North-German Supercomputing Alliance (HLRN)

Services

✓ Computing Capacity
The HLRN-II Supercomputer provides excellent computational resources for large projects in High Performance Scientific Computing (HPSC).

✗ Admission and Resource Allocation
Resources are allocated to projects after successful review by the Scientific Board of HLRN (Wissenschaftlicher Ausschuss des HLRN).

✗ Consultancy and Support
The North-German consulting and competence network provides support at any stage of a project. The network has experts in the fields of chemistry, engineering sciences, climatology, oceanology, mathematics, and physics.

✗ Collaboration Partnership
Please contact us at contact@hlrn.de

✗ Program Libraries and Tools
Scientists developing their own program systems have a large number of scientific libraries and development tools available. We also mediate special research codes from the Scientific Computing Division at ZIB.

✗ Software Packages
We provide common application software for special areas, in particular for chemistry and engineering sciences.

✗ Visualisation
For the purpose of visualisation of numerical data, visualisation equipment (power wall, workbench) and software are provided.

Contact

✗ E-mail: contact@hlrn.de

✗ The supervising committee of the HLRN is the Administrative Council (Verwaltungsrat)
E-mail (Office): verwaltungsrat-gs@hlrn.de

✗ Scientific Board (Wissenschaftlicher Ausschuss)
E-mail: zulassung@hlrn.de

✗ HLRN Homepage
http://www.hlrn.de

✗ Documentation and Support
http://www.hlrn.de/doc

HLRN Host and Operation Sites

Konrad-Zuse-Zentrum
für Informationstechnik Berlin (ZIB)
Takustraße 7
14195 Berlin-Dahlem
http://www.zib.de

Regionales Rechenzentrum für Niedersachsen (RRZN)
Leibniz Universität Hannover
Schloßwender Straße 5
30159 Hannover
http://www.rrzn.uni-hannover.de

Norddeutscher Verbund für Hoch- und Höchstleistungsrechnen
About HLRN

The North-German supercomputing alliance (Norddeutscher Verbund für Hoch- und Höchstleistungsrechnen - HLRN) is a joint project of the six North-German states Berlin, Bremen, Hamburg, Mecklenburg-Vorpommern, Niedersachsen and Schleswig-Holstein, established in 2001. The HLRN alliance jointly operates a distributed supercomputer system hosted by the Konrad-Zuse-Zentrum für Informationstechnik Berlin (ZIB) and the Regionales Rechenzentrum für Niedersachsen (RRZN) at the Leibniz Universität Hannover.

The six states have again pooled their resources, along with funds from the federal government, to purchase a state-of-the-art system in 2007, known as HLRN-II.

HLRN is used mainly by scientists from North-German universities and other scientific institutions of the six states. It satisfies the huge demand for computing resources in the scientific areas of environmental research, climate and ocean modelling, engineering applications like aerodynamics and ship building, as well as in fundamental research of physics, chemistry, and the life sciences.

Users and projects benefit from the support of a competence network of consultants which is spread over all participating institutions of the HLRN alliance.

HLRN System Configuration

The HLRN-II system consists of two identical Infiniband-connected SGI Altix supercomputer complexes: one in Hannover, the other in Berlin. Both sites are closely integrated and are interconnected via a 10 GbE fibre optic link. They can be operated and used as one unified system.

The first installation phase of the system in 2008 delivers a 13-fold increase of peak computing power compared to the current HLRN system (IBM p690). With the final expansion in 2009 the increase of computing power will rise to a factor of 60.

Operating System and Software

• Operating System
  SuSE Linux (SLES), SGI ProPack

• Compiler
  Intel compiler suite, GNU compiler suite

• Libraries and Application Software
  CPMD, MOLPRO, Gaussian, NAMD, VMD, ABAQUS, ANSYS, FLUENT, STAR-CD, EnSight, Intel MKL, PetSc, FFTW

• Parallelisation
  SGI MPI, Intel MPI, OpenMP, MPICH, MVAPICH, SHMEM

• Profiling and Debugging
  Intel Threading & Tracing Tools, TotalView

• System Software
  Moab, Torque, Lustre, SGI Tempo, Scali Manage, Ganglia

Hardware Configuration

Resources per Site (Berlin and Hannover)

Model (MPP Phase 1)
- Number of nodes / cores: 320 / 2560
- Processor (Quad-Core): Intel Xeon Harpertown
- Memory: 5.1 TByte
- System peak performance: 30.7 TFlop/s
- Communication network: InfiniBand 4xDDR

Model (SMP Phase 1)
- Number of nodes / cores: 44 / 352
- Processor (Quad-Core): Intel Xeon Harpertown
- Memory: 2.8 TByte
- System peak performance: 4.2 TFlop/s
- Communication network: InfiniBand 4xDDR

Model (MPP Phase 2)
- Number of nodes: 916
- Processor: Intel Next Generation Xeon
- Memory: 29.3 TByte
- System peak performance: ≈100 TFlop/s
- Communication network: InfiniBand 4xQDR

Model (SMP Phase 2)
- Number of nodes: 136
- Processor: Intel Next Generation Xeon
- Memory: 8.7 TByte
- System peak performance: ≈22 TFlop/s
- Communication network: Numalink 5
- I/O network: InfiniBand

Resources overall

- Storage capacity (gross): 2.3 PByte
- I/O bandwidth: 28 GByte/s
- Number of cores: 24832
- Memory: 92 TByte
- System peak performance: ≈312 TFlop/s