VSB TECHNICAL UNIVERSITY OF OSTRAVA | IT4INNOVATIONS NATIONAL SUPERCOMPUTING CENTER

IT4INNOVATIONS

EMPOWERING INNOVATIONS WITH THE KAROLINA AND BARBORA SUPERCOMPUTERS AND THE VLQ QUANTUM COMPUTER

e-INFRA CZ

IT4Innovations
National Supercomputing Center

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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 two supercomputers, Barbora (849 TFlop/s) and Karolina (15.7 PFlop/s), as well as smaller complementary systems that provide users with access to emerging, non-traditional or highly specialized hardware architectures.

Czech research communities also have access to the LUMI supercomputer, thanks to IT4Innovations' membership in the eponymous consortium.

SUPERCOMPUTERS

	Barbora	Karolina	LUMI
Put into operation	Autumn 2019	Summer 2021	Winter 2023
Theoretical peak performance	849 TFlop/s	15.7 PFlop/s	531,5 PFlop/s
Compute nodes	201	831	5,042
Accelerators in total	32x NVIDIA Tesla V100	576x NVIDIA Tesla A100	11,912x AMD Instinct MI250x
		2x NVIDIA RTX 6000	8x NVIDIA A40
CPU cores in total	7,232	106,880	454,784

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 - Inauguration of the LUMI supercomputer in Kajaani, Finland, whose computing resources are also used by the Czech scientific community.
2023 - The establishment of the European Digital Innovation Hub Ostrava
- Launching of complementary systems
2024 - IT4Innovations part of the CLARA Centre of Excellence
2025 - Launch of the VLQ quantum computer fo the LUMI-Q consortium
- IT4Innovations part of the LUMI AI Factory
- IT4Innovations participates in the delivery of the EuroHPC Federation Platform

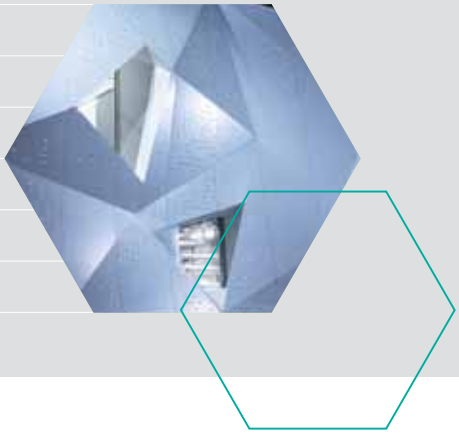
www.it4i.eu

Located in the Finnish town of Kajaani, LUMI has a theoretical peak performance of 531,5 PFlops/s.

In 2025, IT4Innovations installed the VLQ quantum computer of the LUMI-Q consortium. The system is based on 24 superconducting qubits in a star-shaped topology.

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 desing.

RESEARCH LABS



LABS

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

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

Education and training Activities

- 40 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
- 61% are Research and Development
- 13% 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

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