Conjugate Gradient Method in MPI and CUDA
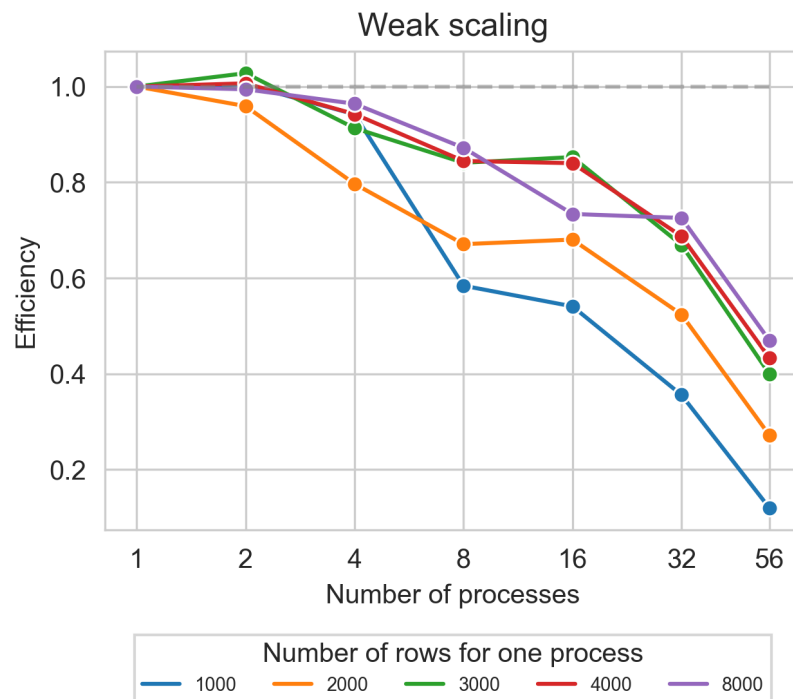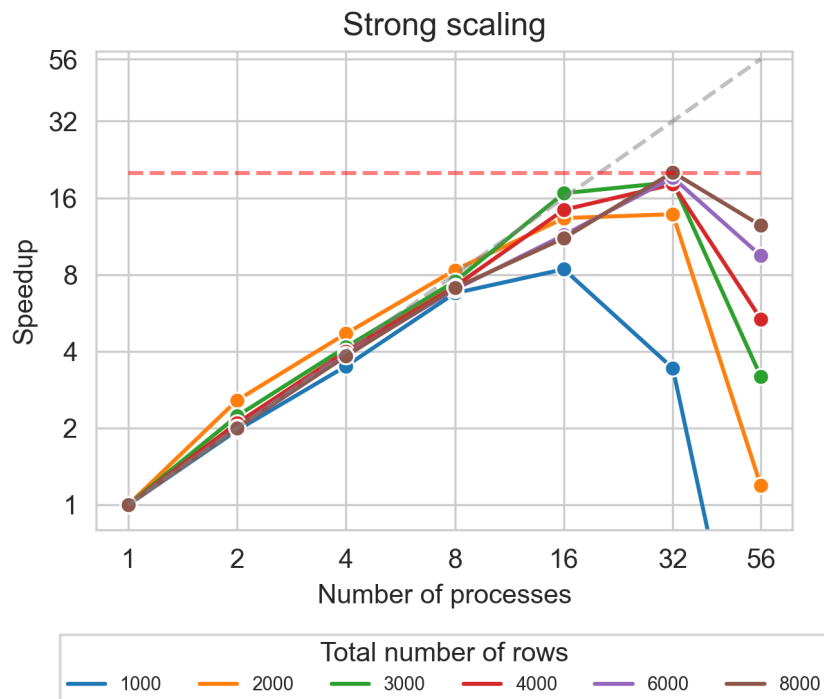
MATH-454 - Parallel & High Performance Computing

Charles Dufour, January 2023
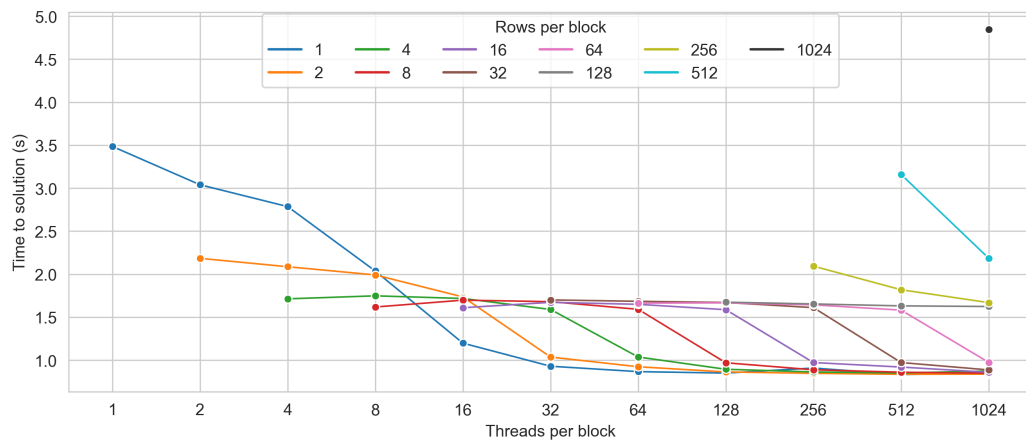
Amdhal's Law & Gustafson's Law

Strong and weak scaling on HELVETIOS (32 cpus per node)

Influence of grid and block size

Time to solution on matrix with 10K rows

Blocks and threads

- ≥ 128 rows per block → not enough blocks to saturate GPU
- < 128 rows per block → enough blocks, worry about occupancy