

Architectures and Platforms for Artificial Intelligence (Module 1)

Last update: 16 September 2024

Academic Year 2024 – 2025
Alma Mater Studiorum · University of Bologna

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1 Introduction

Wall-clock time Time taken to run a program from start to finish.

Wall-clock time

High performance computing (HPC) Specialized hardware aiming to reduce wall-clock time (e.g., super-computer). A program is split into strongly coupled sub-problems.

High performance computing (HPC)

High throughput computing (HTC) Commodity hardware that guarantees a high job throughput (e.g., cloud computing). A program is split into loosely coupled sub-problems that are not necessarily related to each other.

High throughput computing (HTC)

Remark. A system with two units of the same processor with the clock halved is usually more power efficient than a system with a single unit at full speed.

Parallel programming steps The typical steps to write a parallel program is the following:

1. Decompose the main problem into sub-problems.
2. Distribute the sub-problems to the execution units.
3. Solve each sub-problem.
4. Merge the sub-solutions.

Embarrassingly parallel problem Problem that can be split in completely independent sub-problems.

Embarrassingly parallel problem

Remark. Typically, parallelizing a sequential algorithm is not straightforward.