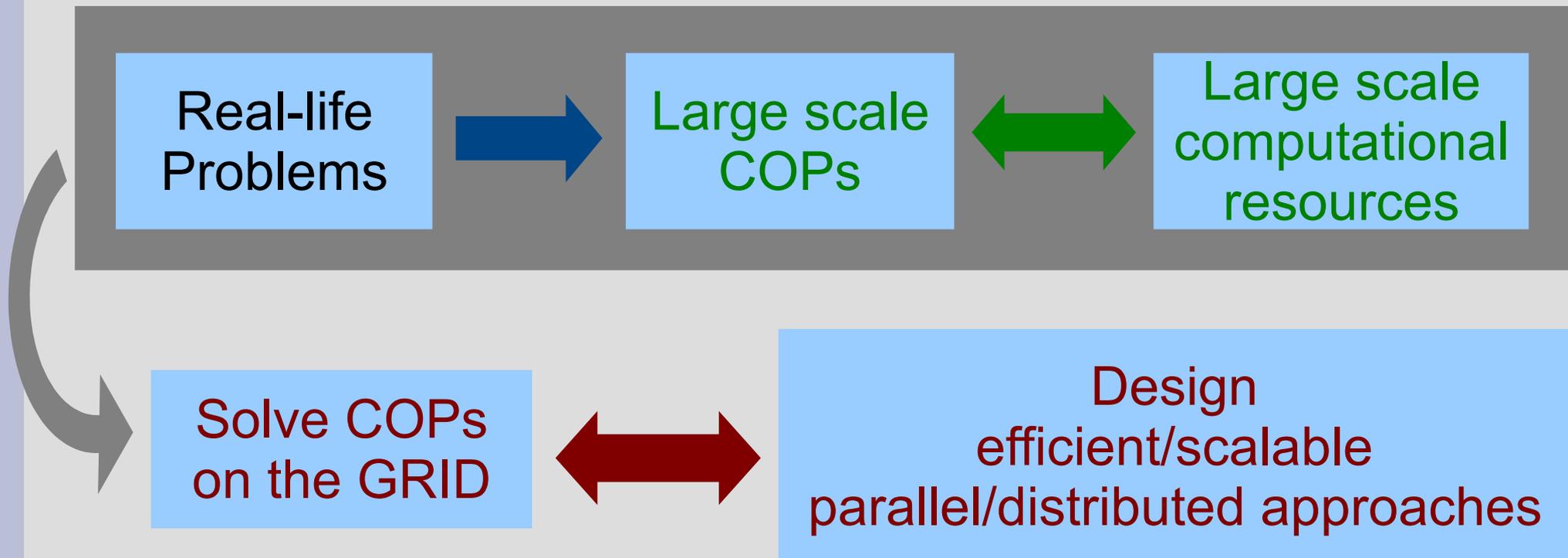# COPs Challenge (A.1)

Bilel Derbel, Nouredine Melab
DOLPHIN Lille

- Objective:

  ▸ Solve optimally large scale Combinatorial Optimization Problems (COPs) using huge amount of computational resources

Real-life Problems	→	Large scale COPs	↔	Large scale computational resources

Solve COPs on the GRID	↔	Design efficient/scalable parallel/distributed approaches

COPs Challenge

- Goals at the application level

  ‣ Solve optimally previously unsolved COPs

  ‣ New specific COPs approaches

- Goals at the algorithmic level

  ‣ How to gain in scalability ?

    ✓ Pure peer-to-peer approaches

    ✓ Fully distributed algorithms

  ‣ How to address latencies / resource-volatility ?

    ✓ Fault-tolerant/dynamic algorithms

    ✓ Redanduncy Vs Efficiency

Hi

Zzzz

Hi

Bye

Too much
work for me!

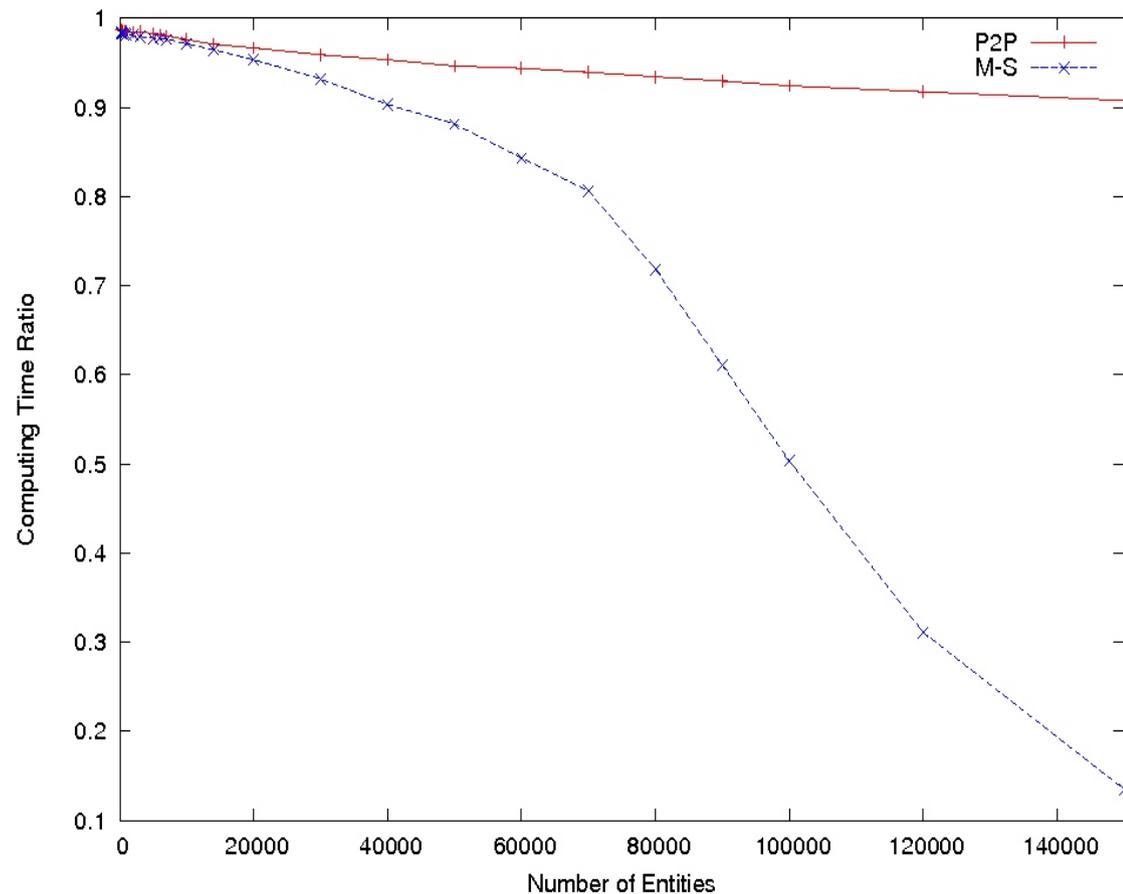No more
Work for me!

I found
a new solution!

COPs Challenge

- How GRID5000 can help achieving our goals ?
  - ‣ At the application level (make it a success story)
    - ✓ Effectively find unknown and optimal COPs solutions
  - ‣ At the algorithmic level (make it smart)
    - ✓ Experiments/simulations are mandatory to validate our algorithms
    - ✓ Measure the scalability / efficiency / congestion / fault-tolerance robustness of our approach

Work in progress

- P2P B&B :
  - ▸ Fully distributed
    - ✓ Work sharing / Load Balancing
    - ✓ Termination detection
    - ✓ Network congestion (messages)
  - ▸ Topology independent
    - ✓ Simulations ?
  - ▸ Solve failures
    - ✓ Models and Algorithms ?

Soumis à IPDPS 2011