The Spanish Network for Supercomputing, Data and AI

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Spain National Tripartite Event
Madrid, 19 September 2023
Red Española de Supercomputación
Spanish Supercomputing Network

Large Distributed Scientific Technical Infrastructure (ICTS)
National Competence Center for HPC, HPDA and AI
Red Española de Supercomputación
Spanish Supercomputing Network

14 Spanish Infrastructures
16 supercomputers
9 data centers
Coordinated by BSC

Open to:
• new partners
• new technologies
• new services
Resources

Supercomputing
Data Exploitation
Artificial Intelligence

offered to the Spanish scientific community

+22 PFlop/s total computing capacity
+180 PB total storage
+1.000 milions CPU hours
+1.000 users per year
+200 scientific publications

Competitive Access

• 3 calls of HPC/AI per year, 1 call of data per year
• External access committee, for reviewing and ranking access requests
Organization of RES as ICTS

- Each infrastructure which can offer HPC-DATA-AI services (+support) and share the vision of RES, can join the network.
- >20% of capacity offered for RES researchers
- Plan every 3 years with objectives, resources and strategies, reviewed by the Spanish Government
- Members have the possibility to apply to specific calls for ICTS to update infrastructure.
RES Users’ Committee

- Aims to provide advice and feedback to RES coordinators:
  - Promotes optimal use of high-performance computing facilities
  - Shares information about users’ experiences
  - Voices user concerns

- Contact: RES intranet
• Capacity fully utilized, with 2:1 oversubscription
• Application open to SMEs and industries for Open R&D and innovation
• Possible to book computing resources in advance – for EU projects
• System of calls and access improving with the feedback of the Users Committee
• Contribution to the European ecosystem (Centres of Excellence)
• One call per year for large data projects (3 to 5 years), applying presenting a DMP.
• Storage and computing for data exploitation
• Data management support (DM community)
• Services to Share and reuse valuable datasets
• Training and guidelines
• Since 2023 specific offer of GPUs
• New services providing hardware and software resources designed to support AI projects applied to RD and innovation

• Same Access procedures of HPC, calls adapted to AI projects:
  • Short: test and technical set up
  • Medium/long: specific scientific objectives (model training), validation of models
  • Mentored activities with experts of the centers.
RES Future - MN5

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RES Future - MN5

In 2024 it will increase x30 the capacity of the Spanish capacity in HPC - 314 Pflops peak performance

Owners of the technology: Spain, Portugal, Turkey.
Access: EuroHPC + RES + PT calls + Turkey calls + BSC researchers

- **General purpose** (GPP) Intel Sapphire Rapids (45,4 Pflops peak)
- **Accelerated partition** (ACC) NVIDIA Hopper (260 Pflops peak)
- **Storage** 248PB HDD 402PB tape IBM Spectrum Scale FS (1.6 TB/s rw)
- **New technology** GPP - NVIDIA Grace (2,82 Pflops peak)
- **Next Generation** TBC
Access to European supercomputing facilities
Mobility of researchers and industry staff

Access to Spanish supercomputing facilities
Free allocation of computing hours and data services to researchers and industry.

Access to knowledge and expertise
Scientific seminars

Access to training and skills development
Open training courses and technical workshops

Access to internationalization
Programs, projects, etc

Access to networking and awareness
Annual Users Conference, RES Twitter and Linkedin

Access to business innovation
Competence center DIH, One-stop shop
RES events:
Networking, training and sharing knowledge

Annual RES Users Conference

Scientific seminars (sponsored by RES)

Technical training workshops

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THANK YOU!

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Twitter: @RES_HPC
LinkedIn applications@res.es dissemination@res.es

www.res.es
Extra
RES-HPC computing capacity

2006
140 TFlop/s

2012
> 1 PFlop/s

2018
> 12 PFlop/s

2024
> 300 PFlop/s

1 PFlop/s = 1.000.000.000.000.000 operaciones por segundo
Quantum at BSC
Research – Development - Deployment

• 2 quantum devices
• Training and Knowledge transfer
• National coordination
• Utility for science:
  • Algorithms for complex systems
  • Simulation of quantum systems – 3 quantum emulators (BSC, CESGA, SCAYLE)
  • Integration with HPC for solving certain problems (CPU+GPU+QPU)
• Applications: optimization of functions, possible compromization of cryptographic systems (they are promising)...
• Access protocol as RES and available to all users.
• European Project for hosting a QC with the MN5, towards EuroQCS network (like EuroHPC).