VSB TECHNICAL UNIVERSITY OF OSTRAVA | IT4INNOVATIONS NATIONAL SUPERCOMPUTING CENTER

COMPUTING INFRASTRUCTURE

e-INFRA CZ

OUR SUPERCOMPUTERS SUPPORT EUROPEAN SCIENCE, INDUSTRY, AND SOCIETY

IT4Innovations National Supercomputing Center at VSB – Technical University of Ostrava is a leading research, development, and innovation centre active in the fields of High-Performance Computing (HPC), Data Analysis (HPDA), and Artificial Intelligence (AI) and their application to other scientific fields, industry, and society. IT4Innovations operates the most powerful supercomputing systems in the Czech Republic, which are provided to Czech and foreign research teams from both academia and industry. Together with the CESNET and CERIT-SC institutions, IT4Innovations constitutes e-INFRA CZ, a strategic research infrastructure of the Czech Republic.

IT4Innovations currently operates three supercomputers — Barbora, NVIDIA DGX-2, a specialized system for AI calculations, and a petascale system called Karolina with a theoretical peak performance of about 15.7 PFlop/s.

The key research areas of IT4Innovations include big data processing and analysis, machine learning, development of parallel scalable algorithms, solution of computationally demanding engineering problems, advanced visualization, virtual reality, modelling for nanotechnologies, and material design.

SUPERCOMPUTERS

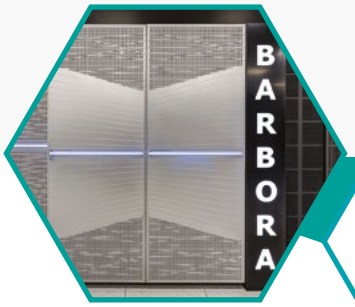
	Karolina	NVIDIA DGX-2	Barbora
Put into operation	Summer 2021	Spring 2019	Autumn 2019
Theoretical peak performance	15 690 TFlop/s	130 TFlop/s / 2 PFlop/s in AI FP16	849 TFlop/s
Operating system	CentOS 64bit 7.x	CentOS 64bit 7.x	CentOS 64bit 7.x
Compute nodes	831	1	201
CPU	1 692 cores in total	2x Intel Xeon Platinum, 24 cores 48 cores in total	2x Intel Cascade Lake, 18 cores, 2.6 GHz, 7 235 cores in total
RAM per compute node	256 GB / 1 TB (GPU) / 24 TB fat node 320 GB HBM2 (8 x 40 GB) GPU	1.5 TB DDR4, 512 GB HBM2 (16 x 32 GB)	192 GB 6 TB fat node
GPU accelerators	576x NVIDIA A100	16x NVIDIA Tesla V100 32GB HBM2	32x NVIDIA Tesla V100
Storage	30.6 TB / home 1 361 TB / scratch	30 TB NVMe	29 TB / home 310 TB / scratch (28 GB/s)
Interconnect	Infiniband HDR 200 Gb/s	8x Infiniband or 8 x 100 GbE	Infiniband HDR 200 Gb/s

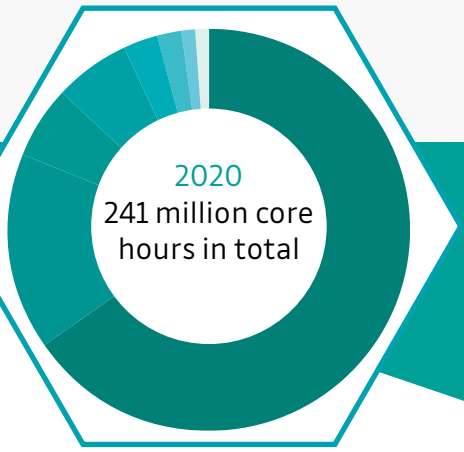
IT4INNOVATIONS BUILDING

- 500 m² server room
- 2x2.5 MVA DRUPS
- Direct hot water cooling (2 x 600 kW)
- Cold water cooling (200, 400 and 600kW)
- Heat recovery (up to 380 kW) for building heating

IT4I is a proud member of

Collaborative EUDAT Data Infrastructure · PRACE · I4MS · EUROPEAN OPEN SCIENCE CLOUD · EuroHPC Joint Undertaking · ETP 4 HPC · BDV BIG DATA VALUE ASSOCIATION





Computational Resources Allocation

The computational resources of IT4Innovations are dedicated to solving problems in research and development conducted by academic and research institutions. Unused capacity can be freed up for the development of collaboration between academia and industry, and for the purpose of independent use by industrial enterprises.

- Open Access Grant Competitions
- Directors' Discretion Scheme
- Commercial Rental

Computational Resources by Scientific Discipline

In 2020, more than 241 million core hours were allocated and distributed across 184 research projects within three Open Access Grant Competitions. The bulk of computational resources, i.e., 65% and 16%, were awarded to projects in the fields of material science and biosciences, respectively.

Computational resources allocated by scientific discipline within the Open Access Grant Competitions in 2020

65%	Material sciences
16%	Biosciences
6%	Computer science
6%	Physics
3%	Engineering
2%	Earth sciences
1%	Astronomy
1%	Applied mathematics

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