

Overview of the National Grid initiatives

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WP5 Kick Off meeting

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Working Group:

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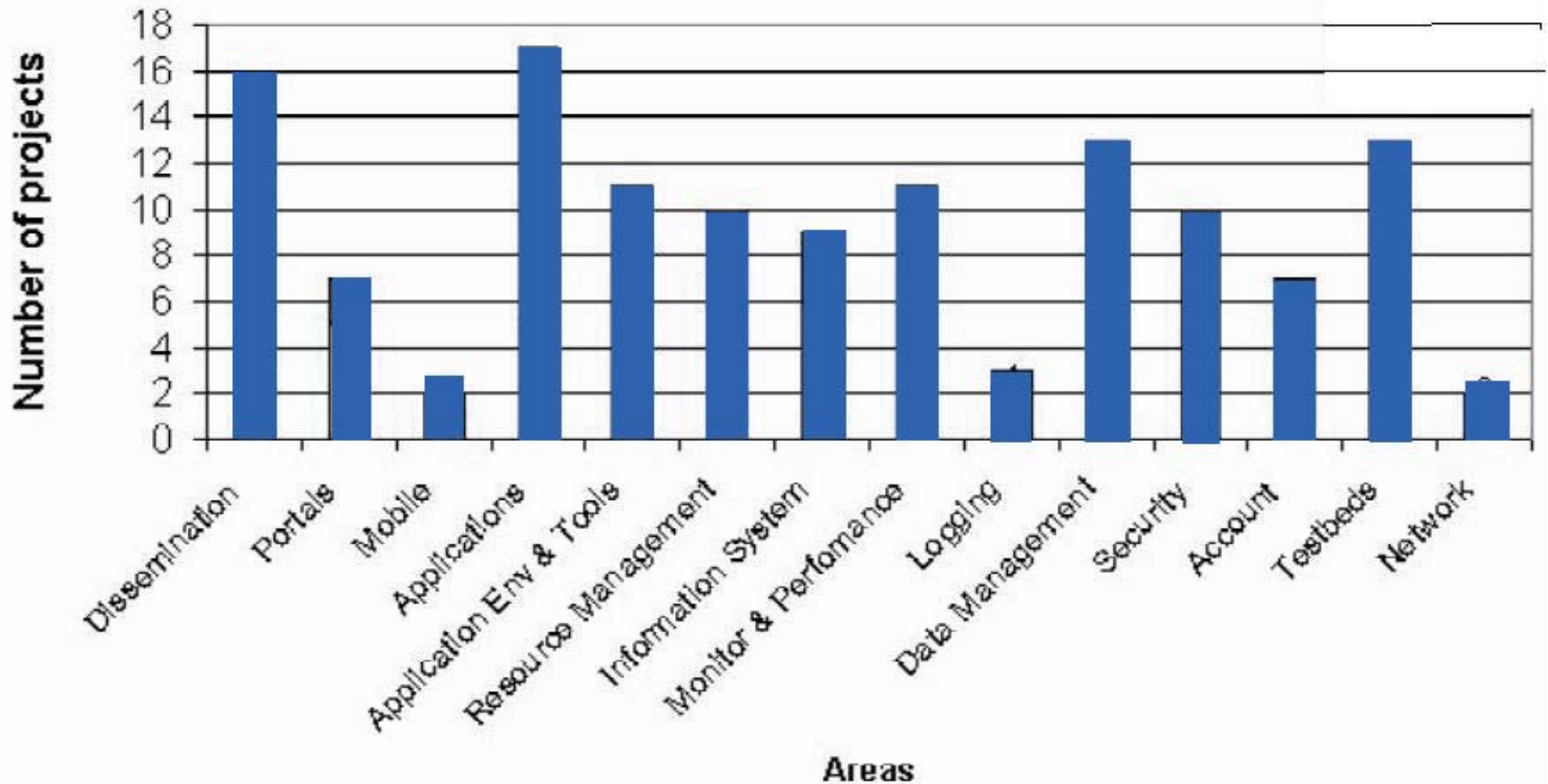
WP5

- To organise the activities necessary to allow VObs users to exploit, through the data centres involved in the project, the processing capabilities offered by the computational Grid projects available in the European countries (e.g. EGEE, DEISA).

There are a number of different grid initiatives in Europe focused on:

- **development of a grid middleware**
- **use of a pre-existing grid infrastructures to run scientific/industrial applications.**
- **development of applications and portals**
- **development of fabric and connectivity**
- **dissemination activities**
- **research and development of monitoring and performance system**

Development of areas

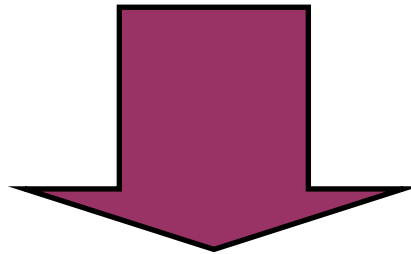


Request:

To achieve the coordination between the VObs and the computational grid communities

And

- Access by data centres to own national Grids
- Diffusion of knowledge among European data centres about the different ways of using national and European Grids with the VObs framework



It is crucial to make a taxonomy that characterizes and classifies various approaches for the building of Grid infrastructure and applications.

The taxonomy

not only

remarks the design and engineering similarities and differences of state-of-the-art in Grid middleware

but also

identifies the areas that need further research.

Therefore

it is main a survey of all the European Grid projects, both on National and European scale

The aim of this survey is:

- to identify the grid projects and the middleware used;
- to identify the projects that actually provide a production grid environment;
- to verify the middleware tools and identify those useful for IVOA data centers;
- to check their interaction with main European grid initiatives (EGEE, DEISA etc.)
- to check the compliance with the standards proposed by OGF.

Currently there are some middleware:

LCG is a deployment project rather than a development project: identifies, tests, debugs and packages solutions to support LHC's demanding computing requirements. LCGs current middleware, also commonly called LCG16, in turn builds on the European Data Grid middleware EDG, but incorporates a number of additional components. Most notably, LCG uses components of the Virtual Data Toolkit (VDT), such as Condor

UNICORE is a software project funded by the German government with the aim to connect Germany's largest Supercomputer centers and to create a uniform access built on existing technologies. Unicore is written in Java for portability reasons and today provides the functionality of a fully grown Grid middleware, including a graphical user interface. A special feature of Unicore is its ability to take into account job dependencies and workflow mechanisms. Interfaces to Globus have been created in the EU-funded Grid interoperability project "GRIP".

GLOBUS is early Grid middleware. It has been co-developed by two veterans of Grid Computing, Ian Foster and Carl Kesselman

AliEn (Alice Grid Environment) is a lightweight, fully functional Grid-framework which has been developed by the ALICE experiment- one of the four LHC experiments. Unlike most Globus-based frameworks, AliEn has been based on Web-Services from the very beginning, which facilitates the implementation of future standards such as OGSA18 and WSRF19.

GLite is the next generation middleware for grid computing. It provides a bleeding-edge, best-of-breed framework for building grid applications tapping into the power of distributed computing and storage resources across the Internet. gLite started as a fork of AliEn, and many AliEn developers are now members of the gLite team. gLite is influenced by the OGF and OGSA and like AliEn, it is based on Web services

NorduGrid and ARC. The ARC (Advanced Resource Connector) middleware, developed by the NorduGrid (Norway and Sweden), has been used by ATLAS in its first and second data challenge. In comparison to EDG's middleware, ARC uses fewer Globus-2 components (mostly from the Grid Security Infrastructure), but nevertheless implements a very similar functionality to EDG. Like AliEn, ARC tries to make use of standard Open Source solutions such as OpenLDAP, OpenSSL and SASL.

We give an overview of the projects for each European Nation.

There are **three** kind of projects:

- Grid Project in Europe
- EU funded initiatives
- National Initiative

Additionally:

- several major US projects involved in Grid development: GrADS, GriPhyN, IPG, iVDGL, PPDG or TeraGrid.
Many of them have contacts and collaborations with European activities.
- many Grid initiatives outside Europe and the US (Southern Korea, Japan and Australia)

Grid Projects in the English universities and industries:

- AVO(Astrophysical Virtual Observatory)
- DAMIEN (Distributed Applications and Middleware for Industrial use of European Networks)
- DataGrid (Next Generation Scientific Exploration)
- DataTAG (Research & Technological development for a Transatlantic Grid)
- EGSO (European Grid of Solar Observations)
- EuroGrid (European Testbed for Grid Applications)
- GRIA (Grid Resources for Industrial Applications)
- GridLab (Grid Application Toolkit and Testbed)
- GRIP (GRid Interoperability Project)
- BioGrid (Bio-technology Information & Knowledge Grid)
- FlowGrid (Flow-Simulations on-demand using Grid-computing)
- GEMSS (Grid-enabled Medical Simulation Services)
- GRACE (GRid SeArch & Categorization Engine)
- GRASP (GRid based Application Service Provision)
- MammoGrid (European mammogram database)
- OpenMolGRID (Open Computing Grid for Molecular Science & Engineering)
- SeLeNe (Self e-Learning Networks)

Centers and City

Cambridge

Bradford

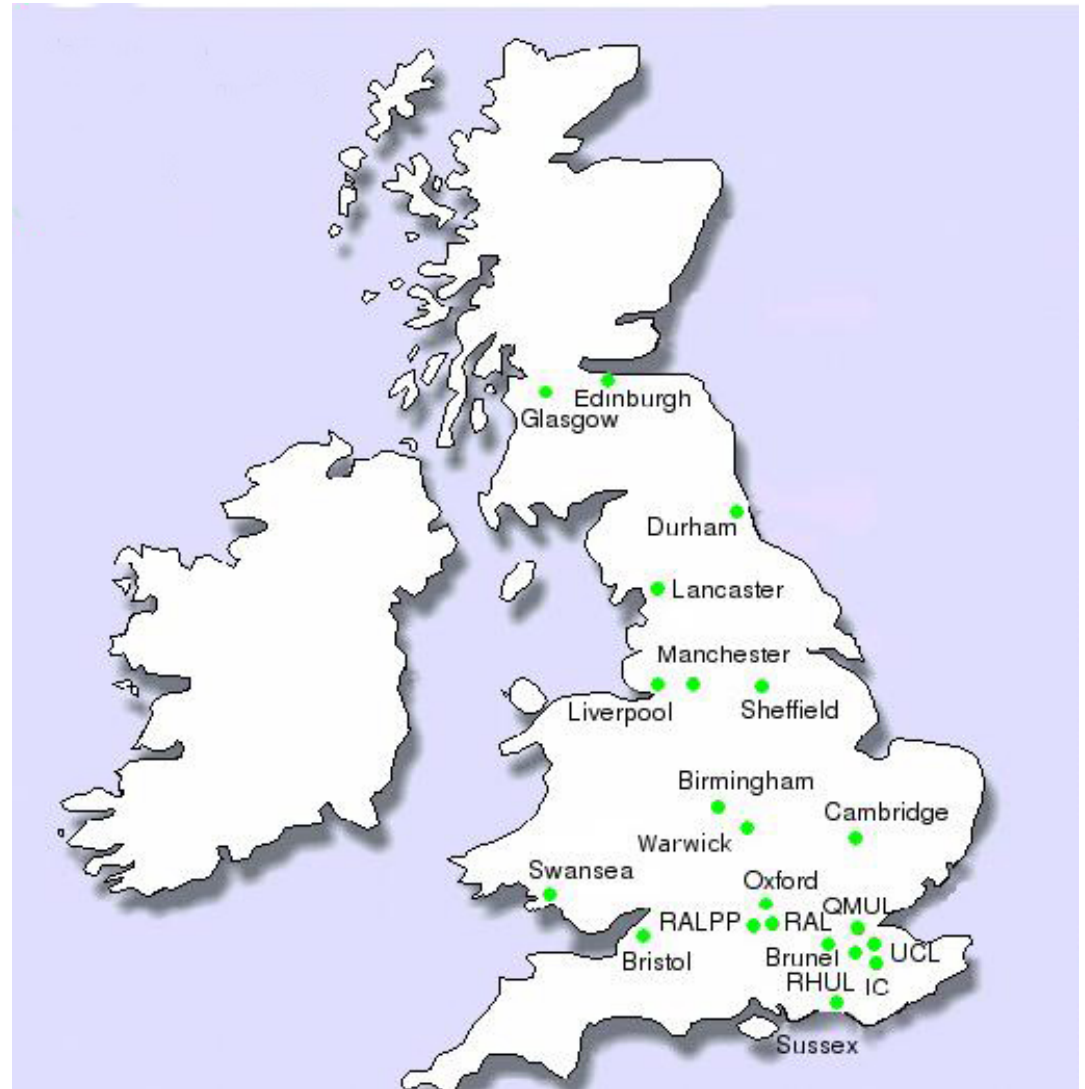
Cardiff

Oxford

PPARC

AstroGrid

IBM UK



Grid Projects in the French universities and industries:

- **AVO (Astrophysical Virtual Observatory)**
- **DAMIEN (Distributed Applications and Middleware for Industrial use of European Networks)**
- **DataGrid (Next Generation Scientific Exploration)**
- **DataTAG (Research & Technological development for a Transatlantic Grid)**
- **EGSO (European Grid of Solar Observations)**
- **EuroGrid (European Testbed for Grid Applications)**
- **GridLab (Grid Application Toolkit and Testbed)**
- **GRASP (GRid based Application Service Provision)**
- **SeLeNe (Self e-Learning Networks)**

Centers and city:

CNRS

INRIA

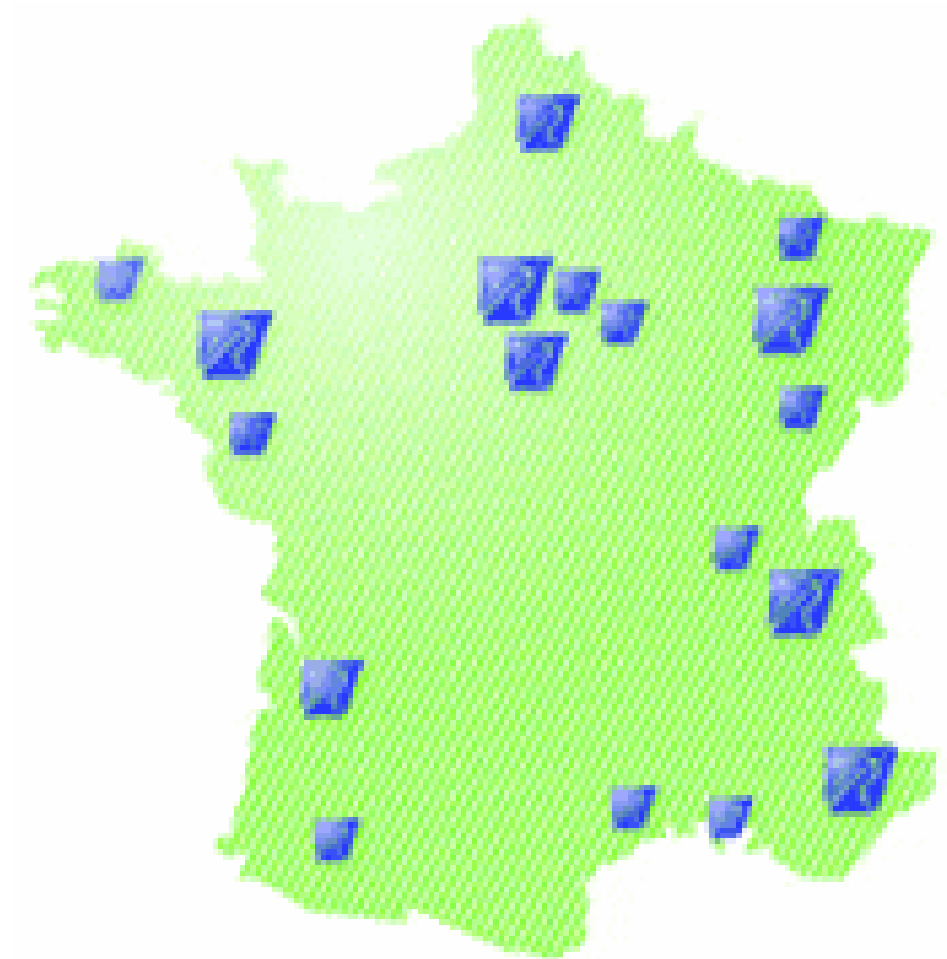
CEA

CDS

DASOP

Compaq

There are not national
initiatives



Grid Projects in the German universities and industries:



- **AVO (Astrophysical Virtual Observatory)**
- **CrossGrid (Large-scale Grid-enabled Simulations)**
- **DAMIEN (Distributed Applications and Middleware for Industrial use of European Networks)**
- **DataGrid (Next Generation Scientific Exploration)**
- **DataTAG (Research & Technological development for a Transatlantic Grid)**
- **EuroGrid (European Testbed for Grid Applications)**
- **GridLab (Grid Application Toolkit and Testbed)**
- **GRIP (GRid Interoperability Project)**
- **FlowGrid (Flow-Simulations on-demand using Grid-computing)**
- **GEMSS (Grid-enabled Medical Simulation Services)**
- **GRACE (GRid SeArch & Categorization Engine)**
- **GRASP (GRid based Application Service Provision)**
- **OpenMolGrid (Open Computing Grid for Molecular Science & Engineering)**








Centers and city

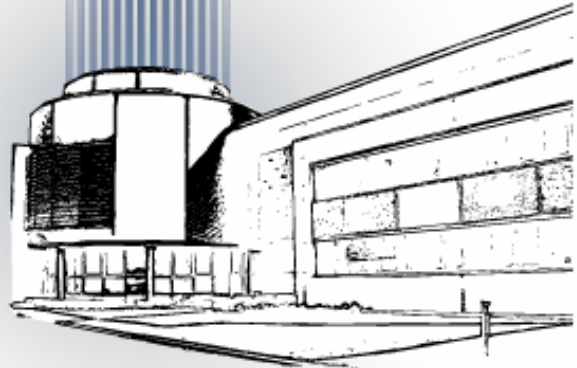
MPG/CNS
Gridware
ESO

There are many projects that are not yet analysed

<http://www.fz-juelich.de/zam/grid/>

Open Middleware Infrastructure Institute for Europe http://www.omii.eu	
UNICORE as a Service Oriented Architecture http://www.unigrids.org	
UNICORE in the DEISA project http://www.deisa.org	
Accessing NIC Resources with UNICORE http://www.fz-juelich.de/unicore	
D-Grid Integration Project in the e-Science Initiative of BMBF http://www.d-grid.de	
UNICORE OPEN SOURCE http://unicore.sourceforge.net	
Standardization Activities OASIS	

A-WARE – An easy Way to Access GRID Resources http://www.a-ware.org	
Chemomentum – Grid Services based Environment to enable Innovative Research http://www.chemomentum.org	
Enabling Grids for E-science II http://www.eu-egee.org	
Next Generation Grid http://www.nextgrid.org	
European Research Network on Foundations, Software Infrastructures and Applications for large scale distributed, GRID and peer-to-peer Technologies http://www.coregrid.net	
VIOLA – Vertically Integrated Optical Testbed for Large Applications http://www.viola-testbed.de	
LUCIFER – Lambda User Control Infrastructure for European Research	



Grid Projects in the Italian universities and industries:

- **CrossGrid(Large-scale Grid-enabled Simulations)**
- **DataGrid (Next Generation Scientific Exploration)**
- **DataTAG (Research & Technological development for a Transatlantic Grid)**
- **EGSO (European Grid of Solar Observations)**
- **GridLab (Grid Application Toolkit and Testbed)**
- **COG (Corporate Ontology Grid)**
- **GRACE (GRid SeArch & Categorization Engine)**
- **GRASP (GRid based Application Service Provision)**
- **MammoGrid (European mammogram database)**
- **OpenMolGrid (Open Computing Grid for Molecular Science & Engineering)**

Centers and city

INAF(Trieste, Catania)

INFN

CNR

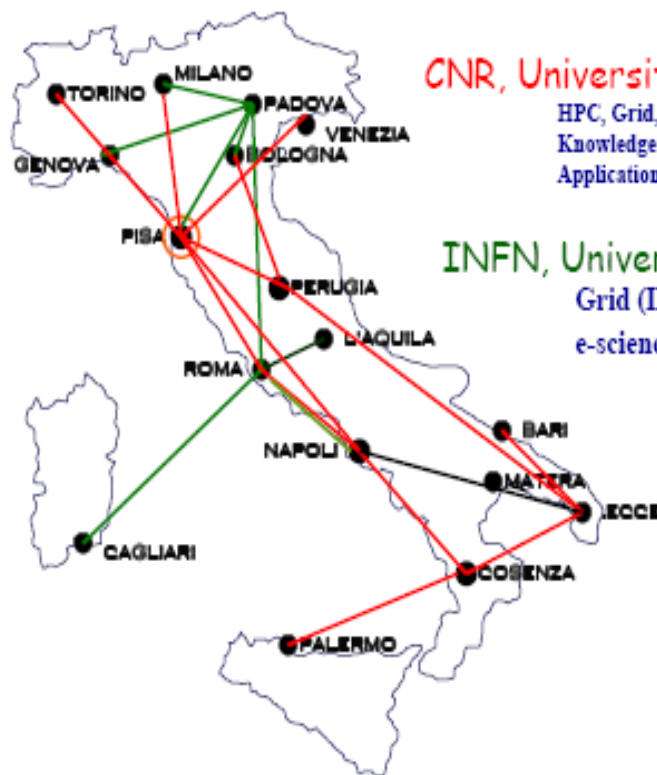
ESA-ESRIN

ASI

CINECA

CNAF

Many projects related
production grid,
dissemination activities, and
portals



CNR, University

HPC, Grid, Platforms, Programming environments,
Knowledge Discovery in Data Bases, Tools, Libraries
Applications, ...

INFN, University

Grid (INFN-Grid, DataGrid, DataTag)
e-science applications, ...

ASI

Applications of
EarthObservation

CNIT

Technologies for
high-performance
communication,
Optical technologies, ...

Grid Projects in the Spanish universities and industries:

- **CrossGrid(Large-scale Grid-enabled Simulations)**
- **DAMIEN (Distributed Applications and Middleware for Industrial use of European Networks)**
- **DataGrid (Next Generation Scientific Exploration)**
- **FlowGrid (Flow-Simulations on-demand using Grid-computing)**
- **GRASP (GRid based Application Service Provision)**
- **ESACGRID**
- **SCIGrid**

Grid Projects in the Dutch universities and industries:

- **CrossGrid(Large-scale Grid-enabled Simulations)**
- **DataGrid (Next Generation Scientific Exploration)**
- **DataTAG (Research & Technological development for a Transatlantic Grid)**
- **GridLab (Grid Application Toolkit and Testbed)**
- **BioGrid (Bio-technology Information & Knowledge Grid)**

Centers and city

NIKHEF

UvA

VU

It has some National initiatives



Grid Projects in the Polish universities and industries:

- **CrossGrid(Large-scale Grid-enabled Simulations)**
- **EuroGrid (European Testbed for Grid Applications)**
- **GridLab (Grid Application Toolkit and Testbed)**
- **GRACE (GRid SeArch & Categorization Engine)**

Grid Projects in the other European universities and industries:

- **Austria: CrossGrid, COG, GEMSS**
- **Czech Republic: DataGrid, GridLab, FlowGrid**
- **Greece: CrossGrid, GRIA, GridLab, COG, FlowGrid, GRASP, SeLeNe**
- **Norway: EUROGRID, GRIA**
- **Sweden: DataGrid, GRACE**
- **Hungary: DataGrid, GridLab, OpenMolGrid**
- **Belgium: GEMSS**
- **Cyprus: CrossGrid, BioGrid, SeLeNe**
- **Estonia: OpenMolGrid**
- **Finland: DataGrid**
- **Ireland: CrossGrid, GEMSS**
- **Israel: COG**
- **Portugal: CrossGrid**
- **Slovakia: CrossGrid**
- **Switzerland: EGSO, EUROGRID**

- **Netherlands:** DutchGrid
- **German:** DGrid (Deutschland Grid)
- **UK:** MyGrid, NGS (UK National Grid Service), GridPP, AstroGrid
- **Italy:** INFN GRID, Grid.it, DRACO, VObs.it, C-OMEGA, IGI, LIBi, LITBIO, GILDA, Genius

The work showed is the first part of the survey

- to identify the grid projects and the middleware used;
- to identify the projects that actually provide a production grid environment;
- to verify the middleware tools and identify those useful for IVOA data centers;
- to check their interaction with main European grid initiatives (EGEE, DEISA etc.)
- to check the compliance with the standards proposed by OGF.

- **The analysis and study are made on all projects from 2000 to 2005**
- **A short mention is made on last years projects**
- **We arranged a draft about the first analysis of Grid initiative, in which the projects are shortly explained and for each one is specified the middleware used.**

- To continue to analyse the projects
- To detail any the state of art of any Grid initiatives and the work started
- To compare them with the current Astronomical Initiative in Grid Computing and VO

And in the end

We propose to each nation to use this survey to interoperate with Grid project of their country

Thanks for your attention