Leibniz Supercomputing Centre
of the Bavarian Academy of Sciences and Humanities

SUPPORT

SUPERCOMPUTING

MUNICH SCIENTIFIC NETWORK, MWN

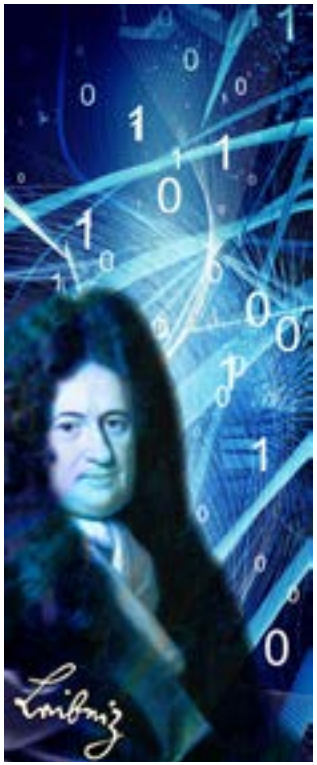
IT-SECURITY

Leibniz Supercomputing Centre

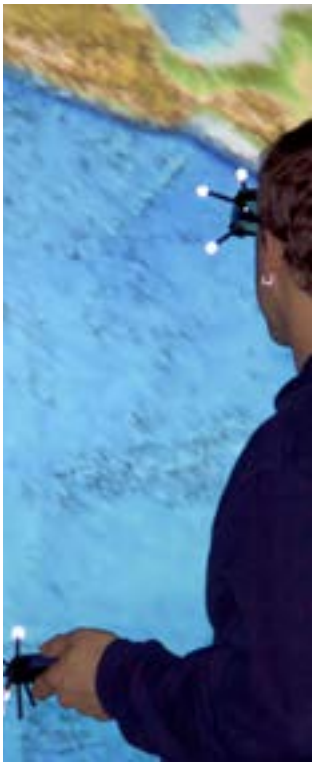
Leibniz Supercomputing Centre (Leibniz-Rechenzentrum, LRZ) of the Bavarian Academy of Sciences and Humanities is the IT service provider for all Munich universities as well as a growing number of research organisations throughout Bavaria. In addition to this regional focus, LRZ also plays an important role as one of the members of the Gauss Centre for Supercomputing (GCS), delivering top-tier HPC services on the national and European level.
LRZ was founded in 1962. Its facilities are located on the Research Campus in Garching.

STORAGE SERVICES

GREEN IT

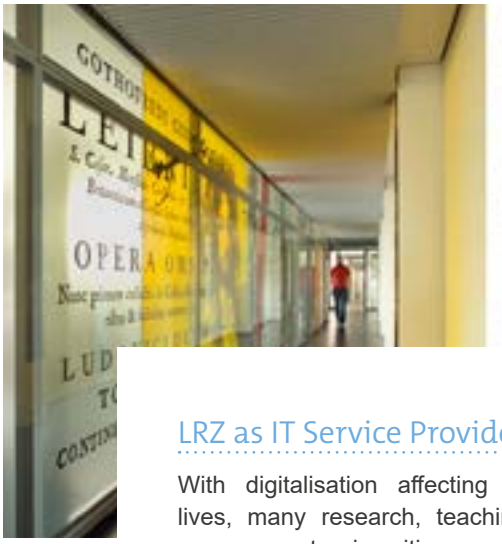


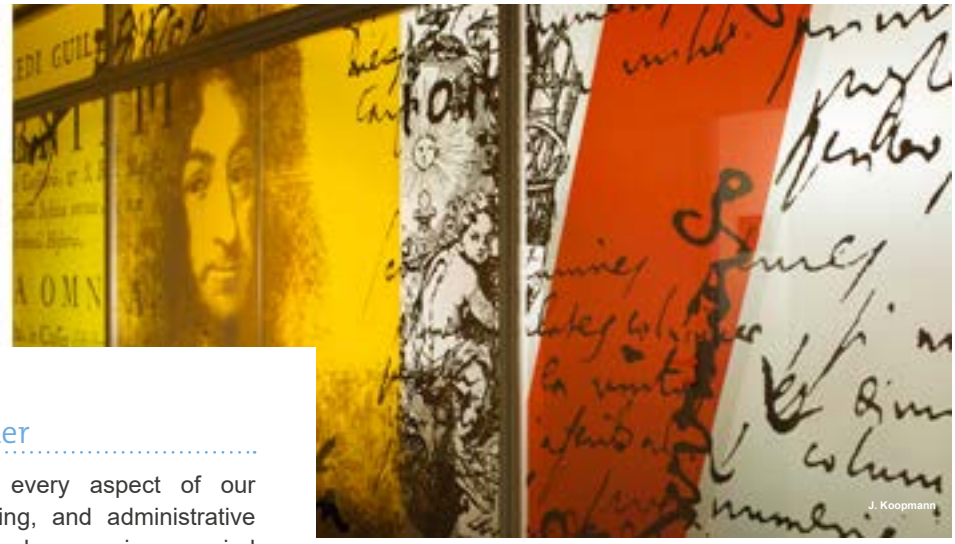
RESEARCH & DEVELOPMENT



VIRTUAL REALITY

LRZ supports ground-breaking research and education throughout a wide range of scientific disciplines by offering highly available, secure and energy-efficient services based on cutting-edge IT technology.
Today it is one of the foremost European computing centres in the area of scientific research by academic communities.





LRZ as IT Service Provider

With digitalisation affecting every aspect of our lives, many research, teaching, and administrative processes at universities nowadays require a myriad of IT services. LRZ supports these processes in numerous ways, ranging from communications infrastructure (such as email and web services) to e-learning platforms, from enablement of breakthrough scientific findings through computational simulations to archivation of result datasets. The Munich Universities, Ludwig-Maximilians-Universität München (LMU) and Technical University of Munich (TUM) both have access to these services directly from LRZ in its role as their IT service provider. Other Bavarian universities also have access to LRZ's services.

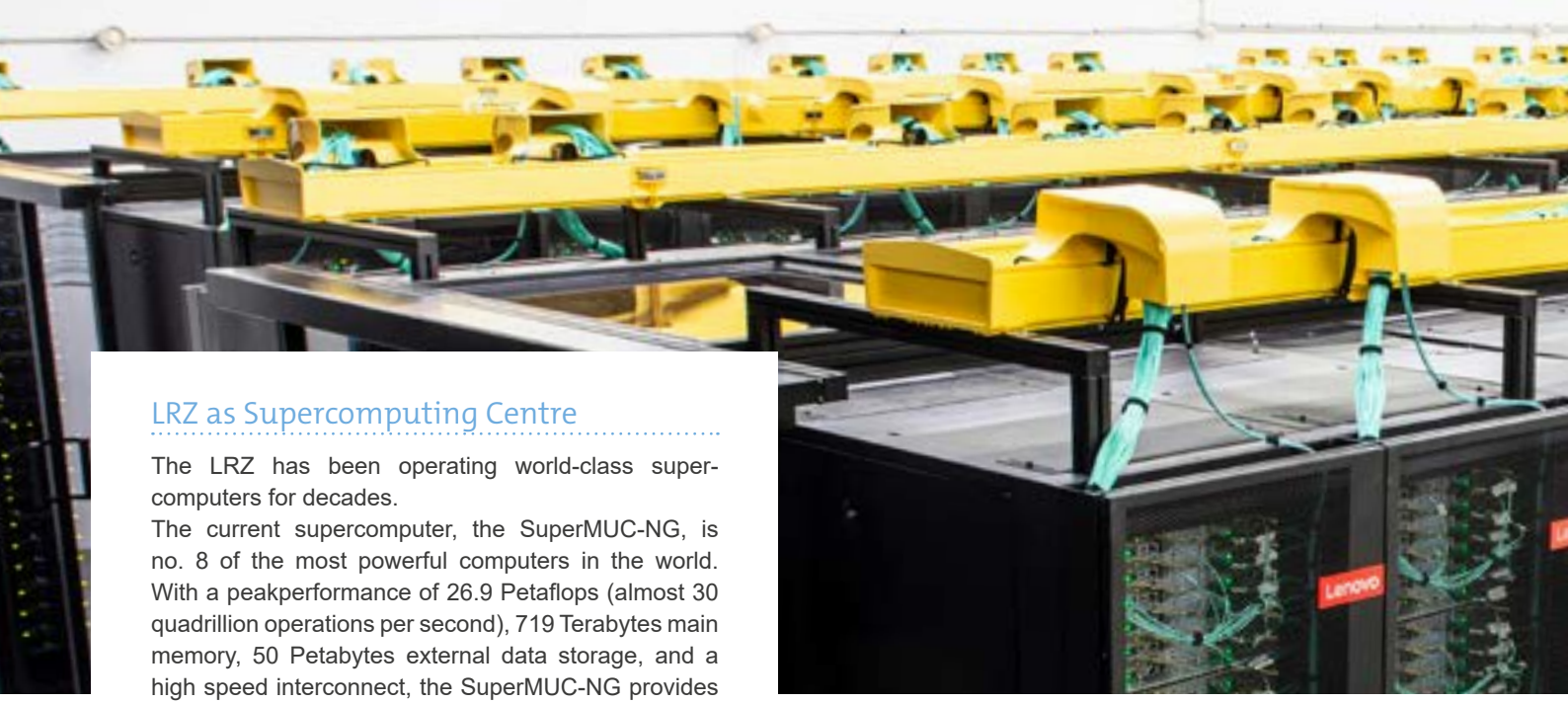
Consulting and Support

LRZ offers clients a wide range of trainings and individual consulting covering all aspects of IT relevant to research and academia. It negotiates state-wide educational rates for software licenses and provides professional anti-virus software free of charge for all of its clients.

Information security and data protection have always been a core competency of LRZ, both in its guiding principles and in its daily operations.

Through the partnership initiative π^{CS}, the LRZ offers domain-specific customized services and close cooperation for computer-assisted scientific endeavours.

Everywhere on the LMU campus: WLAN accessing provided by the LRZ



LRZ as Supercomputing Centre

The LRZ has been operating world-class supercomputers for decades.
The current supercomputer, the SuperMUC-NG, is no. 8 of the most powerful computers in the world. With a peakperformance of 26.9 Petaflops (almost 30 quadrillion operations per second), 719 Terabytes main memory, 50 Petabytes external data storage, and a high speed interconnect, the SuperMUC-NG provides first-class information technology for researchers in the fields of e.g. physics, chemistry, life sciences, geography, climate research, and engineering. Throughout the entire computing process, the LRZ focuses closely on supporting our users so they can take optimal advantage of all the resources we have to offer. Last but certainly not least, SuperMUC-NG's innovative warm-water cooling system makes it one of the most energy efficient supercomputers worldwide.

Centralized IT Systems at LRZ

LRZ operates systems for which local operation would be technically infeasible or economically inefficient. In addition to multiple servers for email, web, or name and directory services, for instance, LRZ also offers its clients a range of central systems including data storage, automatically operated magnetic tape systems storing tens of thousands of Terabytes of backup and archiving data in millions of files.
LRZ operates not only supercomputers: It also runs Linux clusters and virtual machines for a wide variety of scientists' requirements, including High Performance Computing, Cloud Computing, and Big Data.

Direct warm water cooling –
as deployed in SuperMUC-NG

Munich Scientific Network

(Münchner Wissenschaftsnetz, MWN)

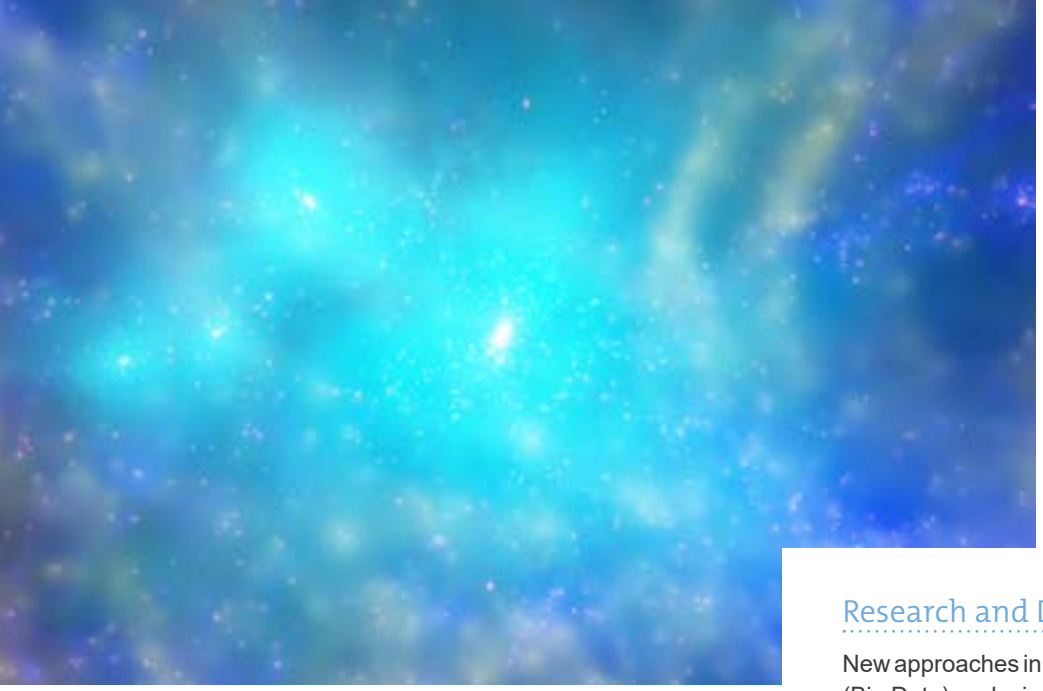
540 locations – from Munich to the top of the alpine mountain Wendelstein and even to the peak of the Zugspitze, Germany's highest mountain – 1,500 network components, 3,000 WiFi access points, and over 180,000 connected devices: The Munich Scientific Network (MWN) operated by LRZ for universities, colleges, Max-Planck-Institutes, and various other scientific research facilities is remarkably capable. The various MWN facilities and the LRZ are connected via a backbone intranet with up to 100 Gbit/s and to the Internet with more than 23 Gbit/s.
Within the MWN scientific network, 20 Petabytes of data are transferred every month. Of those 20 Petabytes, approximately 2 Petabytes are sent or received over the Internet.

Energy Efficient Operations – Green IT

Warm-water cooling, energy aware Supercomputing, reuse of waste heat by deployment of adsorption chillers, energy monitoring – these are but a few of the measures undertaken by LRZ to keep the energy usage for IT and supercomputing as low as possible. Proactive initiatives and active research ranging from hardware improvements over energy efficient algorithms to optimizing facilities management, are all hallmarks of the commitment of LRZ to Green IT. Furthermore, 100% of the electricity it uses comes from renewable energy sources.

The V2C offers a 5-sided 3D projection installation

www.v2c.lrz.de



Fostering top research:
World's largest cosmology simulation – Magneticum project simulates 10% of the visible universe starting from the Big Bang

www.lrz.de/forschung

Research and Development at LRZ

New approaches in the analysis of large volumes of data (Big Data), reducing energy usage of large IT systems, improving data security, or supporting e-Science on a global scale all present new challenges for computer science. By connecting research and development with practical operational experience, LRZ plays a key role in pushing the envelope to meet those challenges. By developing state-of-the-art IT services, the LRZ supports scientific excellence along with its partners in countless regional, national, and European research projects in a wide variety of fields including astrophysics, climate research, medical technology, nanomaterials, architecture, and e-mobility.

Virtual Reality and Visualisation Centre

The Virtual Reality and Visualisation Centre (V2C) at LRZ offers modern technologies for visualising scientific data. This allows for a more rapid advancement and significant enrichment of scientific knowledge. The ability of scientists to understand their data and discover new interrelations in them is vastly improved by the three dimensional, high-resolution data projection on the Powerwall, by the use of the five-sided projection installation, and by the interactive navigation possible in the V2C leading to breakthroughs in understanding and interpreting results. In addition to being used in the natural sciences and in technology, simulation results in humanities and social science research are also visualised using the V2C, for instance in the fields of arts and multimedia, archaeology, and psychology.

A. Podo, LRZ

High-tech for the TU Munich – offered by the LRZ

You can count on us!

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