High Performance Systems
Details

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CSC5001 - Septembre 2023

Objectives

- Presents the challenges, constraints and requirements of HPC
- Design an efficient parallel application on an target architecture from its sequential version using the classic tools of parallelism
  - Multi-core, Cluster, heterogeneous CPU+GPU architectures
  - Tools : OpenMP, MPI, CUDA
- Analyze the performance of a parallel application to propose Improvements after having presented the approach and the results

Teaching team

- **Coordinator**
  - Elisabeth Brunet

- **Teachers**
  - Elisabeth Brunet
  - Gaël Thomas
  - François Trahay

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  + Lecturers : Qarnot, CEA, DDN

Schedule

- **Courses**
  - Introduction
  - Parallel algorithmic
  - Advanced architectures
- **Courses with labs targeting parallel technologies**
  - OpenMP
  - MPI
  - CUDA
  - Performance analysis
- **Conferences**
  - Qarnot Computing : Heating a house with computation
  - CEA : HPC at CEA
  - DDN : Data Direct Networks Storage

Project

- **One subject to be chosen among two**
- **Application parallelization with a scientific approach**
  - Understand the algorithm and its critical sections
  - Choosing the parallelization paradigm and the right tools
  - Understand the performance of the parallel implementation
- **Programs and presentation in pairs**
  - Start of the project: 09/18/2023
  - Deadline for choosing a subject: 09/22/23
  - Deadline for submitting the produced source code: 11/03/23
  - Project defense: 11/06/2023