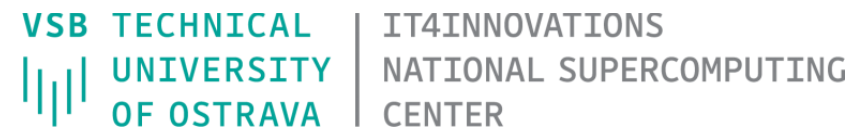


# About IT4Innovations National Supercomputing Center

Tomáš Kozubek, IT4Innovations, VSB – Technical University of Ostrava

June/2021

Univerza v Ljubljani



Co-funded by the  
Erasmus+ Programme  
of the European Union

This project has been funded with support from the European Commission.

This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

# cesnet

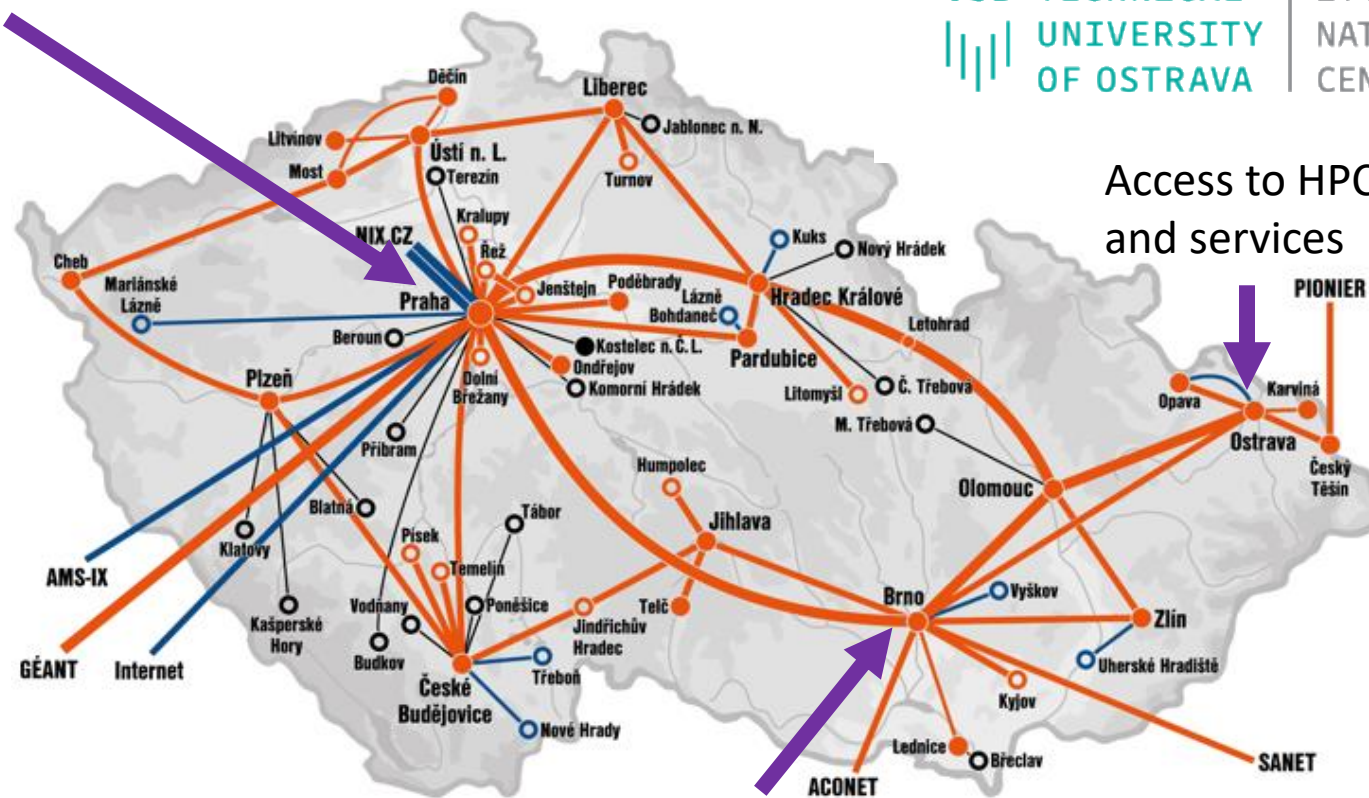
VSB TECHNICAL  
UNIVERSITY  
OF OSTRAVA

IT4INNOVATIONS  
NATIONAL SUPERCOMPUTING  
CENTER

NREN  
MetaCentrum (NGI)  
Data storage



## LARGE RESEARCH INFRASTRUCTURES



Access to HPC infrastructure  
and services

**cerit**  
scientific cloud

Largest node of  
MetaCentrum



# History of IT4Innovations

T. Kozubek, IT4Innovations, VSB-TUO

Anselm (0,1PF)



Salomon (2PF)



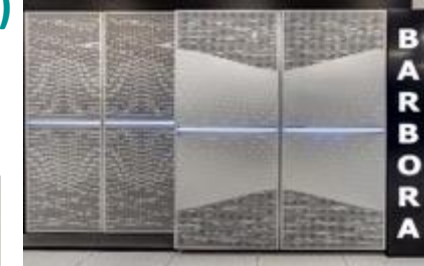
NVIDIA DGX-2 (0,1-2PF)



ARTIFICIAL  
INTELLIGENCE



Barbora (0,9PF)



July 2021

KAROLINA (15,2PF)



University  
Institute

May 2011

June 2013

July 2014

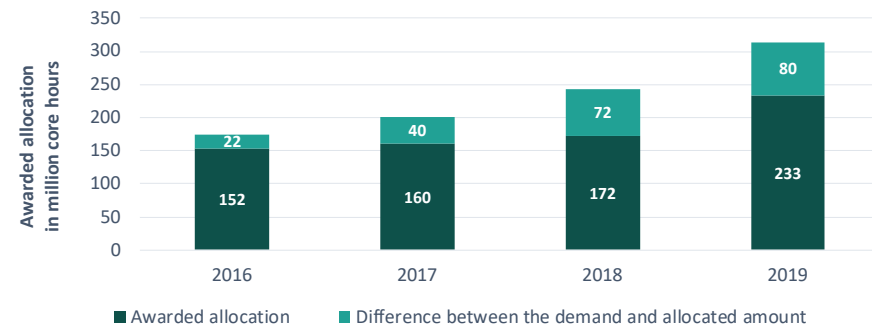
July 2015

March 2019

October 2019



Comparison of demand for computational resources within Open Access Calls between 2016 and 2019



- **Open access**
  - Grant competition announced three times a year (February, June, October) for employees and students of research and educational organizations
- **Directors' discretion**
  - An application can be filed any time. Computing time is assigned irregularly based on an assessment by IT4Innovations
- **National node of EU HPC infrastructures**
  - Partnership for Advanced Computing in Europe (PRACE)
  - European Technology Platform for High (ETP4HPC)
  - EuroHPC Joint Undertaking (EuroHPC JU)
- **Training and educational activities**
  - More than 10 events annually
  - 6 PRACE seasonal schools
  - PRACE Training Centre – 4 two days events in 2018-2021
  - National Centre of Competence in HPC since 2020
- **User support**

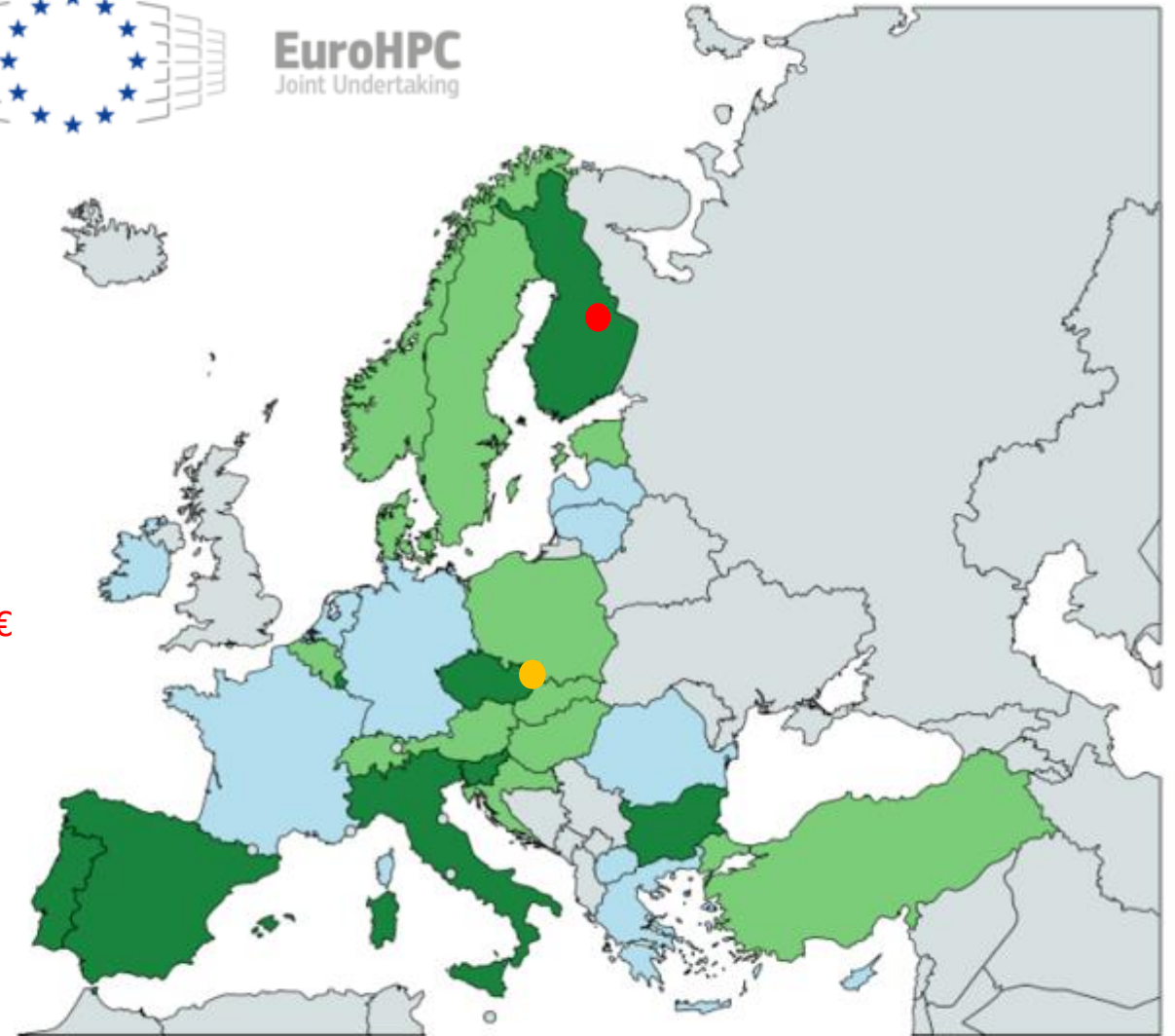
33 European countries

CZ member from January 2018

- Build European HPC infrastructure
  - 5 petascale supercomputers
    - **Karolina (CZ)**
    - Meluxina (LU)
    - Deucalion (PT, ES)
    - Vega (SI)
    - PetaSC (BG)
  - 3 pre-exascale supercomputers
    - **LUMI (FI,SE,NO,DK,BE,PL,CH,CZ, EE, IS)**
      - R\_Max **380PFLOPS** (LINPACK), 207.1M€
    - BSC (ES, ES, HR, PT, TR)
    - Leonardo (IT, SI, SK, AT, HU)
- Support Research and Innovation in HPC
  - HPC Centers of Competence ( EuroCC)
  - Support industry/SMEs
  - Support training and education in HPC



**EuroHPC**  
Joint Undertaking



Created with mapchart.net ©

## Performance to be installed:

- R\_Peak: 15,2PFlop/s
- R\_Max: 9,4PFlop/s (LINPACK)
- R\_AI: 350PFlop/s (DeepLearning)
- Universal partition: 2,8 PFlop/s (LINPACK) (720 nodes)
- Accelerated partition: 6,6PFlop/s (LINPACK) (70 nodes)  
350 PFlop/s (DeepLearning)
- Data analytics partition: 40TFlop/s (LINPACK)
- Cloud partition: 131TFlop/s (LINPACK) (36 nodes)



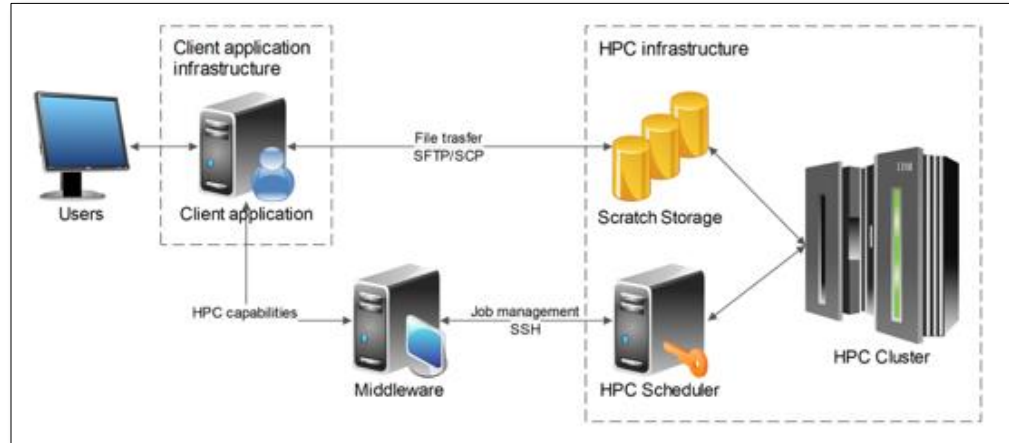
## Estimated top500 ranking:

- Ranking (1H2021):
  1. #70 Accelerated partition of Karolina
  2. #149 Universal partition of Karolina



# Development of Smart Platforms

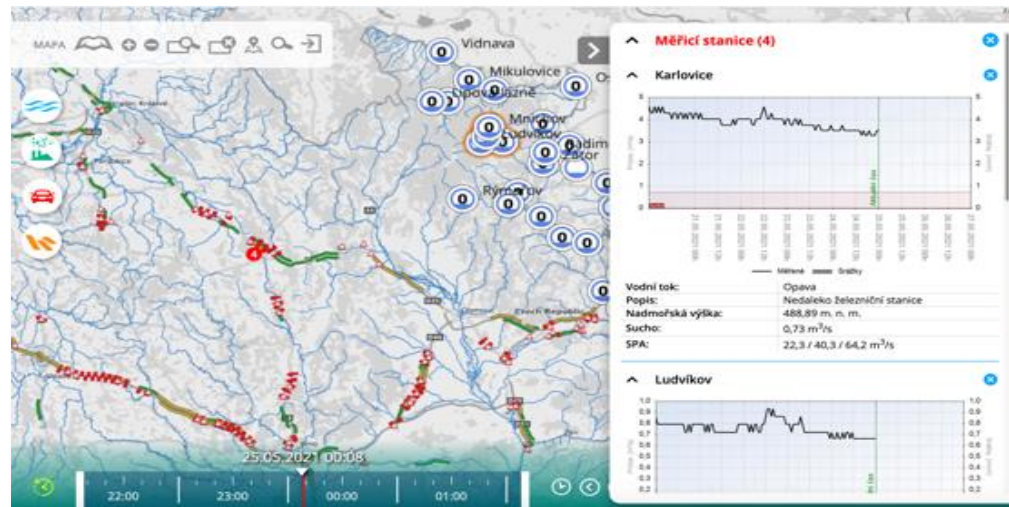
T. Kozubek, IT4Innovations, VSB-TUO



High-End Application Execution Middleware



Urban Thematic Exploitation Platform



Crisis management and decision support, <https://floreon.eu>



HPC-ready platform for Massively Parallel Sequencing



## HPC & HPDA infrastructure & services

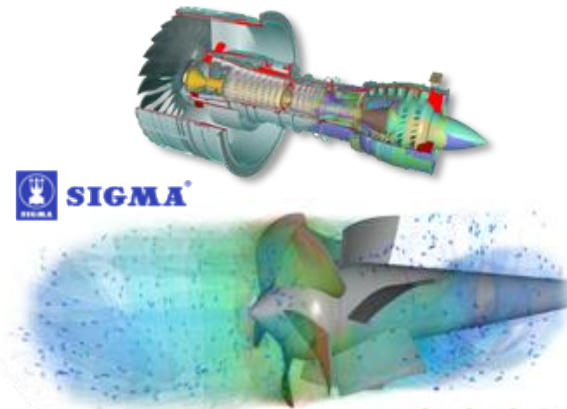
The most powerful public supercomputing infrastructure in Czech republic

## Digital Innovation Hub Ostrava – IT4I & MSIC



Infrastructure provider ★ HPC adoption programme ★ Collaborative research ★ Training & education

Advanced computing  
and simulations



Virtual prototyping  
Digital twins



Big data  
Machine learning



Visualisation  
Virtual reality





# International projects and partnerships

T. Kozubek, IT4Innovations, VSB-TUO

## HPC, HPDA, AI, NANO



S-NEBULA



## Industry support



## Infrastructure



## Education



## Partnerships



I4MS



## Thank you for your attention!

<http://sctrain.eu/>

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TECHNISCHE  
UNIVERSITÄT  
WIEN



VSB TECHNICAL  
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