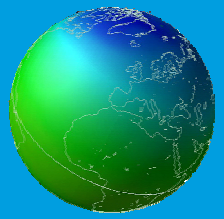
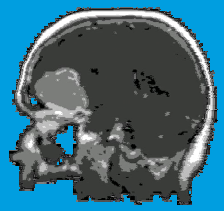
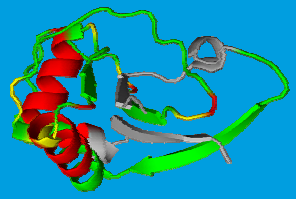



Supercomputing

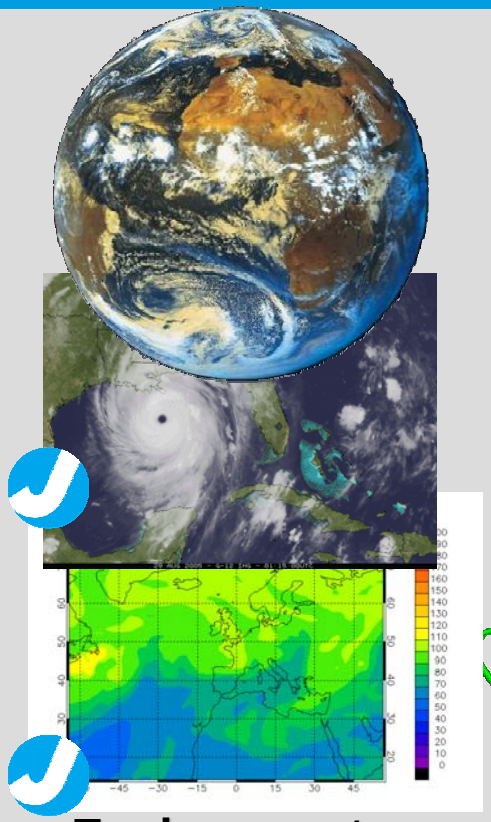
A Key Technology for Europe in the 21st Century

Prof. Dr. Dr. Thomas Lippert
Forschungszentrum Jülich

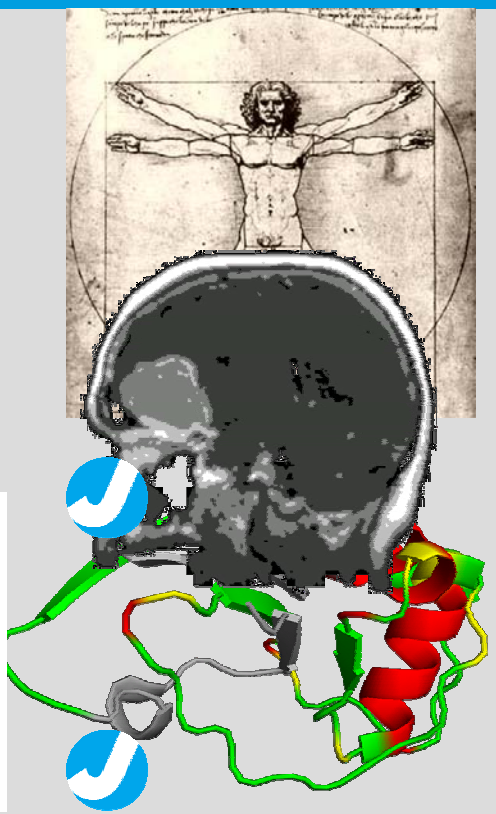
Supercomputing
The Race of the Century

- Universities, research labs, corporations and governments from around the world are lining up for the race of the century.
- It's a race to solve some of the most complex problems anyone has ever considered.
- Being first across the finish line not only determines who gets knowledgeable or rich and who doesn't, but perhaps who lives and who dies.

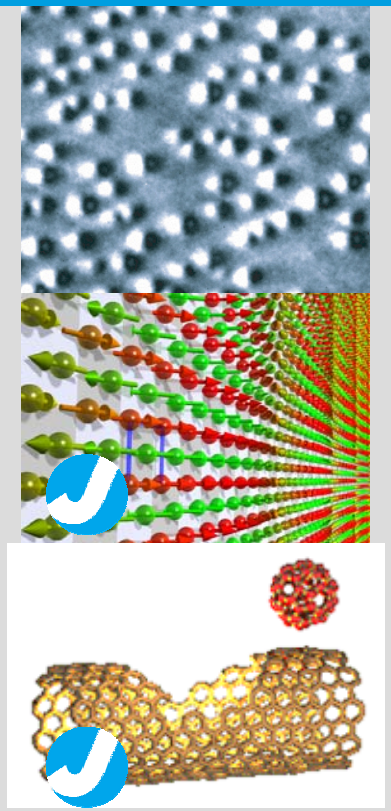
Supercomputing Drives Science



Environment
Weather/Climatology
Pollution / Ozone Hole



Ageing Society
Health
Biology



Materials
Spintronics
Nano-Science

Energy
Plasma Physics
Fuel Cells

Supercomputing Drives Engineering and Business Competitiveness

- Reducing design costs through virtual prototyping:

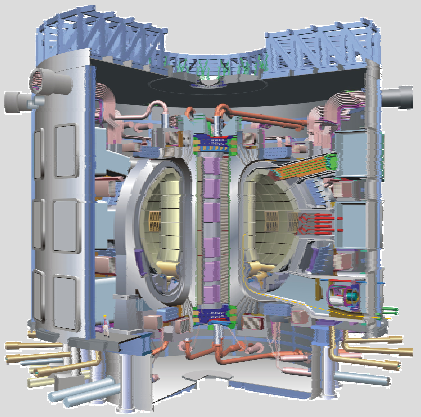
  → faster time to market

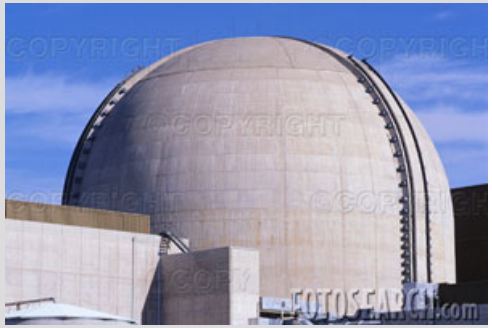
- Phenomena where economics or constraints preclude experimentation

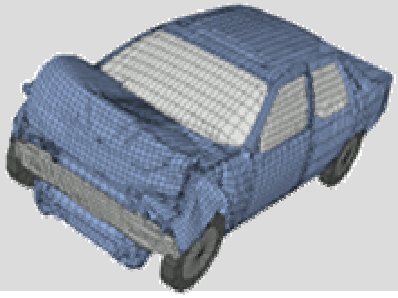
  → imperative of supercomputing

- Supercomputing is a

  key ingredient in innovation productivity and, ultimately, standard of living



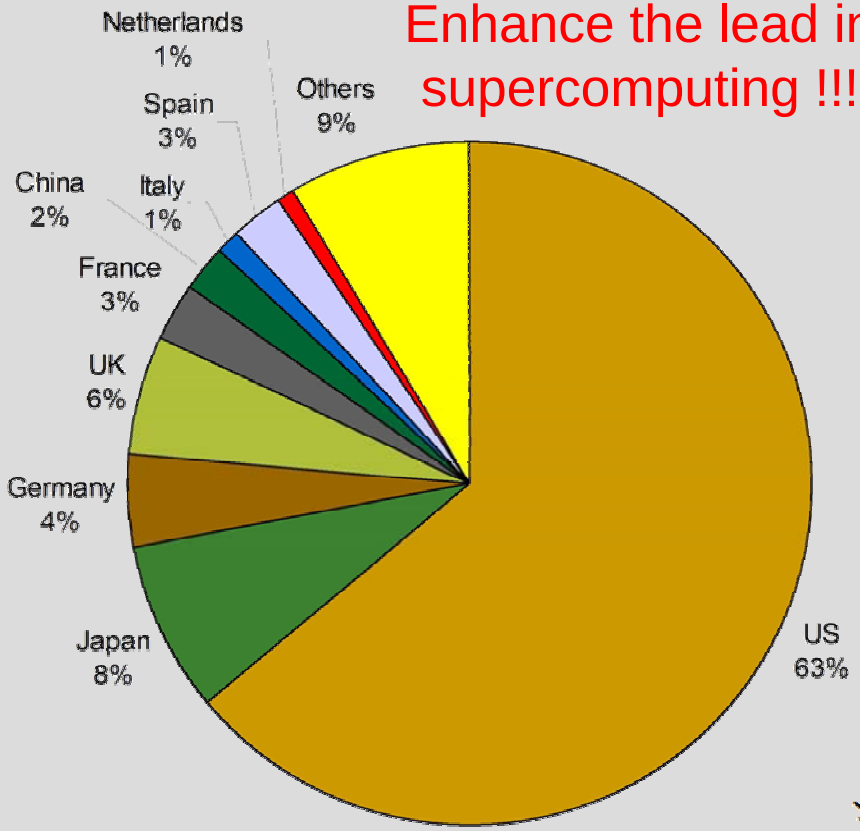




International Situation
(Nov. 2006)

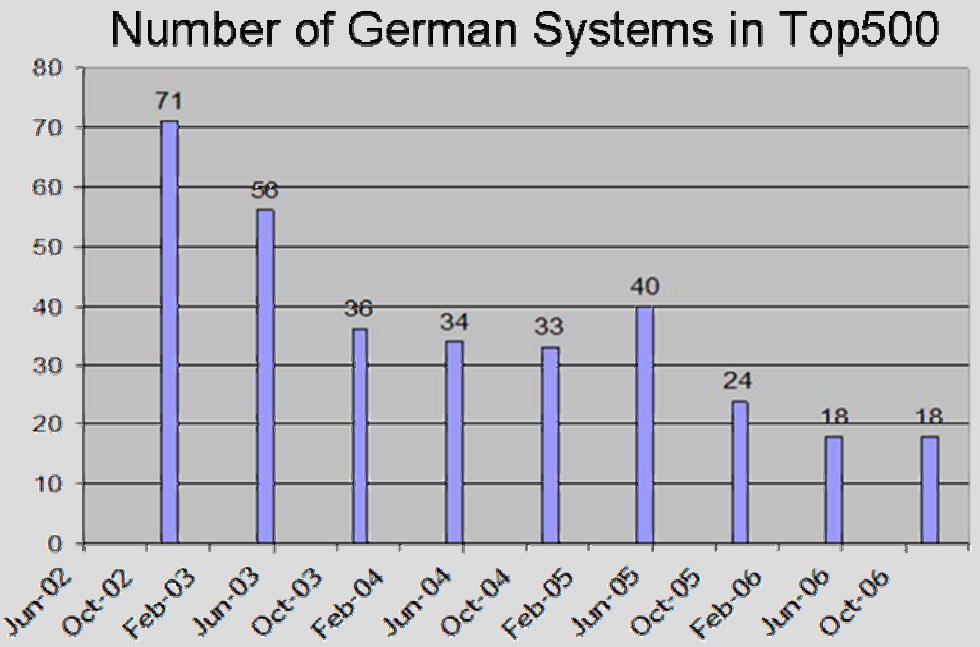
US Policy

Enhance the lead in supercomputing !!!



500 Fastest Supercomputers

- Worldwide industrial use is about 50%
- In Europe industrial use is about 45%
- In Germany industrial use is about 25%



Supercomputers in Germany
(Nov. 2006)

Rank	Site	Manuf	Year	Procs
13	Forschungszentrum Juelich (FZJ) NRW	IBM	2006	16384
18	Leibniz Rechenzentrum	SGI	2006	4096
49	Technische Universitaet Dresden	SGI	2006	2048
50	Scientific Center Karlsruhe	HP	2006	3000
72	HWW/Universitaet Stuttgart	NEC	2005	576
107	Technische Universitaet Dresden	Linux Net	2006	2584
121	Forschungszentrum Juelich (FZJ) NRW	IBM	2004	1312
126	Universität Erlangen	HP	2006	728
137	Adam Opel AG	IBM	2005	720
161	Max-Planck-Gesellschaft MPI/IPP	IBM	2005	688

DG INFSO
Advancing European Supercomputing Activities

- **EU-Call for the** preparation of new research infrastructures (INFRA-2007-2.2.2.1, 22.12.2006)
  - **ESFRI** European Strategy Forum on Research Infrastructures
  - 12/2006: Recommendation to create a permanent European Supercomputer Infrastructure in FP7
  - **Goal:** Up to four European Petaflop-Centres from 2009 on
  - **10 European countries form a stable consortium**
  - **Consortium Leader:** Forschungszentrum Jülich, Prof. Bachem)

HET
HPC in Europe Task Force

- **Taskforce** formed in 2006 by representatives of 10 European states
  - D, E, F, UK, I, S, FL, NL, IRL, CH
- **White Papers** on
  - Scientific Case
  - European Ecosystem
  - Funding Models
  - Peer Review Models
- **Mission**
  - strategy and actions for European supercomputer infrastructure
  - Creation of up to 4 Petascale European-level tier-0 HPC centres
  - Building the performance pyramid (tier-1, tier-2)
  - Scalable software development
  - European Science Grid à la DEISA as eco-system for e-resources

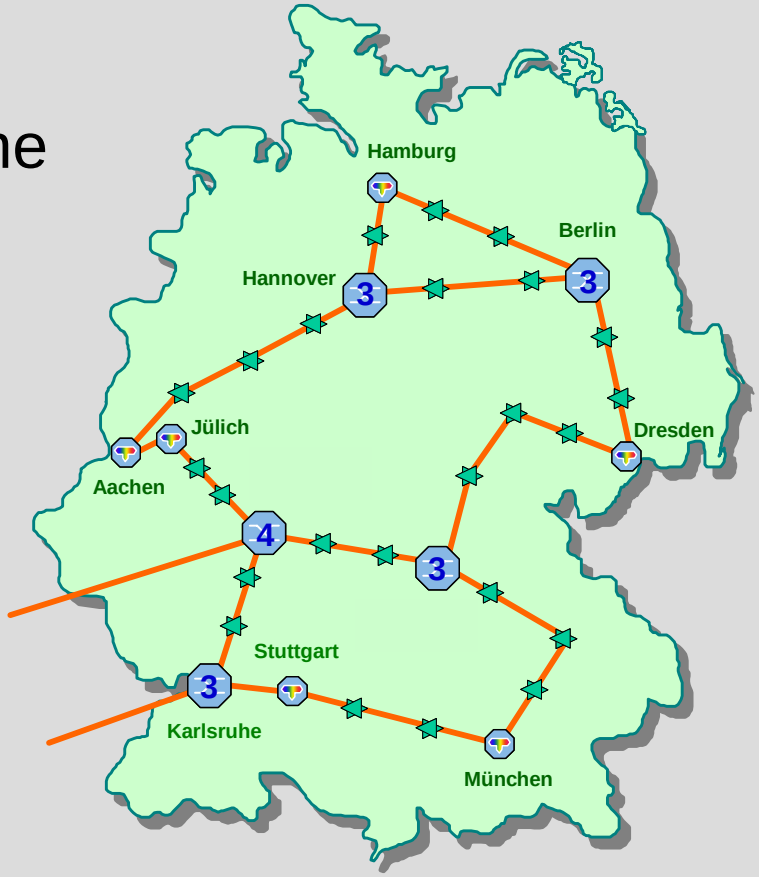
BMBF
Gauss Centre for Supercomputing

Partnership of the three German national tier-0 centres FZJ, HLRS, LRZ

- Proposed by Dr. Schavan in June 2006
- Forming the largest national supercomputer complex in Europe
- Representing Germany in HET
- Leading the German HPC Alliance (German tier-1 and tier-2 centres)
- Spokesman: Prof. Dr. Achim Bachem
- MoU to be signed in 2/2007

BMBF
Ex@Grid-Project

- BMBF stages 30 Mio € for networking and cooperation of the Gauß-Centre & HPC-Alliance
- Project proposal:
  Ex@Grid – dynamic ultra high speed transport network
  - Network test-bed with optical switching with up to 100 Gbit/s among the HPC-Sites



Activities in North-Rhine Westphalia

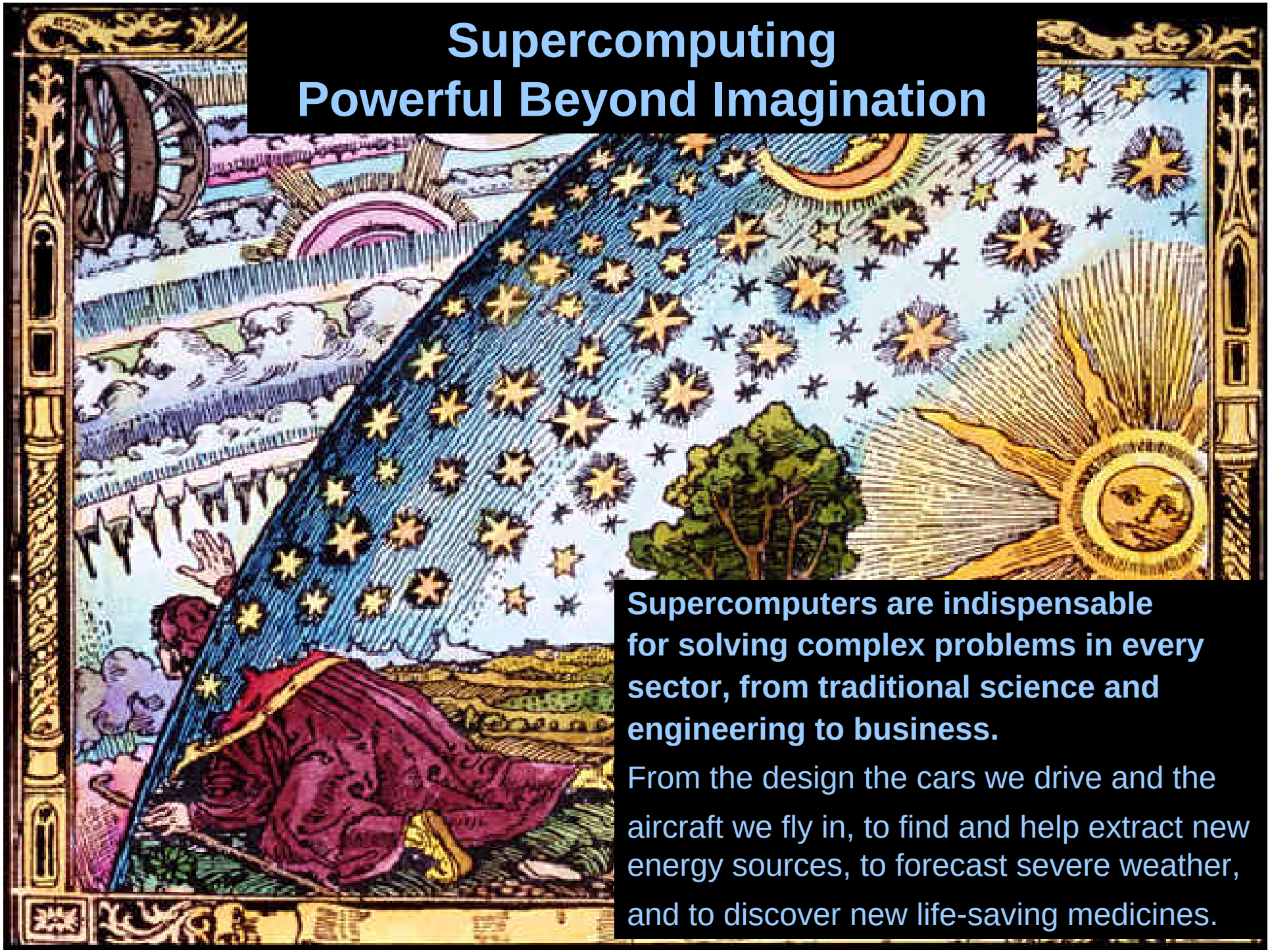
John von Neumann Institut für Computing at FZJ

Goals for 2009

- Petaflop-Supercomputer
- European SC-Centre
- Success relies on strong support by
  - EU
  - BMBF
  - MIWFT – NRW
  - Helmholtz Association

National Supercomputing Centre @ Forschungszentrum Jülich

Supercomputing
Powerful Beyond Imagination



Supercomputers are indispensable for solving complex problems in every sector, from traditional science and engineering to business.

From the design the cars we drive and the aircraft we fly in, to find and help extract new energy sources, to forecast severe weather, and to discover new life-saving medicines.