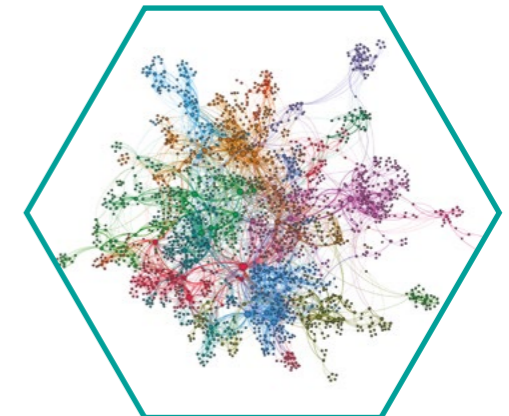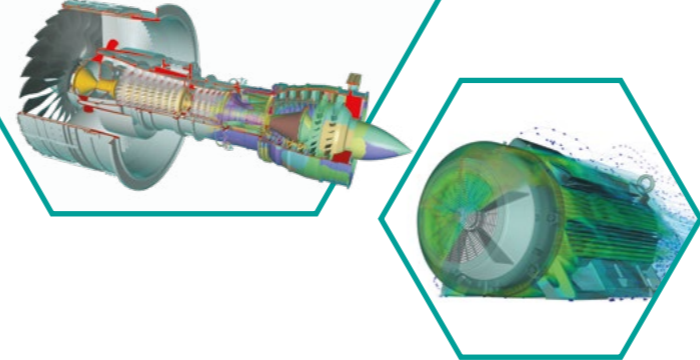# IT4INNOVATIONS

OUR SUPERCOMPUTERS SUPPORT
EUROPEAN SCIENCE, INDUSTRY, AND SOCIETY

e-INFRA CZ

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.
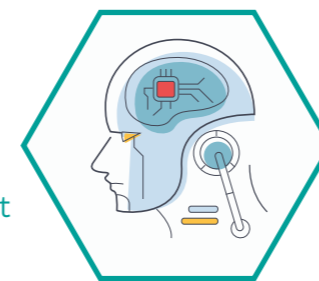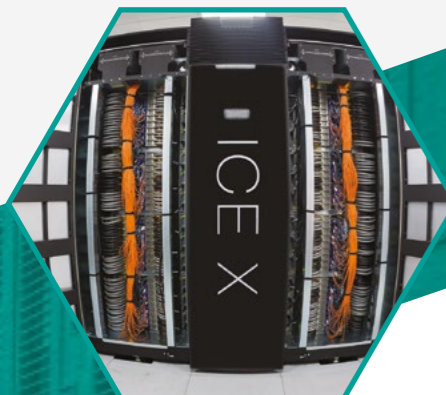
SUPERCOMPUTERS

	Karolina	Barbora	NVIDIA DGX-2
Put into operation	Summer 2021	Autumn 2019	Spring 2019
Theoretical peak performance	15 690 TFlop/s	849 TFlop/s	130 TFlop/s / 2 PFlop/s in AI FP16
Compute nodes	831	201	1
CPU	1 692 cores in total	2x Intel Cascade Lake, 18 cores,	2x Intel Xeon Platinum, 24 cores
		2.6 GHz, 7 235 cores in total	48 cores in total
GPU accelerators	576x NVIDIA A100	32x NVIDIA Tesla V100	16x NVIDIA Tesla V100 32GB HBM2

RESEARCH LABS

LABS (in 2020)	FTE
Advanced Data Analysis and Simulations Lab	39
Infrastructure Research Lab	12
Parallel Algorithms Research Lab	26
Modelling for Nanotechnologies Lab	15
Big Data Analysis Lab	8

HISTORY

- 2011 - The foundation of IT4Innovations
- 2013 - Launching of the Anselm supercomputer
- 2014 - Opening of the IT4Innovations building
- 2015 - Launching of the Salomon supercomputer
- 2019 - Launching of the NVIDIA DGX-2 system for AI research and the Barbora supercomputer
- 2020 - Foundation of the Digital Innovation Hub Ostrava
  - IT4Innovations becomes the National Competence Centre in HPC
- 2021 - Launching of the Karolina supercomputer

e-INFRA CZ
- Unique e-infrastructure for research and development in the Czech Republic
- Partners CESNET / CERIT-SC / IT4Innovations

Digital Innovation Hub Ostrava
- Member of DIHnet EU
- Registered at the European Commission level

Research and Development
- Computationally demanding numerical simulations
- Extensive data analysis
- Artificial intelligence tools
- Development of parallel algorithms
- Modelling for nanotechnologies
- Visualisation and virtual reality

Research Projects
- H2020 Projects
- EuroHPC Projects
- National Projects
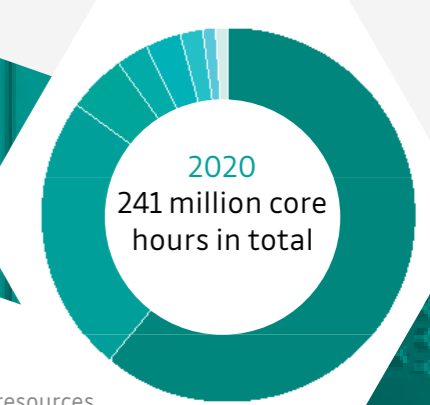
Education and Training Activities
- PRACE Training Center
- Doctoral School for Education in Mathematical Methods and Tools in HPC
- Operation of an HPC oriented doctoral study programme Computational Sciences
- Innovative Training Network project EXPERTISE for PhD students within Horizon 2020
- NVIDIA Deep Learning Institute

Employees
In 2020, the number of employees of IT4Innovations by divisions in full time equivalent (FTE) was 155.48 FTE in total, which consists of:
- 20% are Management and Administration
- 69% are Research and Development
- 11% are Supercomputing Services

Certification
- ISO 9001 Quality Management System
- ISO 27001 Information Security Management System

2020
241 million core hours in total

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

VSB TECHNICAL UNIVERSITY OF OSTRAVA | IT4INNOVATIONS NATIONAL SUPERCOMPUTING CENTER

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