



CSCS

Centro Svizzero di Calcolo Scientifico
Swiss National Supercomputing Centre

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

FACT SHEET

CSCS – A User Lab for World-Class Research

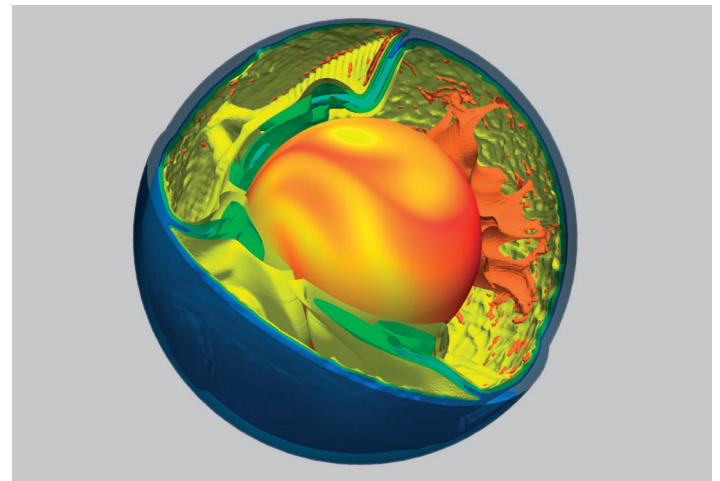
Run as a user lab, CSCS (the Swiss National Supercomputing Centre) promotes and encourages top-notch research. A transparent review process by independent experts guarantees that all promising projects receive computer time.

Simulations created on supercomputers yield completely new insights in science. Consequently, CSCS operates cutting-edge computer systems as an essential service facility for Swiss researchers. These computers aid scientists with diverse issues and requirements – from the pure calculation of complex problems to analysis of complex data. The pool of national high-performance computers is available to its users as a so-called user lab: all researchers in Switzerland can use the supercomputer infrastructure. Disciplines such as physics, materials science and cosmology traditionally use high-performance computers like those operated by CSCS. Cosmologists, for instance, are unable to reproduce the Big Bang in the lab and endeavour to reconstruct the origin and development of the cosmos with the aid of simulations instead. Understanding the development of the universe is of crucial importance as basic principles of physics with far-reaching implications can be confirmed or refuted as a result.

Rising demand

Today, simulations come into play where experiments are no longer possible or our traditional methods no longer suffice. Scientists from an increasing number of disciplines are thus resorting to high-performance computers for their research. For example, supercomputers can model new, unknown materials with hitherto unknown properties and functionalities. Additionally, climate models and simple weather forecasts would be impossible without them. In social science, simulations can also help prevent mass panic by simulating people's behaviour. In medicine, computer simulations aid diagnostics and thus help improve treatment methods. Moreover, they facilitate risk assessments for natural hazards such as earthquakes and the tsunamis they trigger. With the growing number of scientific applications, the number of users and projects at CSCS is therefore constantly on the rise.

In 2010 CSCS had 605 users registered and 65 projects, as of July 2013 the fifty highly qualified staff members at CSCS are supervising 1129 users and 91 projects. The projects have been allocated about 500 million CPU hours.



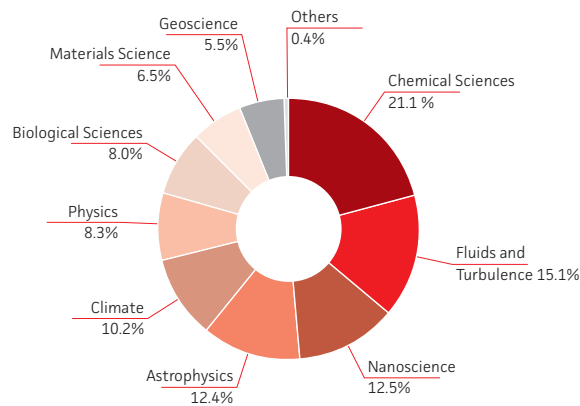
Computer models are extremely important to understand processes in the Earth's interior. They help comprehend plate-tectonic processes and the resulting earthquakes or volcanic activity better. Such simulations are thus essential for hazard and risk assessment. (Image: Paul Tackley's research group, ETH Zurich)

Computer time allocated by independent experts

In the competition for precious computer time, a transparent review process conducted by an independent committee of specialists decides how the time should be allocated. Every project proposal is evaluated by two scientists who belong to academic establishments from around the world and two technical experts from CSCS. An independent expert committee ultimately decides on the allocation of the computer time in a final evaluation based on these assessments. The painstaking procedure is designed to guarantee that all projects be treated equally and all promising projects can be implemented on high-performance computers.

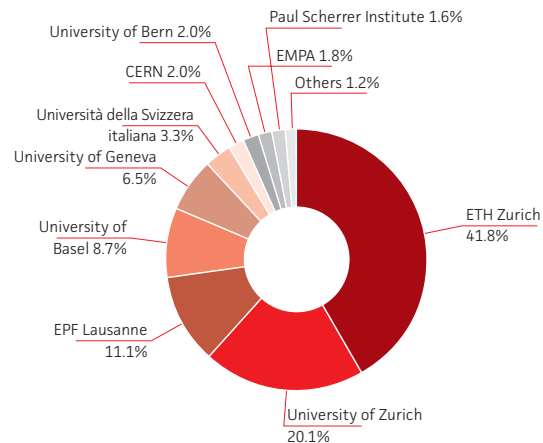


Usage by research fields



The results of the evaluation in 2012 reflects the high scientific quality of the project applications: 87 % of the proposals were granted the computational resources either fully or with a slight reduced allocation.

Usage by institution



In order to do justice to this high standard, the CSCS requires a considerable amount of investment in hardware, infrastructure and well-qualified personnel. The new building provides an ideal environment.

CSCS's high-performance computers in the last twenty years

Supercomputer (model and name)	Commissioned	Highest ranking in Top500 listing	Peak performance (Gigaflops)	Occupied area (m ²)	Power consumption (Kw) at full capacity
CRAY XC30 (Piz Daint)	2013	42	745 500	100	900
CRAY XT6 (Monte Rosa)	2011	34	402 124	52	780
CRAY XT5 (Monte Rosa)	2009	23	212 428	52	700
CRAY XT3 Dual Core (Piz Palù)	2007	60	17 310	48	270
CRAY XT3 (Piz Palù)	2005	57	5 720	16	180
IBM SP4 (MPP)	2002	61	1 330	40	80
NEC SX5 (Prometeo)	1999	238	64	55	40
NEC SX4 (Gottardo)	1996	41	32	95	55
NEC SX3 (Adula)	1992	44	5.5	125	360

The table lists the supercomputers of the national user lab. MeteoSwiss has a separate computer at the CSCS for its weather forecasts. In addition, CSCS provides smaller computers for diverse requirements.

The CSCS has been operating clusters for large-scale Swiss projects for a number of years, such as for the work of particle physicists at CERN. Another high-performance computer is to be installed at the CSCS for the Blue Brain project.