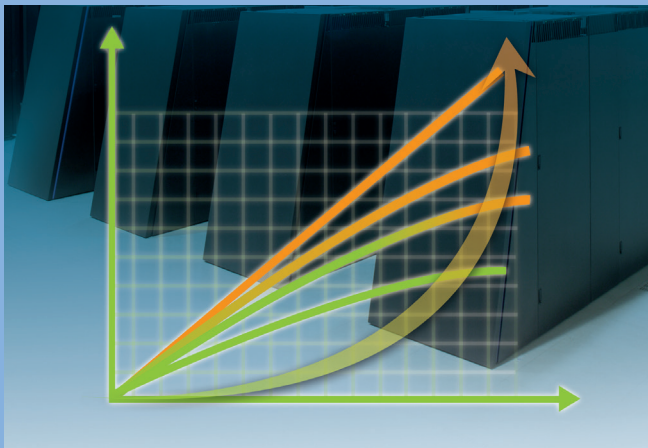# CROSS-SECTIONAL TEAM APPLICATION OPTIMIZATION

Mission and Objectives

- Optimization and petascaling of applications: performance, efficiency, and parallel I/O

- Provide users with knowledge and proper tool sets

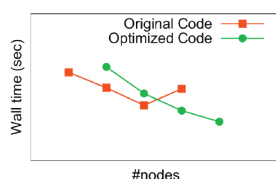- Interaction of Cross-Sectional Teams and Simulation Laboratories

Know-How

- Parallelisation
  MPI, OpenMP
- Optimization Strategies
  Compiler, Memory, I/O
- Benchmarking
  Monitoring, evaluation and parameter-studies of software packages, new architectures

Collaborations with User Projects

Example:
Parallelization with
OpenMP:

Collaborations with funded Projects and Industry

- PRACE – Scaling Applications for Tier-0 and Tier-1
- EIC – Exascale Innovation Centre
- DEEP-Projects – Dynamical Exascale Entry Platform
- EOCOE – Energy oriented Centre of Excellence
- BEAM-ME – HPC in Energy Systems Modelling
- TenneT TSO GmbH – Cluster design and porting of applications

Training:

- Courses on MPI, OpenMP, and Parallel I/O
- Collaboration in Extreme Scaling Workshops

Research and Development

- I/O Research: SIONlib – I/O Library for efficient parallel I/O of task-local data from massively parallel application

- Tool Development
  LLview – Batch system and job monitoring
  JUBE – Benchmarking environment

- Benchmark Development
  e.g. Scalable MPI point-to-point – Linktest

Length of messages: 1 byte
Number of messages: 15
Number of tasks: 294,912

Latency minimum value: 2.6 µs
Latency maximum value: 9.4 µs
Latency average value: 5.8 µs