

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

Sverre Jarpe
CERN
openlab
CTO



First I.N.F.N. International School on
"Architectures, tools and methodologies
for developing efficient large scale scientific
computing applications"

ESC09

**Ce.U.B.
Bertinoro (FC) - Italy
12 - 17 October 2009**

The goal of the school is to provide young scientists and computing professionals with the necessary education and training to address the quest for maximum efficiency in developing large scientific computing applications.

Scientific International Committee:	Program:
F. Ruggieri, INFN Roma Tre - Chair P. Calafiura, LBNL A. De Salvo, INFN Roma P. Elmer, Princeton University F. Furano, CERN F. Galeazzi, INFN Roma Tre - Secretary A. Hanushevsky, SLAC V. Innocente, CERN S. Jarpe, CERN A. Lazzaro, CERN U. Marconi, INFN Bologna P. Mato, CERN A. Nowak, CERN M. Paterno, FNAL D. Salomoni, INFN CNAF L. Tuura, Northeastern University V. Vagnoni, INFN Bologna	Design of efficient OO software. Performance in data access with specific regard to HEP experimental data. Architectural characteristics of modern multi-core CPUs and optimization techniques for multi-tasking and multi-threading. http://web.infn.it/esc09/
Management Committee: M. Morandin, INFN Padova - School Director R. Strolli, Padova University and INFN - Technical Manager	Special Lecturers: U. Drepper - Red Hat D. Galli - Bologna University and INFN



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

