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University Computing Centre

# Overview of the HPC landscape in Europe and Croatia: current state and perspectives

www.srce.unizg.hr

Croatian HPC Competence Centre Day

HPC History

- Vector Processing
  - Cray-1 – 160 MFLOPS
- Massively Parallel Processing (MPP)
- Computer Clusters
  - poor mans supercomputer
- Top500 list
- GPGPUs
  - generative AI
- Exascale era
  - Frontier 1,206 EFLOPS, ~23 MW
  - Aurora 1,012 EFLOPS, ~39 MW
  - Most Top500 systems GPU-powered
- Future
  - Zettascale
 - Quantum Computers
  - Living Computers

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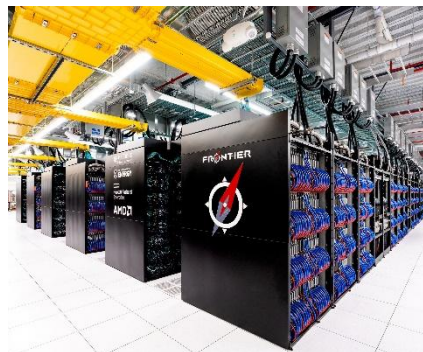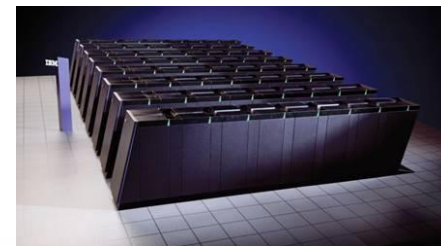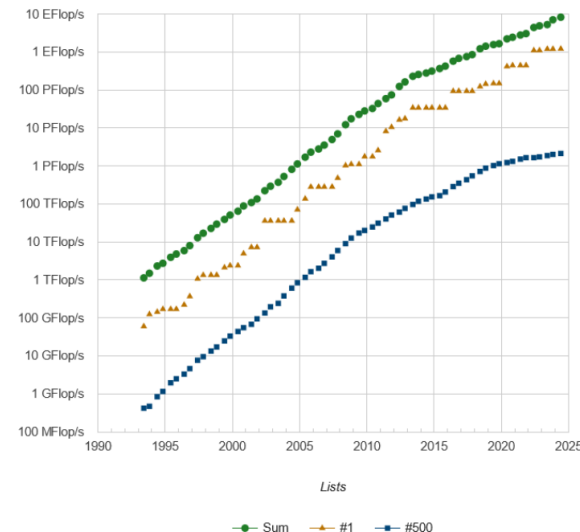
Advanced Computing – SRCE perspective

- **1974. – UNIVAC 1110**

- **2002. – 2024. – Isabella**
  - computer cluster for Croatian researchers
  - peak 150 TFLOPS, 13 expansions

- **2003. – 2024. CRO-GRID & CRO NGI**
  - distributed grid infrastructure in Croatia

- **2006. – Croatia joins EGEE, later EGI**
  - worldwide grid infrastructure

- **2021. – NCC Croatia**
  - raise awareness and offer HPC outside of traditional research community

- **2023. – HR-ZOO infrastructure**
  - Virtual Data Centre
  - Advanced Computing
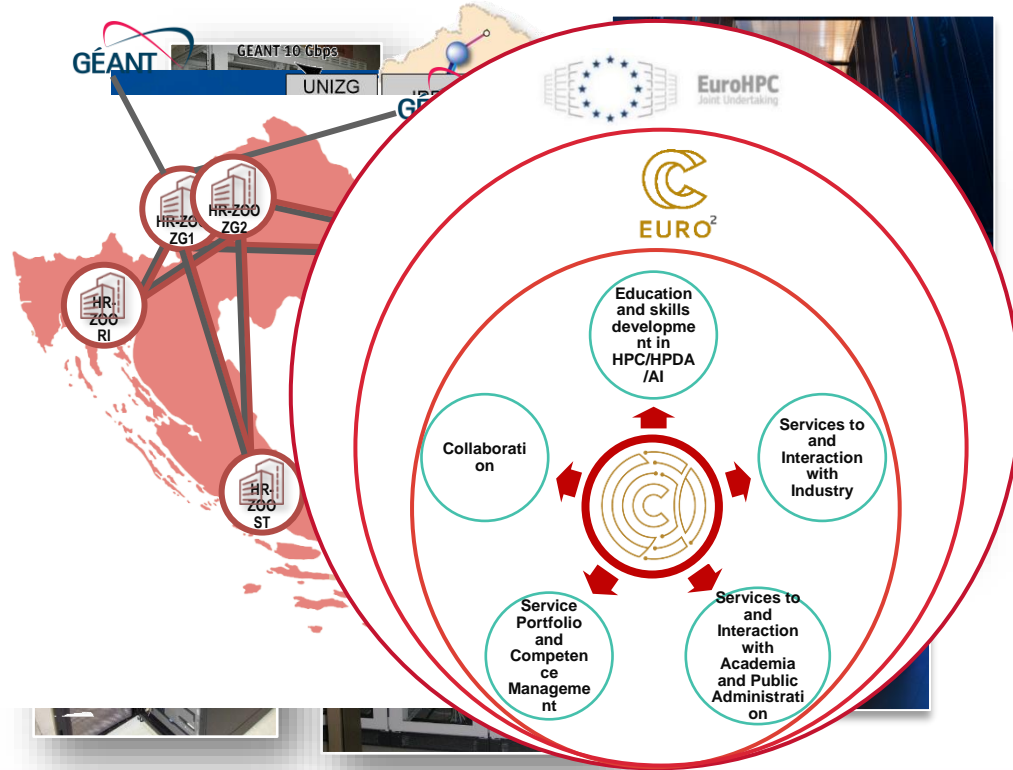
SRCE for Science

INFORMATION SUPPORT

CRO**KIS** — Croatian Research Information System

DATA, REPOSITORY AND OPEN SCIENCE

Dabar I Hrčak I Puh
Support to Open Science

dabar
DIGITALNI AKADEMSKI ARHIVI I REPOZITORIJI

hrčak
PORTAL HRVATSKIH ZNANSTVENIH I STRUČNIH ČASOPISA

puh
POHRANA I UPRAVLJANJE PODACIMA

AKADEMIJA SRCA

AUTHENTICATION & AUTHORIZATION INFRASTRUCTURE

AAI @EduHr

Data Science Lifecycle

Reuse · Plan · Collect · Process · Analyse · Preserve · Share
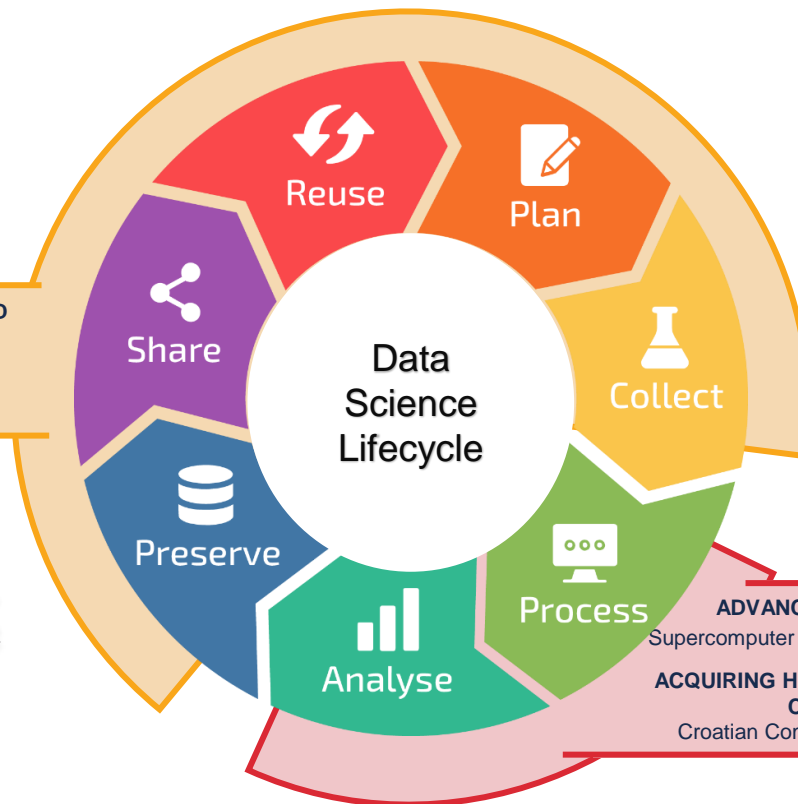
Supek · Vrančić

ADVANCED COMPUTING
Supercomputer Supek I resource Vrančić

ACQUIRING HPC COMPETENCE AND CONSULTING
Croatian Competence Center for HPC

Education and provision of specialized support in the use of digital resources and services

Supercomputer Supek

- Croatian Tier-1 HPC resource

- Advanced computing environment with a power of 1.25 PFLOPS with a total of:
    - 8384 processor cores
    - 80 graphic processors
    - 32 TB of working memory

- HPE Cray EX
    - Direct Liquid Cooling
    - 200 Gbit/s Slingshot interconnect
   - 580 TB all-flash Lustre storage

|	Servers with CPUs	Servers with GPUs	Servers with large memory capacity
Computing nodes total	52	20	2
CPU total	6656	1280	256
GPU total		80	
CPU	2 x AMD Epyc 7763 2,45 GHz	1 x AMD Epyc 7763 2,45 GHz	2 x AMD Epyc 7763 2,45 GHz
CPU cores	128	64	128
Working memory	256 GB	512 GB	4 TB
GPU		4 x NVIDIA A100 s 40 GB memorije	

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Supercomputer Supek
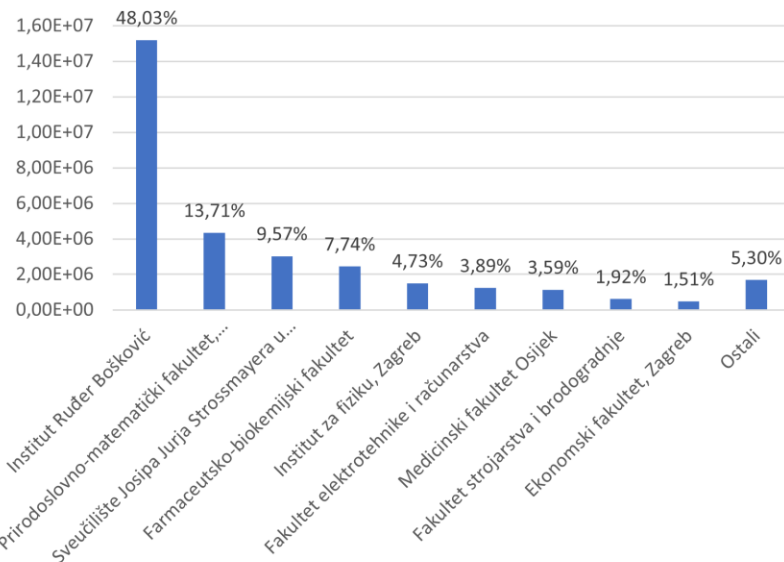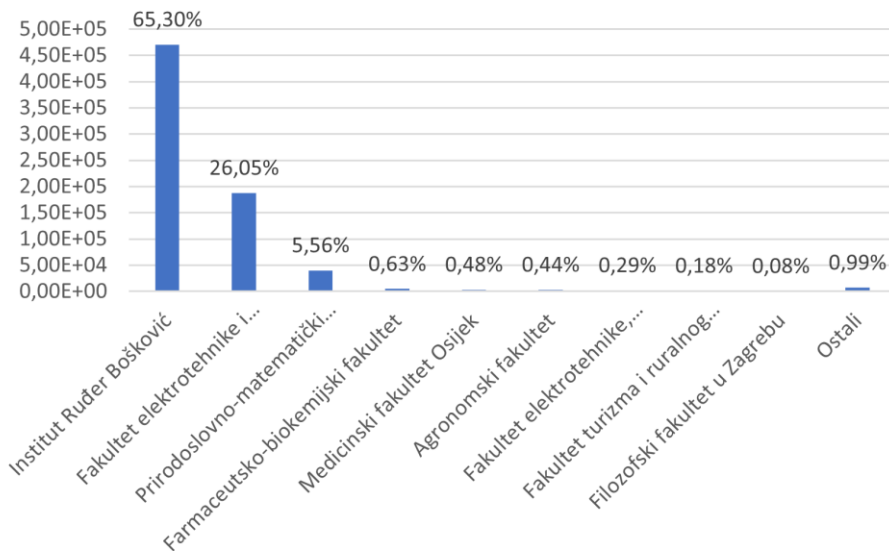
Advanced Cloud Computing Vrančić

The service is established on a resource for High-throughput computing (HTC), intended for a wider set of user applications and systems

- Adaptable, elastic and versatile computing environment

- OpenStack & Ceph

- Additional services
    - Padobran cluster
   - Jupyter notebooks
    - Galaxy

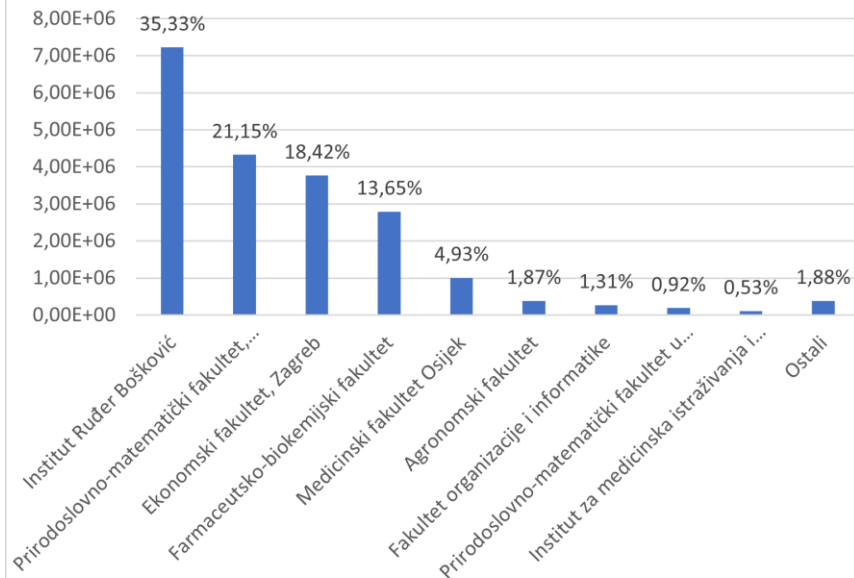|	Servers with CPUs	Servers with GPUs	Servers with large memory capacity
Computing nodes total	86	4	2
CPU total	11.008	256	256
GPU total		16	
CPU	2 x AMD Epyc 7713 2,0 GHz	1 x AMD Epyc 7713 2,0 GHz	2 x AMD Epyc 7713 2,0 GHz
CPU cores	128	64	128
Working memory	512 GB	512 GB	2 TB
GPU		4 x NVIDIA A100 s 40 GB memorije	

Advanced Cloud Computing Vrančić

Vrančić CPUh
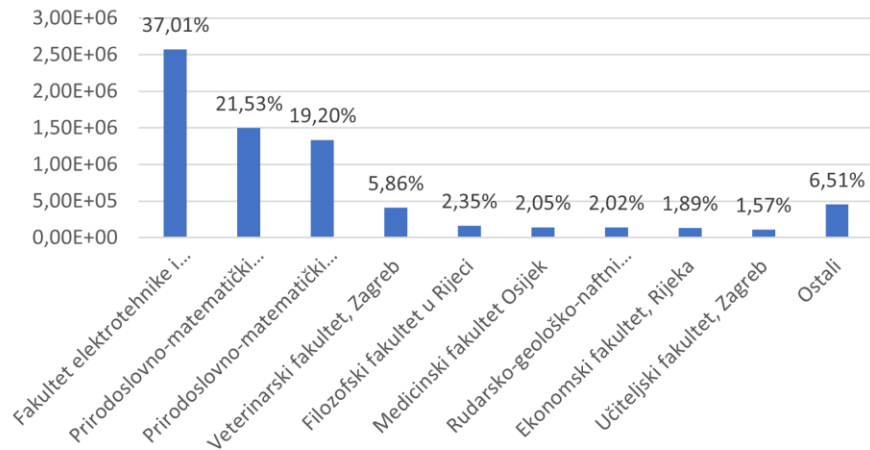
Padobran CPUh

Croatian Competence Centre for HPC (HR HPC CC)

ONE-STOP-SHOP FOR HPC

The Croatian Competence Centre for HPC is a place where users from the academic and scientific community, industry, and public administration get support in the application of the national and European infrastructure of High Performance Computing (HPC) in their work.

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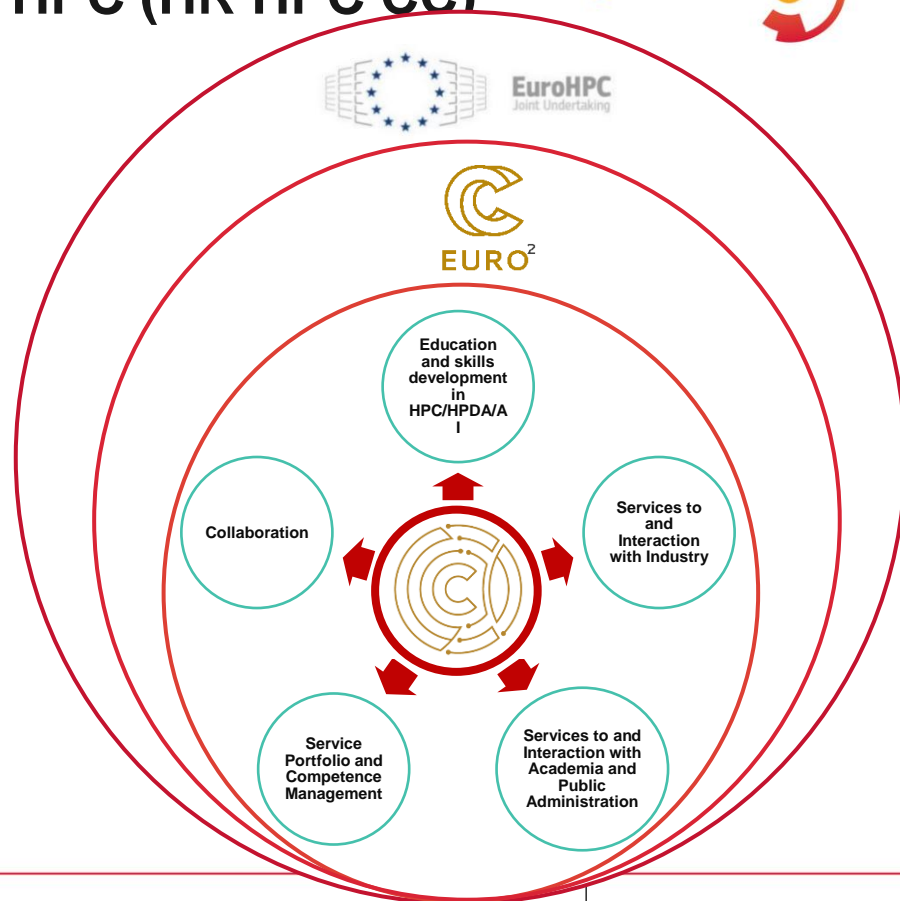Sveučilište u Rijeci
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CROATIAN
COMPETENCE
CENTRE FOR HPC

https://www.hpc-cc.hr/

Co-funded by
the European Union

EuroHPC
Joint Undertaking

EURO²

Education and skills development in HPC/HPDA/AI

Collaboration

Services to and Interaction with Industry

Service Portfolio and Competence Management

Services to and Interaction with Academia and Public Administration

HPC for Industry, SMEs & Public Administration

- European Digital Innovation Hubs (EDIHs) - Services
  - Test before invest
  - Skills development & training
  - Support for access to funding
  - Networking and innovation system development
- EDIHs providing HPC related services
  - CROBOHUB++
    - Education in High-performance Computing
    - Tailored Advisory Services for Companies, Including Access to CPU Compute Nodes
    - Advanced Computing for Artificial Intelligence and Machine Learning
  - AI4Health
    - Test Before Invest
    - Education & Training Services

Thank you for your attention!

Questions?