lrz

Leibniz Supercomputing Centre
of the Bavarian Academy of Sciences and Humanities

SuperMUC-NG

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COMPUTE HARDWARE

- Peak performance: 26.7 PFlop/s
- Estimated HPL performance: 19.5 PFlop/s
- Nodes: 6,336 Lenovo ThinkSystem SD 650 thin nodes featuring 96 GByte memory per node + 144 fat nodes featuring 768 GByte memory each
- Processors: 2x Intel Xeon Skylake 2.7 GHz processors per node (24 cores each, 304,128 cores in total)
- Aggregated main memory: 719 TByte
- Interconnect: Intel Omni-Path 100G
- Topology: Pruned Fat Tree > enables optimal, non-blocking communication between the 788 nodes within an island; there is a blocking factor of approx. 4 between islands
- Aggregate memory bandwidth: 1,327 TByte/s
- Bisection bandwidth over Omni-Path: 21 TByte/s

> **Supports research from a wide variety of scientific domains**

COOLING + ENERGY EFFICIENCY

- Direct warm-water cooling with inlet temperatures of up to 50°C
- Free cooling with up to 97% heat removal efficiency
- Waste heat re-use through next generation adsorption cooling technology
- Energy-optimized execution of compute jobs via application specific dynamical adjustment of processor frequencies at runtime

> **Significant savings in energy costs**

SOFTWARE

- Operating system: SuSE Linux Enterprise (HPC Module), version 12
- Batch queuing system: SLURM
- Parallel file system: IBM Spectrum Scale (GPFS)
- Programming environment: Linux + Intel Parallel Studio XE, OpenHPC

> **Efficient workflow for developing highly-scalable applications**

STORAGE

- High performance parallel file system with 50 PByte,
  aggregated bandwidth of more than 500 GByt/s
- Data Science Storage for long-term data storage of 20 PByte

> **Supports execution of I/O intensive applications**

CLOUD COMPONENT

- 32 nodes with NVIDIA Volta 100 GPUs
- 32 nodes without accelerators
- Supports user-defined virtualised software environments with access
  to simulation data, e.g. for big data analytics or remote visualisation
- Supports computational steering

> **More flexible user interface**