VSB TECHNICAL UNIVERSITY OF OSTRAVA | IT4INNOVATIONS NATIONAL SUPERCOMPUTING CENTER

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 field of High-Performance Computing (HPC), Data Analysis (HPDA) Quantum Computing (QC), 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.

Czech research communities also have access to the LUMI supercomputer, thanks to IT4Innovations' membership in the eponymous consortium. Located in the Finnish town of Kajaani, LUMI is the most powerful European supercomputer with a theoretical peak performance of 580+ PFlop/s. IT4Innovations also participates in its operation.

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

In 2023, IT4Innovations signed a hosting agreement with the EuroHPC JU as leader of the LUMI-Q consortium. Under this agreement, one of the six EuroHPC quantum computers in Europe will be installed and operated at IT4Innovations.

SUPERCOMPUTERS

	NVIDIA DGX-2	Barbora	Karolina	LUMI
Put into operation	Spring 2019	Autumn 2019	Summer 2021	Autumn 2022
Theoretical peak performance	130 TFlop/s	849 TFlop/s	15.7 PFlop/s	580+ PFlop/s
Compute nodes	1	201	831	5,042
Accelerators in total	16x NVIDIA Tesla V100	32x NVIDIA Tesla V100	576x NVIDIA Tesla A100 2x NVIDIA RTX 6000	11,912x AMD Instinct MI250x 8x NVIDIA A40
CPU cores in total	48	7,232	106,880	454,784

The National Competence Center in HPC

The reference and the single point of contact and coordination in Czechia for High-performance computing (HPC) and data analysis (HPDA).
www.eurocc-czechia.cz/en

European Digital Innovation Hub Ostrava

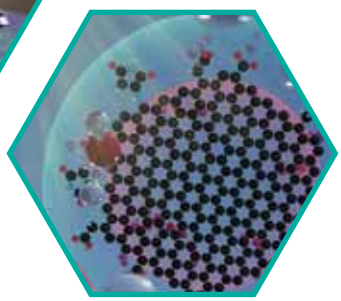
Supports the deployment and use of digital technologies primarily in small and medium-sized companies.
www.edihostrava.cz/en

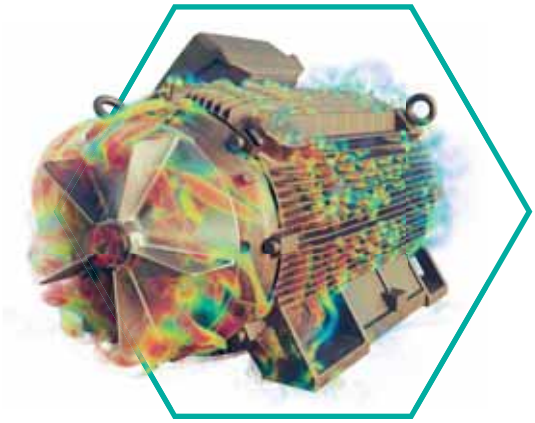
Research and Development

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

Research Projects

- Horizon Europe and Horizon 2020 projects
- EuroHPC JU Projects
- National Projects





RESEARCH LABS

LABS

- Advanced Data Analysis and Simulations Lab
- Infrastructure Research Lab
- Parallel Algorithms Research Lab
- Modelling for Nanotechnologies Lab
- Quantum Computing Lab

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 and the Barbora supercomputer
2020 - IT4Innovations becomes the National Competence Centre in HPC
2021 - Launching of the Karolina supercomputer
2022 - EuroHPC JU selected the LUMI-Q project, IT4Innovations will host quantum computer
2023 - The establishment of the European Digital Innovation Hub Ostrava
- Launching of complementary systems

Education and training Activities

- 25 courses, workshops, conference a year
- Operation of an HPC oriented doctoral study programme Informatics and Computational Sciences
- Involved in the EUMaster4HPC project

Employees

The number of employees of IT4Innovations by divisions in full time equivalent (FTE) is appr. 159 FTE in total,

- 26% are Management and Administration
- 62% are Research and Development
- 12% are Supercomputing Services

Certification

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

Computational Resources Allocation:

- Open Access
- Access for Thematic HPC Resource Utilisation
- EuroHPC JU Grant Competitions

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IT4Innovations is a proud member of

EUDAT · BDV BIG DATA VALUE ASSOCIATION · PRACE · ETP 4 HPC · EuroHPC · eosc · LUMI · iRODS