THE INFRASTRUCTURE OF IT4INNOVATIONS

About IT4Innovations

IT4Innovations National Supercomputing Center at VŠB – Technical University of Ostrava is a strategic large research infrastructure in the Czech Republic. In the framework of the national supercomputing center, the most powerful supercomputing facilities in the Czech Republic are operated and excellent research in High Performance Computing (HPC) and High Performance Data Analytics (HPDA) is performed.

Since 2011, IT4Innovations has been a member of the prestigious research infrastructure Partnership for Advanced Computing in Europe (PRACE). The objective of PRACE is to enhance the competitiveness of European science, research and industry. In 2016 we became a member of the European Technology Platform for HPC (ETP4HPC) and consolidated our position in the European research community.

Infrastructure Description

We are currently operating two supercomputers. ANSELM was installed in the summer of 2013 and its theoretical peak performance is 94 Tflop/s. SALOMON was installed in the summer of 2015, and its theoretical peak performance is 2 Pflop/s. When Salomon was put into operation in June 2015, it ranked 40th on the TOP500 list, and has since then been one of the most powerful European supercomputers based on the first commercially available generation of the Intel Xeon Phi coprocessors (codenamed Knights Corner).

Both supercomputers are located in the IT4Innovations building on the campus of VŠB – Technical University of Ostrava. The administrative part of the building was completed in March 2014. The building is equipped with a 500 m² server room, 2 x 2.5 MVA DRUPS, direct hot water cooling (2 x 600 kW), cold water cooling (200, 400 a 600 kW) and heat recovery (up to 380 kW) for building heating. Implementation of the technological infrastructure for the server room and the Salomon supercomputer installation was completed in the middle of 2015.

Access to Computational Resources

The computational resources of IT4Innovations are mostly dedicated to solving tasks from research and development conducted by academic and research institutions. Part of the capacity is also devoted to the development of cooperation between academia and industry, and to independent use by industrial enterprises. Institutions can apply for computation time within open access grant competitions. Open access competitions are announced three times a year.

Limited computation time can be also granted upon request, at the discretion of the directors. An application can be made at any time, and computing time is assigned irregularly based on an IT4Innovations management assessment. Representatives from both commercial and non-commercial spheres can apply in cases when open access grant competitions cannot be used. Institutions can also rent the computational resources.

Technical specifications of supercomputers

	ANSELM	SALOMON
Production	Spring 2013	Summer 2015, 87th on the TOP500 list of the most powerful supercomputers in the world (November 2017)
Peak performance	94 Tflop/s	2011 Tflop/s
Operating system	RedHat Linux 64bit 6.x	RedHat Linux 64bit 6.x, CentOS 64bit 6.x
Nodes	209	1008
CPU	2x Intel SandyBridge 8 cores, 2.3 / 2.4 GHz, 3344 cores in total	2x Intel Haswell 12 cores, 2.5 GHz, 24192 cores in total
RAM	64 GB / 96 GB / 512 GB	128 GB / 3.25 TB (UV node)
GPU accel.	23x NVIDIA Tesla Kepler K20	N/A
MIC accel.	4x Intel Xeon Phi 5110P	864x Intel Xeon Phi 7120P, 61 cores each, 52704 cores in total
Storage	320 TiB home (2 GB/s speed), 146 TiB scratch (6 GB/s speed)	500 TiB home (6 GB/s speed), 1638 TiB scratch (30 GB/s speed)
Interconnection	Infiniband QDR 40 Gb/s	Infiniband FDR 56 Gb/s

External organisations that have used the computing time include, among others, research institutes of the Czech Academy of Sciences, the Central European Institute of Technology in Brno, Charles University, Brno University of Technology, the Czech Technical University in Prague, Masaryk University, the University of Ostrava, Palacký University Olomouc, and the University of Chemistry and Technology in Prague.

Supercomputers in Ostrava are used in computation of enzymatic reactions, new drug design, projects for the automotive and aerospace industries, development of new intelligent materials, tokamak research, tracking climate change, etc.
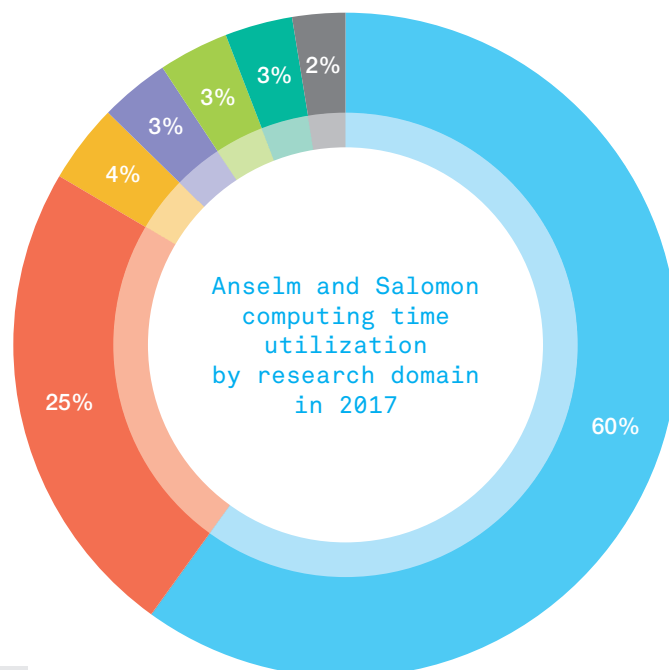
Anselm and Salomon computing time utilization by research domain in 2017

60%
25%
4%
3%
3%
3%
2%

- Material Sciences
- Bio Sciences
- Engineering
- Computational sciences
- Applied mathematics
- Physics
- Earth Sciences