



ЕВРОПЕЙСКИ СЪЮЗ
ЕВРОПЕЙСКИ ФОНД ЗА
РЕГИОНАЛНО РАЗВИТИЕ



ОПЕРАТИВНА ПРОГРАМА
**НАУКА И ОБРАЗОВАНИЕ ЗА
ИНТЕЛИГЕНТЕН РАСТЕЖ**

Centre of Excellence in Informatics and Information and Communication Technologies

HPC Forum, 16 November 2023



ЦЕНТЪР ЗА ВЪРХОВИ ПОСТИЖЕНИЯ ПО
ИНФОРМАТИКА И ИНФОРМАЦИОННИ И
КОМУНИКАЦИОННИ ТЕХНОЛОГИИ



- ✓ Name: Center of Excellence in Informatics and ICT
- ✓ Funding: Operational Program “Science and Education for Smart Growth”
The total amount of the grant is BGN 29 355 861 (more than 15 M euro): BGN 24 952 482 (85%) are provided by the European Regional Development Fund and BGN 4 403 379 (15%) are the national co-financing.
More than 75% of the project's cost is allocated for building scientific infrastructure.
- ✓ Implementation: Consortium of 7 partners with leading organization IICT-BAS
- ✓ Period: 03.08.2018 – 31.12.2023
- ✓ Mission: **Building an integrated world-class infrastructure of HPC and HPDA resources.**





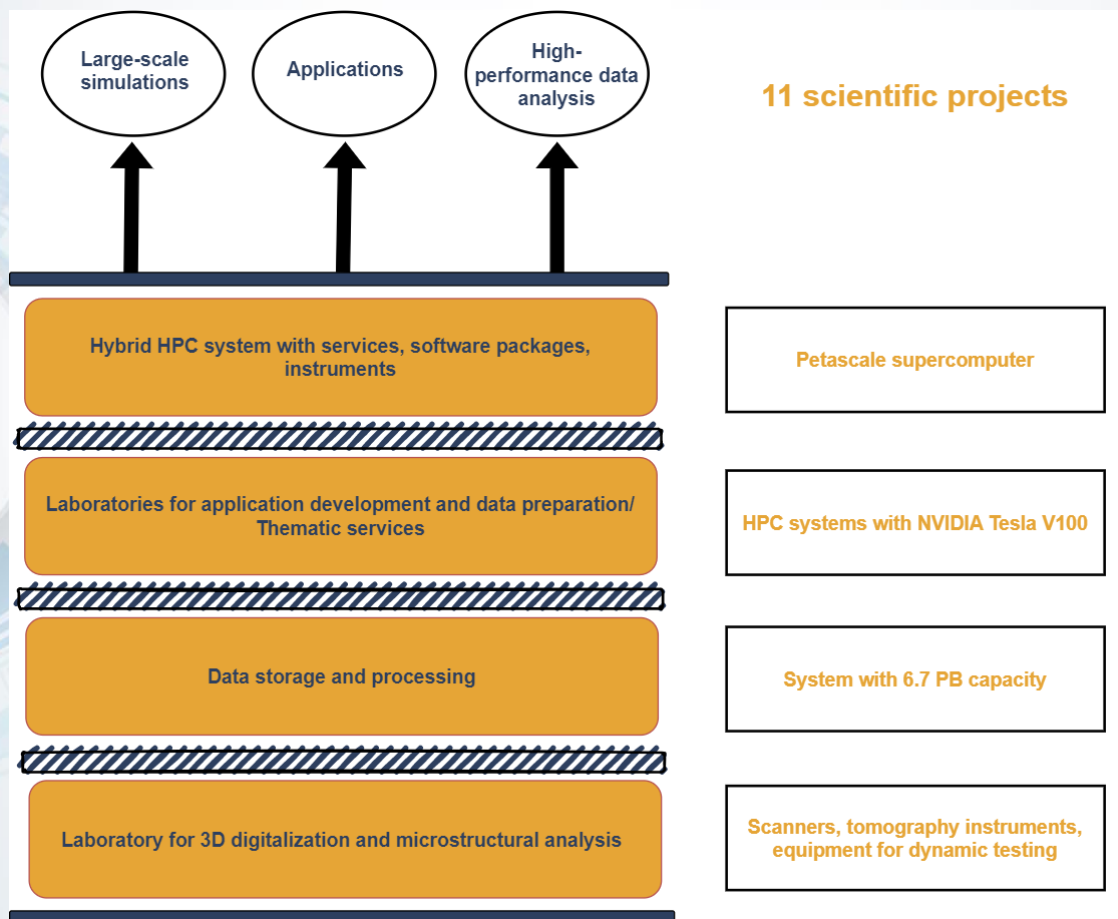
The CoE in Informatics and ICT is built by a consortium comprising:

- ✓ Institute of Information and Communication Technologies – BAS (leading organization);
- ✓ Institute of Mathematics and Informatics – BAS;
- ✓ Institute of Mechanics – BAS;
- ✓ National Institute of Geophysics, Geodesy and Geography – BAS;
- ✓ Plovdiv University „Paisii Hilendarski“;
- ✓ Medical University – Sofia;
- ✓ University of Library Studies and Information Technologies.





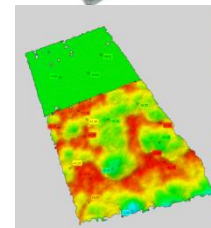
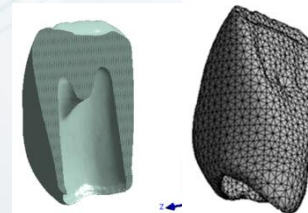
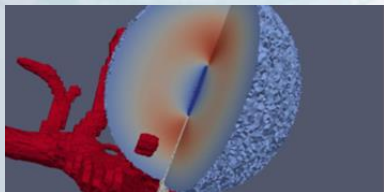
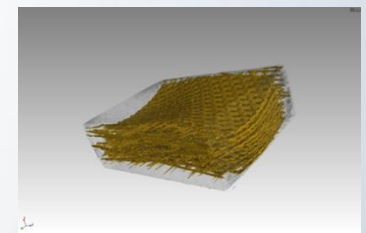
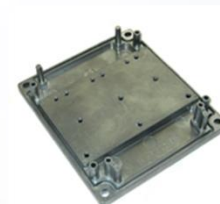
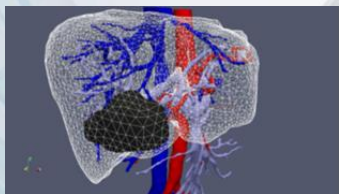
Infrastructural complex for digital transformation and large-scale computations of the CoE in Informatics and ICT





- Industrial Computed Tomograph
- Portable System for 3D Laser Scanning
- Portable System for 3D Scanning in Color
- System Combining Laser Scanning and Sensing Device
- Portable System for 3D Laser Scanning of Large Objects
- Combined System Including Electromagnetic Oscillation Generator and Non-Contact Laser Vibrometer

The laboratory implements the concept of the digital twin for modeling, simulation and optimization.





- System capable of storing and processing Big Data that uses a storage environment with a raw capacity of 6.72 PB and 5 dual-reserved Luster file system management servers.
- Systems with the ability to process large volumes of data in the memory, which consists of 8 servers, each with 4 processors and a total volume of RAM of 24 TB.
- Communication environment between each of the servers of the two systems, as well as their external connectivity, implemented on the basis of InfiniBand 100 and 200 Gbps interfaces, Ethernet 10 Gbps and Ethernet 1 Gbps.





Level 3: Local application development centers

40 Fujitsu Primergy RX 2540 M4 servers with configuration:

NVIDIA Tesla V100 32GB

128 GB RAM

CPU 2x Intel Xeon Gold 5118

2.30GHz 24 core

2x800GB SSD

3x12TB HDD

NVIDIA Tesla V100 32GB:

Double Precision Performance: 7

Tflop/s

Single Precision Performance: 14

Tflop/s

Tensor Performance (AI): 112

Tflop/s





- **HEMUS** is the new Heterogeneous Multifunctional Supercomputer installed in September 2023:
 - petascale performance: more than 3×10^{15} floating point arithmetic operations per second;
 - 148 servers distributed in two subsystems connected by non-blocking InfiniBand;
 - 20 GPU-based servers with 8 NVIDIA A100 cards each;
 - 10 752 CPU cores;
 - 990 720 GPU cores;
 - 1 001 440 cores total.

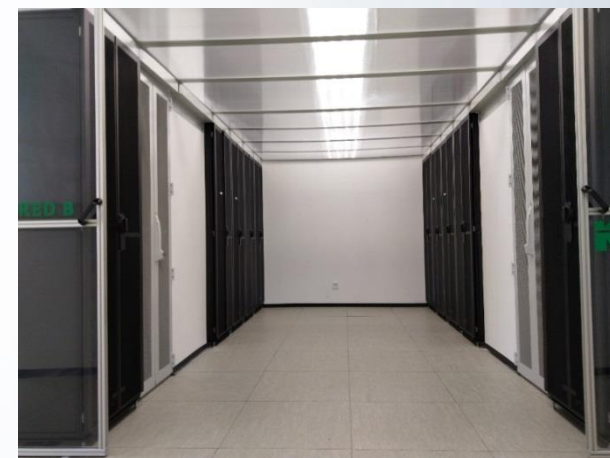
➤ TOP 500 Ranking, 14 November 2023

360

Rmax = 2,53 PFlop/s

E = 78,8 %

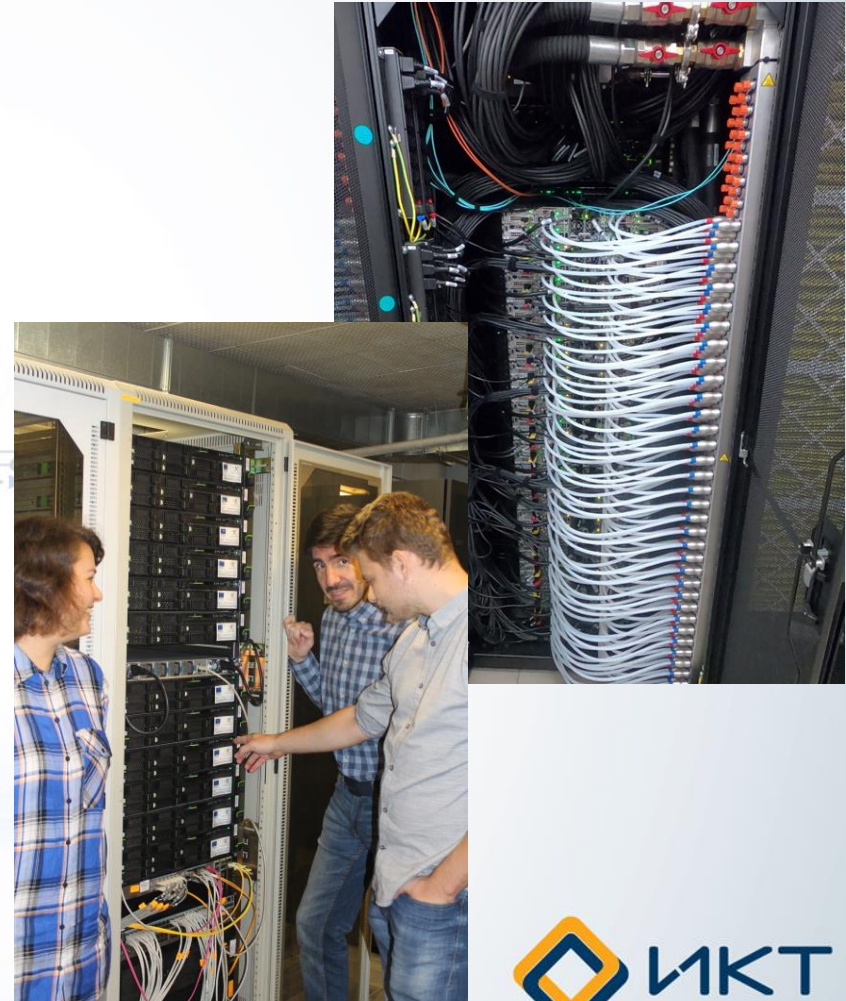
Rpeak = 3,21 PFlop/s





Teamwork, competence, active users

- A highly competent team maintains and provides access, training and support for users.
- The vast experience gained from participation in major European **infrastructure initiatives** and projects is used:
 - PRACE, EGEE 1/2/3,
SEEGRID1/2/3, HP-SEE, SESAME
NET, VI-SEEM, EOSC-hub,
EGI-ACE, NI4OS-Europe,
EuroCC, EuroCC2 ...
- **Over 130** active users of the infrastructure build by the CoE in Informatics and ICT.





Opening ceremony of the new infrastructural complex



On October 19, the new Infrastructural complex for digital transformation and high-performance computing, built under the project "CoE in Informatics and ICT", was opened. Among the official guests at the opening were the Prime Minister Academician Nikolay Denkov, the head of the Representation of the European Commission in Bulgaria Mr. Boyko Blagoev, the executive director of IA "Education Program" Prof. Georgi Vaisilov and the chairman of the BAS academician Julian Revalski.





THANK YOU FOR YOUR ATTENTION!

The synergy between e-infrastructure and artificial intelligence in a Big Data environment creates qualitatively new opportunities for science and innovation.

OUR CENTER IS PART OF THIS ECOSYSTEM!



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