

Team

Members

Markus Fritscher

Medical Engineering

Marcel Gedat

Computer Science with Business Economics

George Heath

Computational Engineering

Jan Laukemann

Computer Science

Benedikt Oehrich

Computational Engineering

Kai Streitferdt

Computer Science



Advisor: Alexander Ditter

Winning Strategy

- ▶ Diversity in degree courses
- ▶ Homogenous CPU-cluster
- ▶ Stable operating system
- ▶ Intelligent work distribution among cluster nodes during competition
- ▶ Equal distribution of tasks with at least two experts on every field

Preparation

- ▶ Weekly team meetings
- ▶ Extensive benchmarking
- ▶ Getting familiar with the architecture and administration of the system
- ▶ Visit at HPE Grenoble to specify hardware
- ▶ HPC colloquium with Intel and members of the local data center

FAU

Friedrich-Alexander
University Erlangen-Nürnberg

Facts

- ▶ 10th largest university in Germany
- ▶ 40,174 students (~ 11% international)
- ▶ 256 degree courses
- ▶ 579 professors
- ▶ 3,445 researchers



Applications

■ HPCG (Marcel & Kai)

Intel HPCG with AVX2 and IntelMPI

■ HPL (Benedikt & Jan)

Performance- and power studies for parameter optimization

■ Paraview (Marcel & Kai)

OpenSWR for fast computing of large datasets

■ ParConnect (Benedikt & Jan)

Recreating the paper with prewritten plot-scripts considering a possibly high communication overhead

■ Password Recovery (George & Markus)

JohnTheRipper using MPI combined with small SLURM jobs

■ Mystery Application

To be prepared for any circumstances the cluster is equipped with 16 nodes having 64 GB RAM and is able to use different compilers and MPI versions

System

■ Head Node

HPE ProLiant D360

- ▶ Intel Xeon E5-2430 @ 2.2 GHz
- ▶ 6 cores
- ▶ 4x 1 TB HDD (RAID 5)
- ▶ 2x 400 GB SSD (RAID 1)
- ▶ 153 Watt TDP

■ Compute Nodes

Chassis: HPE Moonshot 1500

- ▶ 45 Cartridge Slots
- ▶ Moonshot-45GXc Switch
- ▶ Integrated 10 Gb/s Ethernet
- ▶ Integrated Lights Out Chassis Manager (iLOCM)
- ▶ 283 Watt TDP

Cartridges: HPE ProLiant m510

- ▶ Intel Xeon D-1587@1.7 GHz
- ▶ 16 cores
- ▶ 32 GB / 64 GB RAM
- ▶ 265 GB M.2 SSD
- ▶ 2x 10 Gbit/s RoCE RDMA
- ▶ 104 Watt TDP

■ Reasons for the Configuration

- ▶ Compact and simple architecture
- ▶ Out-of-band management
- ▶ Hot-plugable modules
→ no single-point-of-failure

■ Power Allotment

- ▶ Nodes clockable between 0.8 GHz and 1.7 GHz
- ▶ Head node (up to) 120 W
- ▶ Moonshot chassis (up to) 3000 W
- ▶ Automatic power capping by iLO/iLOCM

