

# CENTRO DE SUPERCOMPUTACIÓN DE GALICIA

## CESGA 2008-2012

Javier García Tobío  
(Managing Director, Galicia Supercomputing Centre)



XUNTA DE GALICIA  
CONSELLERÍA DE INNOVACIÓN,  
E INDUSTRIA



CONSEJO SUPERIOR  
DE INVESTIGACIONES  
CIENTÍFICAS



MINISTERIO  
DE CIENCIA  
E INNOVACIÓN



FEDER

FONDO EUROPEO DE  
DESENVOLVEMENTO REXIONAL

ESTABLISHED IN 1993 IN SANTIAGO DE COMPOSTELA (SPAIN)



SANTIAGO DE COMPOSTELA



## MISSION STATEMENT

**To provide** high performance computing and advanced communications resources and services to the scientific community of Galicia and to the Spanish National Research Council (CSIC), as well as, to institutions and enterprises with R&D activity.

**To promote** high quality research in Computational Science in close collaboration with the research community from Galicia as well as from other regions or countries all over the world; contributing in this way to the advancement of science, to transfer technology to industry and administrations , and as consequence, to the welfare of society as a whole.

SANTIAGO DE COMPOSTELA, SPAIN,



XUNTA DE GALICIA  
CONSELLERÍA DE INNOVACIÓN,  
E INDUSTRIA



CONSEJO SUPERIOR  
DE INVESTIGACIONES  
CIENTÍFICAS



## LEGAL ENTITIES

- Public Company
- Public Foundation

## PARTNERS

- Regional Government of Galicia
- National Research Council of Spain



# STRATEGIC PLAN

## BASED ON:

- **Decision of Galician Government** to promote some research excellence centres, including HPC.
- **Decision of CSIC** to deploy a large HPC infrastructure for its research community.
- **Support of the Spanish Government** to establish in Galicia a new Singular Scientific and Technological Infrastructure devoted to HPC.
- **Experience accrued by CESGA** through its 15 year history.

# STRATEGIC PLAN

## TO SOLVE:

- Daily needs of researchers (not only large problems).
- Heterogeneous programs.
- Multiple O.S.
- Based on Open Source Codes.
- Capability and Capacity.
- Running legacy and new codes.
- Complement offer with other centres.
- Development of numerical simulation applied to industry.
- Reduction of “time-to-solution”

# STRATEGIC PLAN

## AS A CONSEQUENCE:

- Improve productiveness and competitiveness of researchers.
- Attract foreign research talent.
- Retain local research talent.
- Attract investment from private companies.
- Continue on the way to achieve higher levels of “excellence” in research and HPC services.

# AREAS OF ACTIVITY

## RESEARCH

**CESGA - C<sup>2</sup>SRC**

(CESGA – Computational  
Science Research Centre)

- Starting date: 2008
- Staff: 140 Researchers (recruiting)

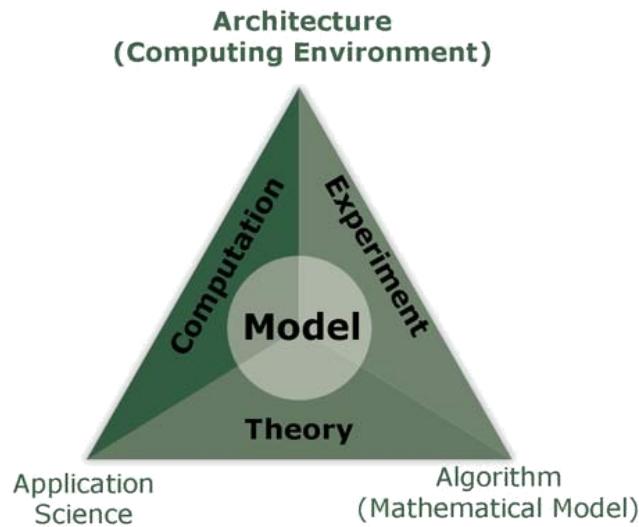
## ADVANCED SERVICES & INNOVATION

- Starting date: 1.993
- Staff: 60, currently

**BUDGET (2008-2012) : 75 M€**

# CESGA COMPUTATIONAL SCIENCE RESEARCH CENTRE

# COMPUTATIONAL SCIENCE



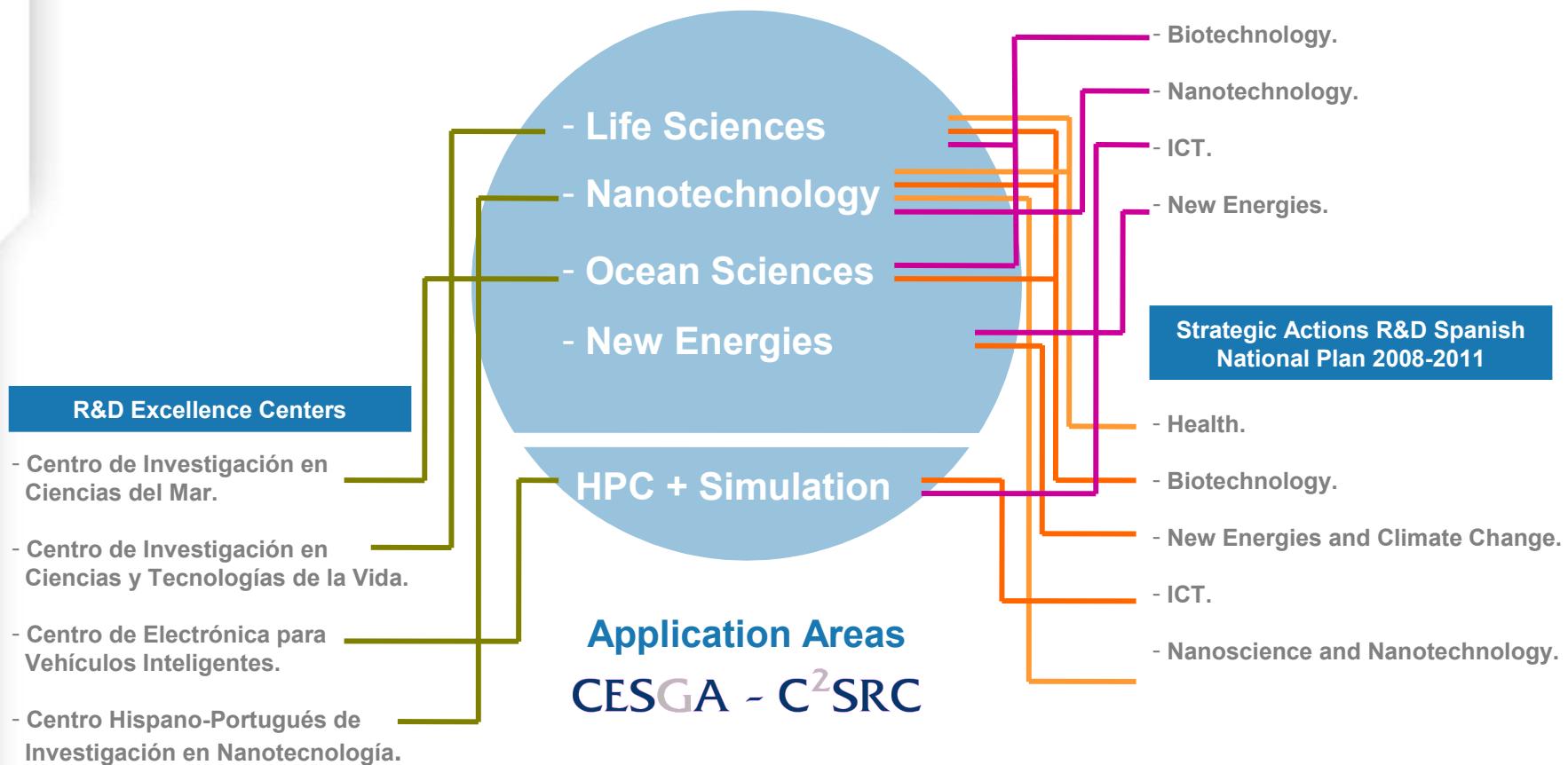
**Computational Science is the field of study concerned with constructing mathematical models and numerical solution techniques and using computers to analyze and solve scientific, social scientific and engineering problems.**

(Wikipedia)

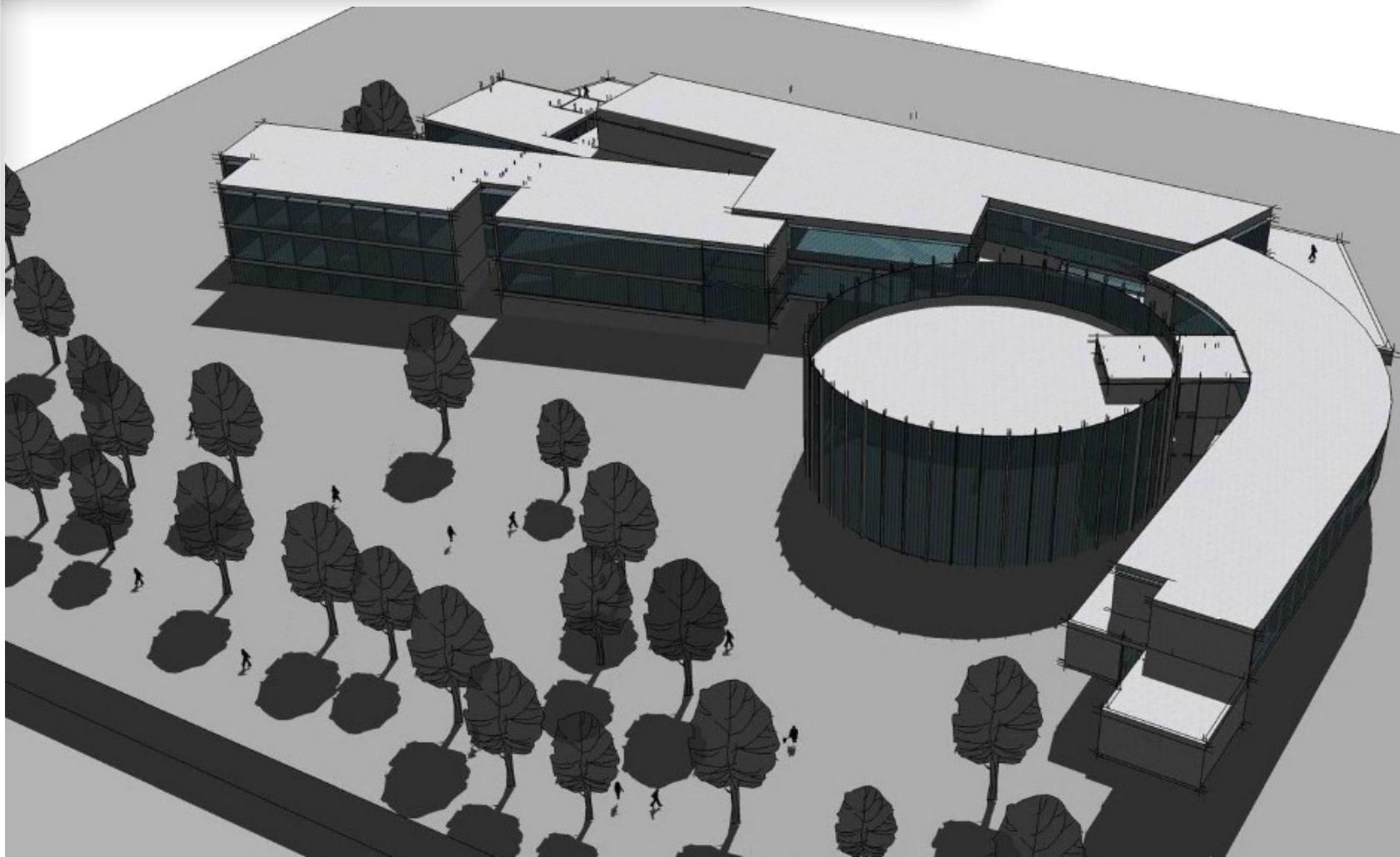
- **Application Areas:**
  - Strategic for Galicia.
  - High demand of HPC resources.
  - Research experience in Galicia and CSIC.
  - Singular in Galicia and CSIC.

# CENTER STRUCTURE

R&D Galician Plan 2006-2010



# NEW FACILITIES



- **Recruiting of 140 researchers until 2012**
  - With the participation of **Galician Universities** researchers
  - With the participation of **CSIC** researchers.
  - **OPEN International Calls.**

# CENTRO DE SUPERCOMPUTACIÓN DE GALICIA

# CESGA-ADVANCED SERVICES And INNOVATION



XUNTA DE GALICIA  
CONSELLERÍA DE INNOVACIÓN,  
E INDUSTRIA

CSIC  
CONSEJO SUPERIOR  
DE INVESTIGACIONES  
CIENTÍFICAS

MINISTERIO  
DE CIENCIA  
E INNOVACIÓN

FEDER  
FONDO EUROPEO DE  
DESENVOLVIMENTO REGIONAL

# CURRENT CESGA's COMMUNITY OF USERS

- **Galician Universities**
- **Galician Regional Government Research Centres**
- **Spanish National Research Council (CSIC) Centres**
- **Other public or private organizations worldwide**
  - Hospital R&D Departments
  - Industries R&D Departments
  - Technological & Research Centres
  - Other Universities worldwide
  - Non-profit R&D organizations

SANTIAGO DE COMPOSTELA, SPAIN,



XUNTA DE GALICIA  
CONSELLERÍA DE INNOVACIÓN,  
E INDUSTRIA



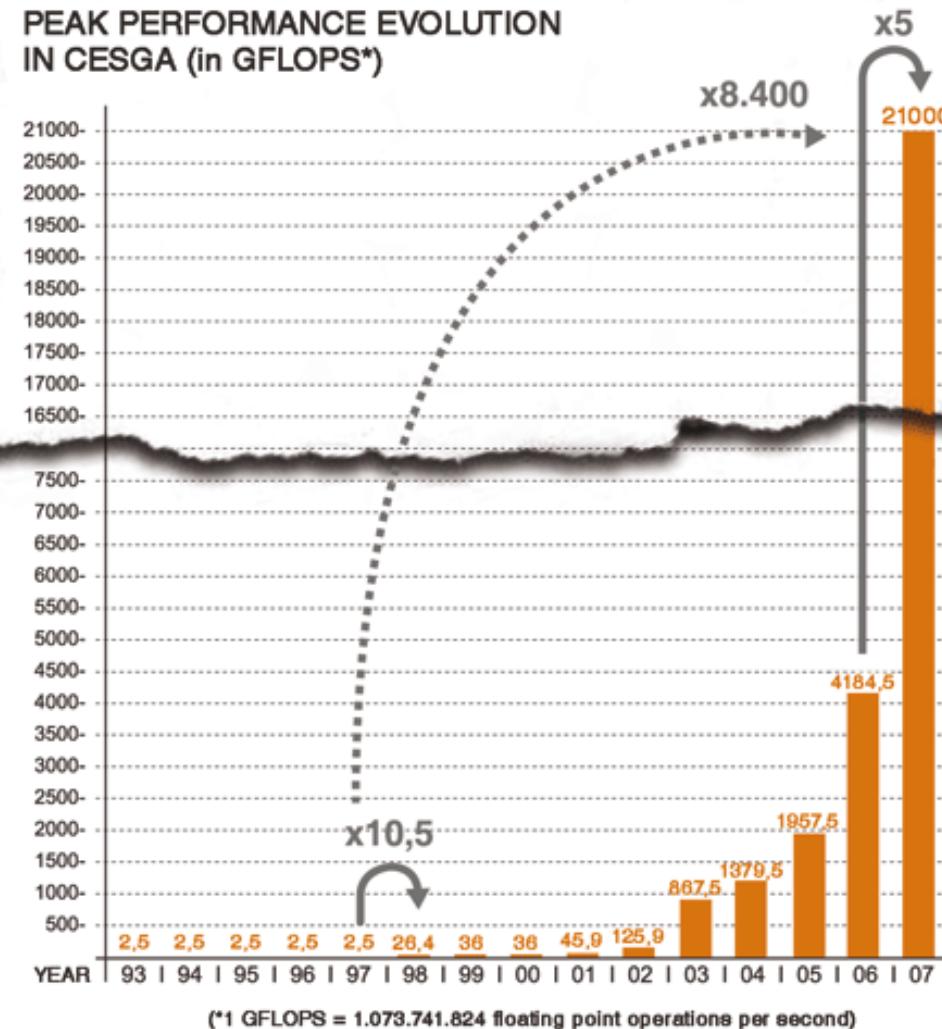
CONSEJO SUPERIOR  
DE INVESTIGACIONES  
CIENTÍFICAS



- **HPC, HTC & GRID Computing**
  - **User Data Storage**
  - **Advanced Communications Network**
  - **e-Learning & Collaboration Infrastructures**
  - **GIS (Geographical Information Systems)**
  - **Technology Transfer to Industry and e-Business**
- Innovation Support**

SANTIAGO DE COMPOSTELA, SPAIN,

# CESGA's PEAK PERFORMANCE EVOLUTION

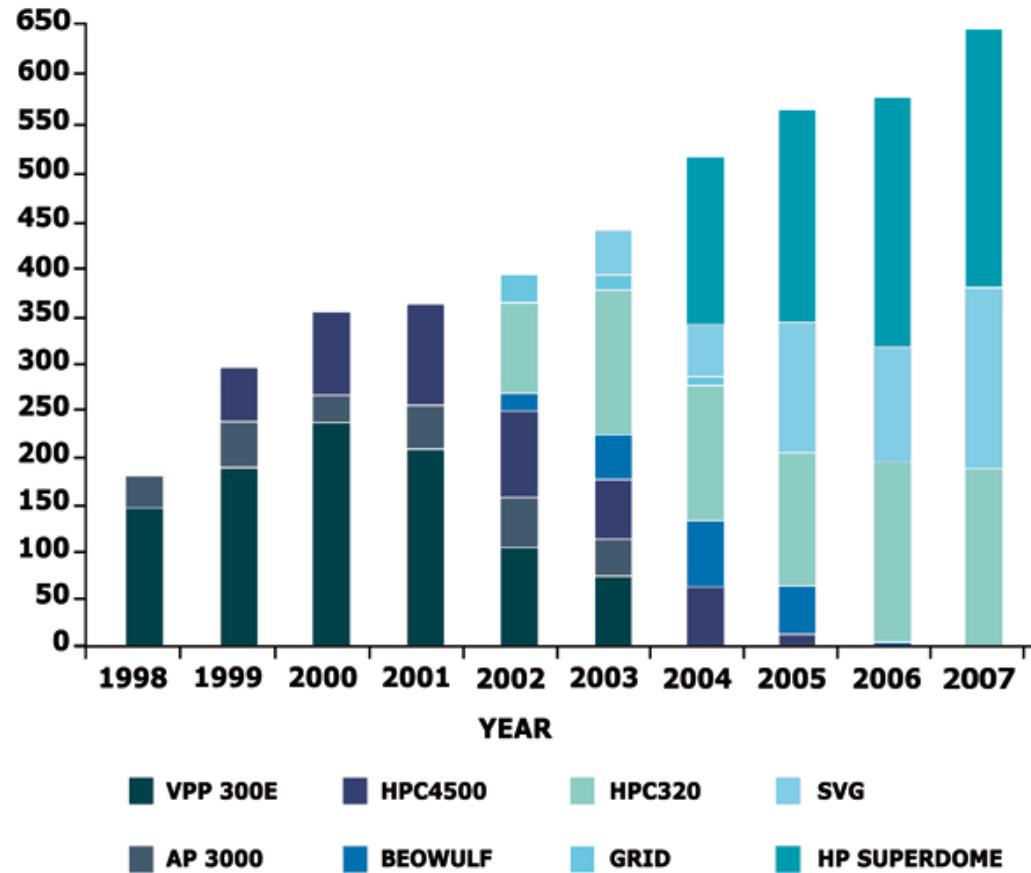


SANTIAGO DE COMPOSTELA, SPAIN,



# DEMAND OF COMPUTING RESOURCES AT CESGA

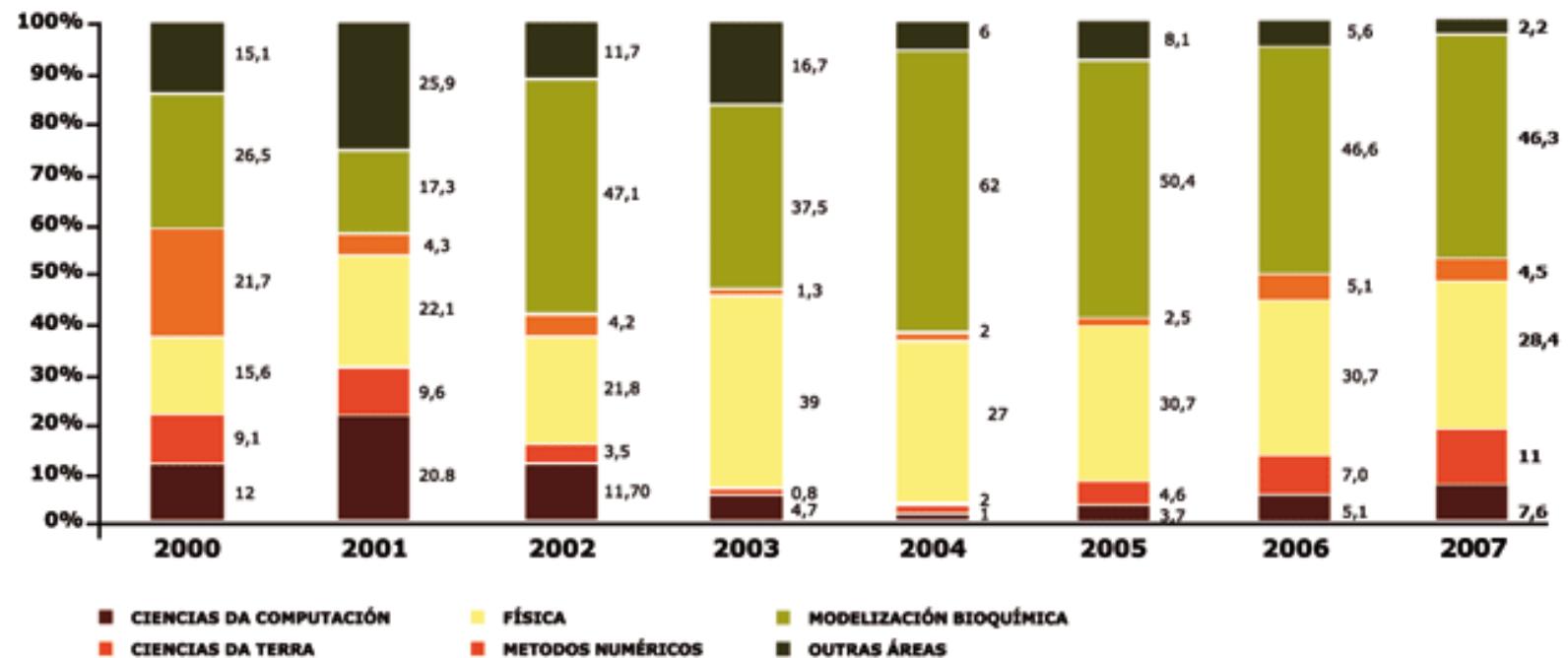
## NUMBER OF USER ACCOUNTS PER SYSTEM PER YEAR



SANTIAGO DE COMPOSTELA, SPAIN,

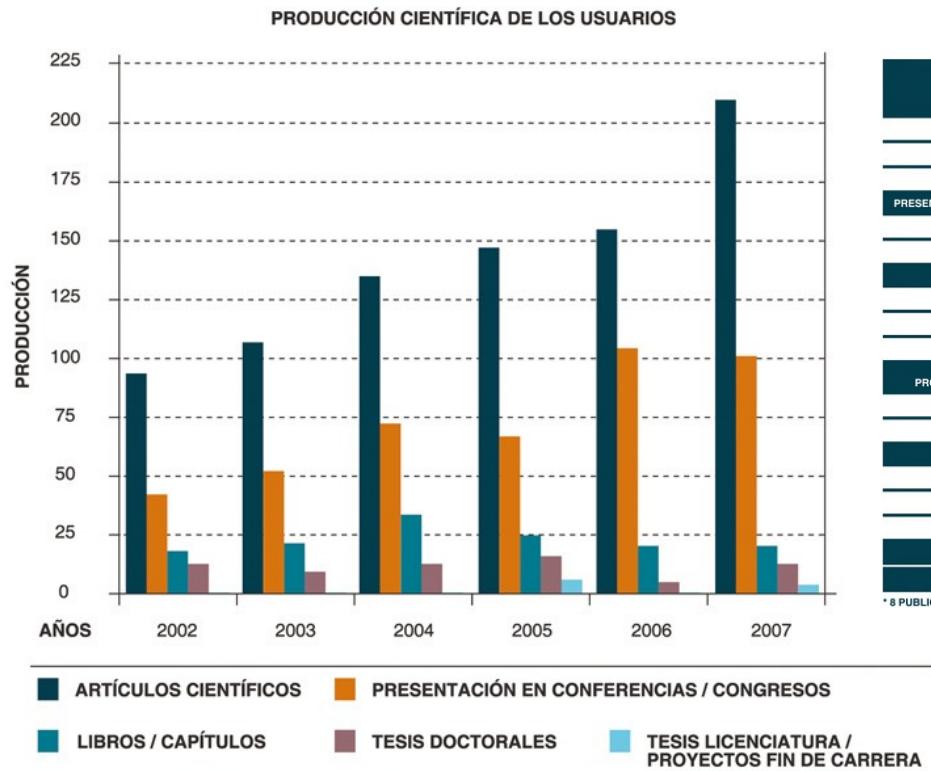
# APPLICATION AREAS AT CESGA

## CPU USE DISTRIBUTION PER AREA



SANTIAGO DE COMPOSTELA, SPAIN,

*comparativa producción científica de cada  
por los usuarios cesga 2002-2007*



| PRODUCTO                                      | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|------|------|------|------|------|------|
| ARTÍCULOS CIENTÍFICOS                         | 93   | 107  | 134* | 147  | 154  | 208  |
| ACEPTADOS                                     | 4    | 8    | 20   | 16   | 26   | 19   |
| ENVIADOS                                      | 16   | 29   | 26   | 27   | 23   | 24   |
| PUBLICADOS                                    | 73   | 70   | 91   | 104  | 105  | 165  |
| PRESENTACIONES EN CONFERENCIAS                | 42   | 52   | 72*  | 65   | 105  | 101  |
| PRESENTACIONES                                | 33   | 40   | 53   | 37   | 53   | 46   |
| POSTERS                                       | 9    | 12   | 35   | 28   | 52   | 47   |
| TESIS DOCTORALES                              | 17   | 21   | 32   | 24   | 18   | 18   |
| DEFENDIDAS                                    | 9    | 4    | 5    | 9    | 10   | 11   |
| PRESENTADAS                                   | 0    | 0    | 0    | 0    | 3    | 5    |
| EN PROCESO                                    | 8    | 17   | 27   | 15   | 5    | 2    |
| TESIS LICENCIATURA / PROYECTOS FIN DE CARRERA | 12   | 9    | 12   | 14   | 5    | 10   |
| DEFENDIDAS                                    | 6    | 4    | 5    | 13   | 3    | 8    |
| EN PROCESO                                    | 6    | 5    | 7    | 1    | 2    | 2    |
| LIBROS / CAPÍTULOS                            | ND   | ND   | ND   | 5    | ND   | 3    |
| ACEPTADOS / IN PRESS                          | ND   | ND   | ND   | 4    | 1    | 1    |
| ENVIADOS                                      | ND   | ND   | ND   | 1    | 0    | 2    |
| PUBLICADOS                                    | ND   | ND   | ND   | 0    | 3    | 0    |
| OTROS   | 5    | 5    | 6    | 5    | 15   | 11   |
| TOTAL   | 169  | 194  | 256  | 260  | 301  | 351  |

\* 8 PUBLICACIONES Y 16 CONGRESOS CON AUTORES DE MÁS DE UNA INSTITUCIÓN

# FIDES TERRAE

EXPANDING  
THE  
FRONTIERS OF KNOWLEDGE

SANTIAGO DE COMPOSTELA, SPAIN,



XUNTA DE GALICIA  
CONSELLERÍA DE INNOVACIÓN,  
E INDUSTRIA



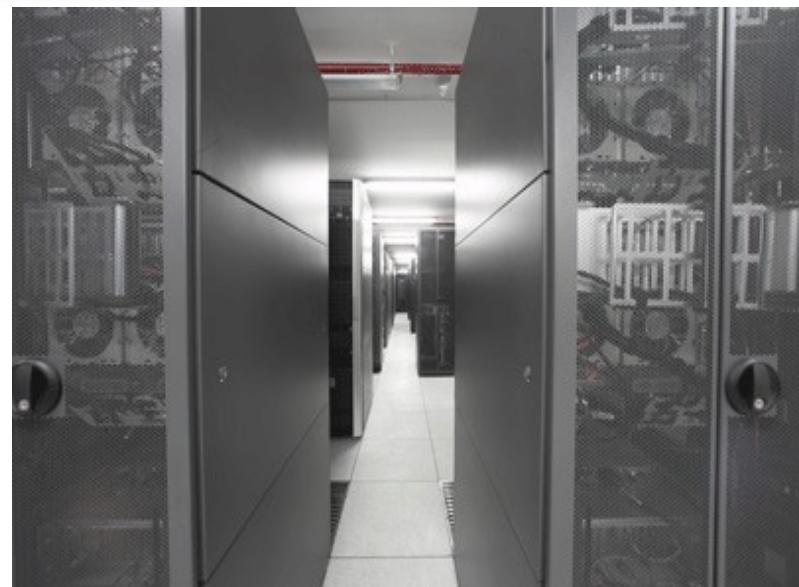
CONSEJO SUPERIOR  
DE INVESTIGACIONES  
CIENTÍFICAS



MINISTERIO  
DE CIENCIA  
E INNOVACIÓN



FEDER



## Spanish National Singular Scientific & Technological Infrastructure

More than: **16,000 GFLOPS**

**2,580 CPUs**

**19,640 GB Memory**

LINUX, UNIX, WINDOWS

SANTIAGO DE COMPOSTELA, SPAIN,

# SOME FIGURES AT 31/May/2008

- **19.812 trabajos ejecutados**
- Más de 2 millones de horas de cálculo (288 años)
- **2.980 trabajos necesitaron más de 64 GB de memoria**
- **4.783 trabajos de más de 100 horas de cálculo**
- **200 trabajos necesitaron más de 100 GB de disco**
- **2.173 programas necesitaron más de 32 CPUs**
- **102 programas utilizaron más de 256 CPUs**
- **5 Trabajos utilizaron más de 1.000 CPUs y más de 10TB de memoria**

SANTIAGO DE COMPOSTELA, SPAIN,

# THANK YOU

## FOR YOUR ATTENTION

**Javier García Tobío**

[info@cesga.es](mailto:info@cesga.es)

[www.cesga.es](http://www.cesga.es)



XUNTA DE GALICIA  
CONSELLERÍA DE INNOVACIÓN,  
E INDUSTRIA



CONSEJO SUPERIOR  
DE INVESTIGACIONES  
CIENTÍFICAS



MINISTERIO  
DE CIENCIA  
E INNOVACIÓN



FEDER

FONDO EUROPEO DE  
DESENVOLVIMENTO REGIONAL