



**Barcelona  
Supercomputing  
Center**  
Centro Nacional de Supercomputación



EXCELENCIA  
SEVERO  
OCHOA

# Access to MareNostrum5 and other European HPC infrastructures

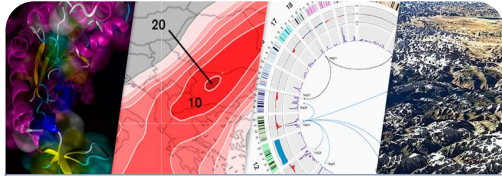
Oriol Pineda

Infrastructure Access Policy

Solid Earth and Geohazards in the Exascale Era

25 May 2023

# Barcelona Supercomputing Center – Centro Nacional de Supercomputación



R&D in Computer,  
Life, Earth and  
Engineering Sciences



PhD programme,  
technology transfer,  
public engagement



Supercomputing and data  
services to Spanish and  
EU researchers

BSC-CNS is  
a consortium  
that includes

Spanish Government

60%



Catalan Government

30%



Univ. Politècnica de Catalunya (UPC)

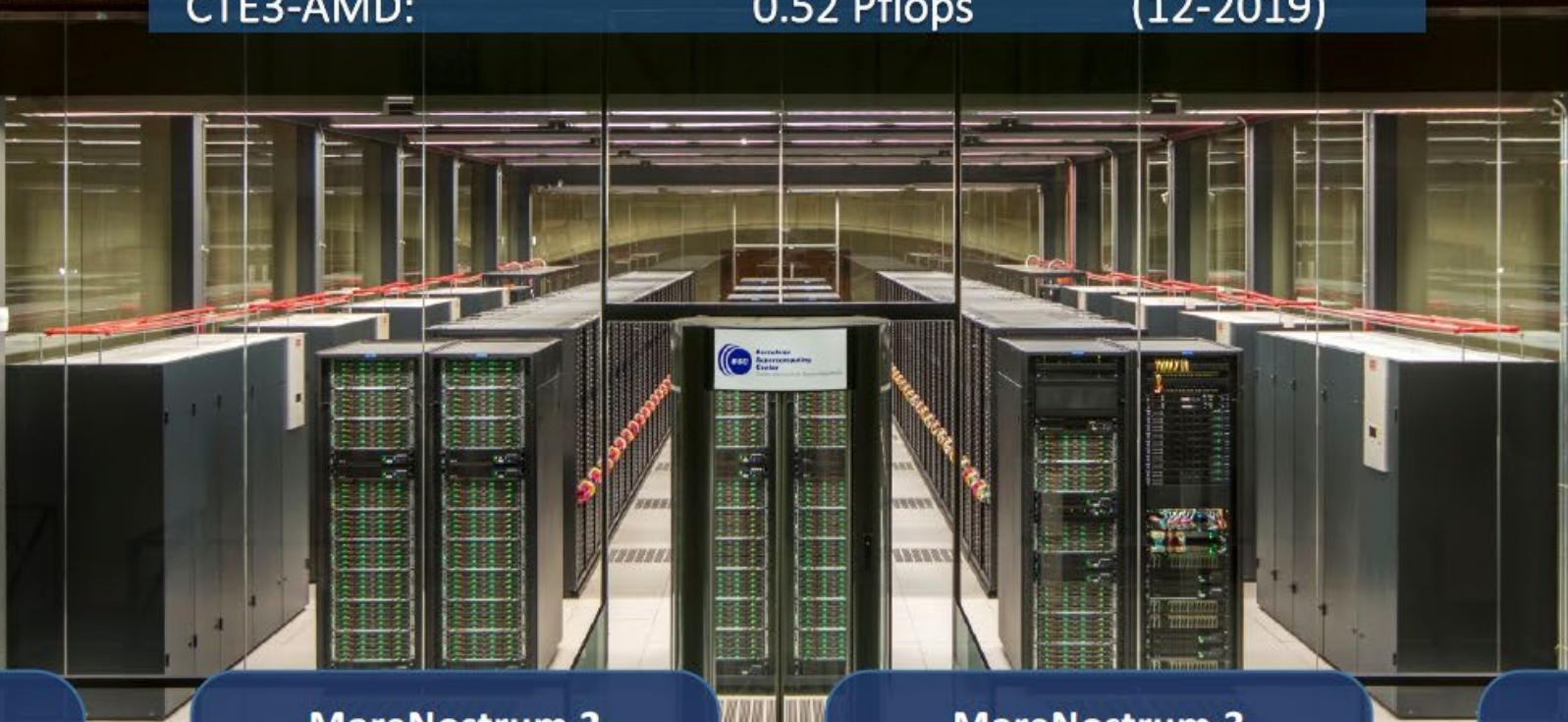
10%



# MareNostrum 4

Total peak performance: **13.9 Pflops**

General Purpose Cluster:	11.15 Pflops	(1-07-2017)
CTE1-P9+Volta:	1.57 Pflops	(1-03-2018)
CTE2-Arm V8:	0.65 Pflops	(12-2019)
CTE3-AMD:	0.52 Pflops	(12-2019)



## MareNostrum 1

2004 – 42.3 Tflops

1<sup>st</sup> Europe / 4<sup>th</sup> World

New technologies

## MareNostrum 2

2006 – 94.2 Tflops

1<sup>st</sup> Europe / 5<sup>th</sup> World

New technologies

## MareNostrum 3

2012 – 1.1 Pflops

12<sup>th</sup> Europe / 36<sup>th</sup> World

## MareNostrum 4

2017 – 11.1 Pflops

2<sup>nd</sup> Europe / 13<sup>th</sup> World

New technologies

GPP - General Purpose

Intel Sapphire Rapids

Peak performance: 45,4 Pflops

Sustained HPL: 35,4+ Pflops

Coming very soon

NGT GPP - Next Generation

NVIDIA Grace

Peak performance: 2,82 Pflops

Sustained HPL: 2 Pflops

Coming later in 2023

## MareNostrum5

InfiniBand NDR 200

Fat Tree

Spectrum Scale File System

248 PB HDD

2,81 PB NVMe

402 PB tape

Coming soon

ACC – Accelerated

Intel Sapphire Rapids

NVIDIA Hopper

Peak performance: 260 Pflops

Sustained HPL: 163 Pflops

Coming later in 2023

NGT ACC - Next Generation

Intel Emerald Rapids

Intel Rialto Bridge

Cancelled

More info coming soon

The acquisition and operation of the EuroHPC supercomputer is funded jointly by the EuroHPC Joint Undertaking, through the European Union's Connecting Europe Facility and the Horizon 2020 research and innovation programme, as well as the Participating States Spain, Portugal, Croatia, and Turkey



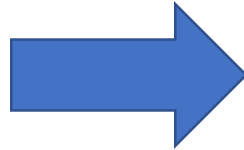
Barcelona  
Supercomputing  
Center  
Centre Nacional de Supercomputació

		Racks	Cooling	Nodes		Provider	Processor/Accelerator		Memory	PFlops (HPL)		Local Drive	High-Perf. Network
				Total	per rack								
Main	General Purpose	89	DLC +RDHX	6192	72 (6x6x2)	Lenovo	2x Intel Sapphire R. 8480+	56c @ 2GHz	>2GB/core 256GB DDR5	35.43	>205	960GB NVMe	1x NDR200 Shared by 2 nodes
				216					>8GB/core 1024GB DDR5				
		1		72			2x Intel Sapphire R. 03H-LC	56c @ 1.7GHz	> 0.5GB HBM/core 128GB HBM + 32GB DDR5	0.34			
	Accelerated	35	DLC	1120	32	Atos	2x Intel Sapphire R. 8460Y+	32c @ 2.3GHz	512GB	163		480GB NVMe	4x NDR200
	4x Nvidia Hopper 64GB HBM												
Next Gen	General Purpose	7	AC +RDHX	408	68	Atos	2x Nvidia Grace	72c @ 2.6GHz	240GB LPDDR5	2	128GB NVMe	1x NDR200	
	Accelerated	Cancelled – More info coming soon						2x Intel Emerald R.	48c	512GB DDR5	4.24	960GB NVMe	2x NDR
								4x Intel Rialto Bridge 128GB HBM2E					

# From MareNostrum 4 to MareNostrum 5

## MareNostrum 4

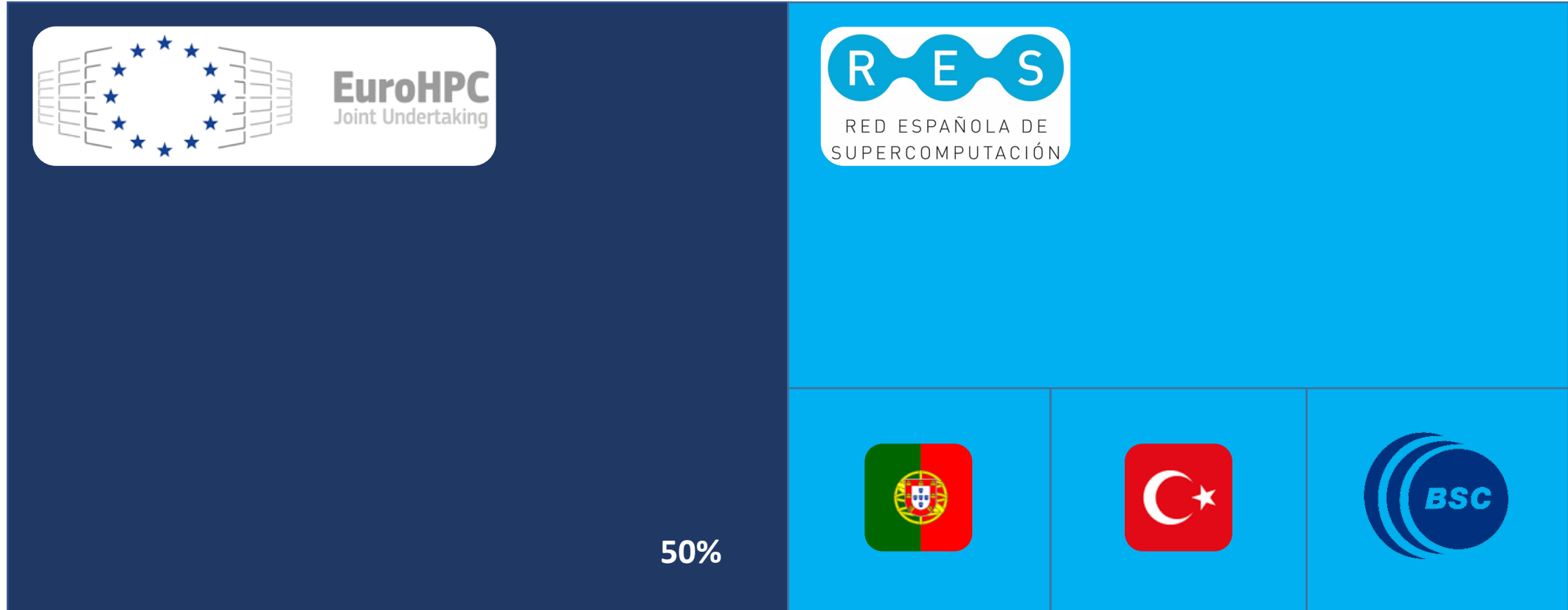
- 960M core hours
- 20M node hours
- **200.000 ExaFlop**



## MareNostrum 5

- 4500M core hours (~5x)
- 42M node hours (~2x)
- **6.000.000 ExaFlop (~30x)**

# Access to MareNostrum 5



# Access to MareNostrum 5

- EuroHPC JU access programmes
  - Extreme Scale Access, 2 calls per year
  - Regular Access, 3 calls per year
  - Benchmark and Development Access, rolling call
- Spanish HPC programme
  - 3 calls per year, for HPC and IA access
- Collaborations with BSC research
  - Always open





# Access to Data exploitation services

- Agora
  - 150PB on HSM (disk/tape)
- MareNostrum 5 storage system
  - 240PB on disk
  - 400PB on tape
- Access through Spanish Supercomputing Network
  - Year call for 3-5 year projects
  - From 200TB to 1PB per project
  - Year review of DMP



**Barcelona  
Supercomputing  
Center**  
*Centro Nacional de Supercomputación*



# Thank you

[oriol.pineda@bsc.es](mailto:oriol.pineda@bsc.es)