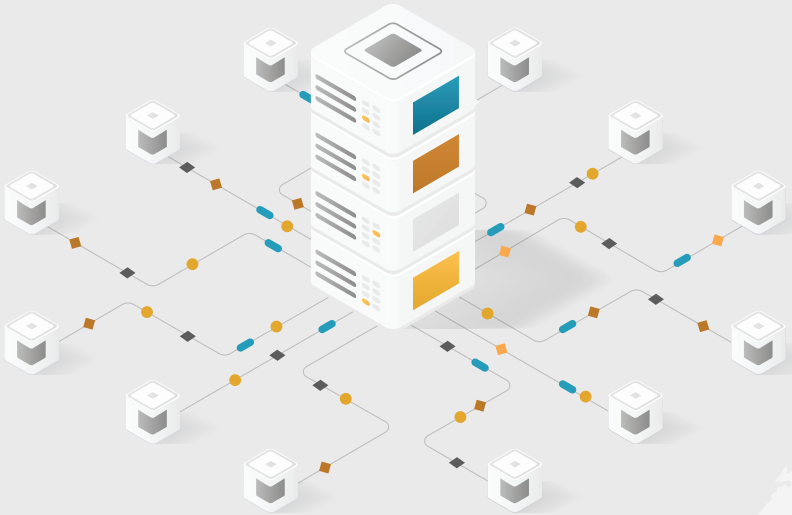
SPAR CITY

An Optimization and Co-design Framework for Sparse Computation

SparCity aims to create a supercomputing framework to provide efficient algorithms and coherent tools to maximize the performance and energy efficiency of sparse computations on emerging HPC systems.

It also opens up new usage areas for sparse computations in data analytics and deep learning.



6 Partners

- Koç University
  Istanbul, Turkey
- Sabancı University
  Istanbul, Turkey
- Simula Research Laboratory
  Oslo, Norway
- INESC-ID
  Lisbon, Portugal
- LMU
  Munich, Germany
- Graphcore*
  Oslo, Norway

4 Countries

- Turkey
- Norway
- Portugal
- Germany

3 Workshops

- ML methods
  at HIPEAC23
- Performance tools
  at EuroPar23
- Future is Sparse
  at Supercomputing23

*until Month21

Objectives

- Developing a comprehensive set of profiling tools for analyzing application performance;
- Devising topology-aware partitioning algorithms, boosting the efficiency of system-level parallelism;
- Allowing advanced optimization for massive and heterogeneous parallel architectures;
- Creating digital "SuperTwins" of supercomputers, simulating hardware scenarios and gathering real-time performance data;
- Demonstrating the effectiveness of the SparCity framework through its four real-life but challenging applications;
- Delivering a robust, well-supported and documented SparCity framework to end-users in industry and academia.

Software Tools for Sparse Computations

The SparCity Project pushes the frontier of how to assess and design hardware and software for High-Performance Computing.

Because we know collaboration is at the heart of progress, outcomes of this project are a series of open-source tools, benefiting the scientific community.

You are free to use:

- **SparseBase:** A pre-processing library for sparse computation;
- **SuperTwin:** A Digital Twin of a supercomputer;
- **Codebase:** Where you can access codes for various tools and frameworks.

Use Cases

Cardiac Modelling

High-order Epistasis

Detection of Digital Wildfires

Autonomous Driving

github.com/sparcityeu

@sparcity_eu

/sparcity-project-944b4320a/

EuroHPC Joint Undertaking

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