First INFN International School on Architectures, tools and methodologies for developing efficient large scale scientific computing applications

Ce.U.B. – Bertinoro – Italy, 12 – 17 October 2009

SUMMARY ESC09

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CTO

Overall

- Full week on efficient HEP software
- Ambitious programme
  - 5 days (8:30 – 20:00 including evening lectures)
    - Lectures (Morning++)
    - Exercises (Afternoon)
  - Exams on Saturday
- 30 students
  - Mainly from INFN (Italy)
    - But also others
- Eleven speakers
  - From HEP
    - Many from (or located at) CERN
- Four evening speakers

Track 1 – Design of Efficient OO Software

- Designing Architectures and Frameworks for HEP
- Physical software design
- Basic C++ performance issues
- Efficient data structures and algorithms
- Building the software
- Memory management and use

Track 2 – Performance in Data Access (for HEP)

- How to Design and Implement an Efficient Data Model:
  - Data Structures and Algorithms.
- Performant I/O
- Network I/O and Latency

Track 3 – Performance focus

- Introduction/Setting the scene for why efficient use of modern architectures is important. Review of modern CPU architectures
- Compiler optimization, including efficient programming with SIMD instructions
- Performance monitors (such as perfmon2) for measuring computing efficiency
- Introduction to multithreading/multiprocessing methodology and vocabulary
- Overview of multithreading methods
- Overview of support tools for multithreading, such as Thread Checker and Thread Profiler

Pictorial session overview