EuroHPC Summit

2023 Göteborg

EuroHPC JU Access Calls

The Peer-Review Process

Krishnakshi Bhuyan & Klara Meštrović

March 21, 2023

Overview

WHY?

Transparency

Fairness

Milestones and achievements

Access Calls

Peer-Review

HOW?

EuroHPC Summit

2023 Göteborg

Access Calls
&
Peer- Review

Available EuroHPC JU Systems

CSC, Finland
Pre-exascale system: LUMI
Partitions: LUMI-C & LUMI-G

IT4Innovations, Czech Republic
Petascale system: Karolina
Partitions: Karolina CPU & Karolina GPU

LuxProvide, Luxembourg
Petascale system: MeluXina
Partitions: MeluXina CPU, MeluXina GPU & MeluXina FPGA

IZUM, Slovenia
Petascale system: Vega
Partitions: Vega CPU & Vega GPU

CINECA, Italy
Pre-exascale: LEONARDO
Partitions: LEONARDO Booster

BSC, Spain
Pre-exascale: MareNostrum5
Partitions: MN5 GPP

SofiaTech, Bulgaria
Petascale system: Discoverer
Partitions: Discoverer CPU

Access Calls

Access calls intended for preparatory activities:

Development Access

Benchmark Access

Access calls intended for production runs:

Regular Access

Extreme Scale Access

Access Calls

Benchmark & Development Access calls

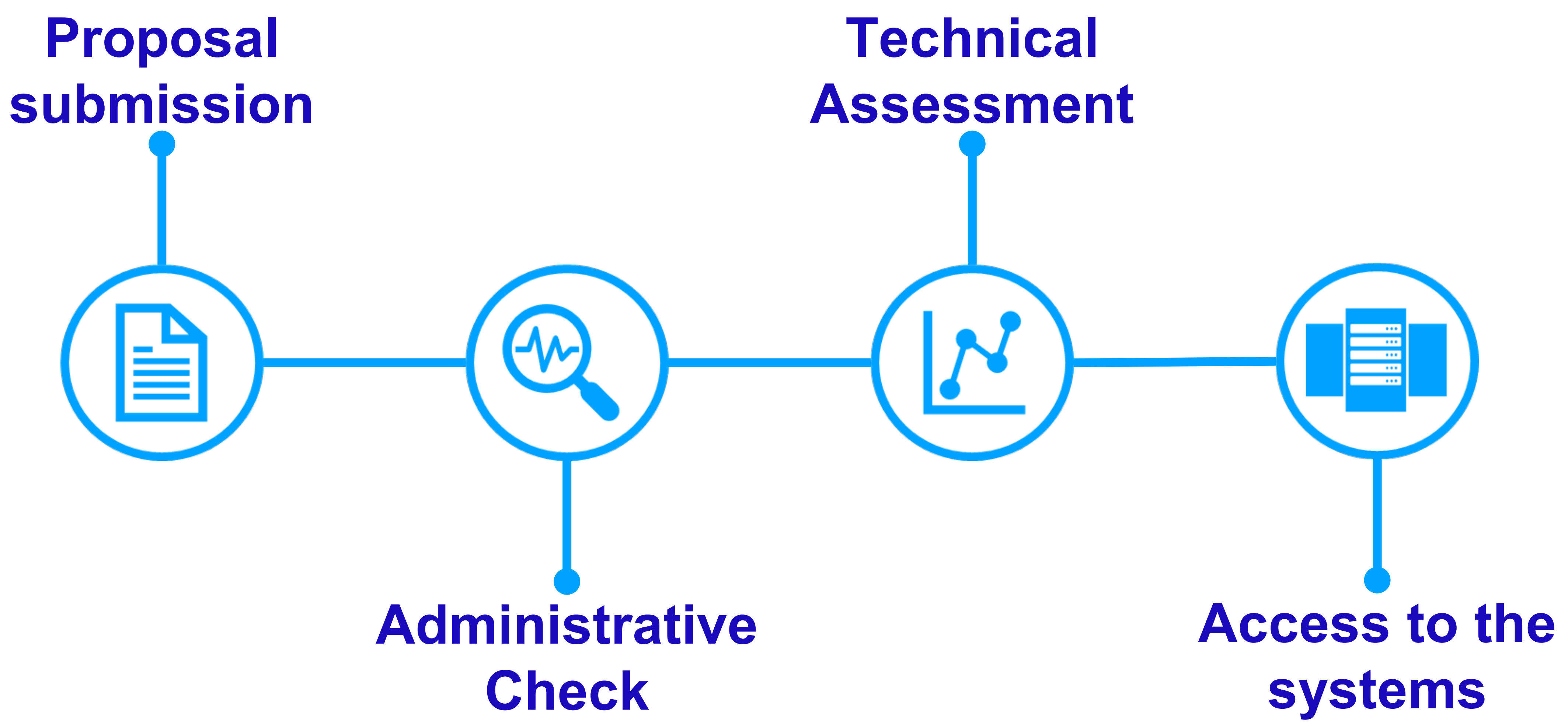
Benchmark Access
- Scaling tests & benchmarks
- Allocation duration – 2 or 3 months

Development Access
- Code and algorithm development
- Allocation duration – 6 or 12 months

Continuously open calls with monthly cut-offs

Predefined resources available per partition

Peer-Review process



Access Calls

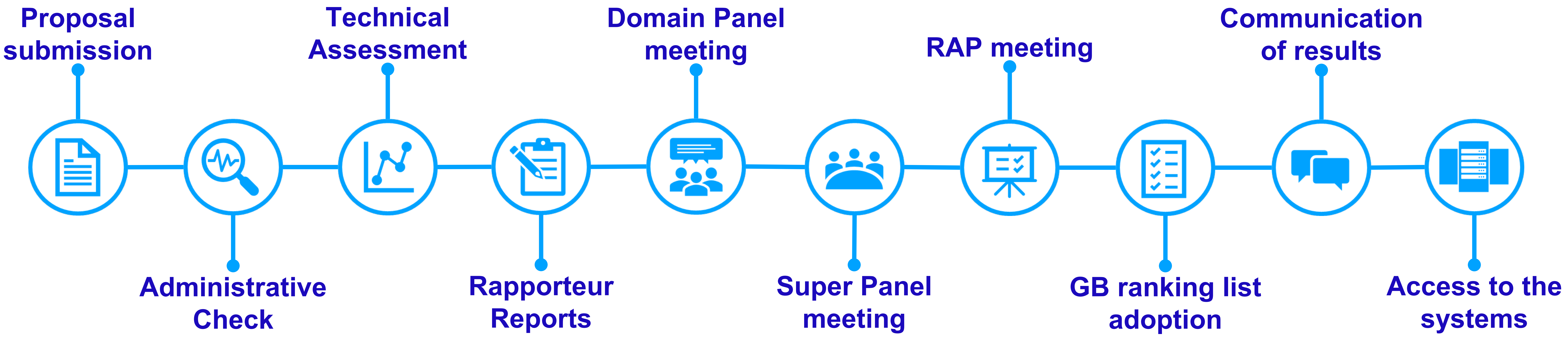
Regular Access call

- Intended for projects that require large-scale HPC resources
- Peer-Review process duration: **4 months**

Continuously open call with 3 cut-off dates per year: **March, July, November**

Available resources on petascale and pre-exascale systems

Peer-Review process



Access Calls

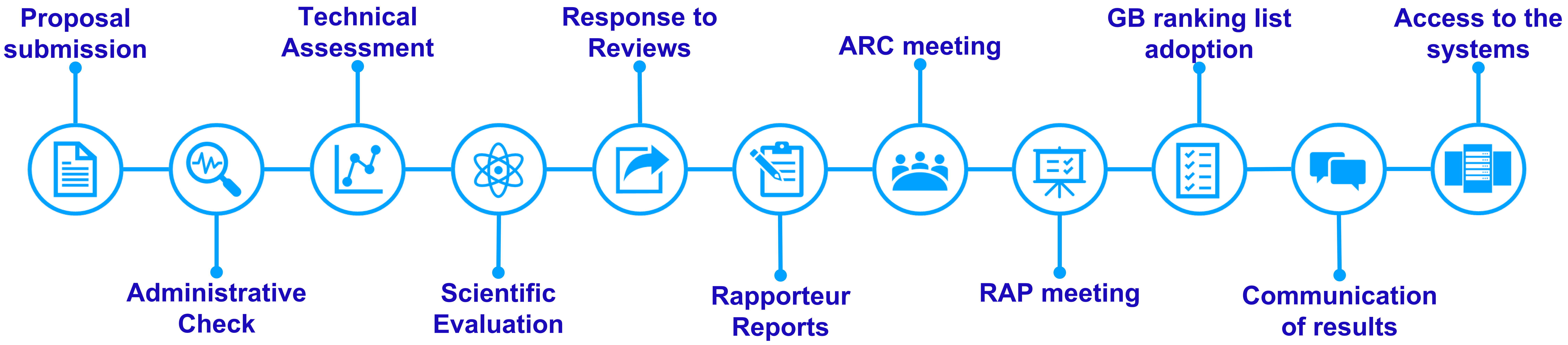
Extreme Scale Access call

- Intended for high-impact, high-gain projects that require extremely large-scale HPC resources
- Peer-Review process duration: **6 months**

Continuously open call with 2 cut-off dates per year: **April, October**

Available resources on pre-exascale systems

Peer-Review process



Access Calls

Regular & Extreme Scale Access – evaluations

Access tracks:

- Scientific
- Industry
- Public Administration

Evaluation criteria:

- Excellence
- Innovation and Impact
- Quality and Efficiency of the Implementation

Scoring system:

- Grade **0-5** per criterium
- Minimum grade per criterium – **3**
- Overall grade sum **0-15**
- Overall grade sum minimum - **10**

Access Calls

Regular & Extreme Scale Access – evaluations

PROPOSAL INFORMATION		EVALUATION MEETING RESULTS			RESOURCE ALLOCATION PANEL (RAP) OUTCOME	
Proposal ID	**Requests on System X**	**Meeting grade**	**Result**	**Rank**	**Awarded resources**	**RAP result**
1111	20,000,000	15	Above threshold	1	20,000,000	Awarded
2222	60,000,000	14	Above threshold	2	60,000,000	Awarded
3333	70,000,000	10	Above threshold	3	0	Not awarded
4444	10,000,000	8	Below threshold	4	0	Not awarded
5555	40,000,000	7	Below threshold	5	0	Not awarded

System X offer: **80.000.000 core hours**

Total resources requested: **200.000.000 core hours**

System oversubscription: **120.000.000 core hours**
System oversubscription percentage: **60%**

System X available resources: **80.000.000 core hours**

System X available resources: **60.000.000 core hours**

System X available resources: **0 core hours**

Access Calls

Regular & Extreme Scale Access – evaluations

Thank you!!

Evaluations of proposals' technical feasibility

Technical experts:

- Computing centre representatives
- Technical reviewers

Evaluations of proposals' scientific excellence, innovation and impact

Scientific experts:

- Committee Chairs
- Domain Panel Chairs
- Rapporteurs
- External reviewers

Access Calls

User guidelines

- Respect the cut-off dates and deadlines
- Use correct, up-to-date proposal templates
- Perform scalability tests on time on the preferred system
- Submit your Final Reports on time
- Take the Committee comments into consideration

Access Calls

Timeline milestones

- May 2021 – Benchmark & Development Access 1st cut-off
- December 2021 – Regular Access 1st cut-off
- March 2022 – Regular Access 2nd cut-off
- July 2022 – Regular Access 3rd cut-off
- November 2022 – Regular Access 4th cut-off
- December 2022 – Extreme Scale Access 1st cut-off
- March 2023 – Regular Access 5th cut-off

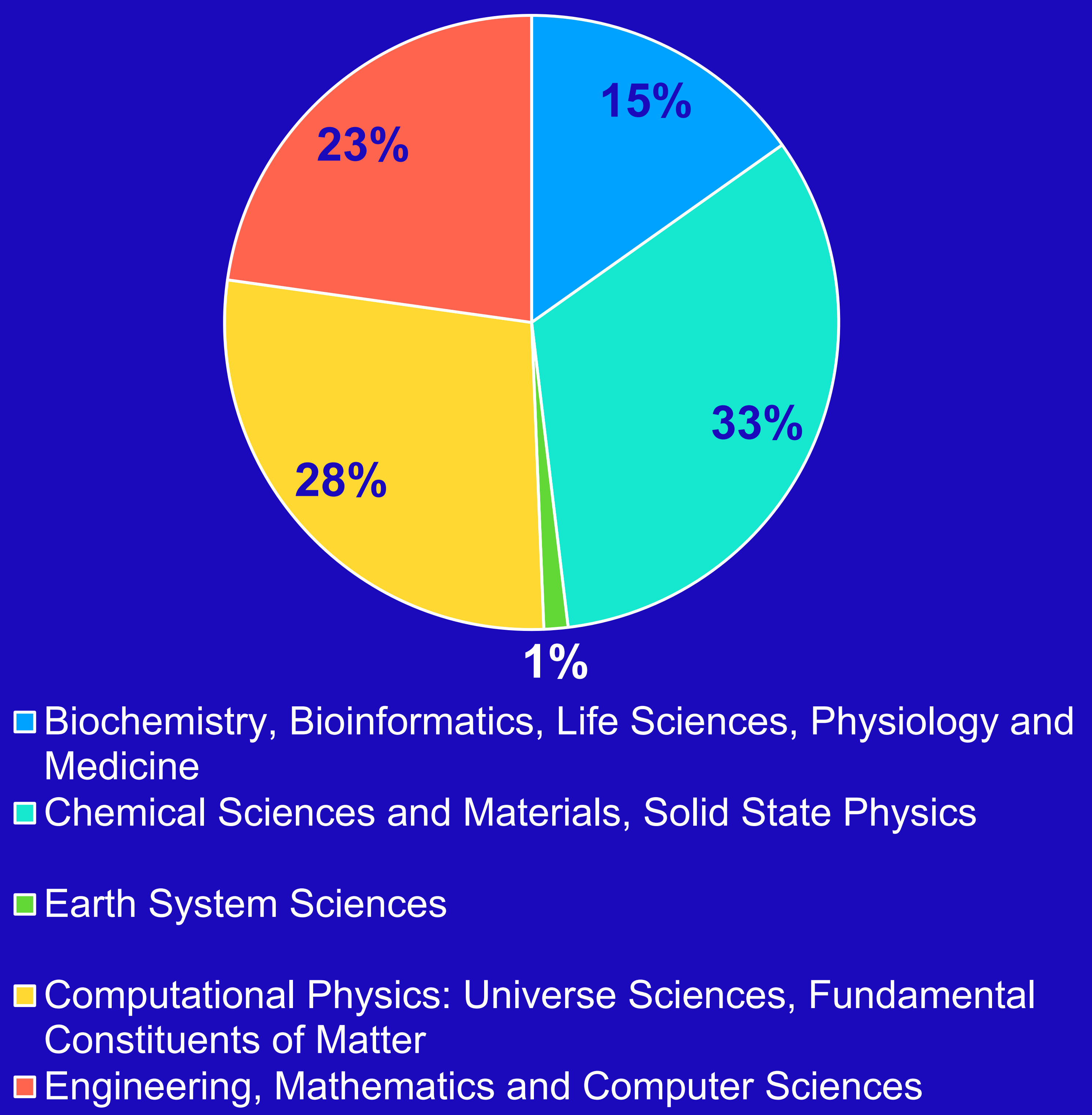
Next Extreme Scale Access cut-off – April 28, 2023

Next Regular Access cut-off – July 7, 2023

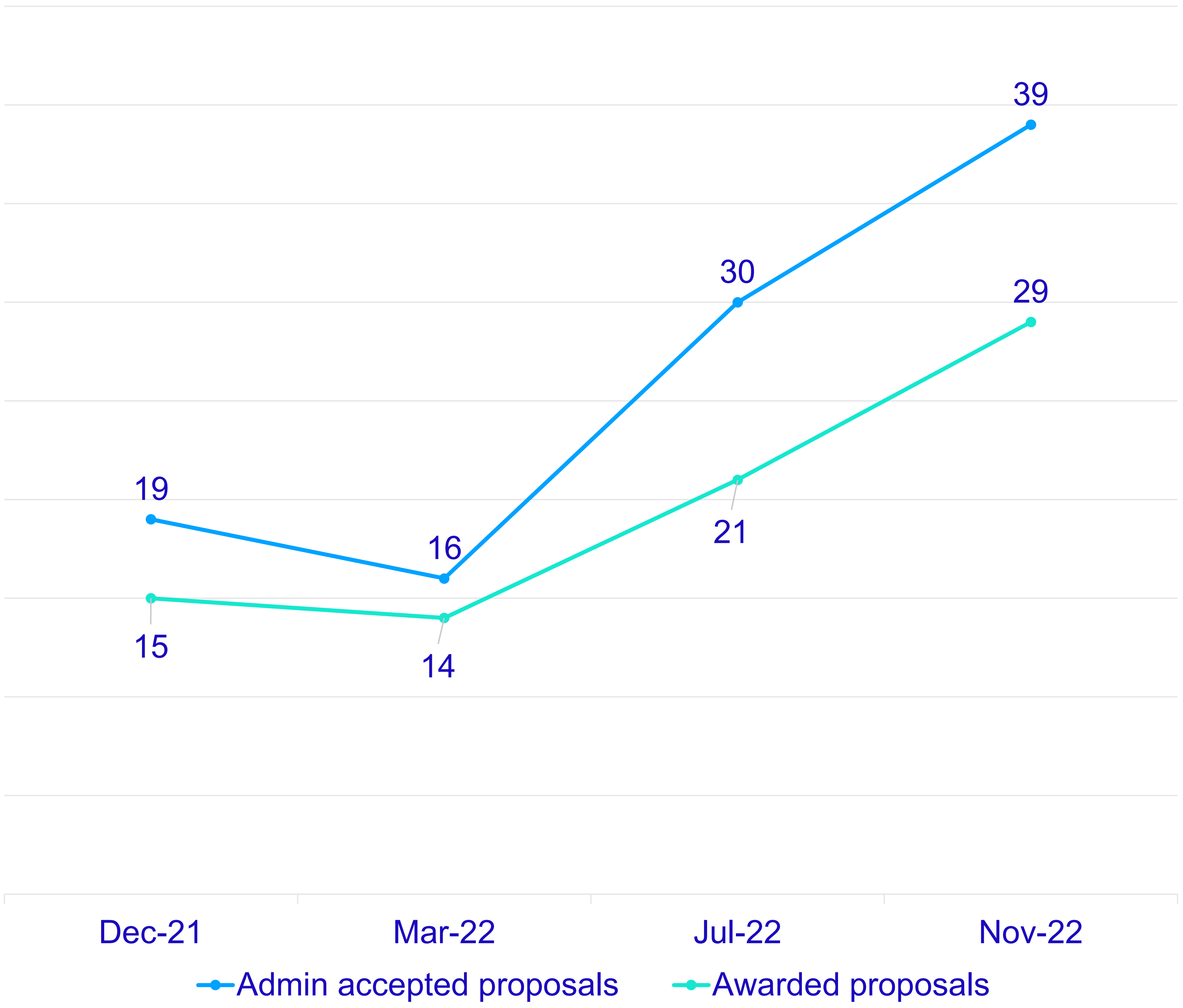
Access Calls

Statistics

Regular Access – Awarded projects - research domains distribution across all cut-offs



Regular Access - Administratively accepted vs awarded proposals - all cut-offs

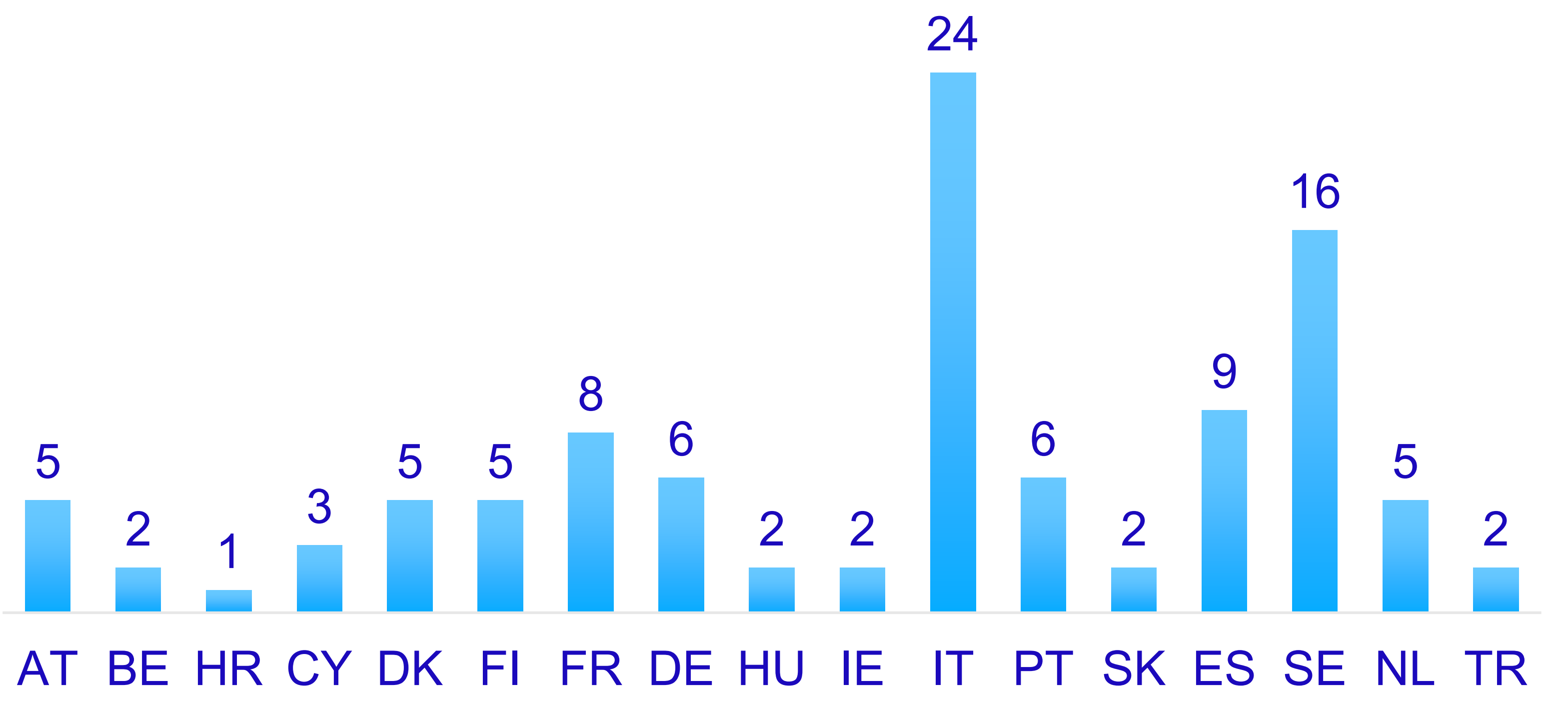


Regular Access – awarded resources	
HPC Centre	**Core hours awarded**
IZUM (SI)	383,379,687
IT4I (CZ)	140,900,667
SofiaTech (BG)	151,310,720
LuxProvide (LU)	121,207,896
CSC (FI)	765,204,976
TOTAL	**1,562,003,946**

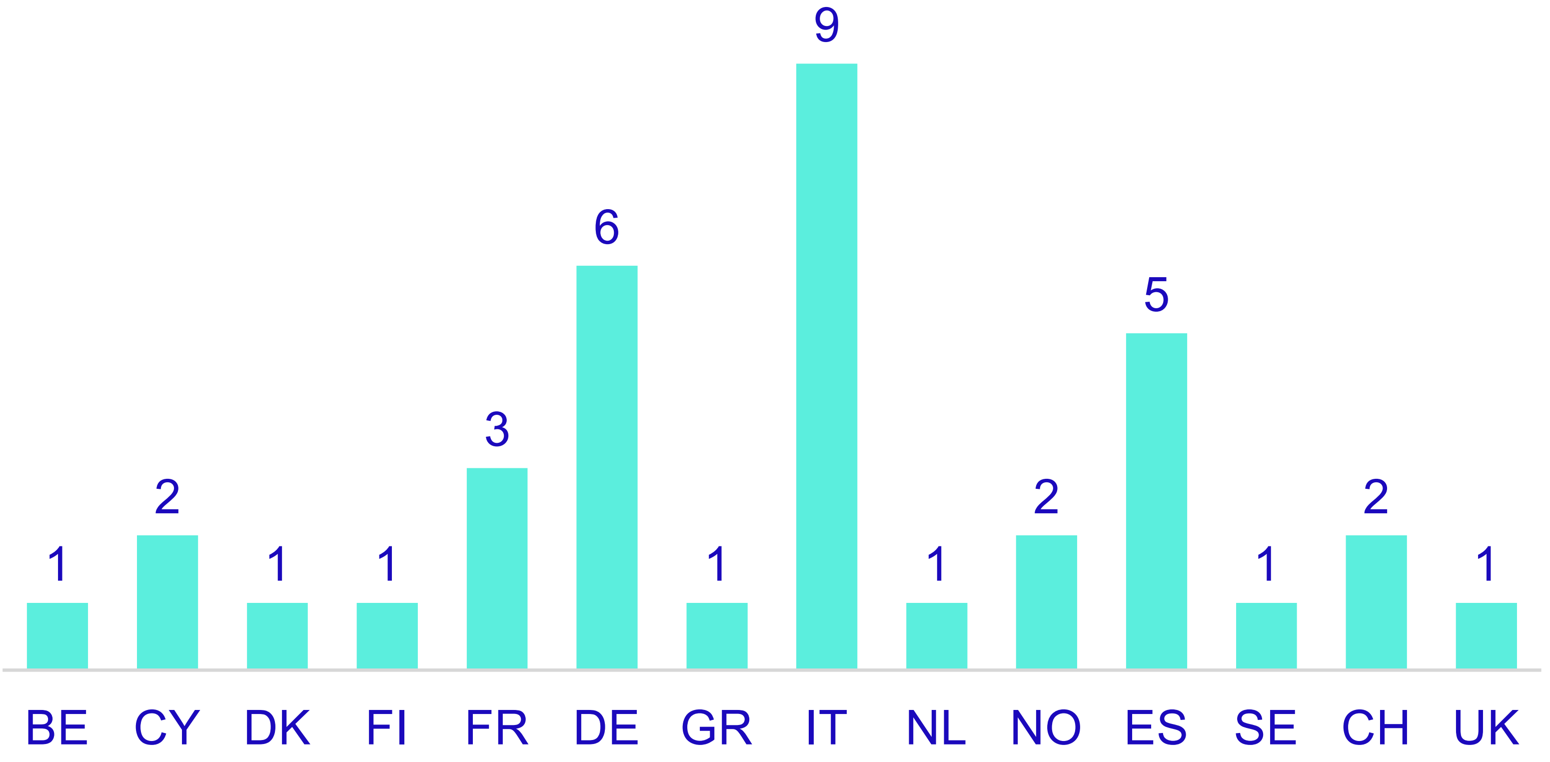
Access Calls

Statistics

Regular Access - awarded projects per country (PI and team members) – all cut offs



Extreme Scale Access - accepted proposals - PI institution country distribution



Extreme Scale Access, December 2022 cut-off

Proposals submitted: **40**
Proposals administratively accepted: **36**

Regular Access March 2023 cut-off

Proposals submitted: **36**
Proposals administratively accepted: **31**

EuroHPC Summit

2023 Göteborg

Innovations

Fairness

Transparency

Equal opportunities

Public benefits

Scientific breakthroughs

Communities

Collaboration

Industrial competitiveness

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Thank you for your attention!

Tack så mycket!

EuroHPC Summit

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EuroHPC JU Access Opportunities

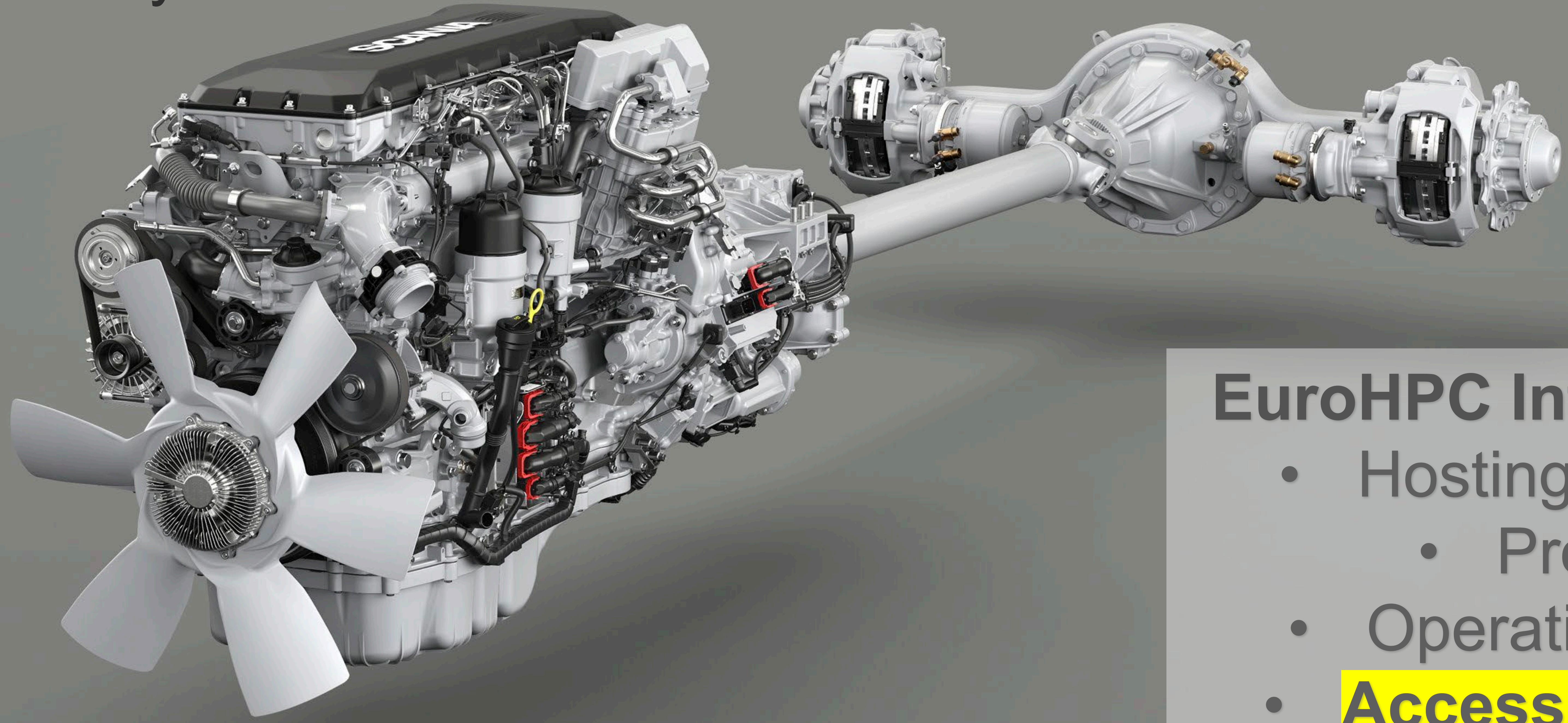
Available calls and systems

Vangelis Floros - 22 March 2023

Supercomputing Infrastructure

The powertrain of EuroHPC

- Empowering European Scientific Research, Academia, Industry & SMEs
- Accelerating discovery and innovation



EuroHPC Infrastructure Pillar

- Hosting Entity Selection
- Procurements
- Operation & Monitoring
- **Access Time allocation**
- Hyperconnectivity
- Federation
- High-Level Application Support

ACCESS TO EUROHPC SUPERCOMPUTERS

WHO IS ELIGIBLE?

- Academic and research institutions (public and private)
- Public sector organisations
- Industrial enterprises and SMEs
- Established in the EU or H2020 affiliated country

→ Open to all fields of research

WHICH TYPES OF ACCESS EXIST?

- Regular access
- Extreme scale access
- Benchmark access
- Special access

Regular and extreme scale access calls are continuously open, with several cut-offs throughout the year triggering the evaluation of proposals.

WHAT ARE THE CONDITIONS FOR ACCESS?

Access is free of charge. Participation conditions depend on the specific access call that a research group has applied to.

In general users of EuroHPC systems commit to:

- acknowledge the use of the resources in their related publications
- contribute to dissemination events
- produce and submit a report after completion of a resource allocation

More information on EuroHPC access calls available at: https://eurohpc-ju.europa.eu/participate/calls_en

Access Policy

Access Policy v1.1 as adopted by the EuroHPC GB

- **To be revised in 2023!**

- **6 Access Modes offering resources on a continuously open call basis with periodic cut-off dates.**
  - **Extreme scale:** Large applications, Pre-exascale systems (mostly). Peer-reviewed
  - **Regular:** Medium to large applications, Petascale systems (mostly). Peer-reviewed
  - **Development.** All systems. Up to 1 year access. Limited resources.
  - **Benchmark.** All systems. Up to 3 months access. Limited resources.
  - **Fast track for Industry & Academia.** Quick access to previously completed applications

- Decided by the Governing Board:
- **Strategic Initiatives/Projects** -> **Destination Earth**
- **Urgent/Emergency** Computing & Access

- **PRACE supports EuroHPC** in the implementation of the Access Policy!

Visit https://pracecalls.eu/ and https://prace-ri.eu/hpc-access/eurohpc-access/

Regular Access

- EuroHPC JU Regular Access call is open to all fields of **science**, **industry**, and the **public sector**, targeting applications that will enable progress and innovation in the domains covered (3 distinctive tracks).
- **Continuously open** with **pre-defined cut-off dates (3 per year)** that trigger the evaluation of the proposals submitted up to this date.
- Intended for **large-scale projects** demonstrating excellence in their domain with significant European added-value.
- Allocations granted for **one (1) year** with the option for projects to apply for a continuation of their allocation.

Extreme Scale

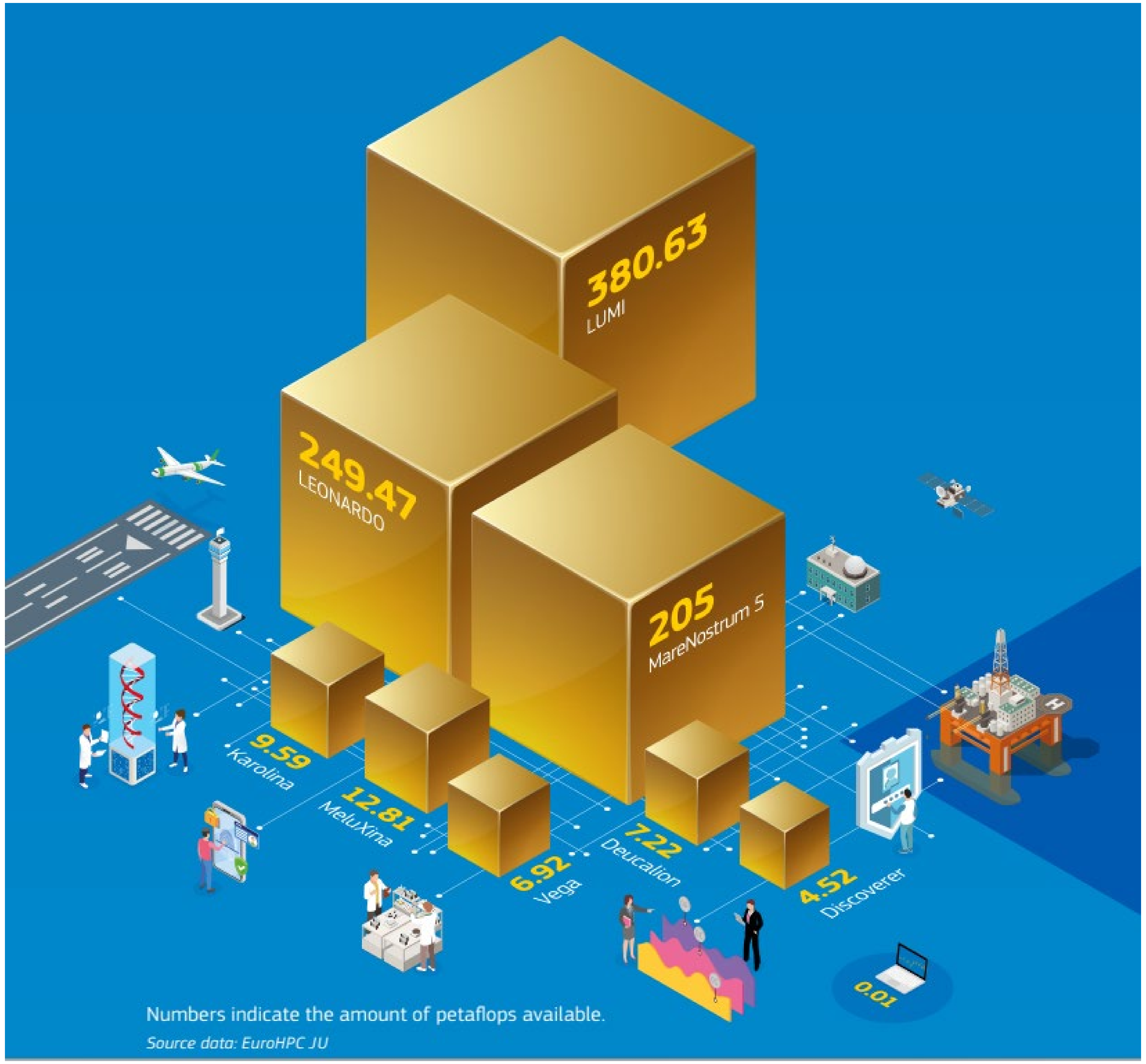
- This access mode will call for applications with **high-impact, high-gain innovative research**, open to all fields of **science**, **industry** and **public sector** justifying the need for and the capacity to use extremely large allocations in terms of compute time, data storage and support resources.
- **Continuously open** with **pre-defined cut-off dates (2 per year)** that trigger the evaluation of the proposals submitted up to this date.
- Intended to support **outstanding research and innovation projects** requiring access to **very large-scale computing** and **storage resources**.
- Allocations granted for **one (1) year** with the option for projects to apply for a continuation of their allocation.

Resource availability

By end 2023: **64.5 Million** node hours across **8 systems** (**15 partitions, 22.596 nodes**).

- CPU, GPU, FPGA resources
- Variety of platforms: AMD (x86, Instinct), Intel (x86), Nvidia (A100, H100), Fujitsu ARM (A64FX)
- **~870 PFlops** aggregated performance

To reach **91.3 Million** node hours by end of 2024 (full systems capacity)



Available EuroHPC Supercomputers

Pre-exascale systems

LUMI Consortium (Coordinator CSC)

Kayaani, Finland

Cray EX, Hewlett Packard Enterprise
#3 Top500 (Nov 2022): **309.1** PFlops (LUMI-G)

AMD platform

- CPU: 64-core next-generation AMD EPYC™
- GPU: AMD Instinct™ (MI250X),

Leonardo Consortium (Coordinator CINECA)

Bologna, Italy

Atos BullSequana XH2000
#4 Top500 (Nov 2022): **174.7** PFlops (BOOSTER)

Intel/NVidia platform

- CPU: Intel Sapphire Rapids
- GPU: Nvidia custom Ambere (A100)

Available EuroHPC Supercomputers

Petascale

Vega

Sustained performance:	**6,9 petaflops**
CPU:	AMD Epyc Rome
GPU:	Nvidia A100
TOP500 ranking:	#32 in EU; #106 globally (June 2021)
Vendor/model	Atos BullSequana XH2000
Operated by	IZUM, Maribor, Slovenia

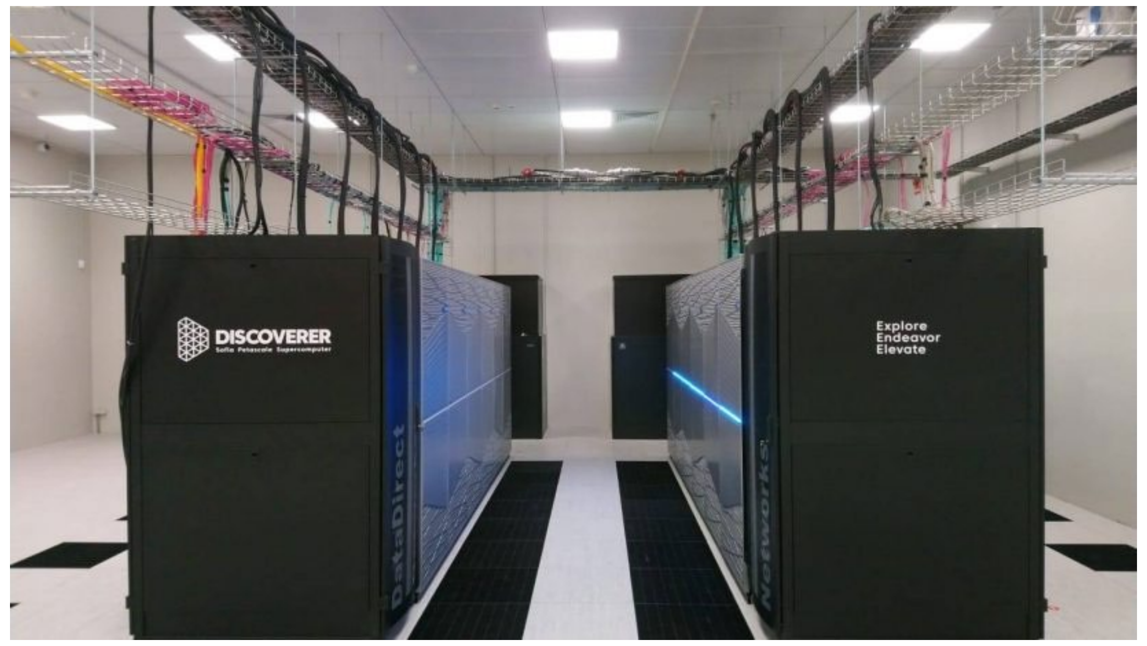
MeluXina

Sustained performance:	**12,8 petaflops**
CPU:	AMD Epyc Rome
GPU:	Nvidia A100
TOP500 ranking:	#10 in EU; #36 globally (June 2021)
Vendor/model	Atos BullSequana XH2000
Operated by	LuxProvide

Karolina

Sustained performance:	**9,13 petaflops**
CPU:	AMD Epyc Rome
GPU:	Nvidia A100
TOP500 ranking:	#20 in EU; #69 globally (June 2021)
Vendor/model	HPE Apollo 2000Gen10 Plus and Apollo 6500
Operated by	IT4I, Ostrava, Czech Republic

Discoverer



Sustained performance:	**4,45 petaflops**
CPU:	AMD Epyc Rome
GPU:	-
TOP500 ranking:	#27 in EU; #91 globally (June 2021)
Vendor/model	Atos BullSequana XH2000
Operated by	PSB consortium, Sofia, Bulgaria

Petascale systems in numbers

33.83 Petaflops sustained (47.19 Petaflops Rpeak)

- **11** partitions
- **3401** CPU Nodes
- **332** GPU Nodes
- FPGA, Visualisation and Cloud capabilities
- **24PB** Lustre Storage
- **6802** AMD EPYC Rome CPUs
- **1616** Nvidia A100 GPUs

ACCESS TO EUROHPC SUPERCOMPUTERS IN NUMBERS

CORE HOURS AWARDED FOR REGULAR ACCESS

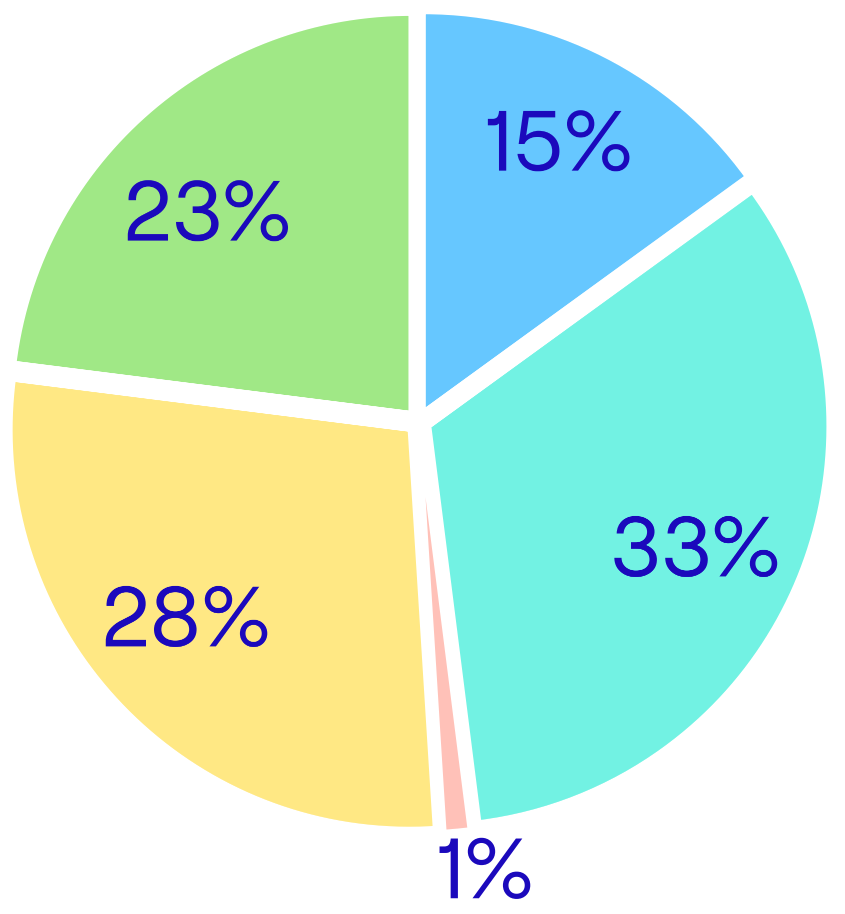
VEGA	383,379,687
KAROLINA	140,900,667
DISCOVERER	151,310,720
MELUXINA	121,207,896
LUMI (CPU only)	765,204,976

Total core hours awarded across all systems: **1,562,003,946**

Regular access time is currently being provided to the following fields of research:

- Biochemistry, Bioinformatics, Life Sciences, Physiology and Medicine
- Chemical Sciences and Materials, Solid State Physics
- Earth System Sciences
- Computational Physics: Universe Sciences, Fundamental Constituents of Matter
- Engineering, Mathematics and Computer Sciences

Research domains distribution across all cut-offs



Thank you!

European research and innovation on EuroHPC systems

Dr. Lilit Axner
Programme Officer at EuroHPC JU

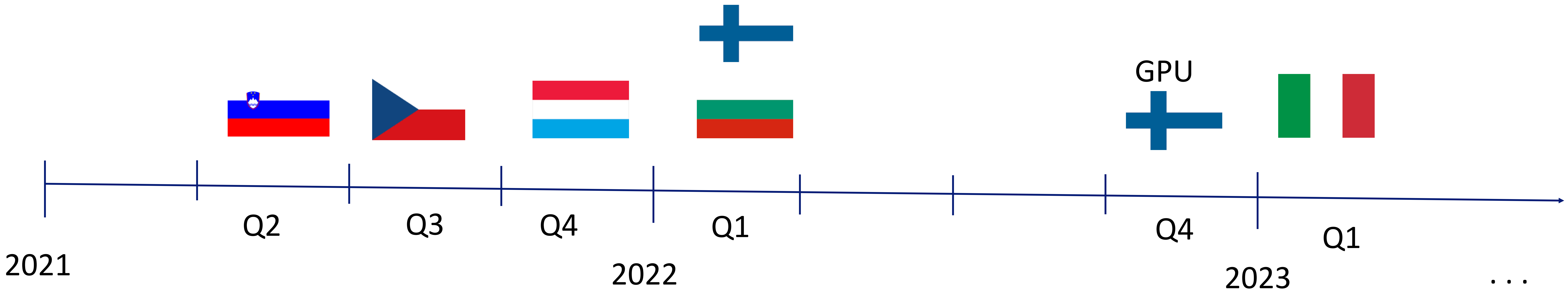
EuroHPC
Joint Undertaking

Why do We Need Supercomputers?

USERS: Innovation and Evolution

through Collaboration!

Systems in production: The timeline



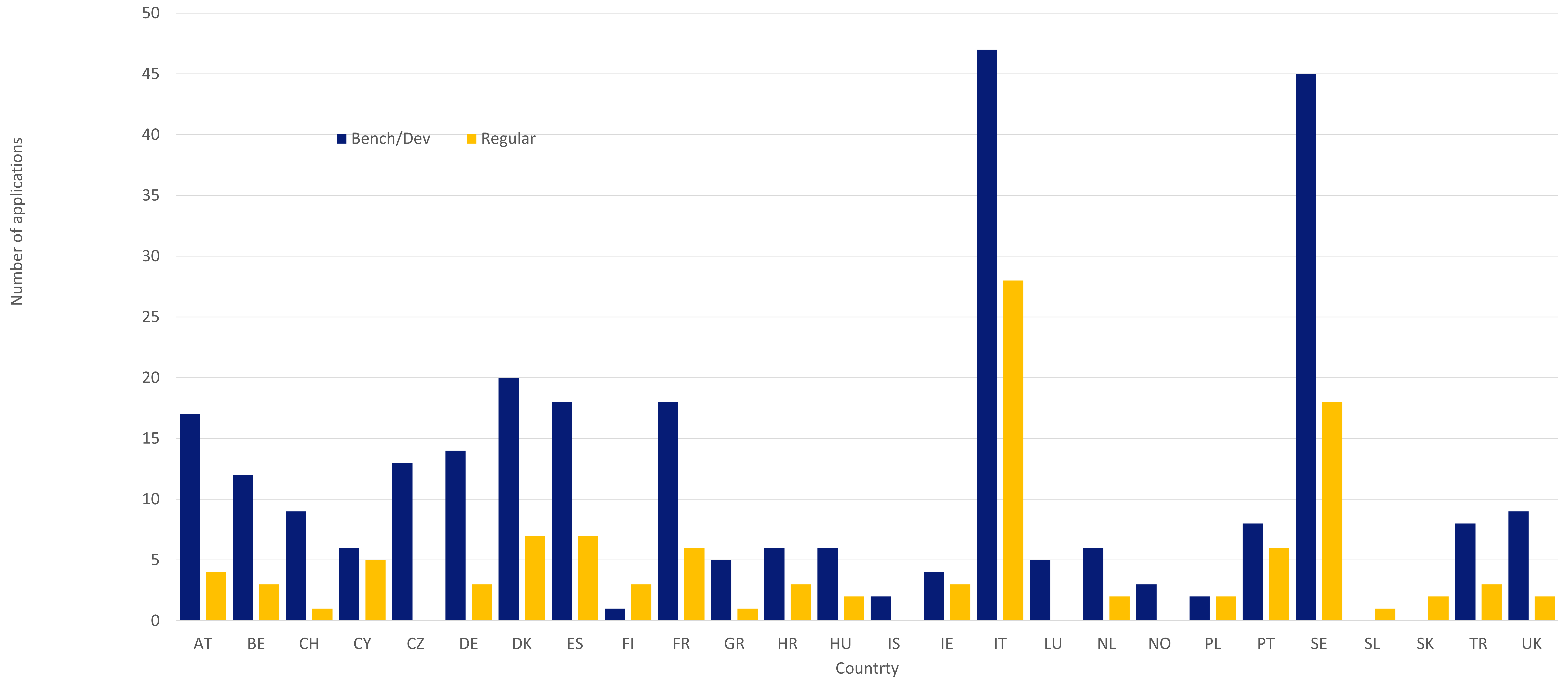
The first EuroHPC JU access projects started 1st of June 2021 and the second applicant was the Swedish SME **NorthVolt** (now a large company).

1,5 years of EuroHPC JU systems usage

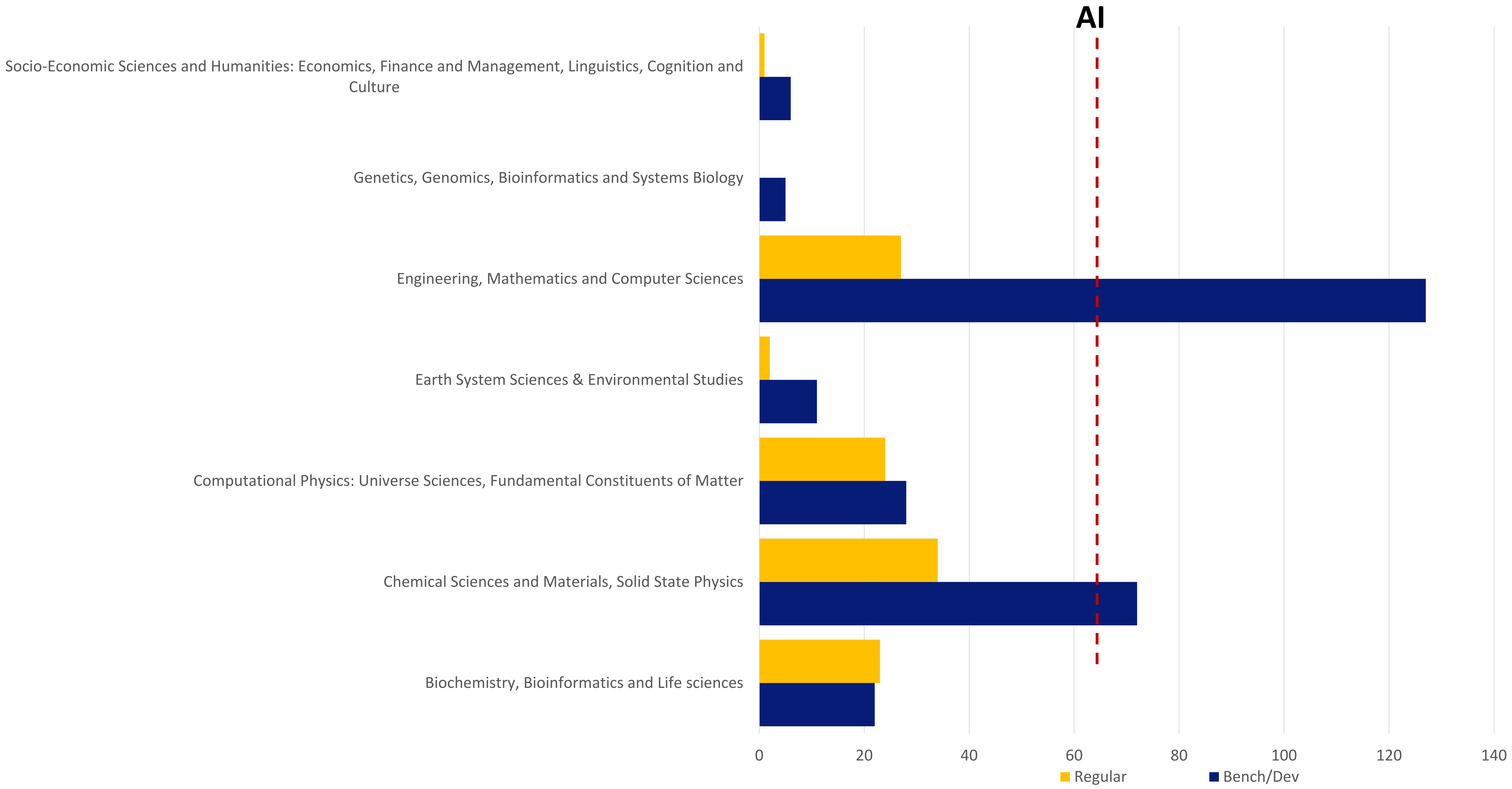
- As of 31 December 2022 there were **394** projects of these **~11% (private and public administration sector)**
- **20** SMEs (7 through Regular access calls)
- **21** governmental organisations (3 through the Regular access calls)
- SMEs are from Sweden, Spain, Slovenia, Turkey, Italy, France, Finland, Croatia and Belgium.

Image by vectorjuice on Freepik

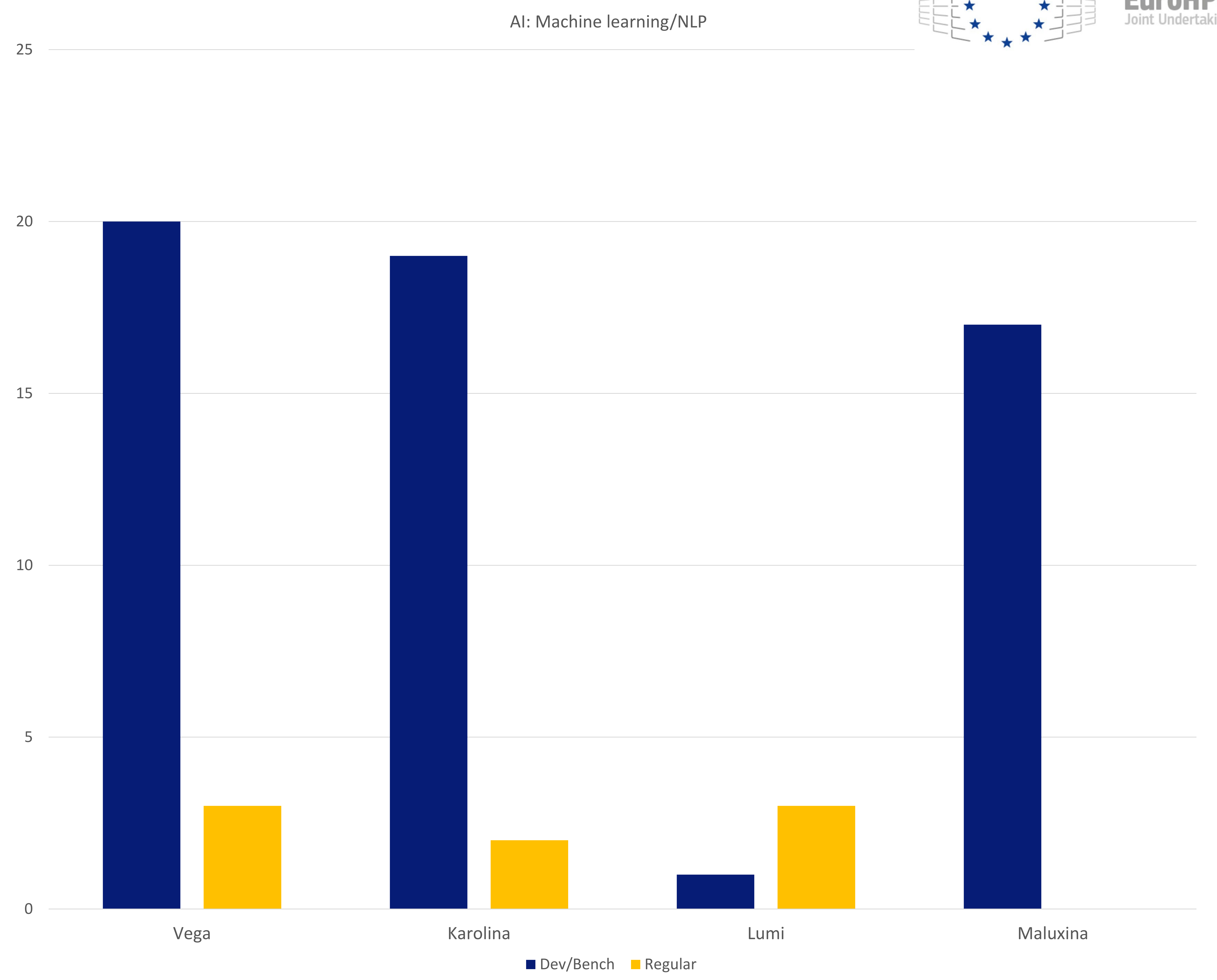
Number of Applications per Country by December 2022



Number of Applications per Discipline by December 2022



AI Applications per System by December 2022



Using EuroHPC Vega System by the Swedish National Archives

EuroHPC
Joint Undertaking

Vega for training and inference

- Training the SATRN-model on Vega enabled us to increase the scale of the resized images going into the model, thereby improving accuracy for handwritten text, which generally requires more information than printed text
- Running 9 million images thorugh the pipeline on VEGA took roughly 90 node-hours
- At a hit-rate of 90% this project saves us about 700000 euros in manual labor costs, and the indexing database gets created a lot quicker

Riksarkivet

Adapting AI-technology for use in archives

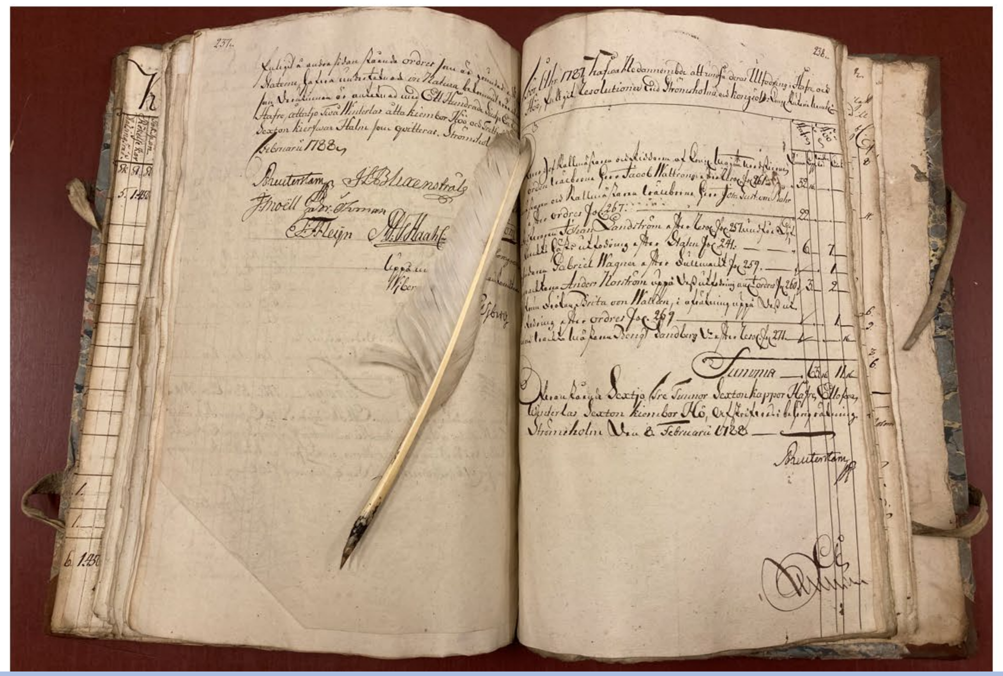
- Image segmentation models
- Text-recognition

Make scanned images searchable

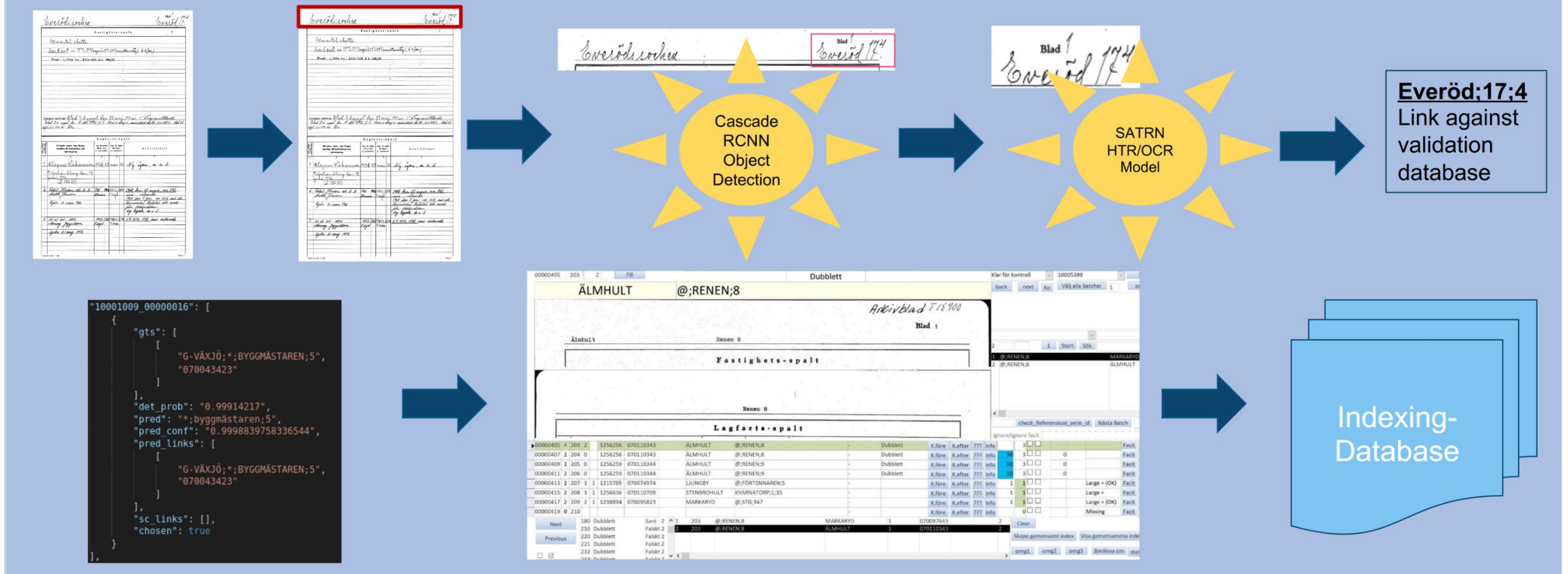
384 000 GPU core hours

(Development Access, VEGA)

Riksarkivet



The Property Record Indexing Pipeline



Riksarkivet

Using EuroHPC JU Vega System by the Croatian SME Called TIS

EuroHPC Joint Undertaking

System for Early Neurological Deviation Detection

A unique **AI** solution for assessing the quality of spontaneous movements (fidgeting).

The target:

Children in early infancy (2-3m)

The purpose:

Detecting infants at high risk of neurodevelopmental disorders or expected normal outcome in a group of neuro risky children

Goal: AI system automatically detects neurological risk infants

Europska unija
Zajedno do fondova EU

Operativni program
KONKURENTNOST
I KOHEZIJA

EUROPSKI STRUKTURNI
I INVESTICIJSKI FONDOVI

Using EuroHPC JU MeluXina System by Researchers at UC Louvain, Belgium

EuroHPC Joint Undertaking

Towards scalable CFD simulations using MeluXina

Thomas Gillis, Pierre Balty, Philippe Chatelain

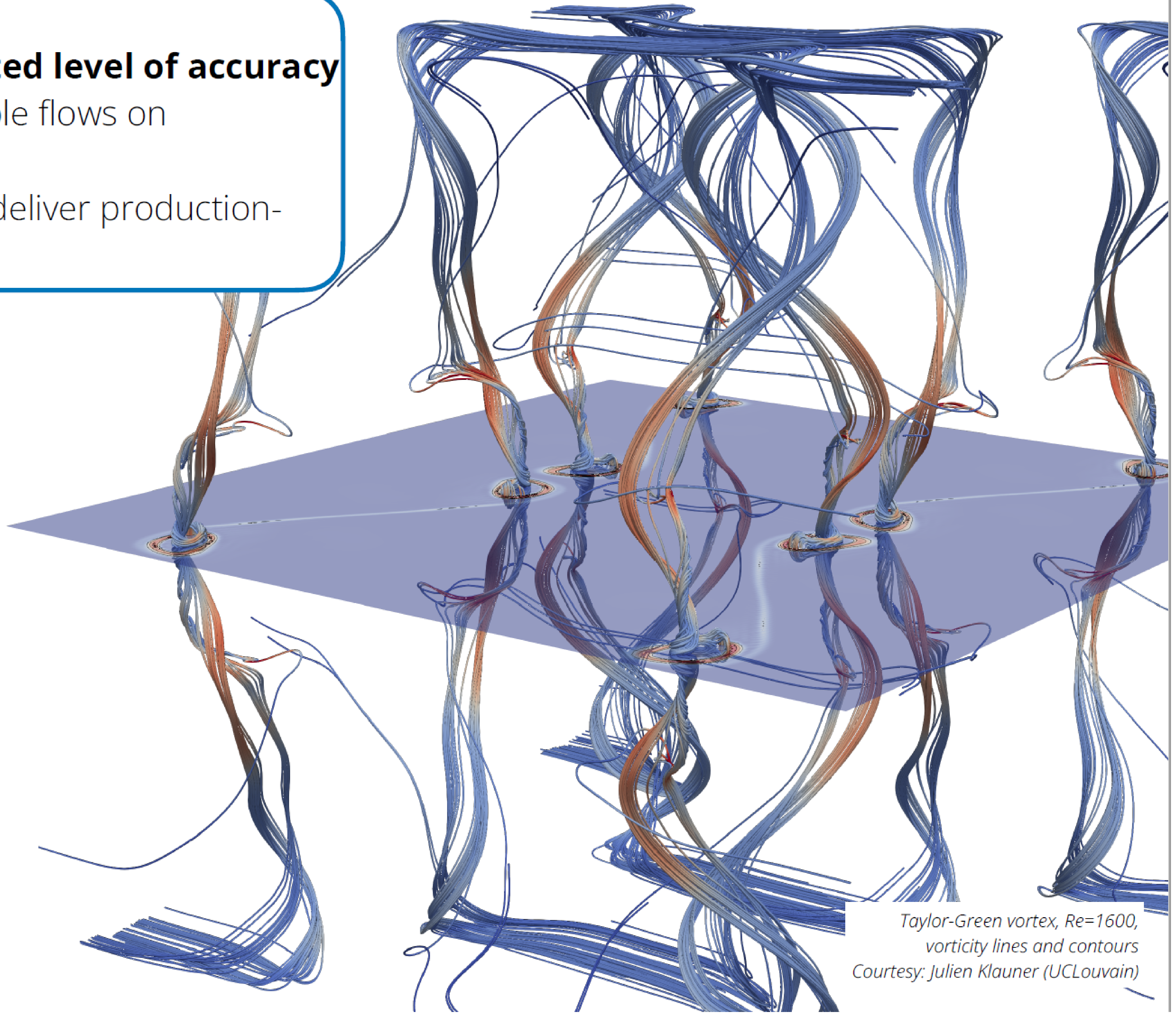
> goal

Understand and explore fluid phenomena at **unprecedented level of accuracy**
- Development of a 3D simulation codebase for incompressible flows on **massively distributed systems**
- **Combine advanced MPI with applied mathematics** to deliver production-ready software

> flups
- Fourier-based Library of Unbounded Poisson Solvers
- User-friendly, scalable, and fast

> murphy
- wavelet-based multiresolution simulation framework
- High order FD and compression
- One-sided communications (MPI-3.1)

UCLouvain
Institute of Mechanics, Materials and Civil Engineering



Taylor-Green vortex, Re=1600, vorticity lines and contours
Courtesy: Julien Klauner (UCLouvain)

Using EuroHPC JU LUMI System For an EU Collaborative Project

EuroHPC
Joint Undertaking

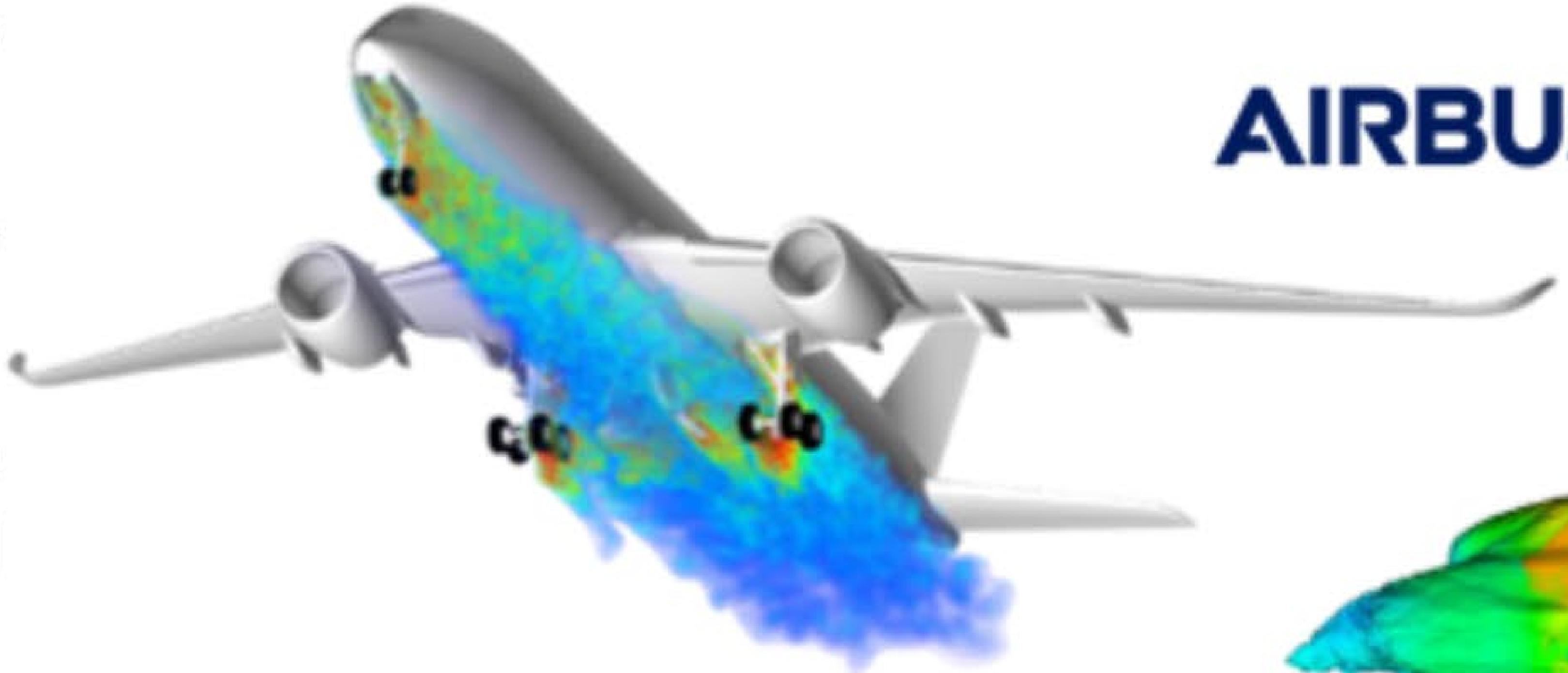
SCALABLE

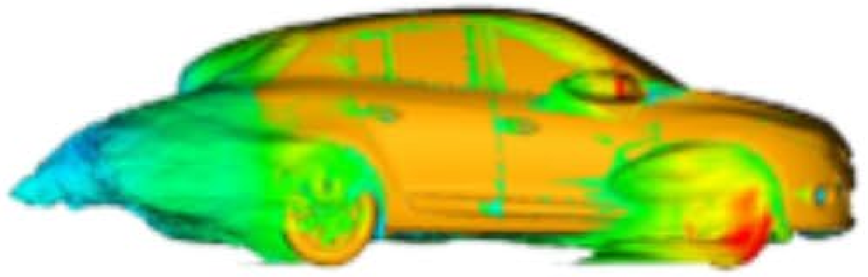
Lattice-Boltzmann CFD simulation at Exascale

Goals: ProLB waLBerla

- Assessment of top industrial (LaBS/ProLB) and academic (waLBerla) solver differences and understanding of key drivers for optimal performance, while preserving industrial needs as "best solution" industrial solver
- Performance, scalability, and energy efficiency optimizations
- Code generation for LBM addressing runtime specifics to enable greater versatility and performance for next generations of HPC hardware
- Usability and operability increase of highly scalable HPC systems for industrial applications

CS GROUP · CERFACS · FAU Friedrich-Alexander Universität Erlangen-Nürnberg · JÜLICH Forschungszentrum · VSB Technical University of Ostrava · IT4Innovations National Supercomputing Center · AIRBUS · Groupe Renault · Neovia Innovation





scalable-hpc.eu
@scalable_hpc
company/scalable-hpc

Top500 #85, #12, and #3*

Project start: 01/01/2021
Project end: 31/12/2023

*Source: Nov. 2022 Top500 List

EuroHPC
Joint Undertaking

Thank you!

Questions?