CESGA HPCN 2010

High Performance Computing Networking

CESGA´S NICHE IN THE SPANISH SUPERCOMPUTING ECOSYSTEM

Santiago de Compostela, November 2010

Javier García Tobío
(Managing Director, Galicia Supercomputing Centre)

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1- Galicia Supercomputing Center in the framework of High Performance Computing activities in Spain:

* **HPC** Worldwide and in Europe
  (TOP500 Nov-2010)

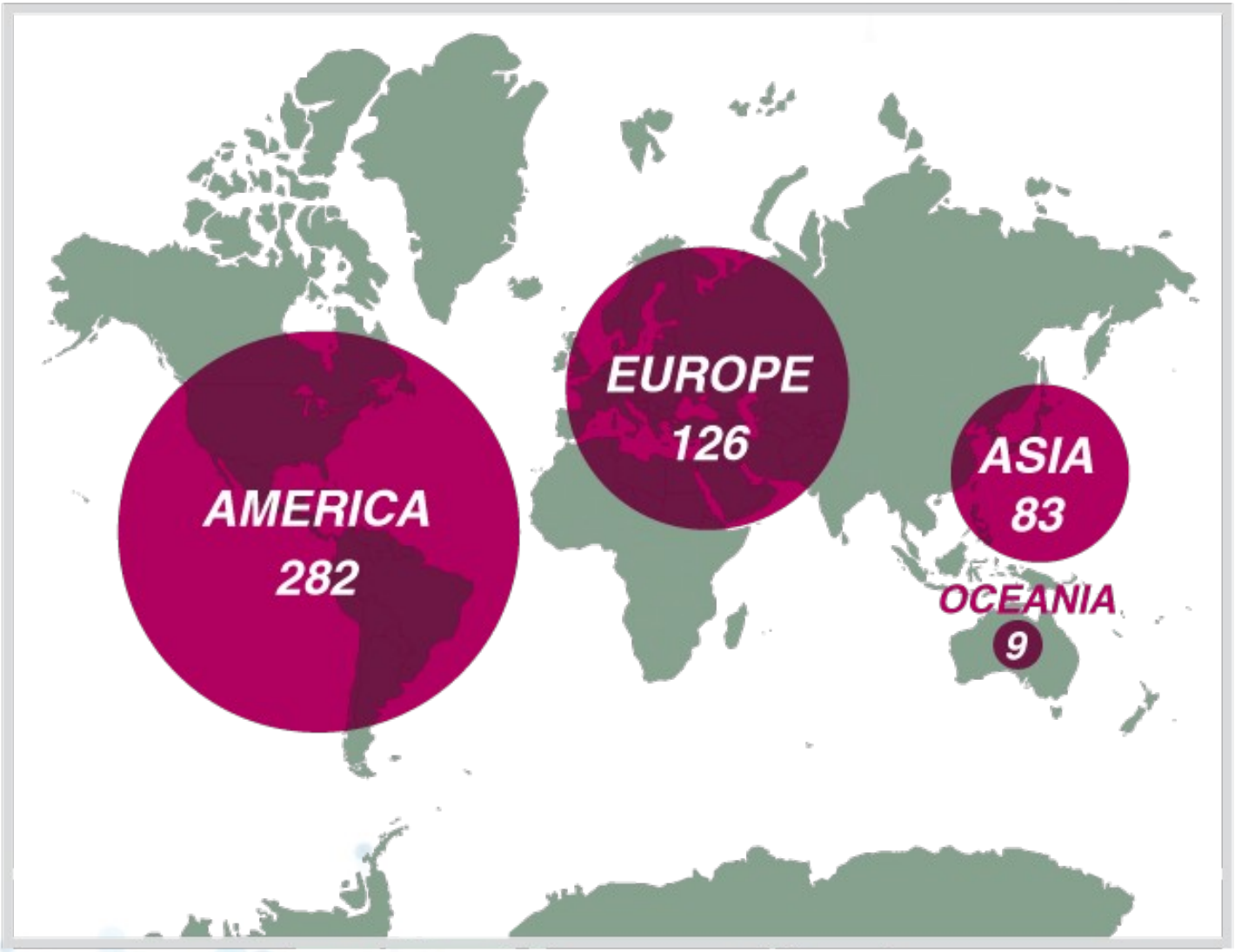
* Main **HPC** Initiatives in Spain

2- Evolution of Galicia Supercomputing Center:

* Services and Facilities
* RTD Projects and Scientific production

Supercomputing in the World

Supercomputing in the World (Top 500 Nov 2010)



Rmax Sum (GF) increase (TOP500 Nov 2011)

NOVEMBER 2009 – NOVEMBER 2010

>>Increase>>

OCEANIA 88%

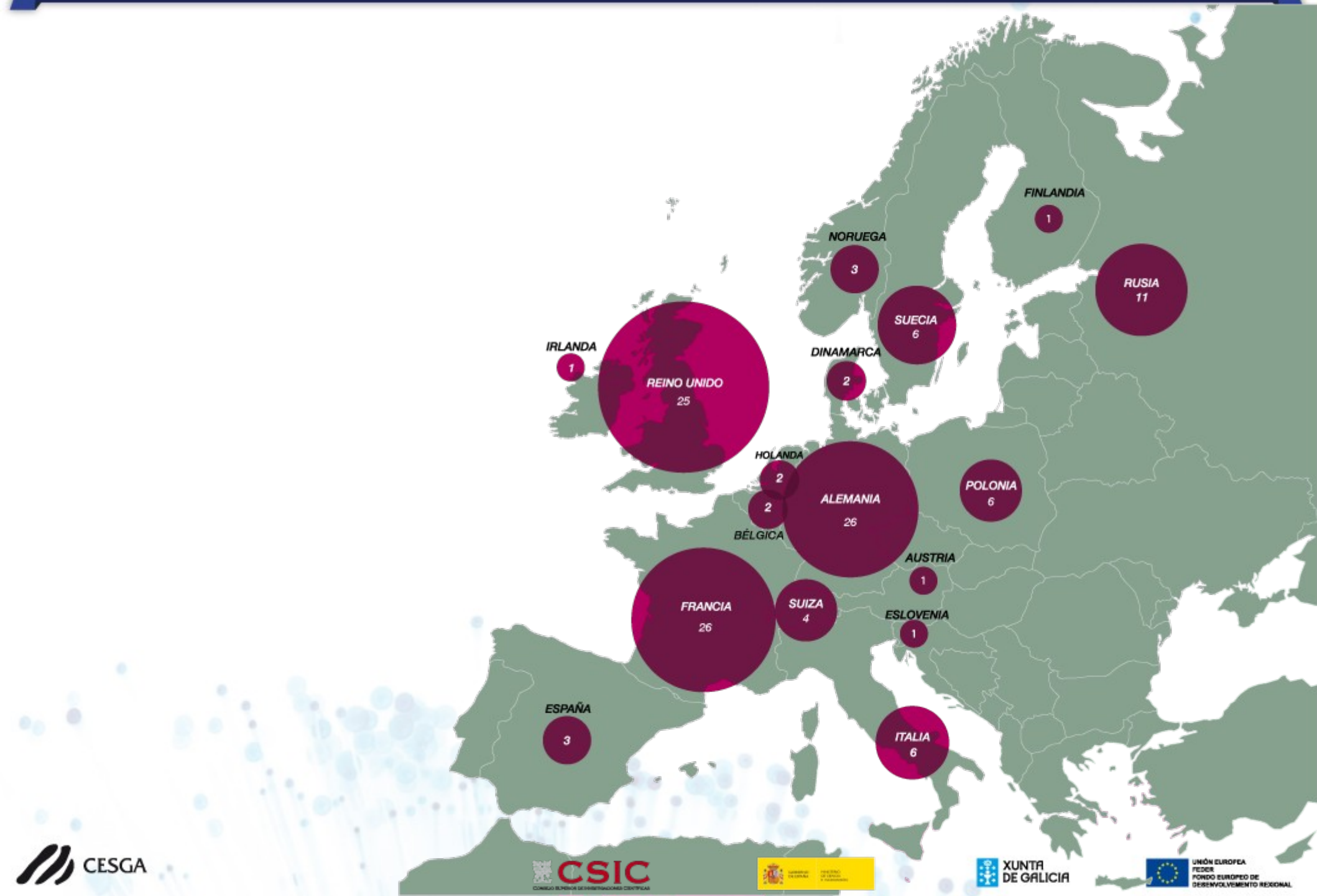
AMERICA 35%

ASIA 211%

EUROPA 32%

Supercomputing in Europe

Supercomputing in Europe



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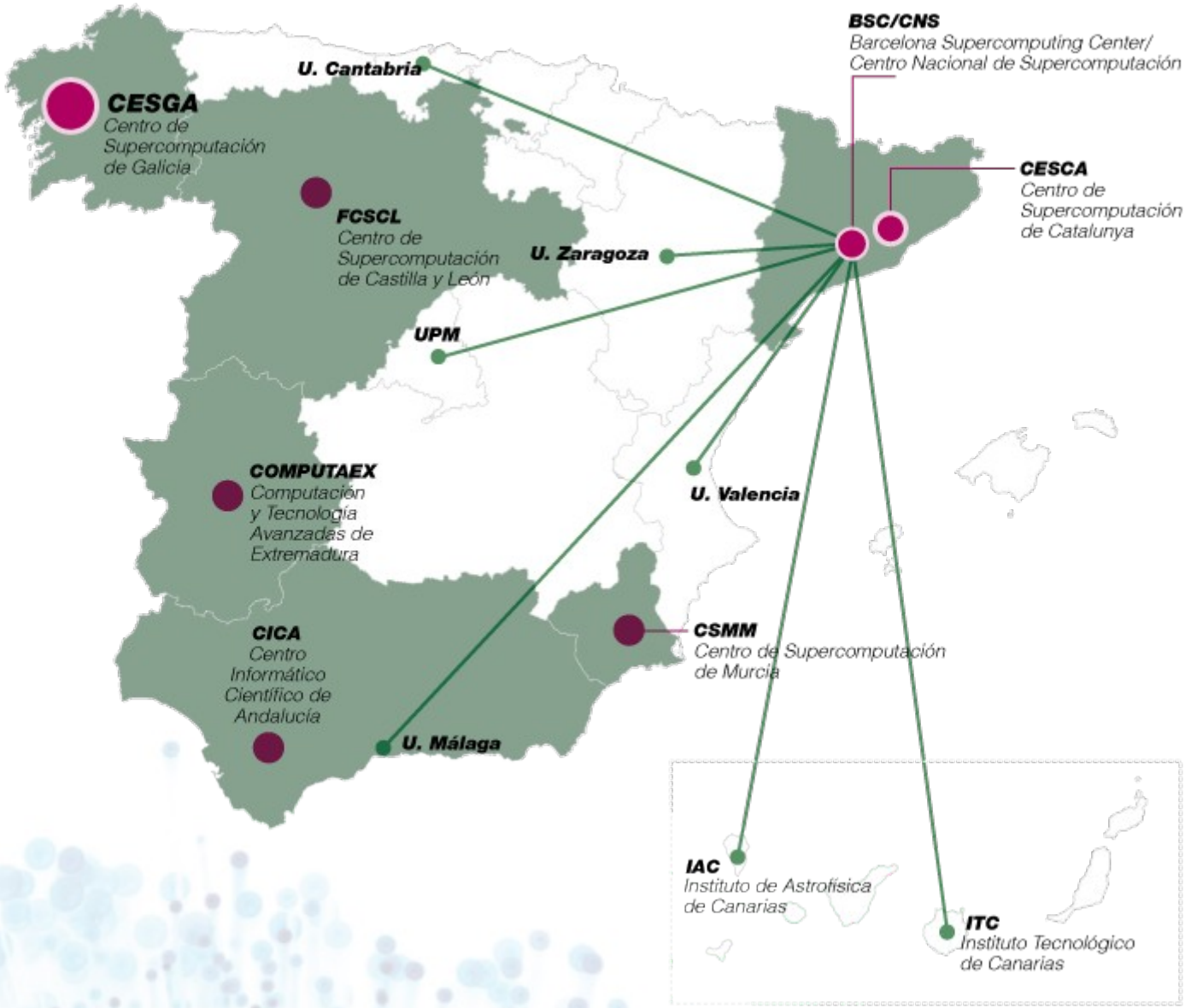
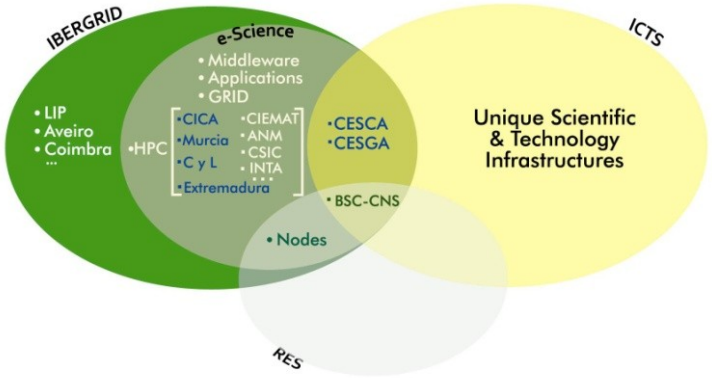
Supercomputing in Spain

Supercomputing in Spain



Main HPC Initiatives in Spain



Instalaciones Cientifico Tecnológicas Singulares

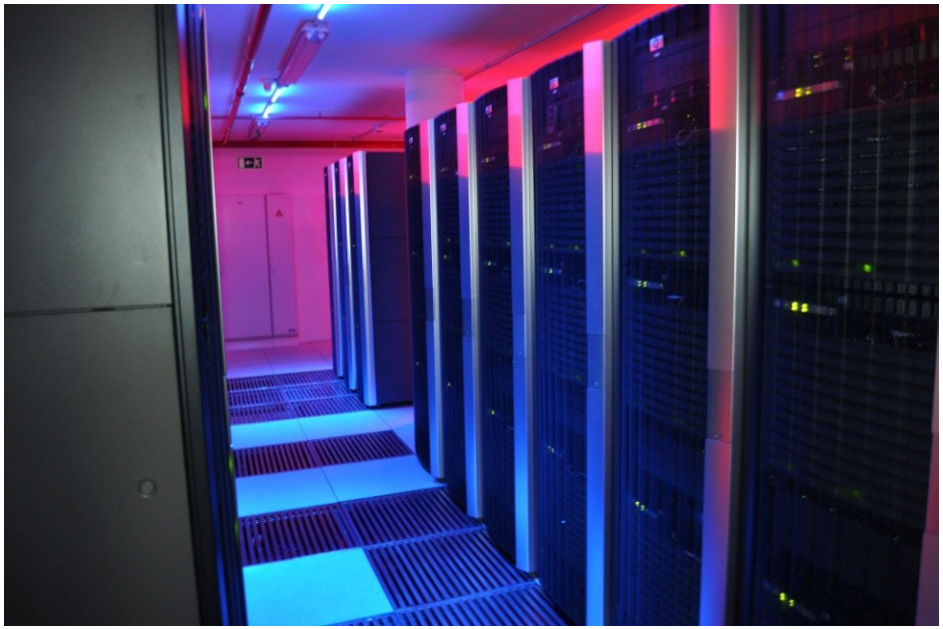
(Unique Scientific & Technology Infrastructures)

Unique S&T Infrastructures

Initiative of the Ministry of Science and Innovatión through the Directorate General for International Cooperation

Facilities, resources or services *that the scientific community requires to develop top quality research at the forefront of international scientific activity, as well as to disseminate, exchange and preserve such knowledge.*

ICTS: Required to conduct research that strives for excellence



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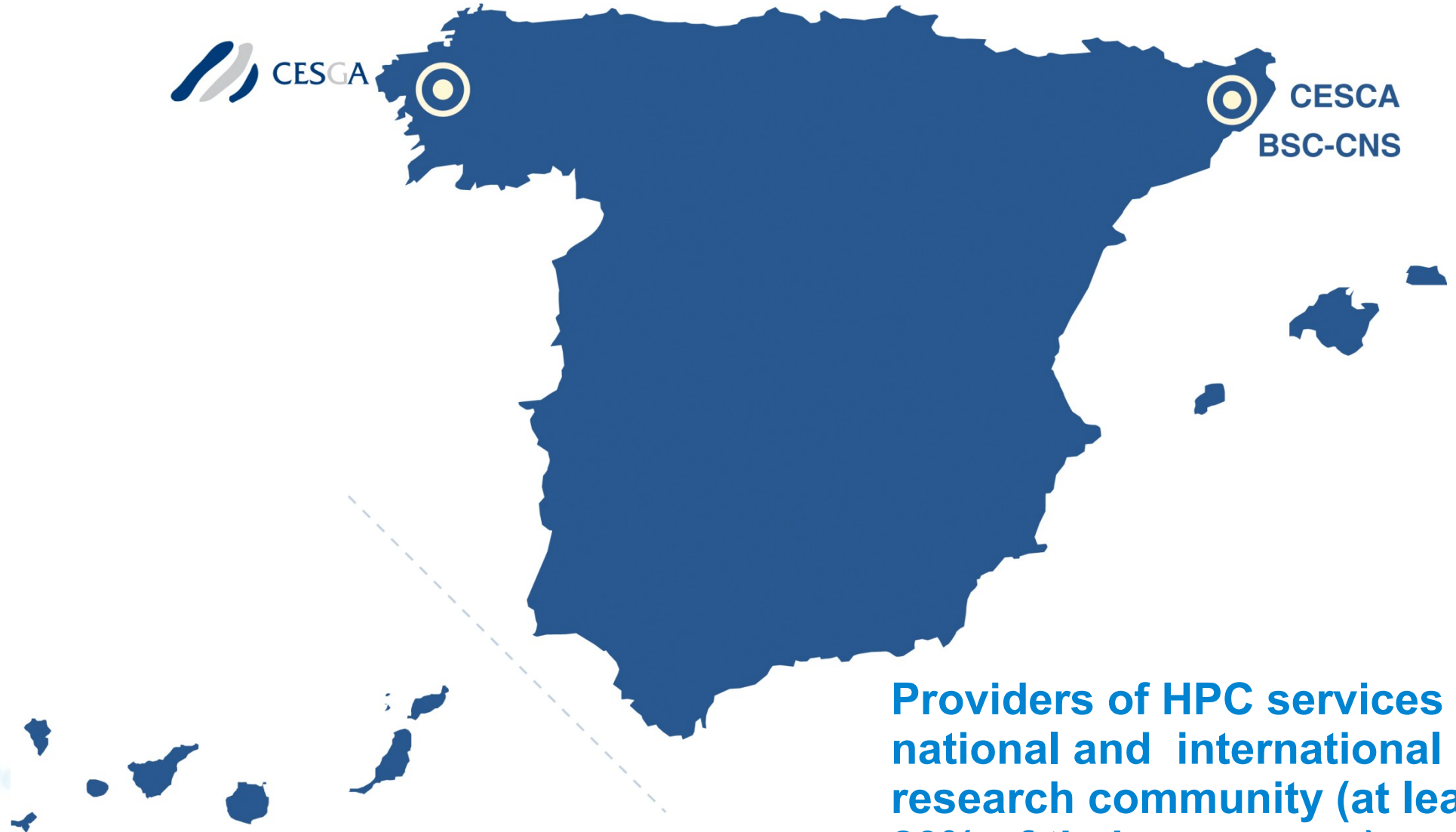
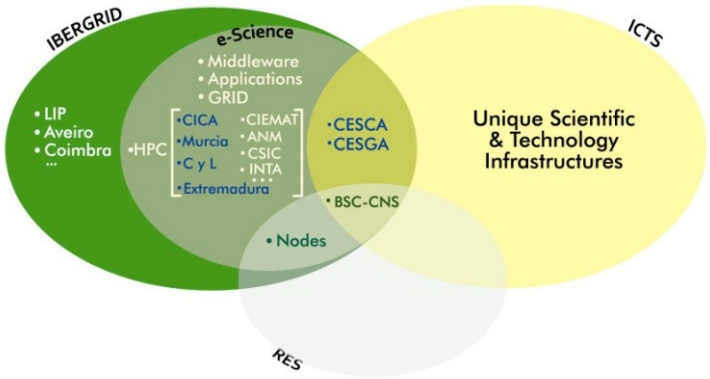
Unique S&T Infrastructures

Spanish Unique HPC Infrastructures (ICTS)



Providers of HPC services to national and international research community (at least 20% of their resources)

Main HPC Initiatives in Spain



CENTROS AUTONÓMICOS DE SUPERCOMPUTACIÓN

(REGIONAL SUPERCOMPUTING CENTRES)

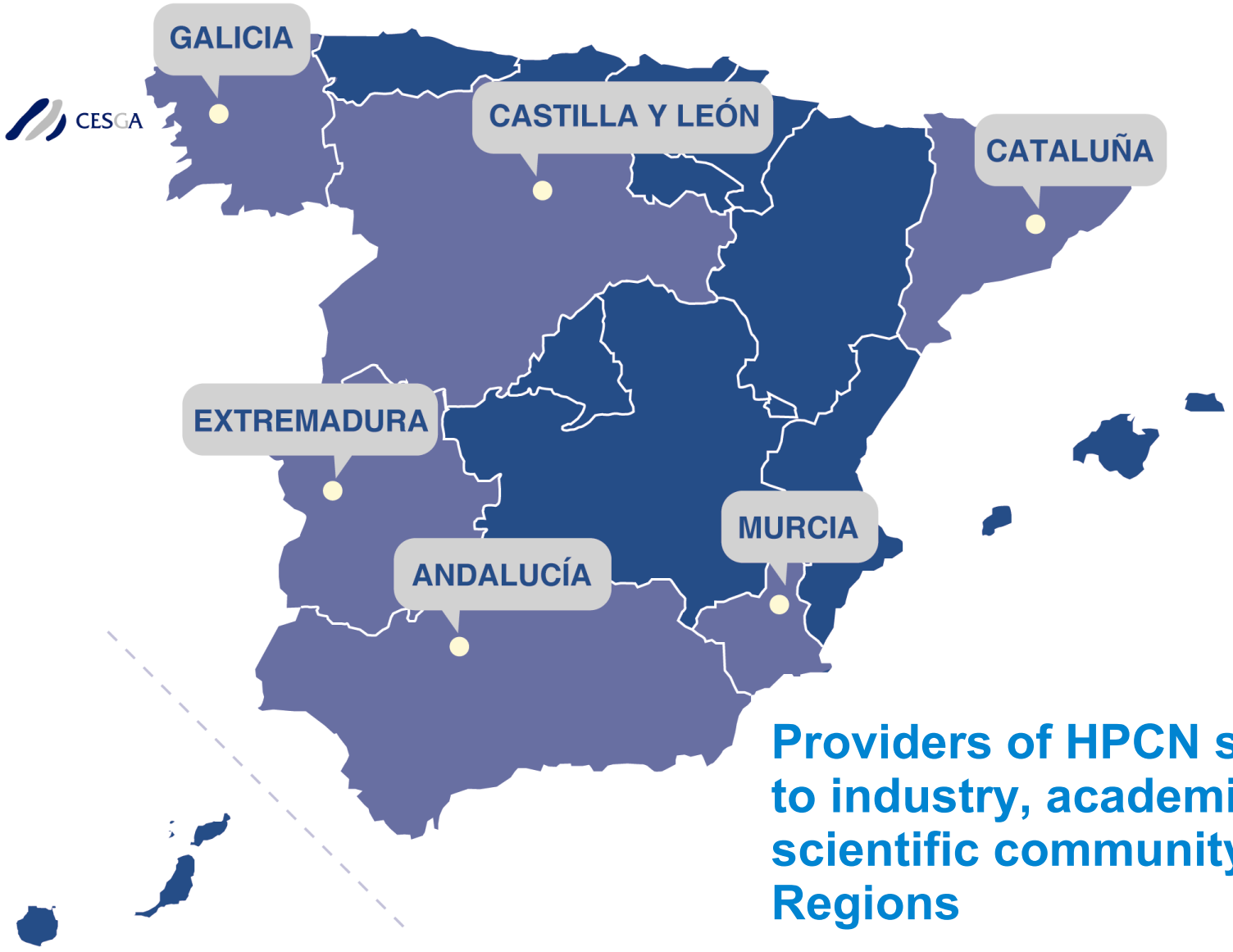
Regional Supercomputing Centres

- Centres promoted and funded by *Regional Governments*.

- Currently there are *six Regional Supercomputing Centres*, three of them running since early 90's.

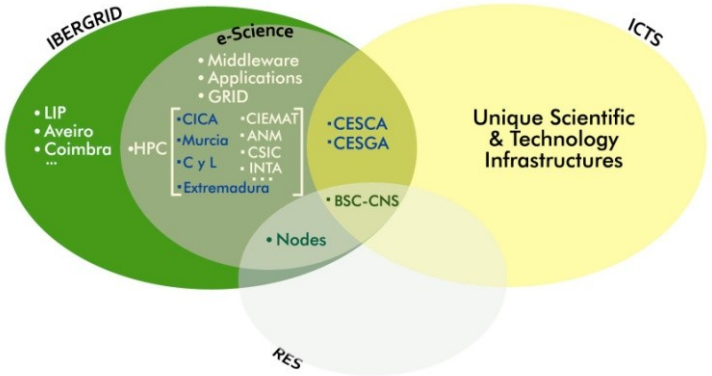
- The aim of these Centres is to *promote and provide supercomputing services* to *academic* and *scientific community* as well as to *industry of their Regions*.

Regional Supercomputing Centres



Providers of HPCN services to industry, academic and scientific community of Regions

Main HPC Initiatives in Spain



RED ESPAÑOLA DE SUPERCOMPUTACIÓN (SPANISH SUPERCOMPUTING NETWORK)

Spanish Supercomputing Network (RES)

The Spanish Supercomputing Network was promoted in 2007 by the Ministry of Science and Technology and is managed by BSC-CNS.

This network is composed by seven nodes which include servers provided by the BSC-CNS.

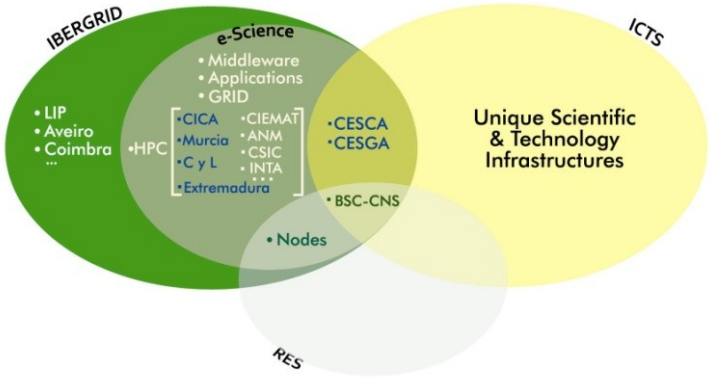
The aim of this network is to provide supercomputing services to the Spanish scientific community, complementing, the BSC-CNS.

Spanish Supercomputing Network (RES)

RES (Supercomputing Spanish Network)

Network managed by BSC-CNS and open to Spanish researchers

Main HPC Initiatives in Spain



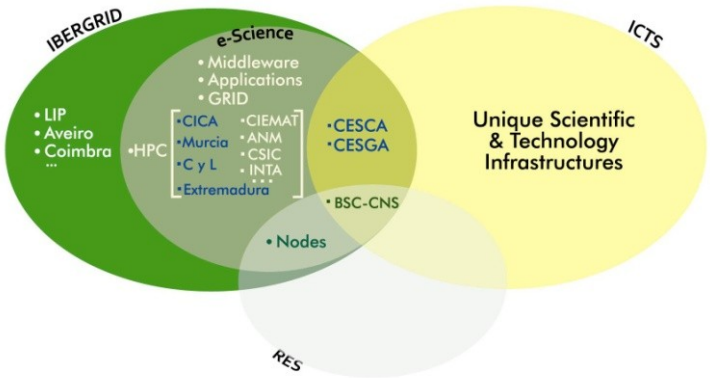
IBERGRID

Iberian Grid Infrastructure Iniciative

GENERAL BACKGROUND

- SCIENTIFIC AND TECHNOLOGICAL COOPERATION AGREEMENT BETWEEN THE GOVERNMENTS OF PORTUGAL AND SPAIN FOR COMPUTING AND COMMUNICATON RESEARCH NETWORKS:
  - COMMON ACCESS TO COMPUTING RESOURCES
  - INFORMATION EXCHANGE AND TRAINING
  - RESEARCHERS MOBILITY
  - COMMON R&D PROJECTS

Main HPC Initiatives in Spain



Red Española de e - Ciencia

Spanish Network for e-Science

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The Spanish Network for e-Science

Red Española de e-Ciencia

Initiative of the Ministry of Science and Innovatión

Objectives of the Network

To Promote and ***Coordinate*** the Development of the ***e-Science in Spain.***

- To ***coordinate the Spanish e-Infrastructures*** from the point of view of required investments, management, operation and user support.

To Become the ***National Speaker for*** e-Science in the ***European framework.***

To ***foster the Cooperation*** with other Programs and Projects.

To promote the Collaboration with Portugal (IBERGRID) and other Countries in the e-Science Context.

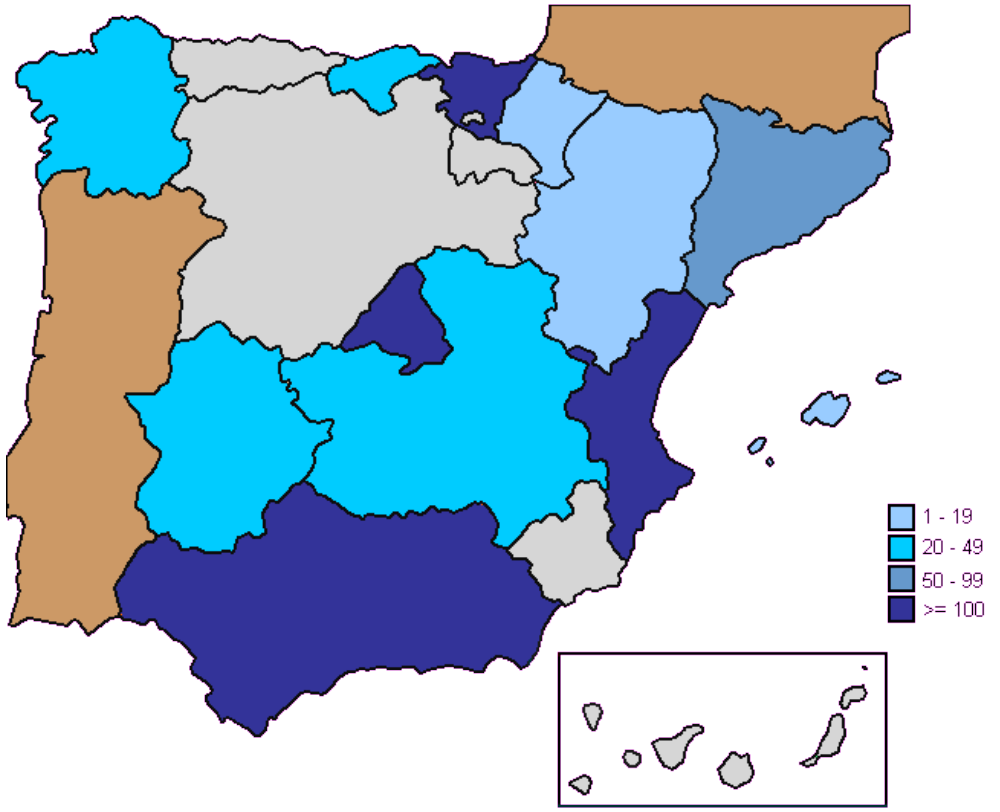
To ***transfer the Network results***, and to ***train people***.

The Spanish Network for e-Science

Red Española de e-Ciencia

Members

- Around 900 Researchers.
- 75 Research Groups.
- More than 50 Institutions.



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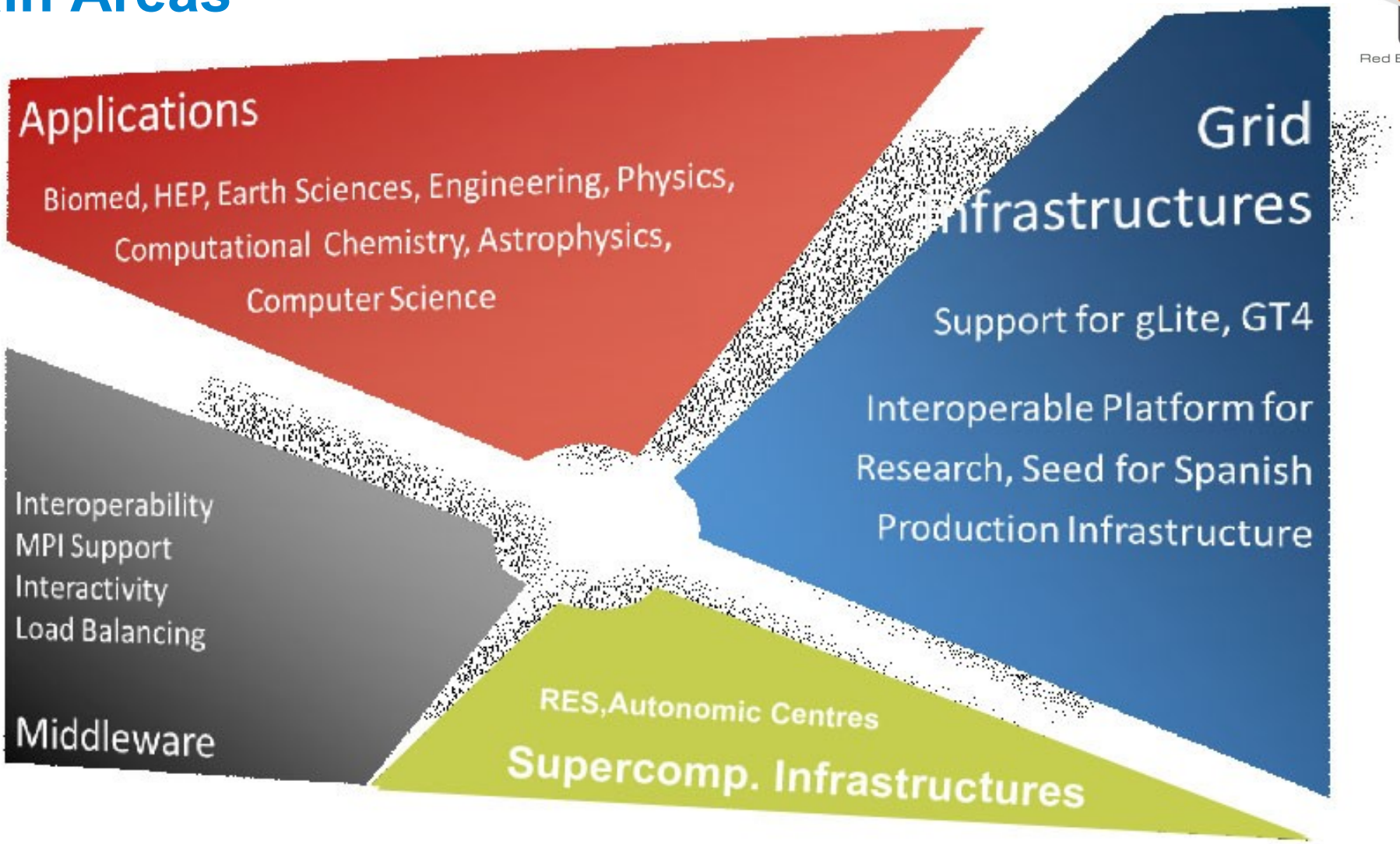
The Spanish Network for e-Science

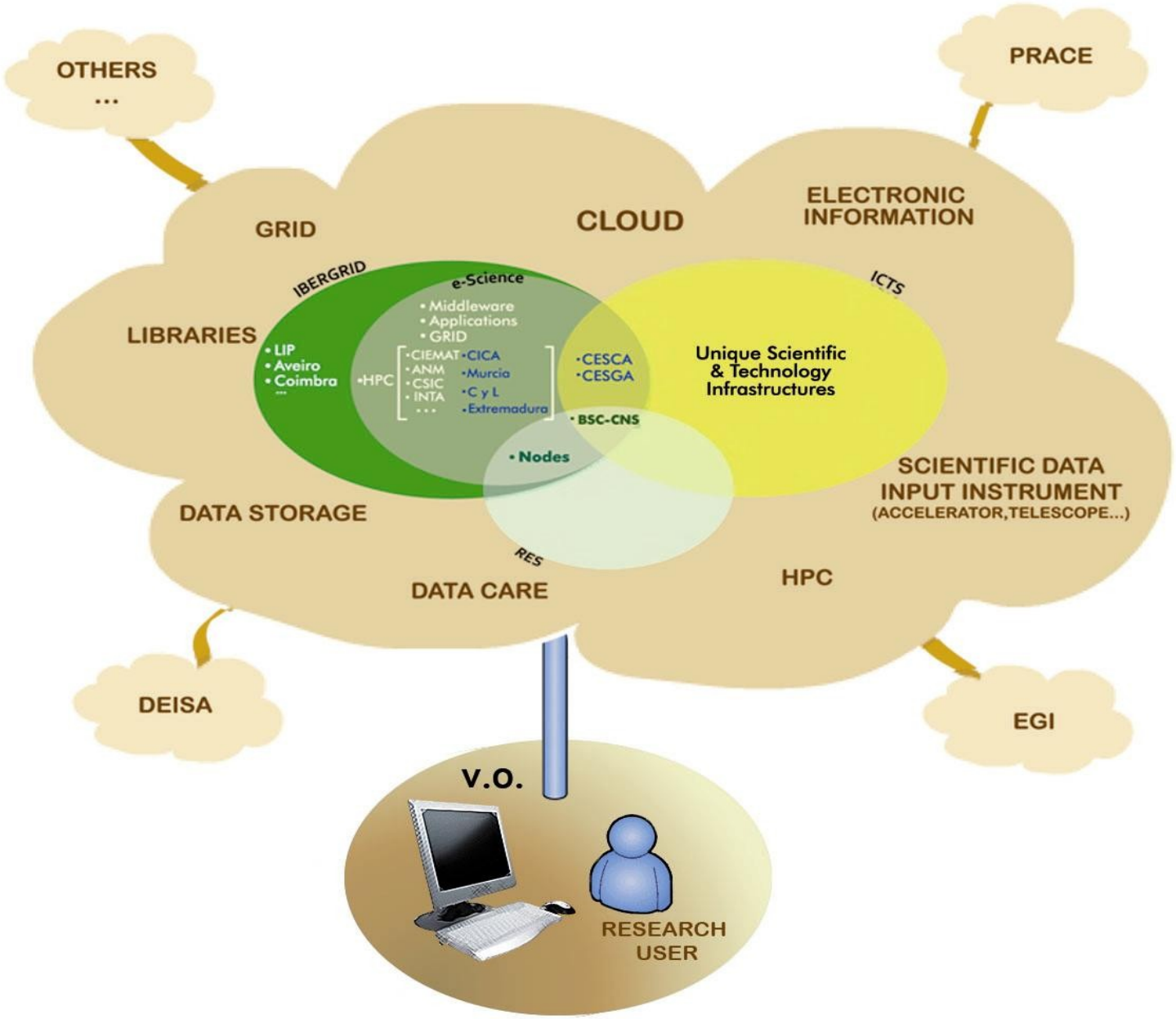
Main Areas



Red Española de e - Ciencia

Cesga is participating in all the activities

The Spanish Network for e-Science



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CESGA

JAVIER GARCÍA TOBÍO
MANAGING DIRECTOR, GALICIA SUPERCOMPUTING CENTER

CESGA FUNCTIONAL AREAS

HPC, HTC, GRID, AND CLOUD COMPUTING

RESOURCES	SERVICES
HPC, HTC Servers, GRID Servers, Scientific Software Applications	Code Optimization, Problem Definition, Parallelisation, User Support...

DATA STORAGE

RESOURCES	SERVICES
Storage Servers	Critical Storage Systems

COMMUNICATIONS NETWORK

RESOURCES	SERVICES
RECETGA Science and Technology Network of Galicia	DNS, Hosting, Mail Servers, Mailing List, FTP, News, Mirrors, Multicast, Video-conference, MCU / Gateway, Proxycache, Network Management, Security Systems, Statistics...

RTD PROJECTS

Viability Analysis, Proposal Development, Consortium Creation, Project Negotiation, Management...

TRAINING (EDUCATION)

Workshops and Training Courses for Users

DISSEMINATION

Web, Publications, Presentations, Seminars, Scientific Conferences...

e-LEARNING & COLLABORATION TOOLS

RESOURCES	SERVICES
e-Learning Room Network and e-Learning Platform, "AULA CESGA", Access Grid, Room Network	Analysis, Development, Implementation and Hosting of Solutions

TECHNOLOGY TRANSFER & e-BUSINESS

RESOURCES	SERVICES
Galicia's e-Business Leveraging Centre	Viability Analysis, Project writing, Partnerships Formation...

GEOGRAPHIC INFORMATION SYSTEMS

RESOURCES	SERVICES
Map Servers, Geographical Data Bases	Analysis, Development Implantation and Lodging Solutions

DNV

ISO 9001:2008

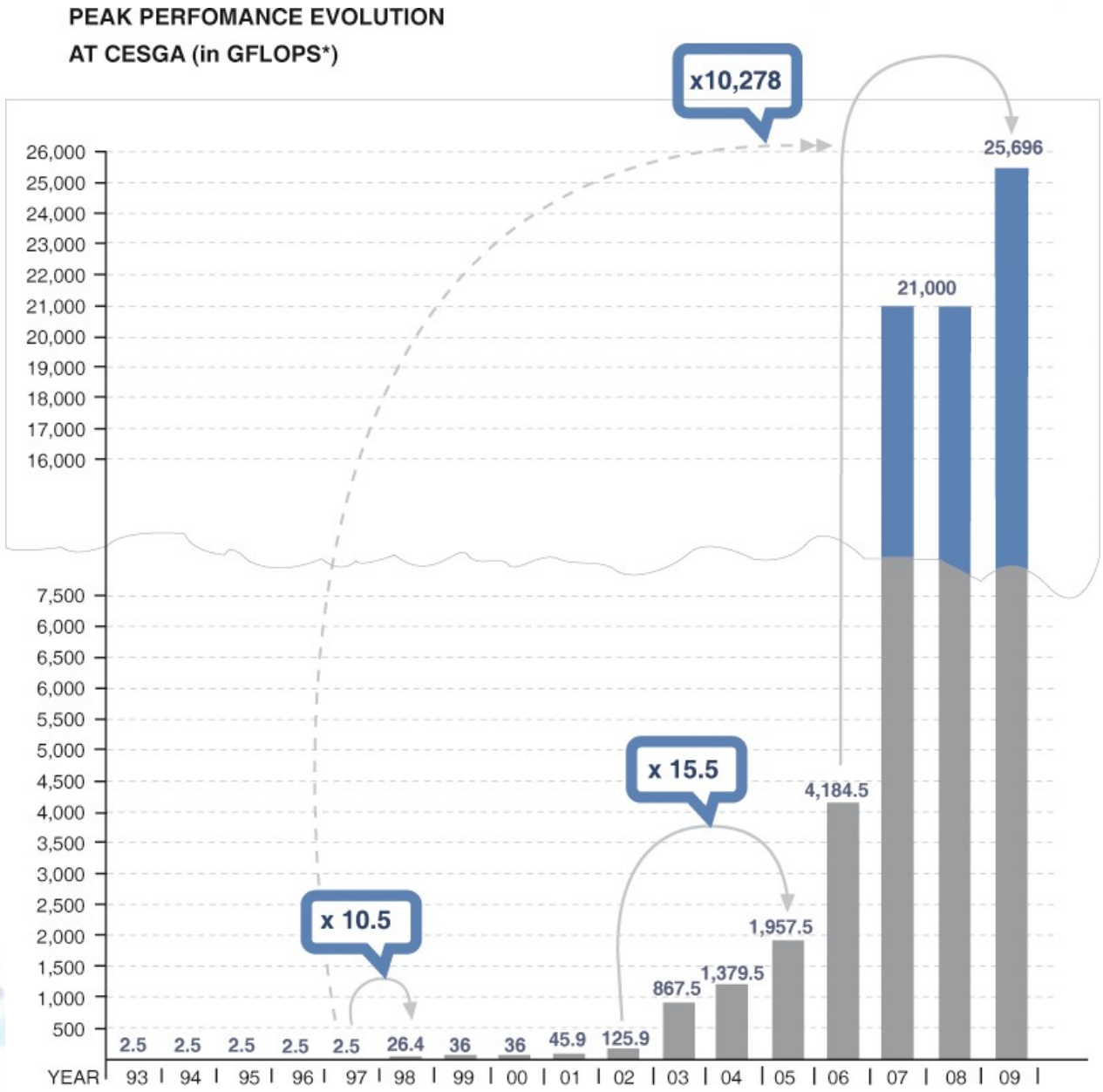
Quality Management

Applus

Excellence in Management

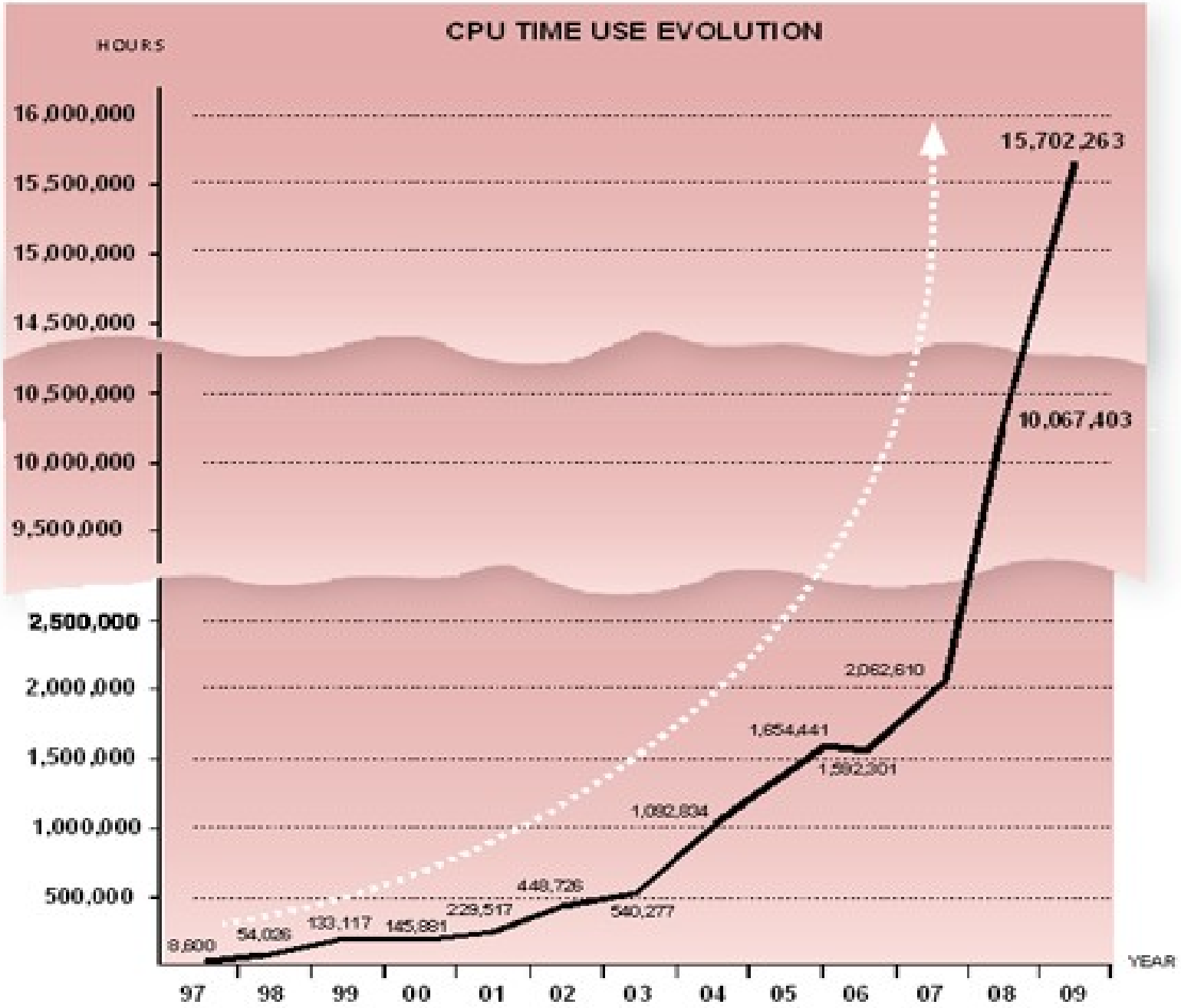
CESGA STAFF

PEAK PERFORMANCE EVOLUTION AT CESGA

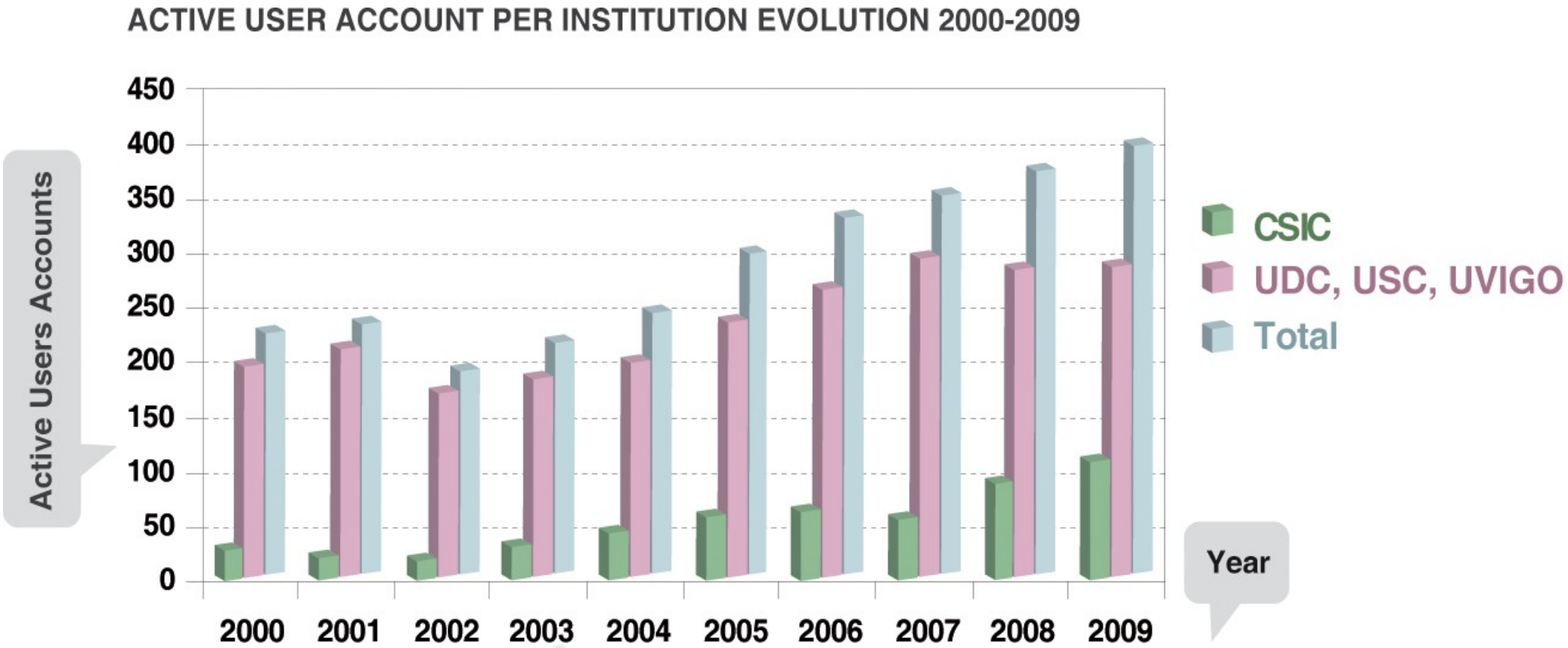


* 1GFLOPS= 1,073,741,824 (floating point operations per second)

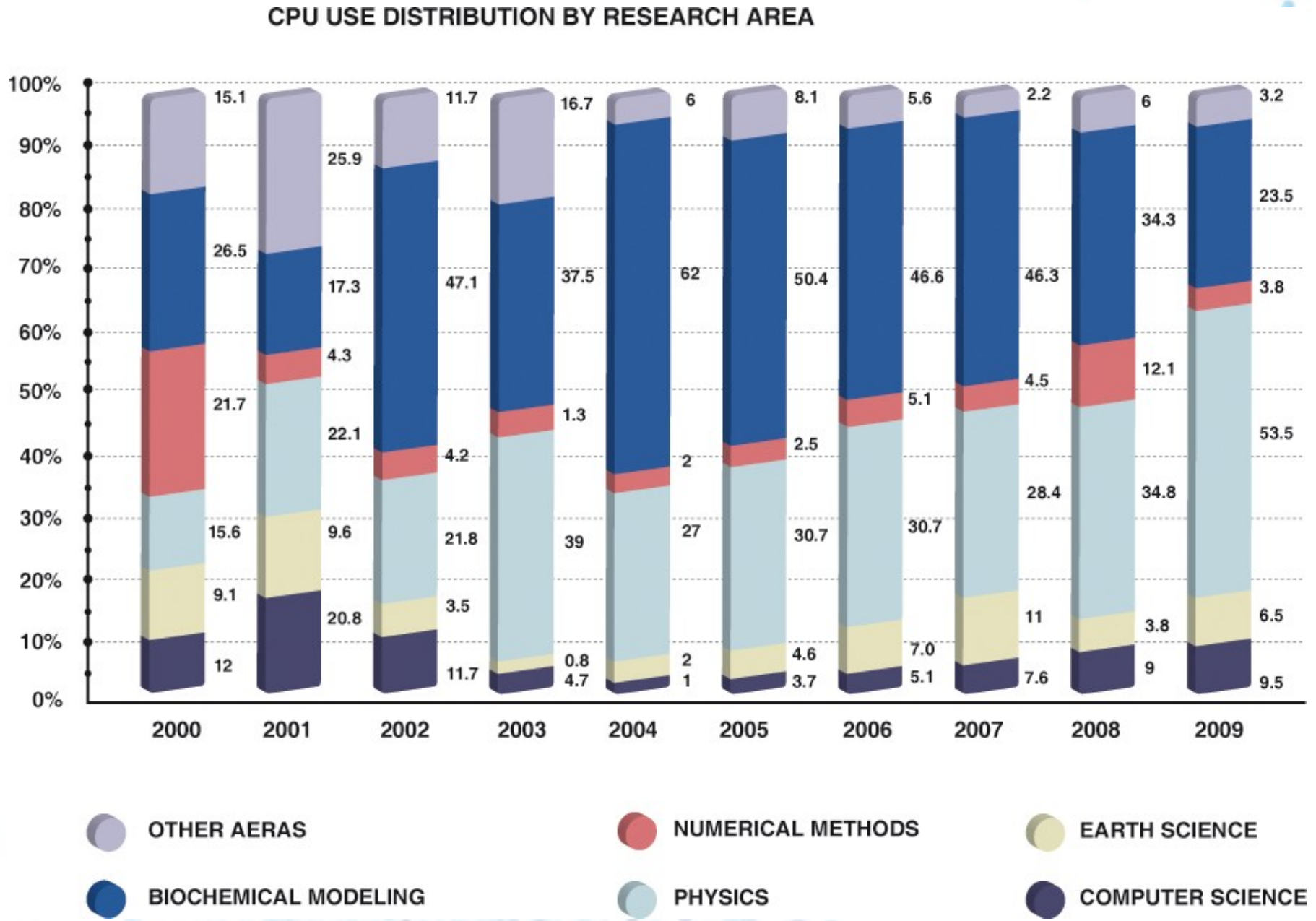
EVOLUTION OF CPU CONSUMPTION



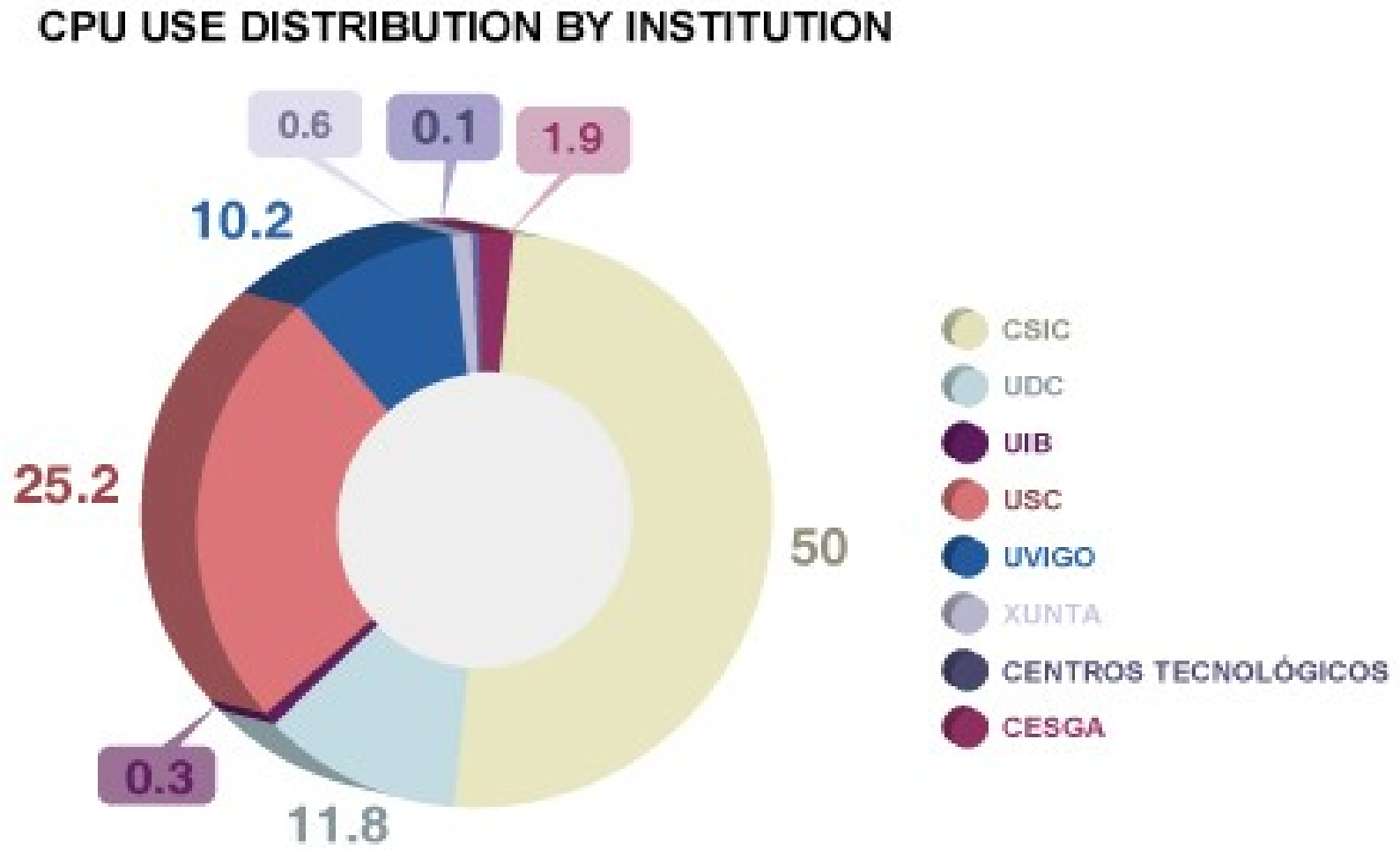
COMPUTING USERS



CPU DISTRIBUTION BY RESERCH AREA



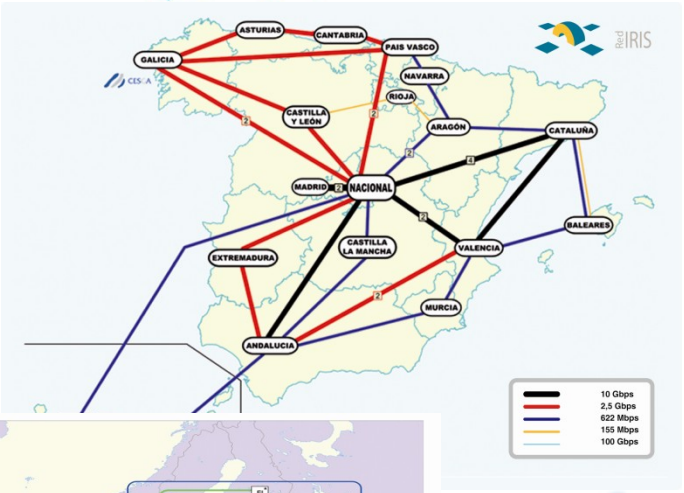
DISTRIBUTION BY INSTITUTIONS OF THE CPU HOURS IN ALL SYSTEMS

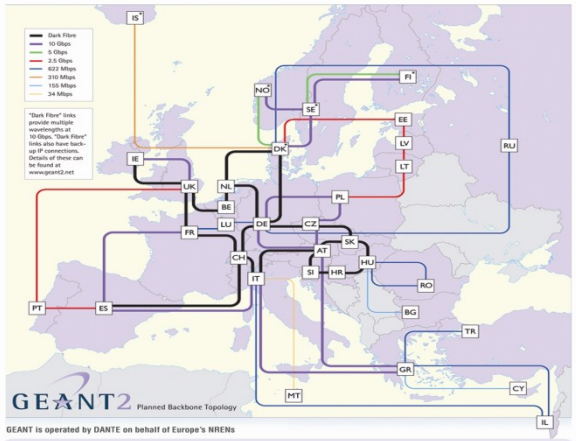


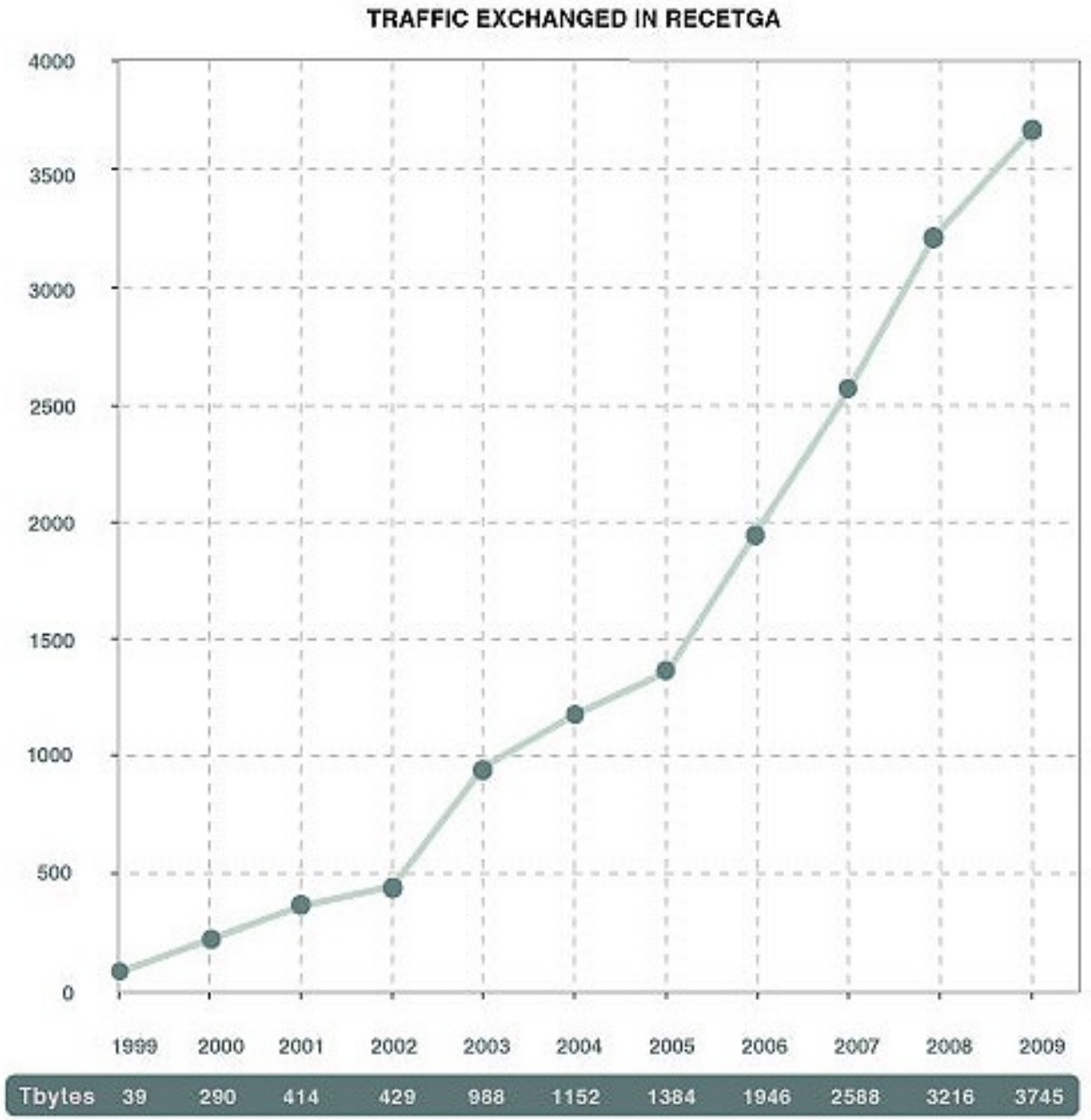
DATA STORAGE USED

TYPE OF STORAGE	CAPACITY (TB)
Temporary or Scratch	130
Temporary Parallel	223
Permanent Disk	25
Tape	1,360
TOTAL	1,739

TRAFFIC EXCHANGED IN THE REGIONAL RESERACH NETWORK







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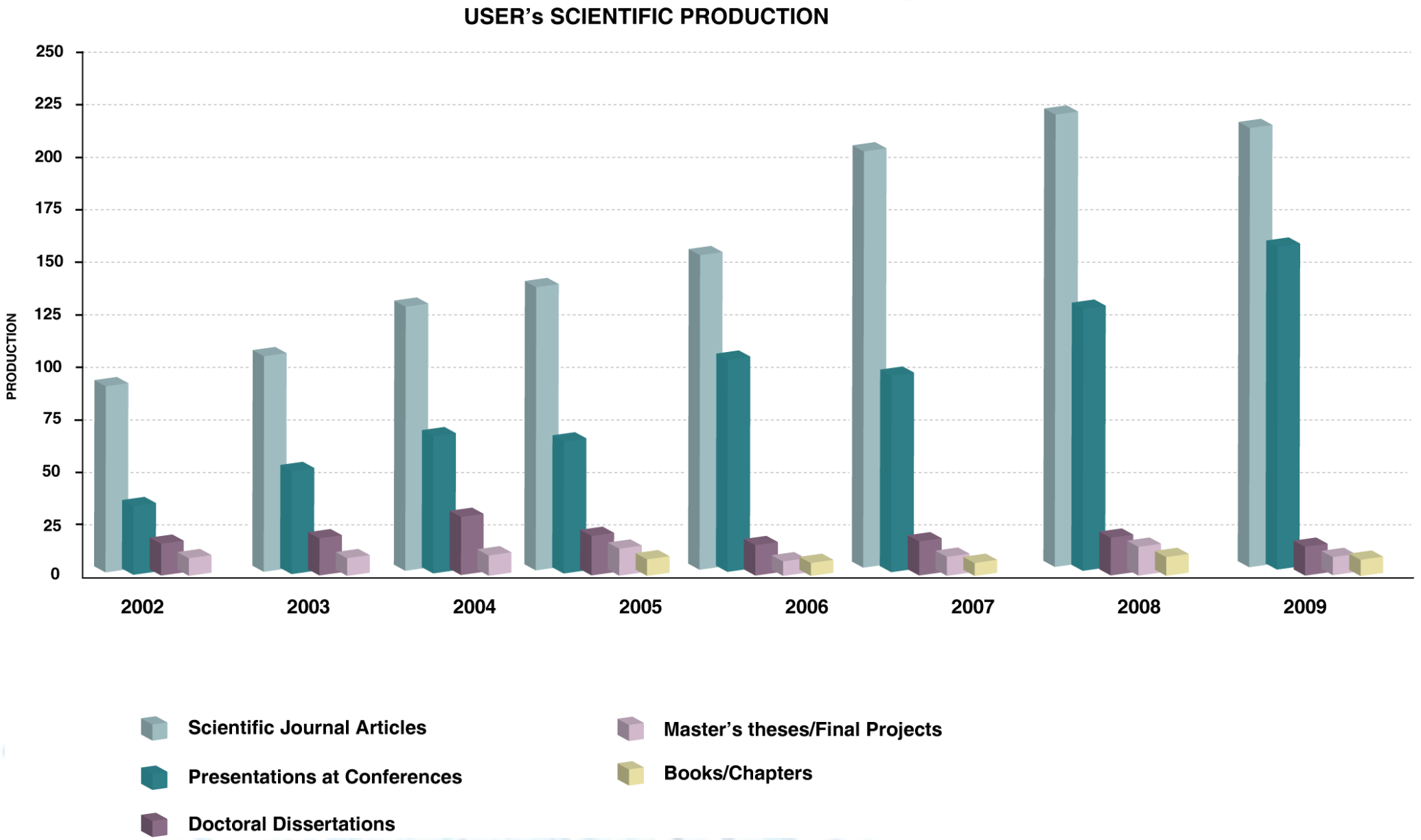
SUPPORT ACTIVITY 2009

Area	Number of requests
- Communications	636
- Applications	252
- Systems	1.262
- Infrastructures	55
- GIS	41
- General	23
TOTAL:	**2.269**

USER SATISFACTON LEVEL: 4,5

(Mesure: 1: Very bad, 5: Excellent)

USER'S SCIENTIFIC PRODUCTION



PROJECTS

In 2009 36 project proposals were presented.

50% were successful and got the funding necessary for implementation.

AREA	PROJECTS	
	2008	2009
Computing	19	19
Network Comunications	4	3
Colaboration Tools & e-Learning	3	9
Geografical Information Systems	4	3
Tecnology Transfer & e-Business	4	4
Other Grants for Research	4	6
TOTAL	38	44

GRANT SOURCE	PROJECTS	
	2008	2009
European Comission	10	10
Spanish Goverment	7	13
Galician Regional Goverment	17	19
Industry	4	2
TOTAL	38	44

Thematic Networks, Tecnological Platforms	19	19

CESGA

FINIS TERRAE

FINIS TERRAE

Spanish National Unique Scientific & Technology Infrastructure

More than: **16,000 GFLOPS** **2,580 CPUs** **19,640 GB Memory**

The Spanish Network for e-Science

Red Española de e - Ciencia

eGI

PRACE

IBERGRID

OTHER...

Coordination and collaboration among the Supercomputing Centres of the country.

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HIGHLIGHTS 2009

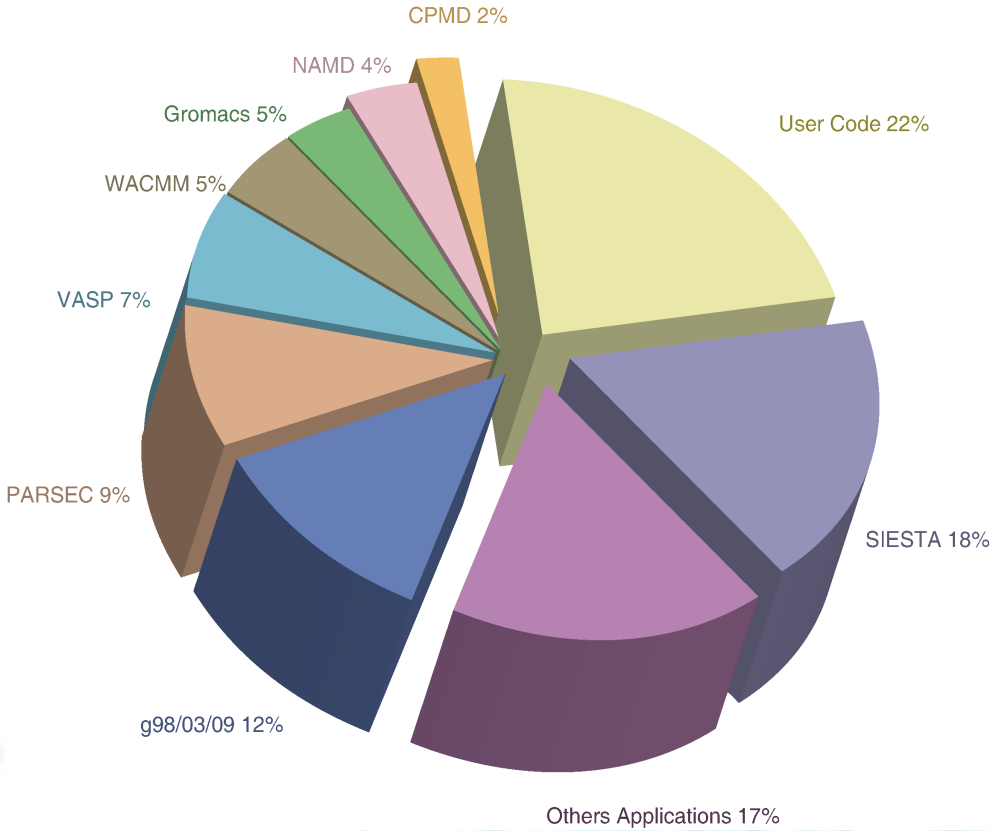
- The amount of *CPU hours* consumed by the community of users on CESGA's servers increased by **57%** as compared to the previous year.
- The first open call for "***Computational Challenges***" was successfully launched in 2009 and had an execellent reception within the user community.
- The first edition of ***CESGA's Computational Science Summer School*** took place with training sessions, speakers, and students of the highest quality standards.
- CESGA, along with users and projects partners, was recognised with ***three*** different international ***Awards*** in 2009
- Preliminary work for the deployment of the ***dark fibre*** in the Galician Research and Education Network, RECETGA, was undertaken.
- CESGA actively participated in ***44 RTD projects*** and in ***19 thematic research networks and technological platforms.***
- CESGA renewed its ***ISO:9001*** certification under ***2008 new version***
- Preliminary work was undertaken toward the implementation of Norm ***UNE166002*** that governs the management of reseach, tecnological development, and innovation activity.

SCIENTIFIC COMPUTING APPLICATIONS

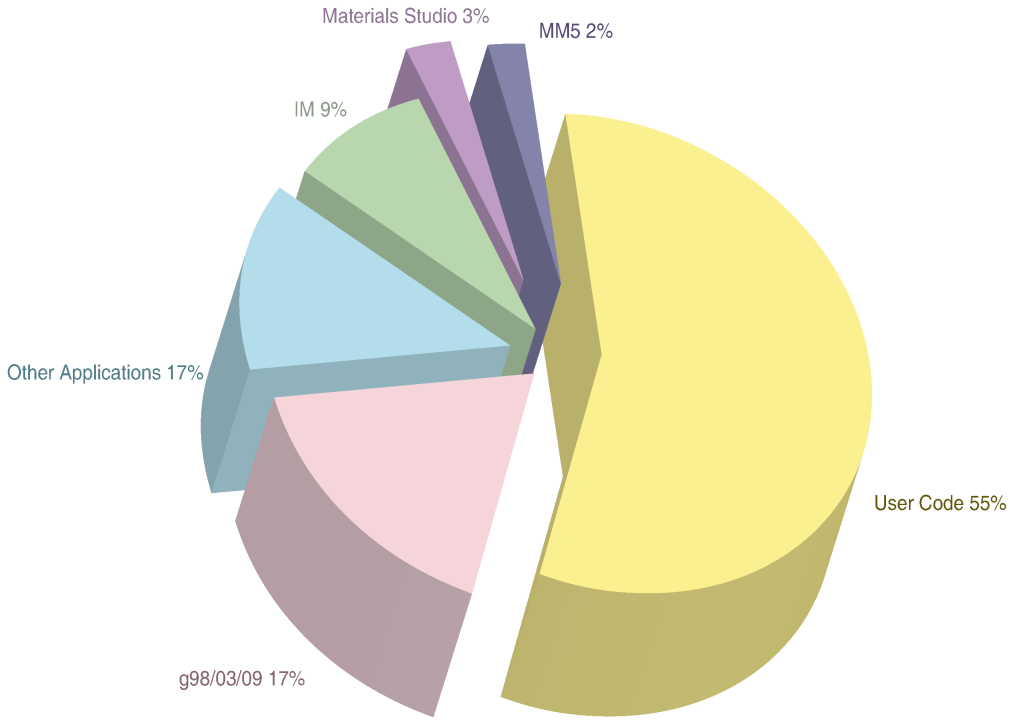
- 74 scientific applications or libraries applications

- 94 new applications versions, libraries, compilers, and development tools were installed in 2009.

FINIS TERRAE

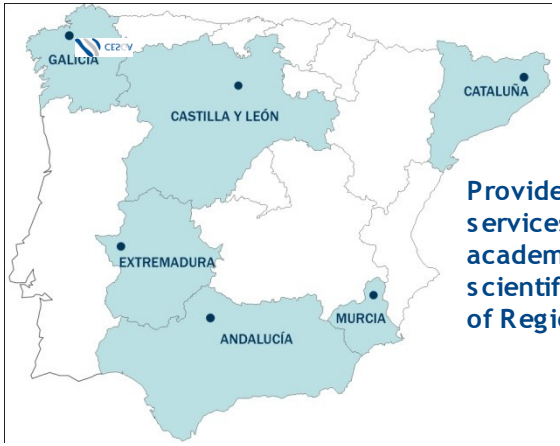


SVG



Main HPC Initiatives in Spain

REGIONAL SUPERCOMPUTING CENTRES



Providers of HPCN services to industry, academic and scientific community of Regions

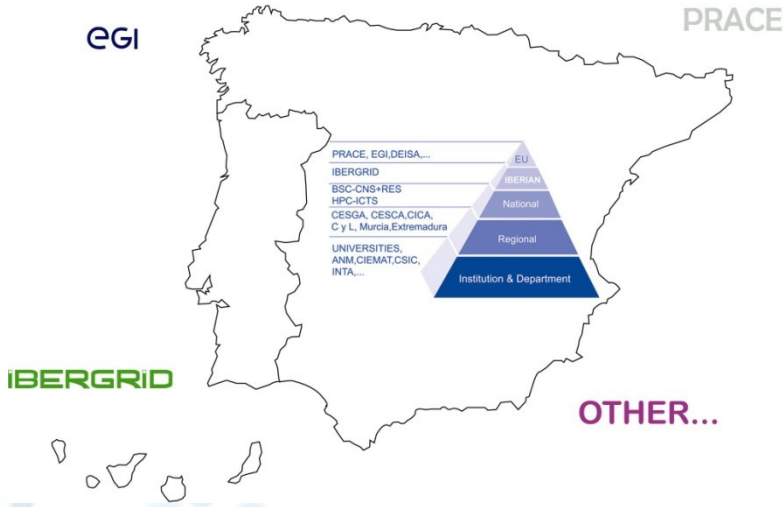
SPANISH SINGULAR HPC INFRASTRUCTURES (ICTS)

Providers of HPC services to national and international research community(at least 20% of their resources)

(RES) SUPERCOMPUTING SPANISH NETWORK

Network managed by BSC-CNS and open to Spanish researches

SPANISH e-SCIENCE INITIATIVE



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