

Vienna Scientific Cluster

- Besides Theory and Experiment numerical Simulation has become a third pillar in science.
- VSC satisfies the high performance computing needs of scientist from all universities with the joint project

The first 10 Years

- Collaboration established 2008
- VSC-1 installed 2009
 - Ranked #156 in Top500
 - 32 Tflop/s
- VSC-2 installed 2011
 - Ranked #56 in Top500
 - 150 Tflop/s
- New partners in 2013
- VSC-3 Installed in 2014
 - Ranked #85 in Top500
 - Ranked #86 in Green500
 - 600 Tflop/s
- More partners in 2016
- VSC-4 awarded end of 2018
 - About 2.000 Tflop/s



universität
wien



TECHNISCHE
UNIVERSITÄT
WIEN



University of Natural Resources
and Life Sciences, Vienna



Graz University of Technology



ALPEN-ADRIA
UNIVERSITÄT
KLAUSENFURT | WIEN GRAZ



MONTAN
UNIVERSITÄT
WWW.MONTAN-UNIVERSITAT.AC.AT



MEDICAL UNIVERSITY
OF VIENNA

eurac
research



Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Organization

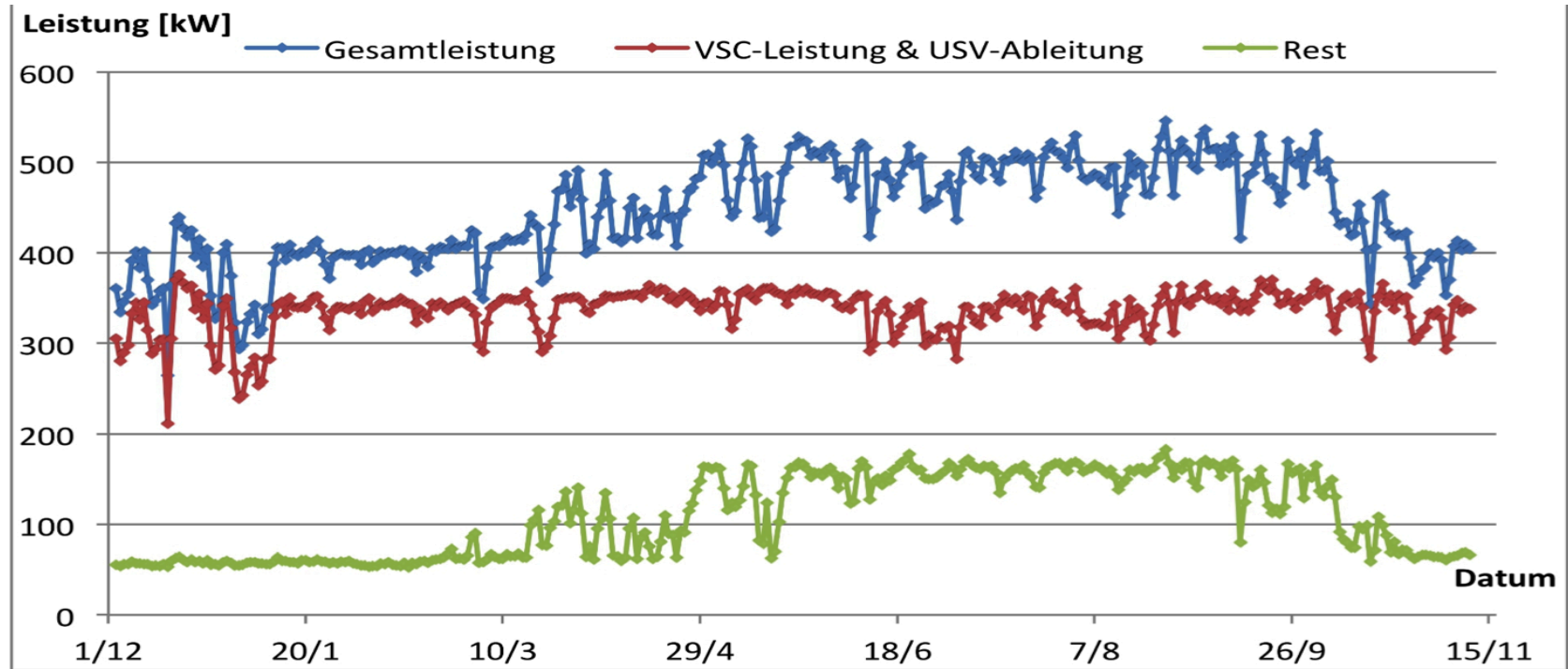
- Governance:
 - Steering Committee advises rectorates of member universities
 - decides on project applications and grants resources.
 - Coordination between partners
 - VSC is **not** a legal entity
- Finance:
 - From the Federal Ministry of Science, Research and Economy via the budget of the member universities.
 - Additional funding via HRSM projects
 - Pay per use for other research oriented partners (e.g. eodc)
- Operation:
 - TU Wien has been assigned to operate the VSC systems
 - VSC Team supports user community

VSC-2

- Installed Summer 2011
 - 1220 AMD Opteron nodes
 - Mellanox QDR Infiniband
- Air cooled
 - Water cooled rear doors
 - 20 °C water input temperature
 - 18 °C in the outer loop
 - Hybrid cooling system
 - free-cooling (up to 15°C)
 - chiller based cooling

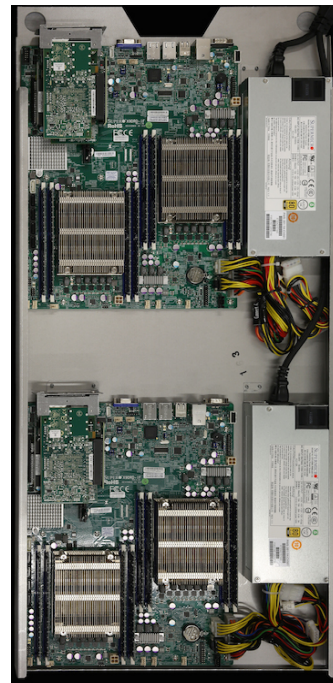


VSC-2 Power consumption



VSC-3

- VSC-3 optimized for performance and efficiency
- Installed Summer 2014
 - 2020 Supermicro based compute nodes
 - Intel E5-2650 v2 (8 cores, 2.6 GHz)
 - 64 GB main memory
 - Two Intel QDR Infiniband HCAs
 - Intel dual-rail QDR Infiniband
 - Fabric is segmented into 8 islands
 - each about 4500 cores
 - Immersion cooling



VSC-3 Cooling

- Oil based immersion cooling
 - Provided by Green Revolution Cooling (GRC), Texas based
 - More than 32.000 liters of white mineral oil
 - Pump modules (PM) under the raised floor, heat transfer into water loop
- No room (air) cooling
 - Room temperature up to 45 °C
 - Infiniband core rack air cooled
- Free cooling all over the year
 - Cooling overhead less than 3%
 - State of the art energy efficiency
- Storage is located in nearby room



Science at VSC

- The VSC is primarily devoted to research
- Projects are peer reviewed
 - either by a funding agency (preferred)
 - or by reviewers appointed by the steering committee
- Publications and Projects are publicly visible at our web site.
 - More than 900 publications in scientific journals
- 300 active projects with 1200 users
 - 900 projects since 2009

Challenges

- New topics
 - Big data, data analytics, real time data
 - Machine learning, artificial intelligence
- Empower scientists
 - computation resources and data storage
 - Support scientific projects with new tools and methods
 - Collaboration and partnership
 - Interoperability

Thank You for Your Attention