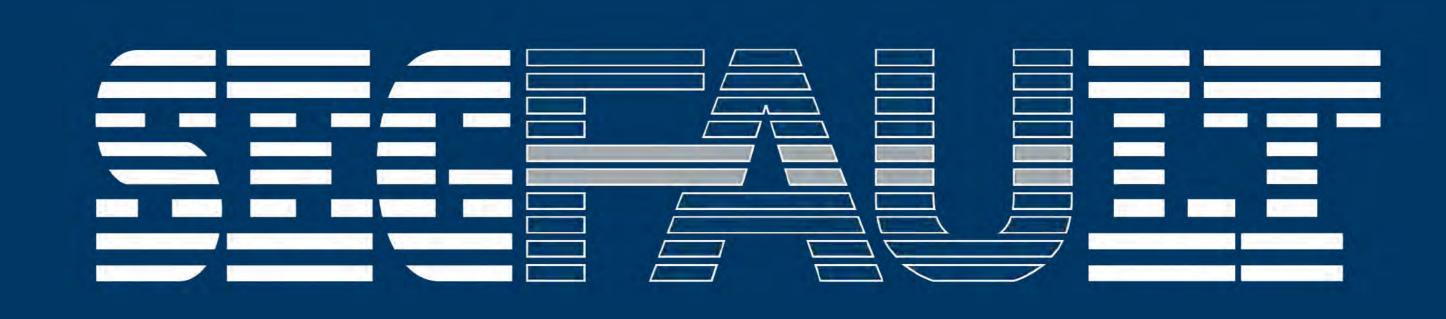
Team SegFAUlt

#WorkHardPlayHard



Team

Members

Markus Fritscher
Medical Engineering

Marcel Gedat

Computer Science with Business Economics

George Heath

Computational Engineering

Jan Laukemann

Computer Science

Benedikt Oehlrich

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 colloqium 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

