



Enabling Grids for E-science

Spanish National Research Council- CSIC

Isabel Campos

Institute of Physics of Cantabria-IFCA

Santander

Applications porting activity

www.eu-egee.org



Information Society
and Media



- **CSIC: Spanish National Research Council**
 - Largest public entity in Spain dedicated to research
 - Multidisciplinary (<http://www.csic.es>) :
 - Physics, Chemistry and Materials Science
 - Biology, Biomedicine and food sciences
 - Environmental Sciences.
 - CSIC has 124 research institutes distributed across Spain
 - The **Institute of Physics of Cantabria-IFCA** and the **Institute of Corpuscular Physics-IFIC** are involved in EGEE-III
 - Grid applications activities at IFCA (Santander)
 - Tier-2 of CMS experiment
 - Astrophysics and Environmental Sciences support
 - Grid applications activities at IFIC (Valencia)
 - Tier-2 of ATLAS experiment
 - Medical imaging applications

- **Project GRID-CSIC**

- Aims to deploy a computational grid between several institutes to serve our scientific community at CSIC
- First phase (operative by september 2008):
 - IFCA (coordinator) 1500 CPUs
 - IFIC 1200 CPUs
 - IAA (Astrophysics) 800 CPUs
- By fall of this year we will initiate a prospective among all CSIC centers in order to define application requirements from the point of view of Grid support
- Strategically linked to CNRS -> good framework for collaboration in the context of EGEE-III

- **Support to MPI and i2glogin**

CSIC as coordinator of inteugrid has developed a strategy of support for **parallel MPI app.s** and for **interactive job submission**

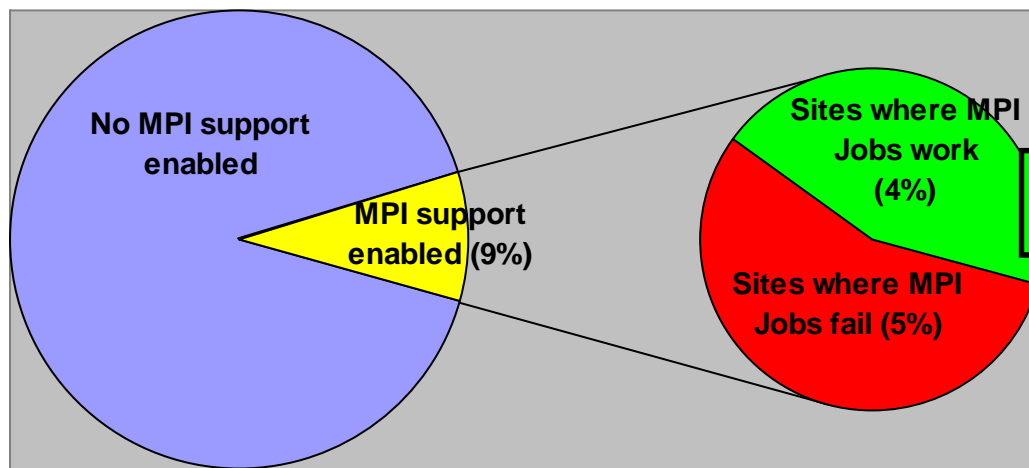
- **Middleware deployment**
 - *mpi-start*
 - *i2glogin*
- **Infrastructure support**
 - Low latency intranet cluster: Infiniband
- **Documentation for user and applications developers (wiki)**

- **Support to our user communities**

- **Astrophysics (AA cluster)**
 - Planck mission
 - User induction (XMM group)
- **Fusion**
 - SA1 coordinators in EUFORIA (FP7 Jan 08 – Dec 10)
- **Environmental research**
 - Modelling of coastal landscapes
 - Grid instrumentation: networks of sensors in the framework of DORII (FP7 Feb 08 – June 10)
- **Medical Applications**
- **Support to our HEP community (CMS and ATLAS Tier-2)**

- MPI support in EGEE is a longstanding issue. The MPICH job type supported in glite WMS has revealed to be rather inflexible since it enters in conflict with standard site configuration.
- A solution has been worked out in the framework of the MPI Technical Coordination Group of egee together with inteugrid
<http://www.grid.ie/mpi/wiki>
- The solution implies using an intermediate software layer, mpi-start.
- The adoption so far is rather limited in EGEE.
- We need to improve this situation
 - More documentation
 - Dissemination at the level of EGEE
 - SELF-dissemination
 - Identify MPI as a key feature for many VOs and enforce it at the site level.

MPI support reliability in EGEE Biomed VO



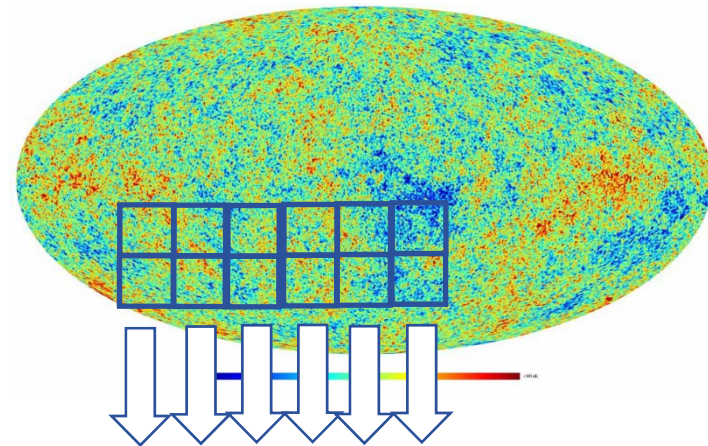
9% of the sites in Biomed publish the MPICH tag. From those, only on half of them MPI actually works (using mpi-start)

Site Name	CPUs available	Site Interconnect (from gridice)
ce.grid.rug.nl	120	Gigabit Ethernet
cirigrdce01.univ-bpclermont.fr	60	Gigabit Ethernet
grid10.lal.in2p3.fr	900	Gigabit Ethernet
gridgate.cs.tcd.ie	770	Gigabit Ethernet
Grive11.ibcp.fr	22	Gigabit Ethernet
Marce01.in2p3.fr	210	Gigabit Ethernet

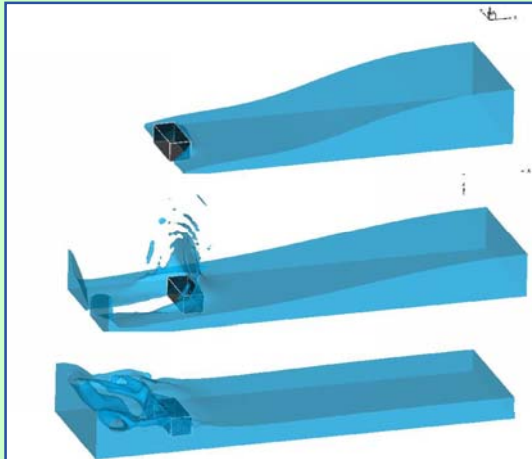
- **Analysis of XMM – Newton data**
 - X-Ray telescope
 - Database installed in Spain at ESA/ESAC
 - Support and installation of analysis software SAS



- **Analysis of CMB maps and support to the Planck mission**
 - Search for anisotropies in CMB maps
 - Distributed analysis of image filtering



MPI processes distribution



- *Simulations of*
- *Dam breaking*
- *using TELLURIDE*

Portability Analysis

- Regarding Intel Fortran compilers ifc (F90)
- Libraries associated
- Open-MPI itself

The Group of Research in Oceanography and Coasts of the University of Cantabria is using this code for landscape design of harbours in the North coast of Spain.

<http://www.gioc.unican.es>

Telluride is a MPI software used to simulate many problems in the areas of solidification, fluid flow, heat transfer, phase transformations and mechanical deformation

<http://www.lanl.gov/telluride>

- **Objective: Create a working environment suitable to run Lattice QCD on our Infiniband clusters in GRID-CSIC**
 - Project financed by the Spanish Office for Science

- **Requirements:**

- **Low latency intra-networks required**
(~ 10 microsecond: **Infiniband or Myrinet**)
- **Competitive simulations run for several weeks, or months, on cluster of minimum 128 – 512 cores**
- **Input / Output** involved is order of a few TB per year, but an efficient structure for sharing data should be designed