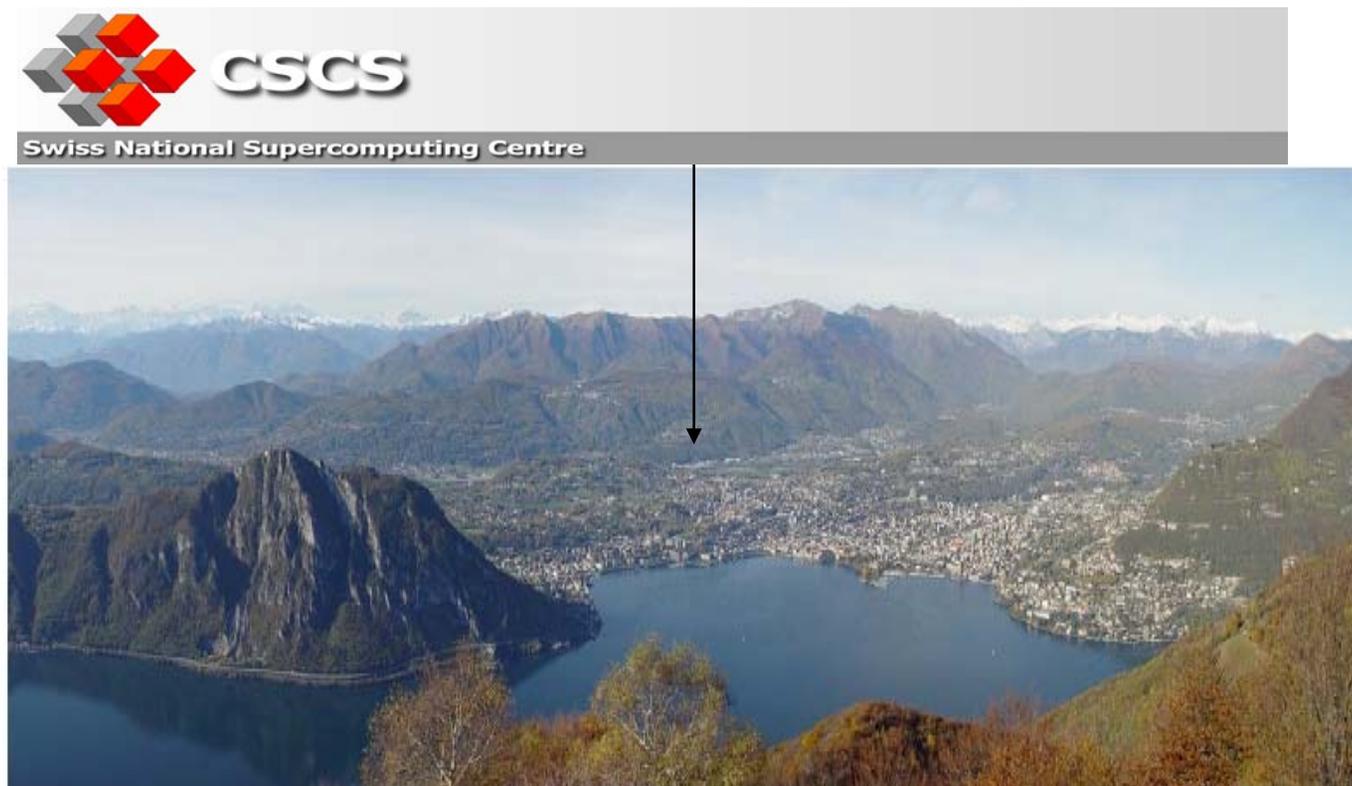


CSCS and the swiss national HPC strategy

Dr. Marie-Christine Sawley, co-director CSCS
June 12 June 2007, SOS11

Where is the Swiss national supercomputing centre?

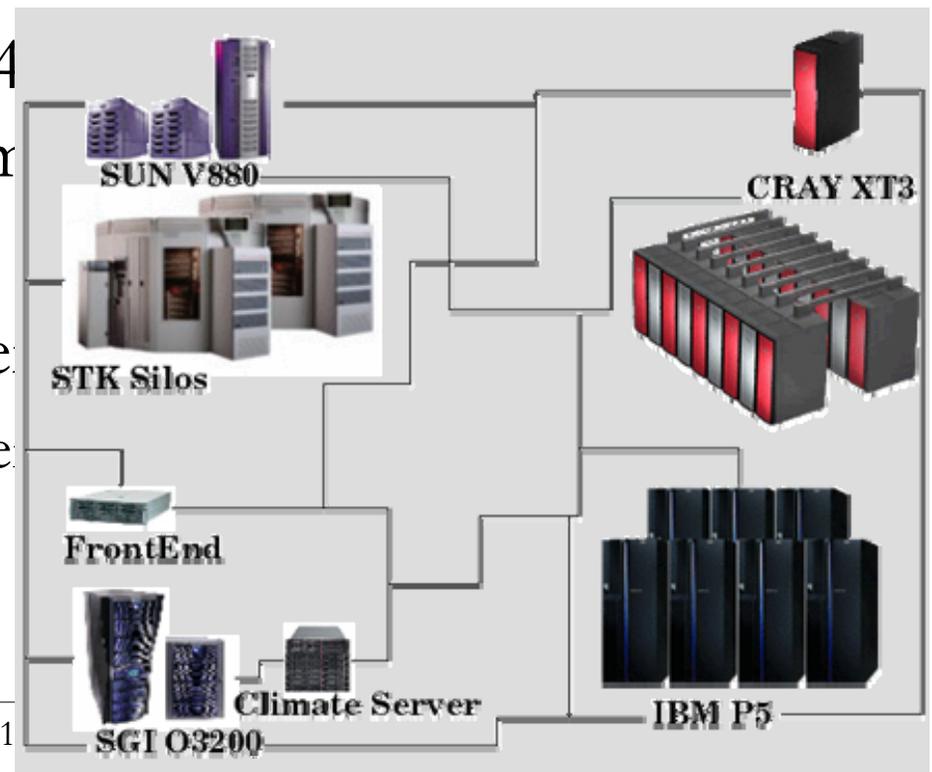


Over the last 3 years

- Staff doubled
- CSCS multiplied the available cycles for science on HPC systems by a factor 20
- Multiplied by 3 its power and cooling capacity
- Significantly expanded its collaborations with scientific communities
 - LHC-CERN, SIB and BioZentrum, Alps initiative, EPFL, USI

CSCS Compute Servers

- Cray XT3
 - Joint project with the national lab PSI
- IBM Power5-575, Linux, 74 of 16 cpus each, 10 TB mem “blanc”,
- Two systems went on retire:
 - IBM Power4 with Colony inte.
 - NEC SX-5



At present, top 5 institutions using the XT3 and the IBM Power 5

- ETHZ
- PSI
- Meteoswiss
- UniZh
- EPFL

New service: SVA Parallel Visualization Cluster

- A Scalable Visualization Array (SVA) cluster is CSCS's new visualization server. The cluster is made of 16 nodes (bi-processor AMD Opteron) with NVIDIA Quadro FX4500 graphics cards, and uses an InfiniBand 4x internal network. The cluster is available remotely for CSCS users via [HP's Remote Graphics System](#), a software layer allowing real-time frame buffer capture, compression and remote delivery



CSCS Top codes

- Top codes used at CSCS can be categorised
 - 25% classical Molecular Dynamics
 - 20% Car-Parrinello
 - 20% Climate and NWP codes
 - 10% Ab-initio quantum chemistry
 - 10% Fluid Dynamics
 - 15% Others

Cray XT3 at CSCS

- First XT3 in Europe, accepted Dec. 2005
- CSCS' large XT3 is called "Palu"
 - Piz Palu is a mountain in Switzerland
- Initial configuration
 - 1126 single-core AMD Opteron 2.6GHz
 - 2.2 Terabytes of memory
 - 3 DDN 8500 controller couplets
- August 2006 - 50% increase in size of machine
 - 6 new cabinets
 - Processor count went from 1126 to 1664
 - Memory increased to 3.3 Terabytes
- April 2007 - Dual-core
 - 2.6GHz single core replaced with 2.6 GHz dual core
 - No memory change
 - On average, increase of performance of 70-80%; some memory-hungry codes had problems

2006: Expansion and Opportunities

- The introduction of the new systems at CSCS enabled new scientific research opportunities
 - Tackle problems requiring more memory
 - New scaling opportunities for faster turnaround times
- CSCS could use new opportunities to increase its role as an enabler of scientific innovation
- With the procurement of the IBM p5-575 and the expansion of the Cray XT3 a new initiative was launched

2006: The Swiss ALPS Scheme

- The Swiss ALPS scheme is the new initiative to allow CSCS to engage more closely with scientists.
- Actual allocation was 16 million CPU Hours over 2 years
- Granted to to
 - Prof. A. Jackson, “*Convection and Magnetic Field Generation in Earth and Other Planets*”
 - Prof. M. Parrinello, “*Modelling Protein-Protein Interactions at the Atomic Level*”
 - Prof. C. Schaer, “*Climate Change and the Hydrological Cycle from Global to European/ Alpine Scales (“ALPS-CLIMATE”)*”
 - Prof. V. Vogel, “*Towards Simulating a Cell Adhesion Site at Angstrom Resolution*”

Paul Scherrer Institute

Swiss Na



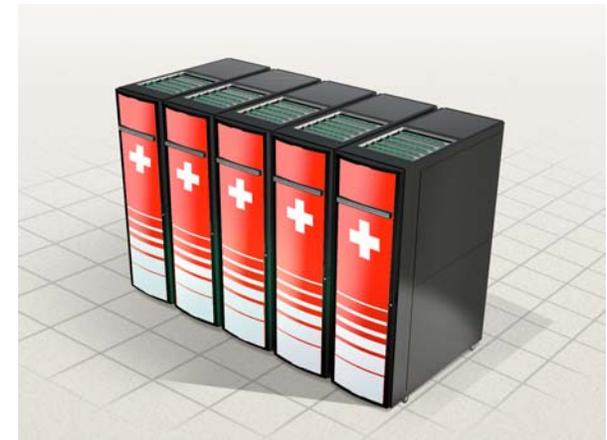
- Largest national research institute
- www.psi.ch
- in Switzerland
 - Multi-disciplinary research centre for natural science and technology
- 1200 persons, home of the Swiss Light Source, SLS
- *“Only thanks to supercomputers and the most advanced modern numeric techniques do we know today the entire path along which the protons move, with the needed precision as well as the impact on the quantitative description of such complex devices ” (Andreas Adelmann)*
- ■ [video](#)

MeteoSwiss

- MeteoSwiss provides twice daily weather forecasts for Switzerland
- Running on a Cray XT3 since January 2007
 - “Gele” is the name of this single cabinet machine
- MeteoSwiss will change to running operational high resolution forecasts in January 1st 2008
 - Forecasts will run 8 times per day
 - New resolution is concentrated on Alpine arc
 - 2.2km resolution, 18 Hour forecast, 15 second time step
 - The full suite must run in 25 minutes (30 minutes including post-processing)
 - *Changing the resolution is a strong scaling problem*
- CSCS has upgraded one of its smaller versions of the XT3 to XT4

Buin

- Buin is the name given to CSCS' XT4
 - Piz Buin is a mountain in Switzerland
- 5 Cabinets
 - 448 Dual-core Opteron 2.6GHz compute processors
 - 896 Gbytes of memory
 - 1 DDN 8500 couplet



Future

- Oct.06-June 07:
 - Swiss National HPC strategy group
- Proposal to Parliament for the next 4 year credit for:
 - Petaflop system and petaflop SW development
 - New building and technical facilities by 2009
 - Boost for research and education in HPC
 - Stronger collaborations between the scientific centres, a tighter HPC computing eco-system

Acknowledgements

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