20% cached on disk

Openlab I

- 2003 – 05: CERN Openlab I partnership with Intel
  - Cluster of 100 Itanium servers (HP and Intel) Demonstrated excellent “mainframe” quality for I/O and cluster computing
  - Internet2 land speed record across 10Gbit transatlantic link
  - Prototyping high-performance disk servers
  - CFD cluster with fast interconnect used for detailed simulation of heat flow in LHC experimental areas
  - Huge effort on porting of physics software of 64-bit Linux. / 64-bit Grid middleware
  - Work on Compilers and Tools

Openlab II

- 2006 – 2008: CERN Openlab II
  - Emphasis on multi-core computing:
    - Fits HEP farming model perfectly. (Large acquisition of Intel Xeon production systems last year)
    - Close collaboration to look at medium-term evolution (2010)
  - Power efficiency: Today's Computing Centre plus future outlook
  - Other focus areas:
    - Beta testing of new platforms,
    - Virtualization,
    - Performance monitoring,
    - Compiler improvements,
    - TOP500 submission, etc.

Other Activities Openlab II

- Visits, Intel and External
- CERN on stage with PSO at Oracle Openworld – video
  - http://www.youtube.com/watch?v=bg0r7nfXhGw
- Joint booth activities and demos at the Intel Booth in Tampa, Florida for Supercomputing 2006
- HPC roundtable in EMEA held at CERN in May 2006.

Openlab III ?

Challenges = Possible topics?

- Operational:
  - From setting up the Grid infrastructure to sustained results production
- Technical:
  - Multi-/Many core architectures continued
  - Scalable programming paradigms
  - Power Efficiency continued
- Marketing/PR
  - LHC opening / operational
  - First results
  - Large grid structure producing results: Reliability

Discussion started outcome open

Summary

2003 – 2008: Very good activities and results on cooperation

Increasing importance:

- **Production environment**
- **Programming**
- **Performance / watt**
- **Outside communication**

Thank you!