Towards massive parallelism

High Performance Computing for Mechanical Simulation

CONTEXT & OBJECTIVES

code_aster, a legacy code, massively and widely used and recognized but…

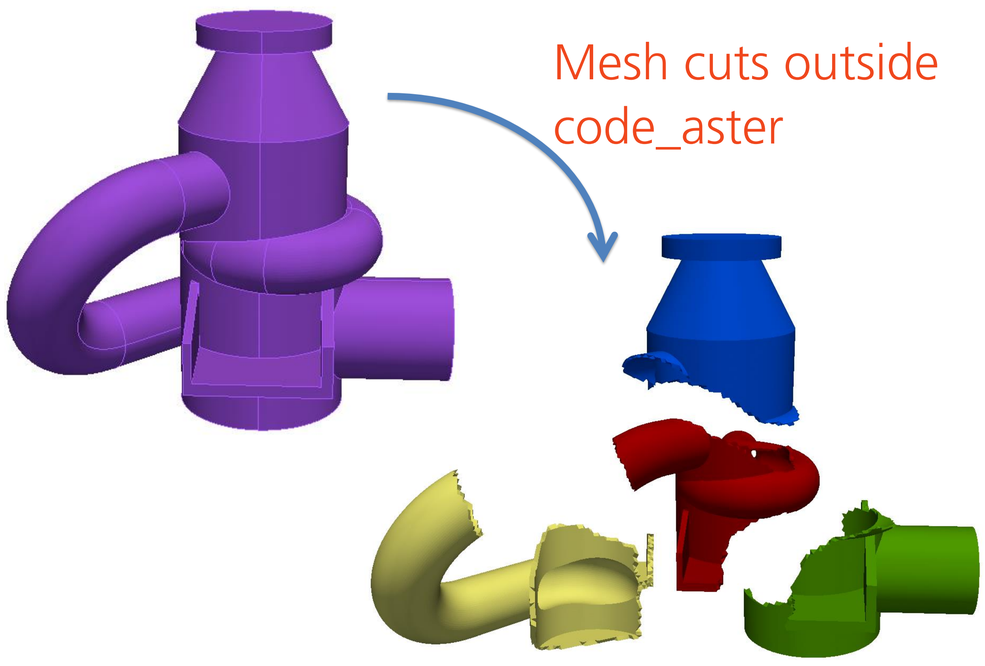
… Not massively parallel

Basic question: Is it possible to change code_aster into a massively parallel code ?

YES WE CAN !

HOW TO DO SO ?

The solution consists in cutting out the computation domain

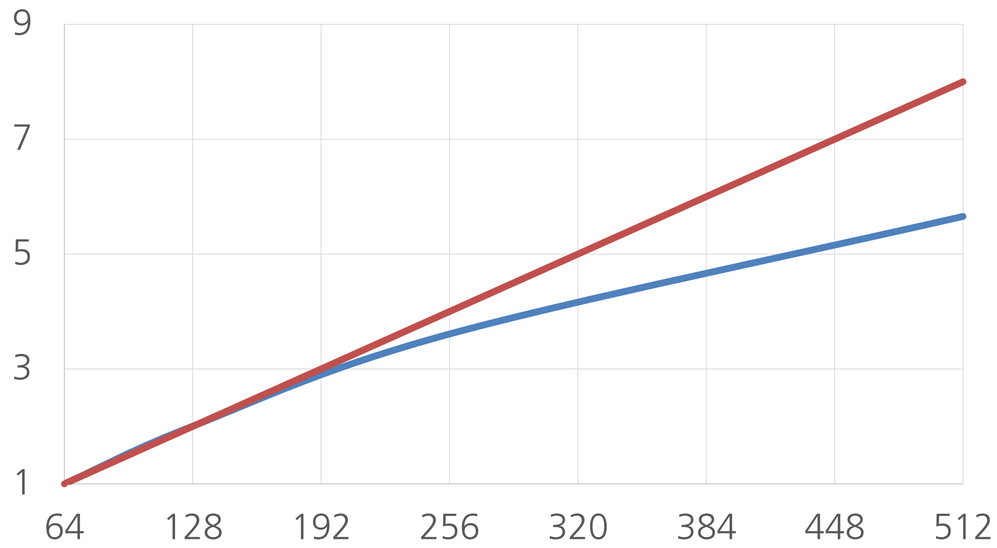


Example of a modest domain cutting (4 subdomains)

AND SO ?

By doing so, we managed to make code_aster massively parallel and make it run thousands of processors for "real-life" problems (linear, non-linear mechanics, static or dynamic)

TARGET MET !



Speed-up of code_aster HPC (blue) compared to ideal (red)

CONSEQUENCES

This change towards massive parallelism has led fundamental changes in the code_aster informatical architecture:

code_aster will become a completely object-oriented python module

→ Work in progress…

PLANNING

2013: First massively parallel computation

2016: Major architectural redesign

2019: New version available for end users

Contacts:
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