

The Grid Services of Consorzio COMETA for Industry

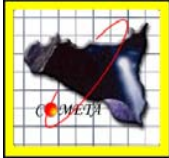
Roberto Barbera (roberto.barbera@ct.infn.it)

COMETA Consortium CTO

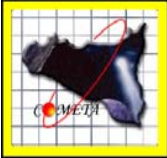
EGEE'08 – Business Track

Istanbul, 22.09.2008





- **Grid & Industry**
- **The Sicilian e-Infrastructure and its Grid services**
- **Examples of industrial/commercial applications**
- **Summary and conclusions**



The European e-Infrastructure today...

Production quality Grid,
HEP, Biomed..., int. links
(67M€ – CERN)

Grid of EU supercomputers
networked at Gbps, focus on
global filing systems, >40 Tflop/s,
several user communities
(15M€- CNRS)

EGEE Related
projects co-
vering several
regions of the
world

REL-PROJ's

EGEE

DEISA

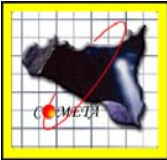
GRID
INFRASTRUCTURE

GÉANT
INFRASTRUCTURE

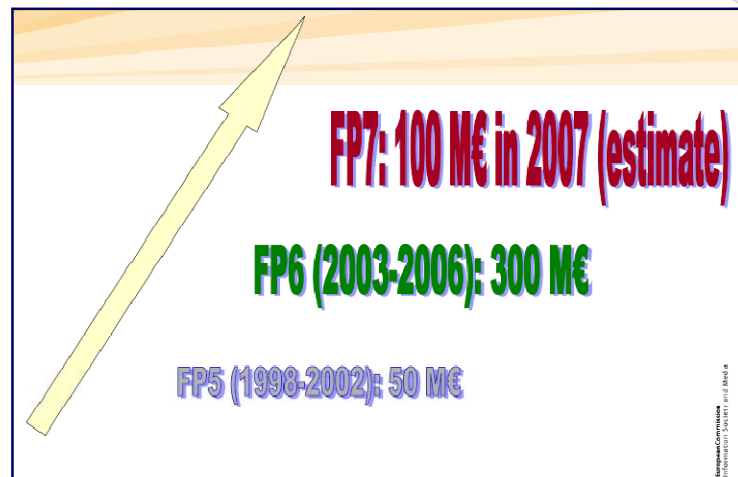
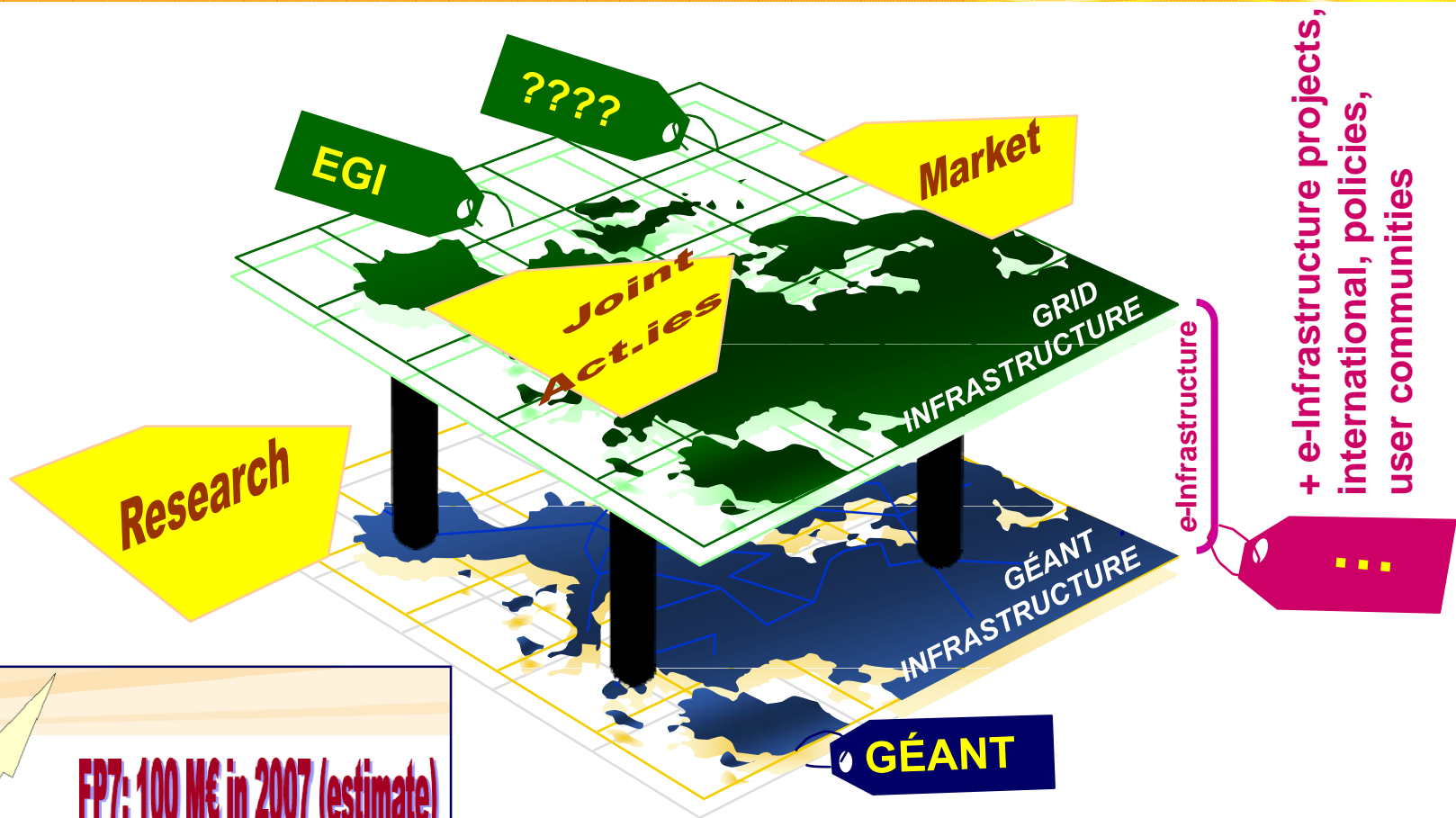
GÉANT

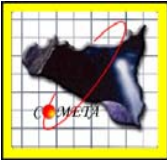
- 300 M€ in FP6
- 4 G€ in FP7 !

Pan-European
Research Network,
3900 inst., 30+ million
users, 40+ countries
(~100 M€- DANTE)



....and tomorrow ?





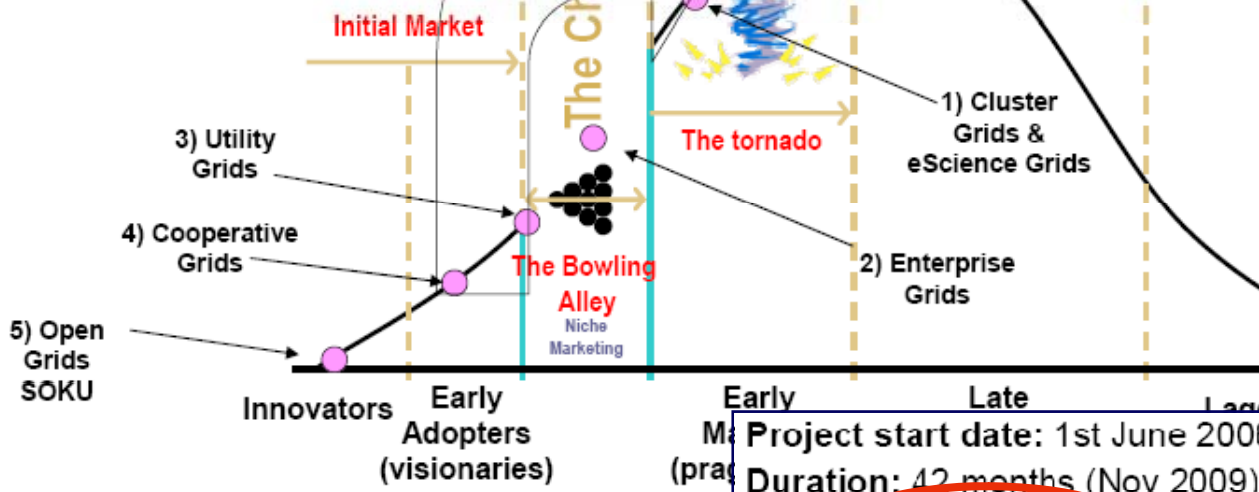
Grid & Industry: a concrete example



Grid Technology Adoption Life cycle



BEinGRID bowling

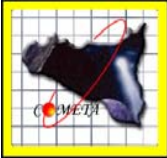


	BE1	BE2	BE3	BE4	BE5	BE18
Trust & Security						
Architecture & Interop						
Service & Data Mgt						
VO Management						
Market Study						
Business Modelling						
Legal Issues						
Sector 1: Finance (3), Media (3), Advanced Manufacturing (5), Retail/Logistics (4), Environment/eScience (3)						



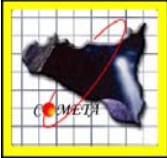
Project start date: 1st June 2006
 Duration: 42 months (Nov 2009)
 Budget: 24.7 M Euros
 Max EC contribution: 15.7 M euros
 Effort: 2713 PM (226 PY, 65 P, 360.000h)
 Consortium: 77 partners (+10 additional)
 Website: www.beingrid.eu

Coordinator: Atos Origin



Things are however not so easy...

- The adoption of **Grid technology by Industry is slower than it could be (and than what happened with the web 15 years ago)**
- **Recent surveys (conducted also by EGEE) confirm that the most important “brakes” are:**
 - **Security**
 - Strict ACLs and strong “privacy” rules for sensible data;
 - **Standards**
 - Their adoption would encourage long term investments
 - **Training**
 - Need of a formative offer “tailored” for the business world
 - **Management of commercial software licences**
 - Usage control and protection of revenues of commercial software providers



Objectives of an e-Infrastructure in Sicily

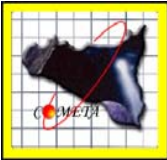
- Create a Virtual Laboratory in Sicily, both for scientific and industrial applications, built on top of a Grid infrastructure and with a special support for HPC
- Connect the Sicilian e-Infrastructure to those already existing in Italy, in Europe, and in the rest of the world improving the scientific collaboration and **increasing the “competitiveness” of e-Science and e-Industry “made in Sicily”**
- Disseminate the “*grid paradigm*” through the organization of dedicated events and training courses
- Trigger/foster the creation of spin-offs in the ICT area in order to reduce the “*brain drain*” of brilliant young people to other parts of Italy and beyond



The COMETA Consortium

(www.consortio-cometa.it)

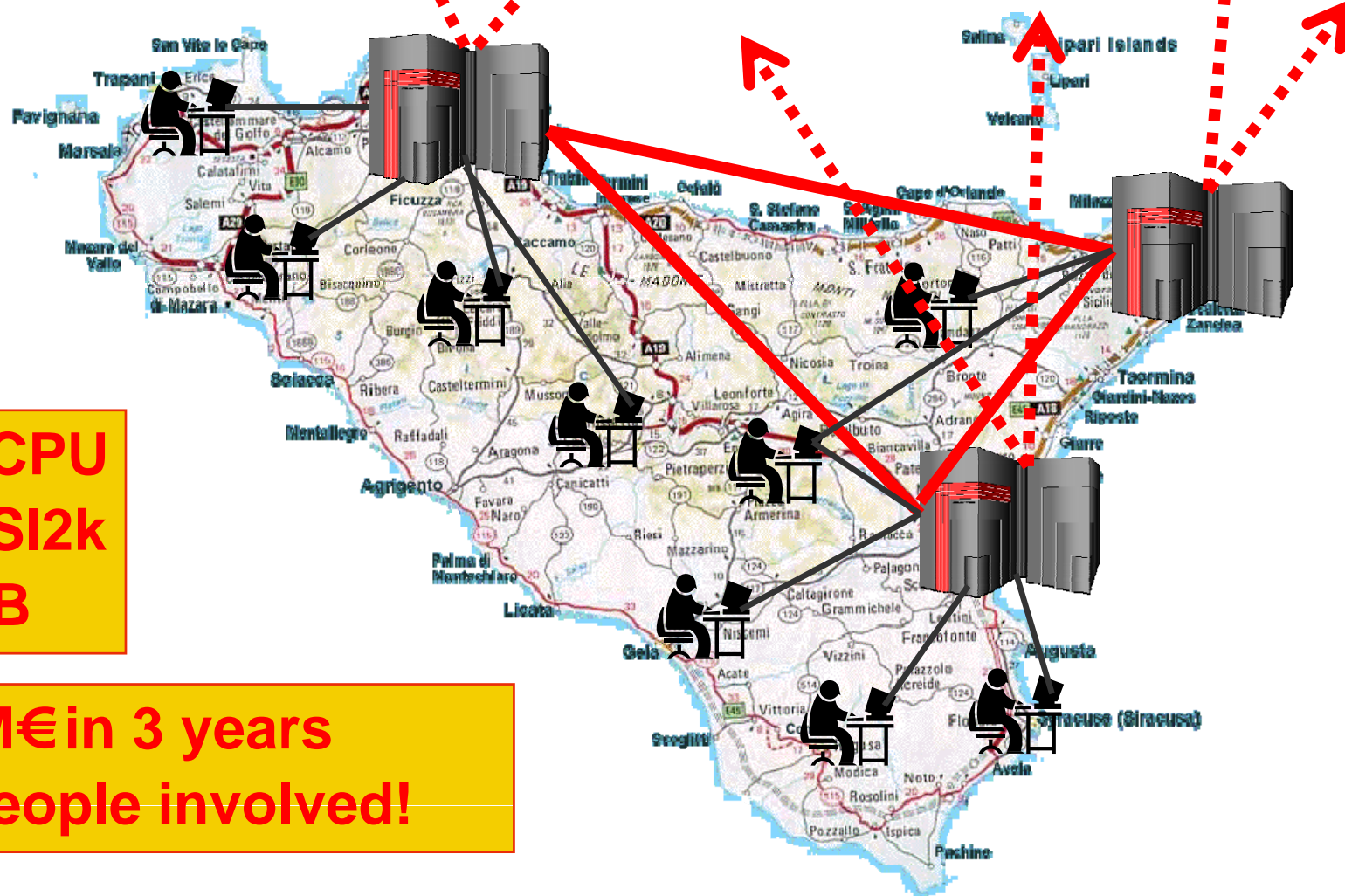




The Sicilian Grid in one slide...

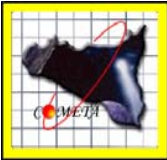


Ministero
dell'Università e della Ricerca



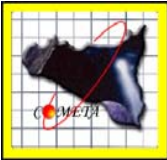
~2000 CPU
~3.2 MSI2k
~250 TB

~11.3 M€ in 3 years
>270 people involved!



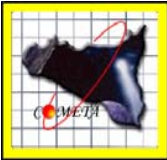
The Sicilian e-Infrastructure (1/2)





The Sicilian e-Infrastructure (2/2)





Computing and Storage resources available

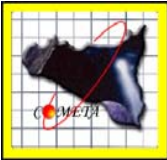
1. **~2000 cores** AMD Opteron 2218 rev. F
2. 2 GB of RAM per core
3. Commercial LRMS (LSF)
4. **Infiniband-4X (for MPI applications)**



gLite 3.1 as Grid middleware everywhere.
A deliberate investment on a “de facto” standard.
Vendors taught to install and configure it.



1. **~250+ TB** of storage
2. Distributed parallel filesystem (GPFS)



Usage of the Sicilian e-Infrastructure

EGEE
Enabling Grids
for E-science



>1000 jobs/day
(mostly parallel)
~30-40 CPU years/month

Scheduled = 187
Running = 251

Site: COMETA-UNICT-DMI-CATANIA

COMETA-UNICT-DMI-CATANIA

Scheduled = 0 / Running = 53

[show CE unict-dmi-ce-01.ct.pi2s2.it](#)

Site: COMETA-UNICT-DIIT-CATAN...

COMETA-UNICT-DIIT-CATANIA

Scheduled = 8 / Running = 60

[show CE unict-diit-ce-01.ct.pi2s2.it](#)

Site: COMETA-INFNLNS-CATAN...

COMETA-INFNLNS-CATANIA

Scheduled = 3 / Running = 24

[sh...](#)

Site: COMETA-INFN-CATANIA

COMETA-INFN-CATANIA

Scheduled = 2 / Running = 25

[show CE infn-ce-01.ct.pi2s2.it](#)

Scheduled = 183 / Running = 245

[show RB infn-rb-01.ct.pi2s2.it](#)

[show RB infn-rb-02.ct.pi2s2.it](#)

[show all RBs](#)

Site: COMETA-INAF-CATANIA

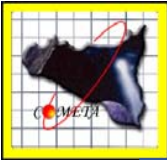
COMETA-INAF-CATANIA

Scheduled = 161 / Running = 61

[show CE inaf-ce-01.ct.pi2s2.it](#)

17:32:51 UTC





Commercial Software Available

(www.pi2s2.it/tecn/index.php?option=com_content&task=view&id=27&Itemid=58)

ABAQUS

ABAQUS è un pacchetto, per l'analisi agli elementi finiti adatto ad una vasta gamma di problemi dall'analisi strutturale (di tipo statico e dinamico sia lineare che non lineare) alla termodinamica (problemi di scambio termico conduttivo sia lineare che non lineare), alla dinamica di problemi termo-meccanici lineari e non), all'acustica e all'analisi di elementi finiti.

Il Consorzio COMETA dispone di una licenza DEMO (scadenza 31-10-2007) vers. 6.3.26 E' possibile consultare i sottoelencati siti per una panoramica del prodotto e degli sviluppi commerciali di questo, dei corsi disponibili:

<http://www.abaqusdocs.ecn.purdue.edu:2080/v6.7/index.html>

L'utilizzo di ABAQUS sull' infrastruttura PI2S2

FLUENT

Il Consorzio COMETA dispone di una licenza DEMO (scadenza 31-10-2007) vers. 6.3.26 E' possibile consultare i sottoelencati siti per una panoramica del prodotto e degli sviluppi commerciali di questo, dei corsi disponibili:

<http://www.fluent.com/software/fluent/index.htm>

L'utilizzo di Fluent sull' infrastruttura PI2S2

IDL

Il Consorzio COMETA dispone di una licenza IDL Version 6.4 (linux x86_64 m64) E' possibile consultare i sottoelencati siti per una panoramica del prodotto e degli sviluppi commerciali di questo, dei corsi disponibili:

<http://www.ittvis.com/idl/analyst/index.asp>

L'utilizzo di IDL sull' infrastruttura PI2S2

MATLAB

Il Consorzio COMETA dispone di una procedura che permette di far girare codice generato da MATLAB

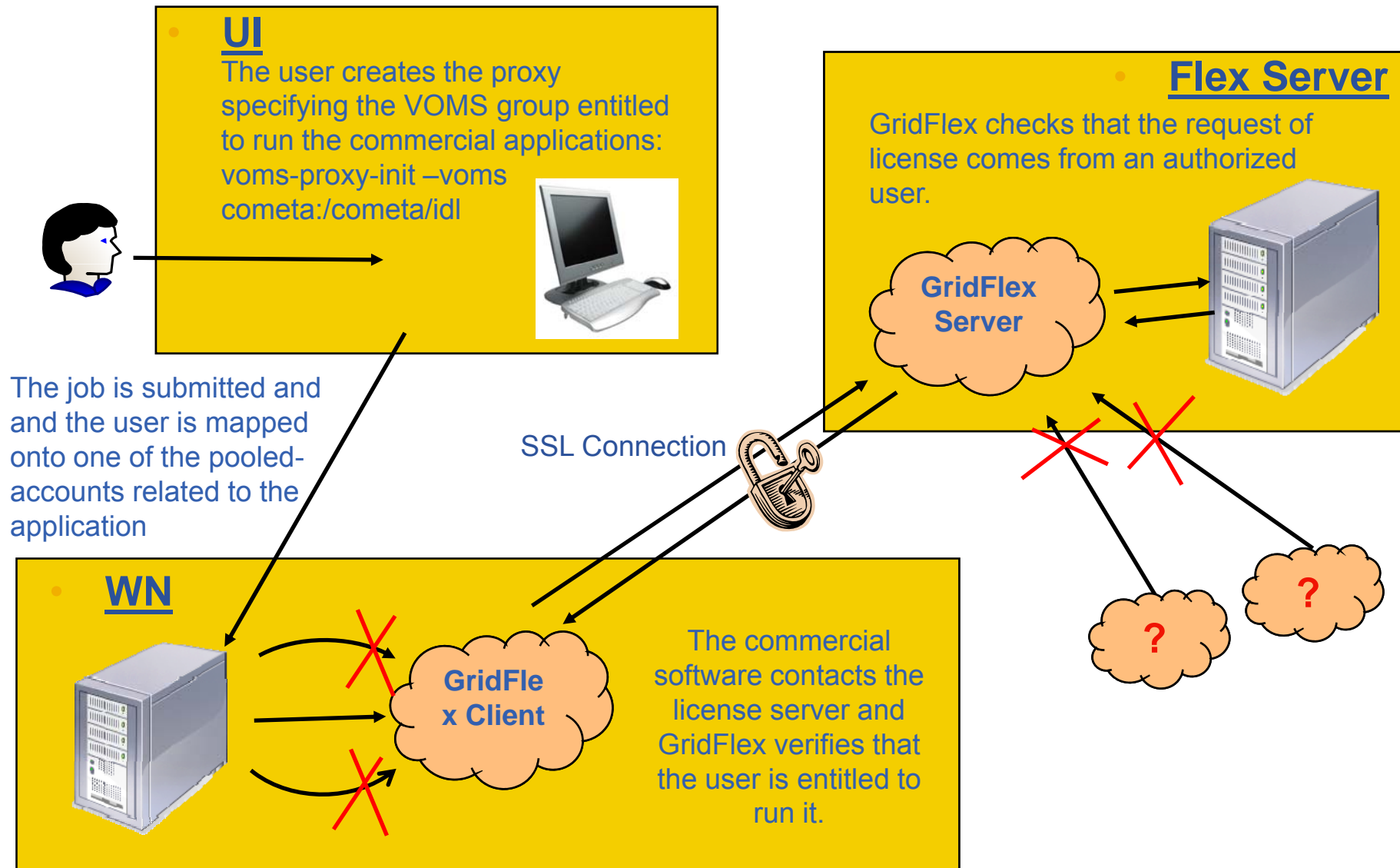
Done

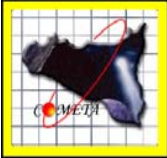
"Distributed" management of licenses and fine grained ACLs

En Mini HowTo
Scientific Results
Commercial Software
Sottometti un'applicazione
Boards
Metriche QA
Deliverables & Milestones
Missioni
Accedi alla e-Infrastruttura
Progetti PON MUR 1575
Avvisi e News
Sitemap



GridFlex (1/2)



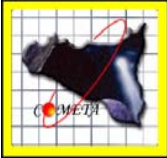


1. What is it ? What is it not ?

GridFlex is NOT a license manager but a tool that implements a license server (e.g. Flexlm) with the Grid Security Infrastructure (certificates, proxies, etc.) and the VOMS extensions (groups, roles, etc.);

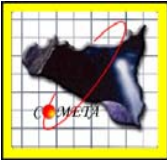
2. Why to use it ?

Because the actual license servers can not be used in a Grid environment. GridFlex opens e-Infrastructures to commercial software and allows external users to use their own licenses “on demand” on business-oriented e-Infrastructures.



Other Grid Services available on the Sicilian Grid

1. Full support for MPI-1 and MPI-2 applications;
2. Transactional frameworks for the creation and management of digital repositories;
3. Grid portals for “clouds”;
4. QoS and SLA in Grid
(see A. Puliafito talk tomorrow afternoon in the session “Business models and Grid environments – SME perspectives”);
5. Porting of gLite to MS Windows;
6. Secure Storage (encrypted);
7. Storage accounting



Grid & HPC in COMETA (1/2)

(grid.ct.infn.it/twiki/bin/view/PI2S2/HowToRunAMpiJob)

HowToRunAMpiJob - PI2S2 - Grid CT WIKI - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://grid.ct.infn.it/twiki/bin/view/PI2S2/HowToRunAMpiJob

You are here: Grid CT WIKI > PI2S2 Web > WikiConsorzioCometa > HowToRunAMpiJob

How to run a MPI job

Introduction

Actually PI2S2 Grid infrastructure supports the following MPI versions:

MPICH-1.2.7p1	mpich2-1.0.6p1	(on Gigabit Network)
mvapich-1.0	mvapich2-1.0.2	(on Infiniband Network)

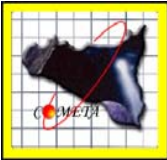
Each MPI version has been built with a different compiler. The supported tags are:

- MPICH_GCC4
- MPICH_INTEL9
- MPICH_PGI706
- MPICH2_GCC4
- MPICH2_INTEL9
- MPICH2_PGI706
- MVAPICH_GCC4
- MVAPICH_INTEL9
- MVAPICH_PGI706
- MVAPICH2_GCC4
- MVAPICH2_INTEL9
- MVAPICH2_PGI706

- Support for Gigabit and Infiniband networks
- Support for GCC, Intel and PGI compilers
- Support for gLite 3.1

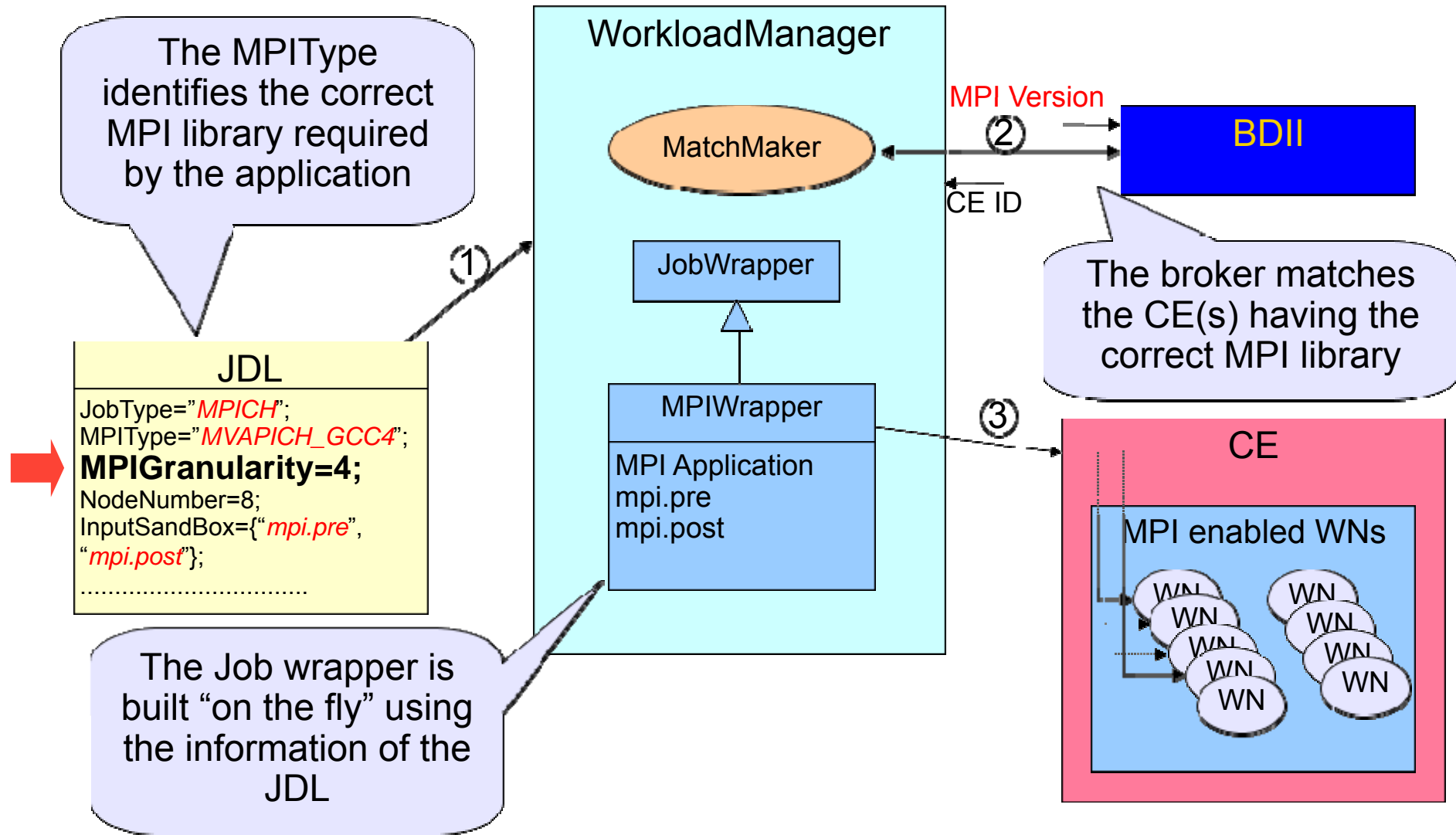
```
Type = "Job";
JobType = "MPICH";
MPIType = "MVAPICH_gcc4";
NodeNumber = 12;
Executable = "mergesort-ib1-gcc4";
StdOutput = "mpi.out";
StdError = "mpi.err";
InputSandbox = {"mergesort-ib1-gcc4","mpi.pre.sh","mpi.post.sh"};
OutputSandbox = {"mpi.err","mpi.out"};
RetryCount = 1;
```

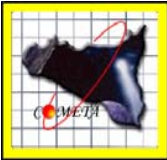




Grid & HPC in COMETA (2/2)

(The Architecture)

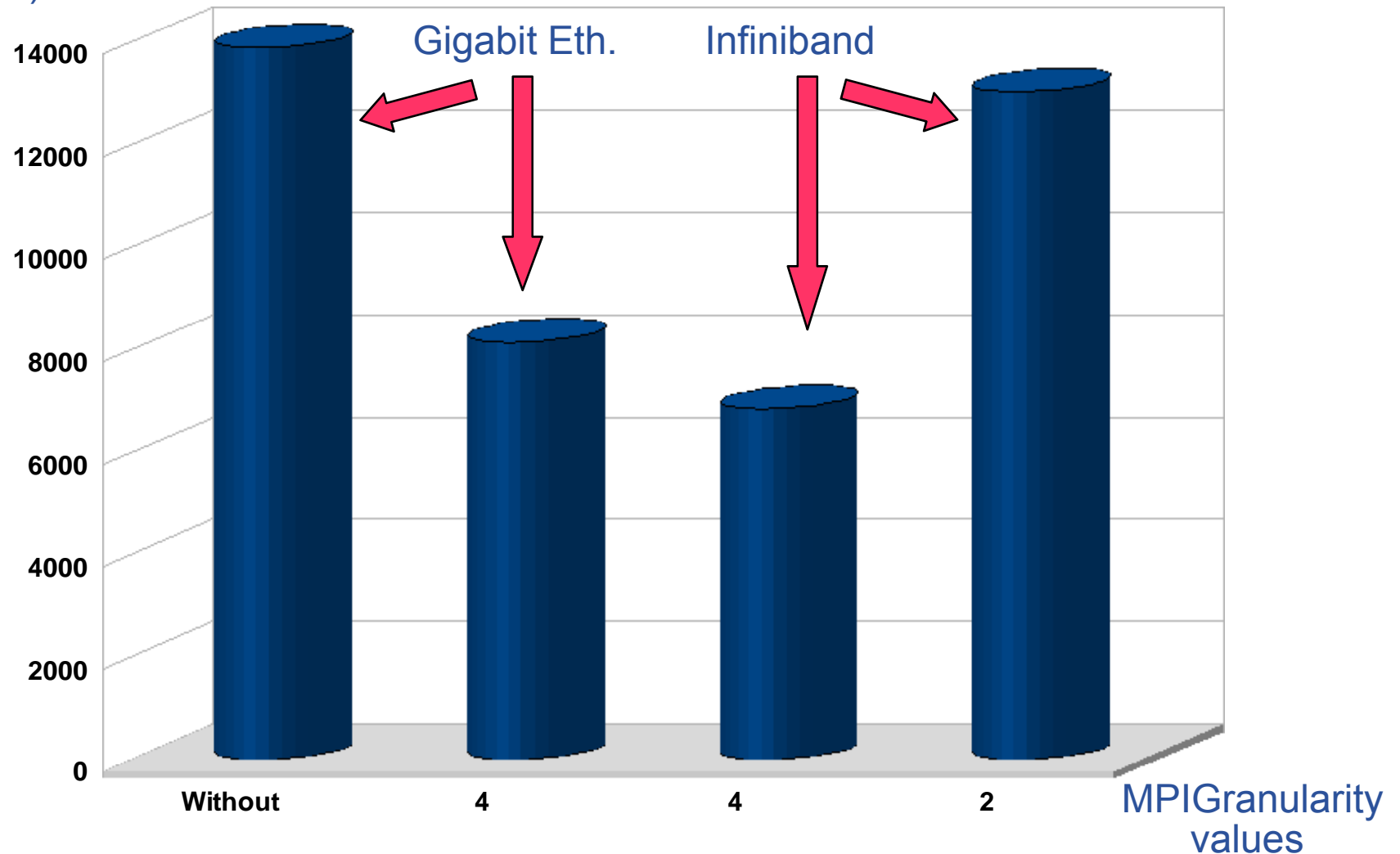




Effect of MPIGranularity

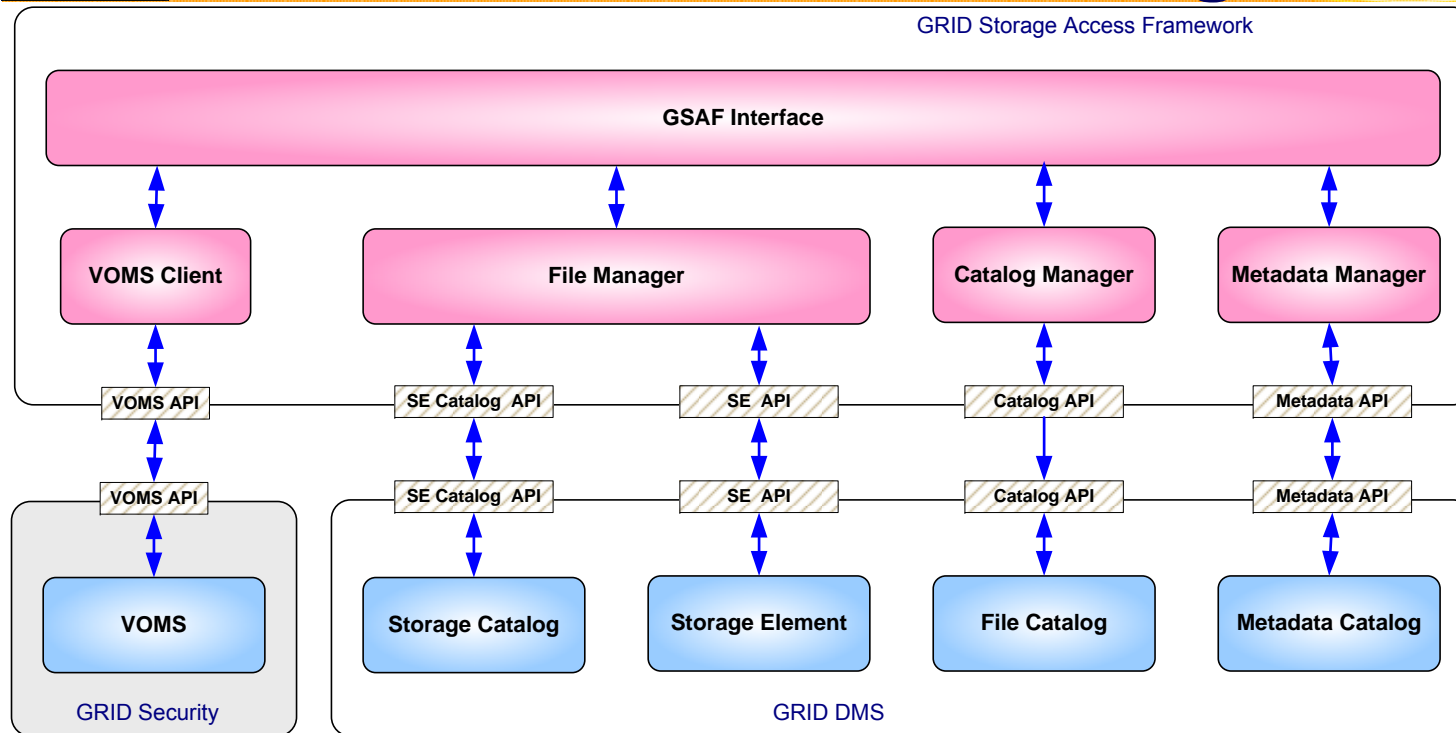
Execution of Fluent on the COMETA infrastructure

Time (sec)

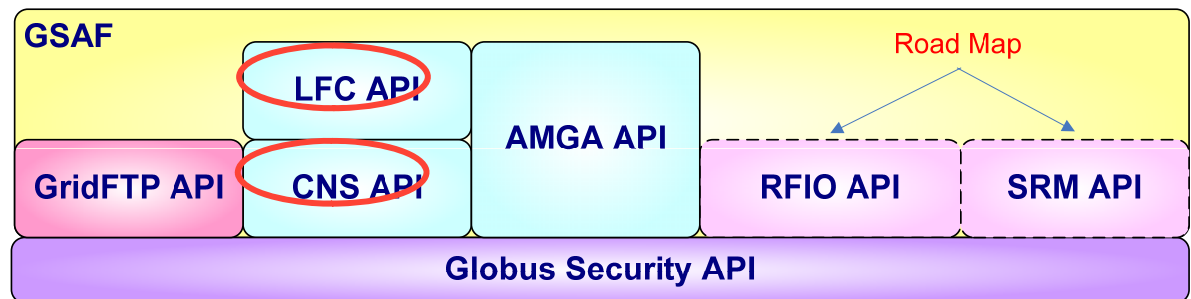




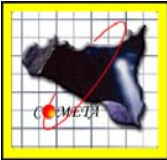
Grid Storage Access Framework - (1/3) The Logical Architecture



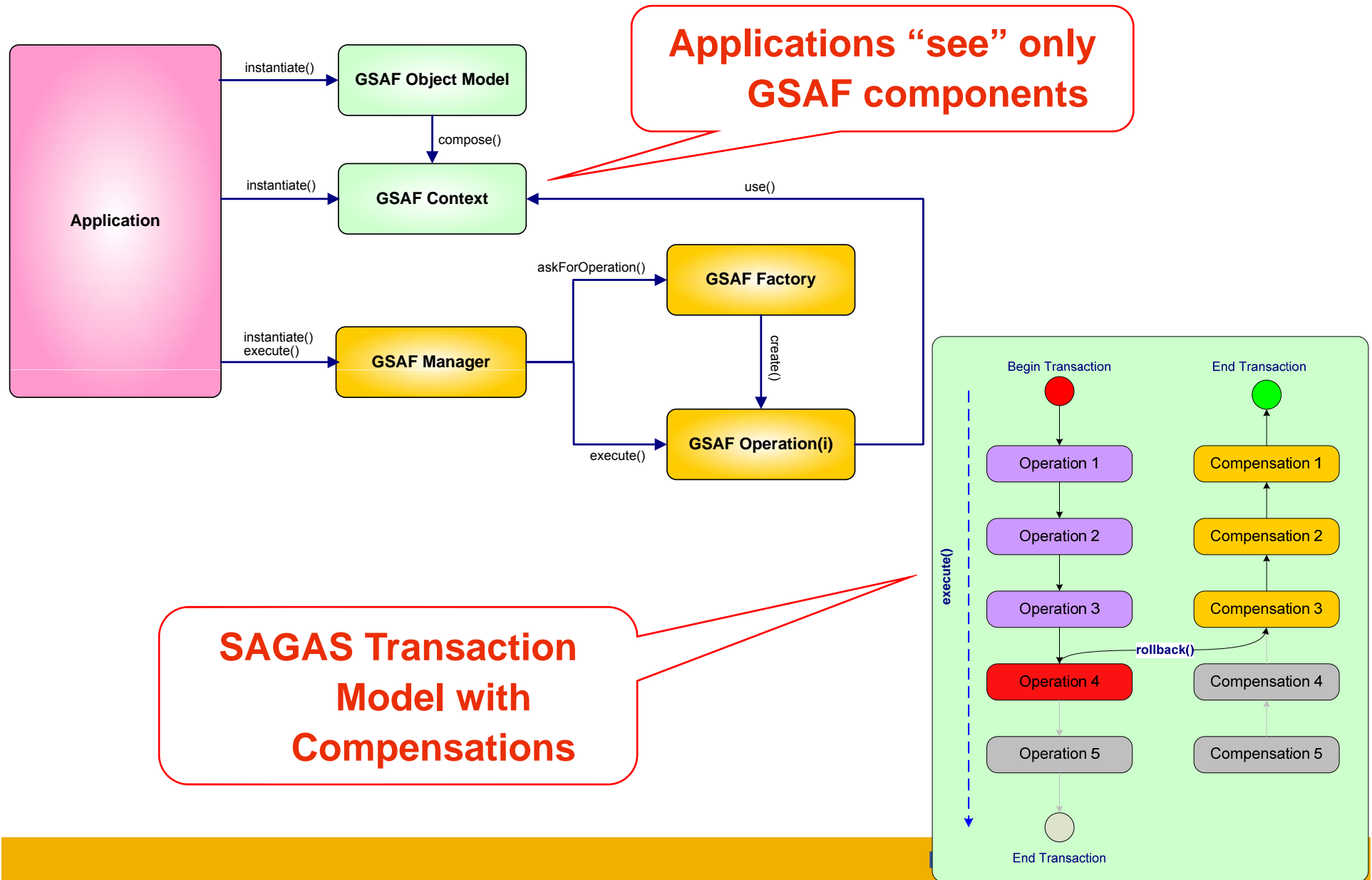
Pure Java implementation



- Security
 File Management
 DMS API
- POSIX
 File Catalogue



Grid Storage Access Framework - (2/2) Software Model and Transactionality



The "new" GENIUS Grid Portal (COMETA-INFN-NICE collaboration)

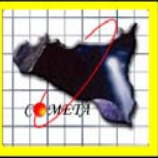


The screenshot displays the GENIUS Grid Portal interface, which is a web-based environment for job submission and monitoring. The interface is divided into several sections:

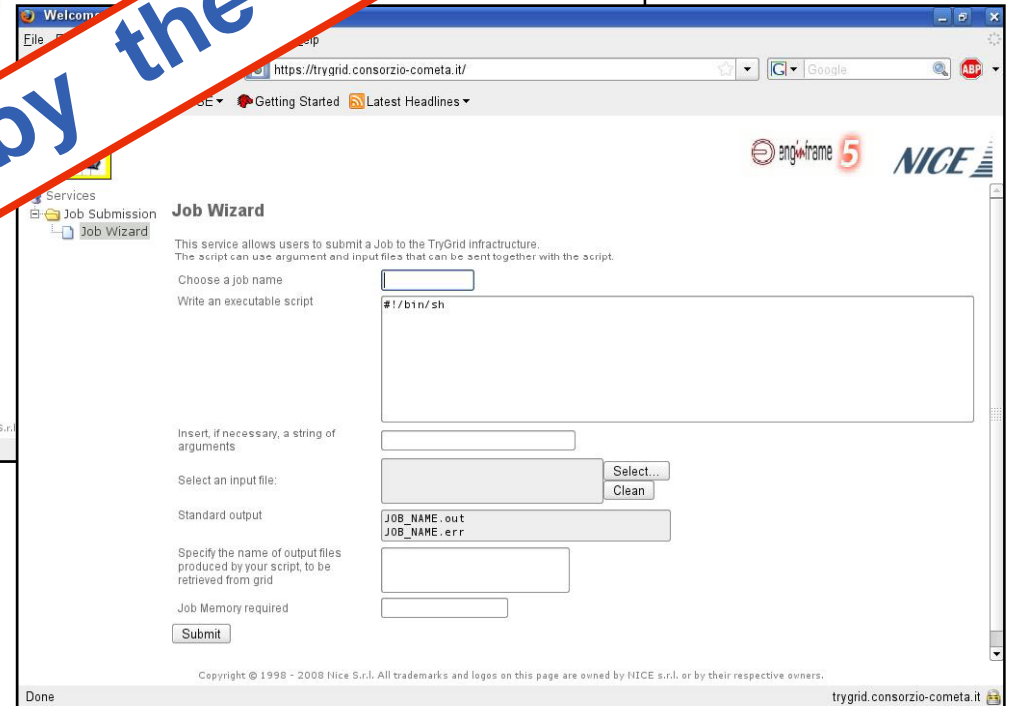
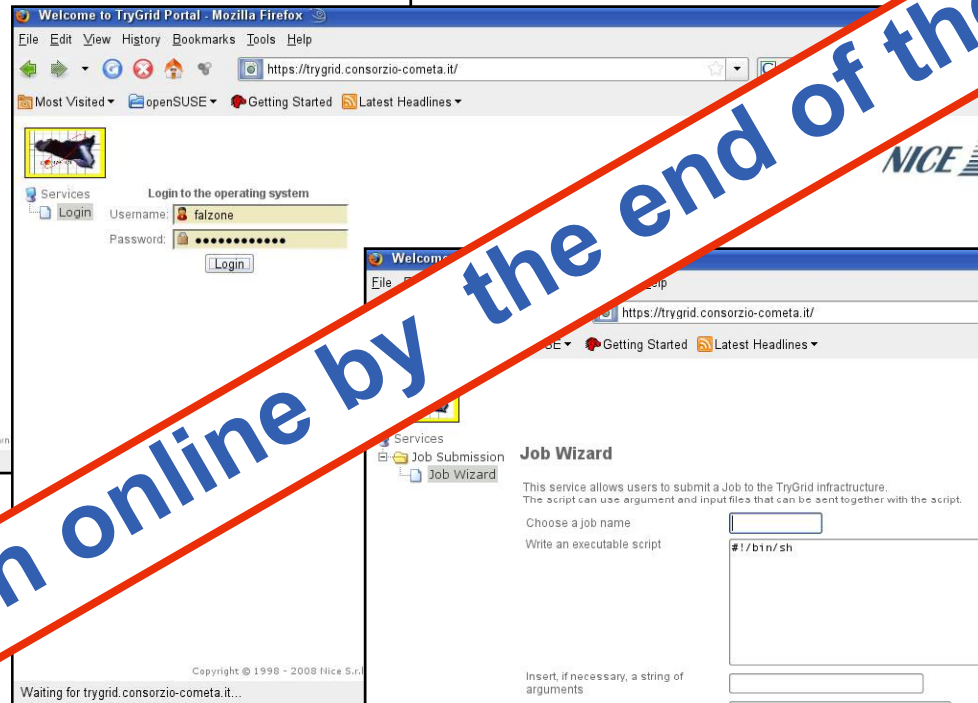
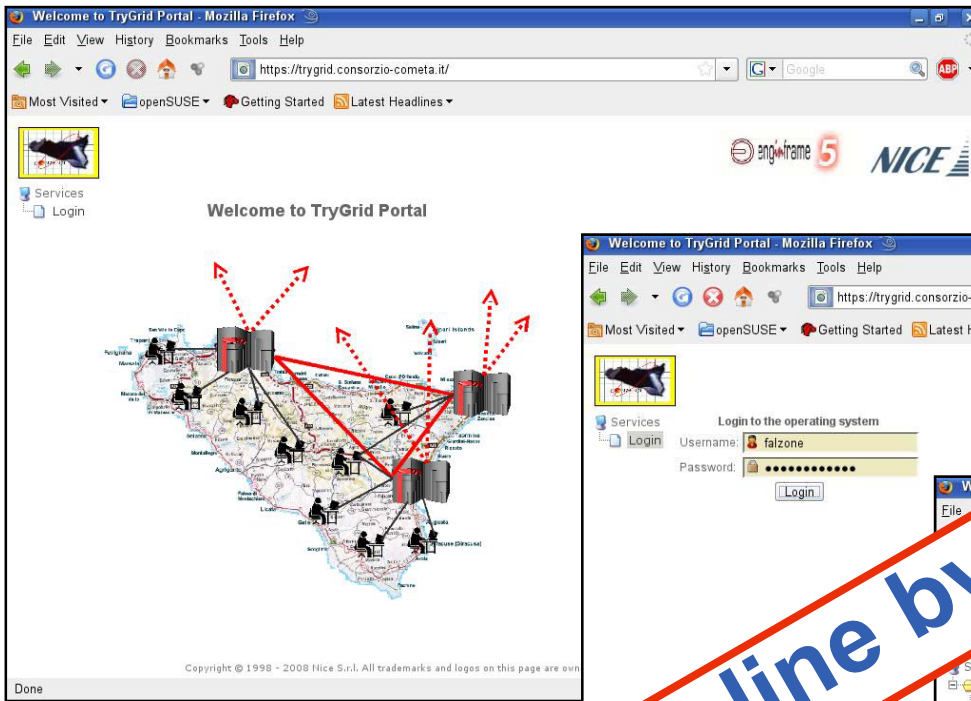
- Top Navigation:** Includes logos for INFN, enginframe, and genius Data GRID. A welcome message reads: "Grid Enabled web eNvironment for site Independent User Job Submission Welcome to GENIUS 2.7.0".
- Job Submission:** A section for submitting jobs, including a "Job Queue" table and a "Current directory is /" section.
- Monitoring:** A "Current directory is /" section showing a list of files and directories, including "data.out1" through "data.out5", "dataatest", "edglog.log", and "hostname.out".
- Site Information:** A table showing the status of various sites, including "bo.infn.it", "cineca", "ind.infn.it", "na.infn.it", "pd.infn.it", "to.infn.it", and "ts.infn.it".
- Job Queue Table:**

Job ID	Job Name	Status	Destination	Exit Code	Action
4					
1	byRSTNDeWfGuvzVfRQ	Done	testheadn1.cnaf.infn.it:211	0	Get Output
2	/home/barbera/csound.jdl	Done	pbs-medium	0	
3	/home/barbera/alroot.jdl	Done	pbs-medium	0	
4	/home/barbera/ident00.jdl	Done	pbs-medium	0	
5	/home/barbera/hostname.jdl	Done	pbs-medium	0	
6	/home/barbera/hostname1.jdl	Done	pbs-medium	0	
7	/home/barbera/interactive.jdl	Done	pbs-medium	0	
8	/home/barbera/povray_defcity.jdl	Done	pbs-medium	0	
- Bottom Section:** A "Web Edit" section with a "Directory contents" view showing a list of files and directories, including "RelDoseTree.gif" and "RelDoseT". Below this are several plots showing "RelDose" data for different plans (e.g., "RelDose Relatives Plan y=5.0 mm").
- Right Side:** A "Web Edit" section with a "File Services" menu and a "Job Queue" table.
- Bottom Right:** A "Web Edit" section with a "Web Edit" button and a "Web Edit" button.

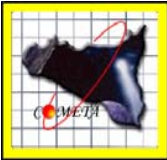
A red circle highlights a section of the interface, containing the text "robot certificates" on e-tokens, with an image of a USB token and a computer monitor displaying a "Digital Signature" window.



TryGrid: Cloud Computing with gLite at Consorzio COMETA



First version online by the end of the year.

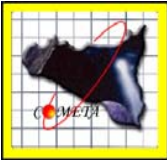


H/W Infrastructures for Training



**3 classrooms available for
a total of ~100 seats**

S/W Infrastructures for Training



Training material repository with about 100 topics sorted in 3 levels of difficulty. Educational formats customized for Industry.

UserTutorials - PI2S2 - Grid CT WIKI - Mozilla Firefox

gLite 3.0 User Tutorials

This section is intended as a guide for the VO COMETA users with some or small experience in the use of the gLite middleware. The section is divided in three levels of topics, but the main body starting from the one regarding authentication and authorization.

Basic

- [Authentication & Authorization](#)
- [Certificate Management](#)
- [How to use the VO Resource Manager \(VRM\)](#)
- [How to Authenticate Users on the VO](#)
- [How to Authenticate Users on the VO](#)
- [How to Authenticate Users on the VO](#)
- [How to Authenticate Users on the VO](#)
- [How to Authenticate Users on the VO](#)
- [How to Authenticate Users on the VO](#)

Medium

Advanced

WikiConsorzioCometa - PI2S2 - Grid CT WIKI - Mozilla Firefox

GRID CT

- [The watchdog utility to monitor job execution](#)
- [Portiang Group compiler available](#)
- [Recursive catalog interaction with lcg-rec-* tools](#)
- [How to Execute FLASH Jobs on the PI2S2 Infrastructure](#)
- [How to Execute IDL Jobs on the PI2S2 Infrastructure](#)
- [How to Execute FLUENT Jobs on the PI2S2 Infrastructure](#)
- [How to Execute ABAQUS Jobs on the PI2S2 Infrastructure](#)
- [How to Execute R-CRAN Jobs on the PI2S2 Infrastructure](#)
- [How to Execute MATLAB jobs on the PI2S2 Infrastructure](#)
- [A DAG Programming Exercise \(Foreword\)](#)

Account Summary -

Enabled	Features	Usage and Quotas
✓	System Features	Bandwidth per Month (MB): 37.6 / Unlimited Disk Usage (MB): 191.8 / Unlimited
	Presentation	Authors: 0 / 0
✓	Training	Concurrent Learner Pricing Model Training Managers: 0 / Unlimited Named Training Learners: 0 / 0 Training Concurrent Learner License Limit: 75
✓	Meeting	Concurrent Attendee Pricing Model Meeting Administrators: 7 / Unlimited Meeting Peak Concurrent Users: 0 / 1 (Soft Limit:1) Concurrent Users Per Meeting: Unlimited
✓	Seminar Rooms	Seminar Administrators: 9 / Unlimited
	Event Management	Event Administrators: 0 / Unlimited

Advanced Features

Enabled	Features
✓	Enable Flash Paper
✓	Customization and Rebranding Requires SSL Connection

Seminar List - Mozilla Firefox

ADOBE® CONNECT™ ENTERPRISE SERVER

Home Content Training Meetings Seminar Rooms Administration

Shared Seminars Seminar Dashboard

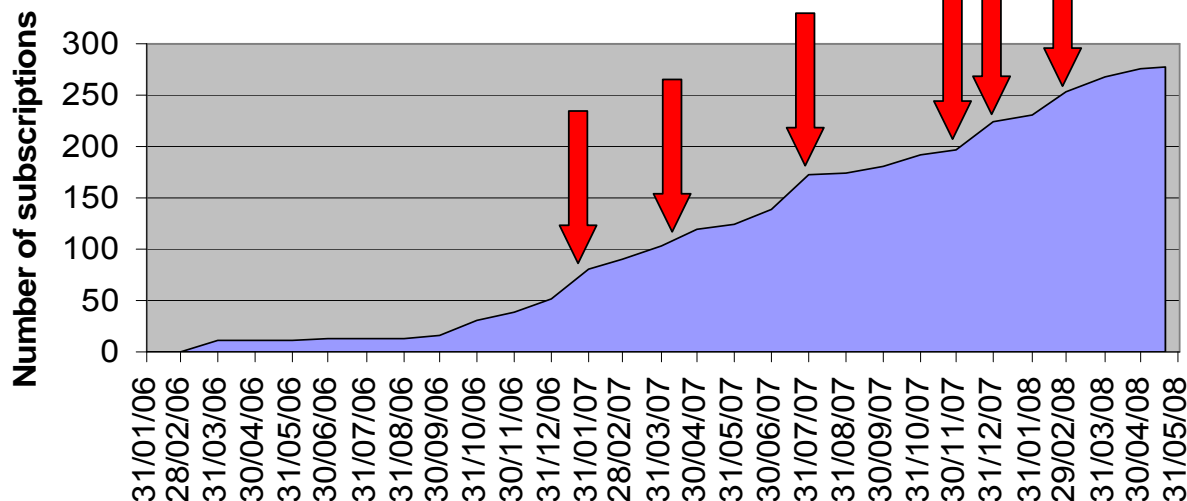
Seminar Name	Date	Time
...	04/23/2008	03:00:00
...	04/24/2008	03:30:00
...	04/28/2008	03:30:00
...	04/29/2008	03:30:00
...	05/13/2008	03:30:00
...	05/15/2008	03:00:00
...	03/27/2008	03:00:00
...	04/01/2008	03:00:00
...	04/03/2008	03:00:00

Use of Adobe Connect® and Adobe Training® to organize and broadcast training events (sinergy INFN-COMETA)



Quality metrics: VO subscriptions and accesses to the infrastructure

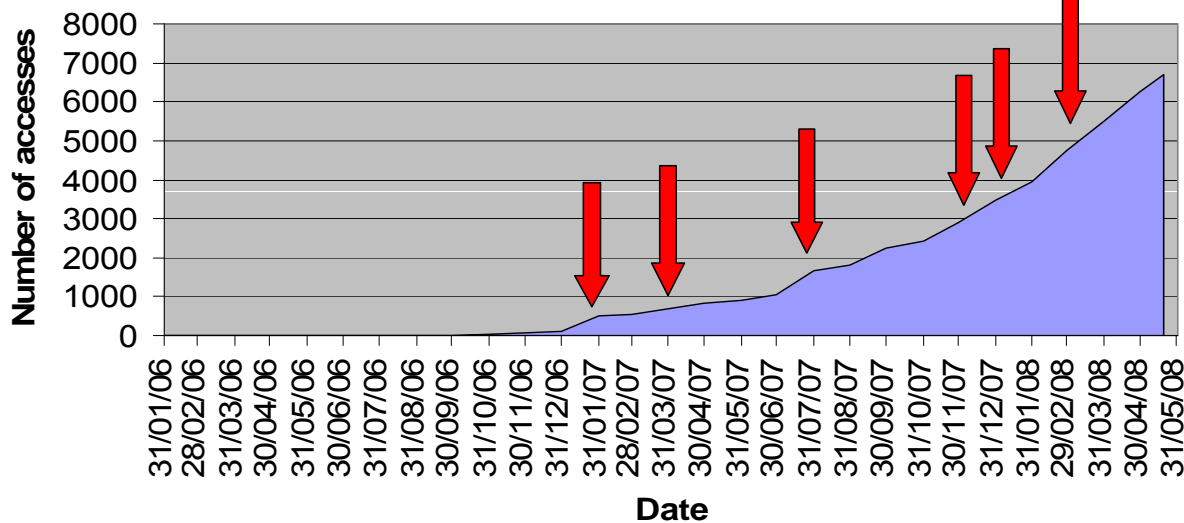
COMETA VO Subscriptions (cumulative)

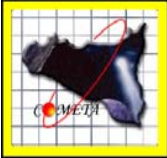


Direct correlation between training and usage of the infrastructure

Arrows indicate
Tutorials and
Grid Open Days

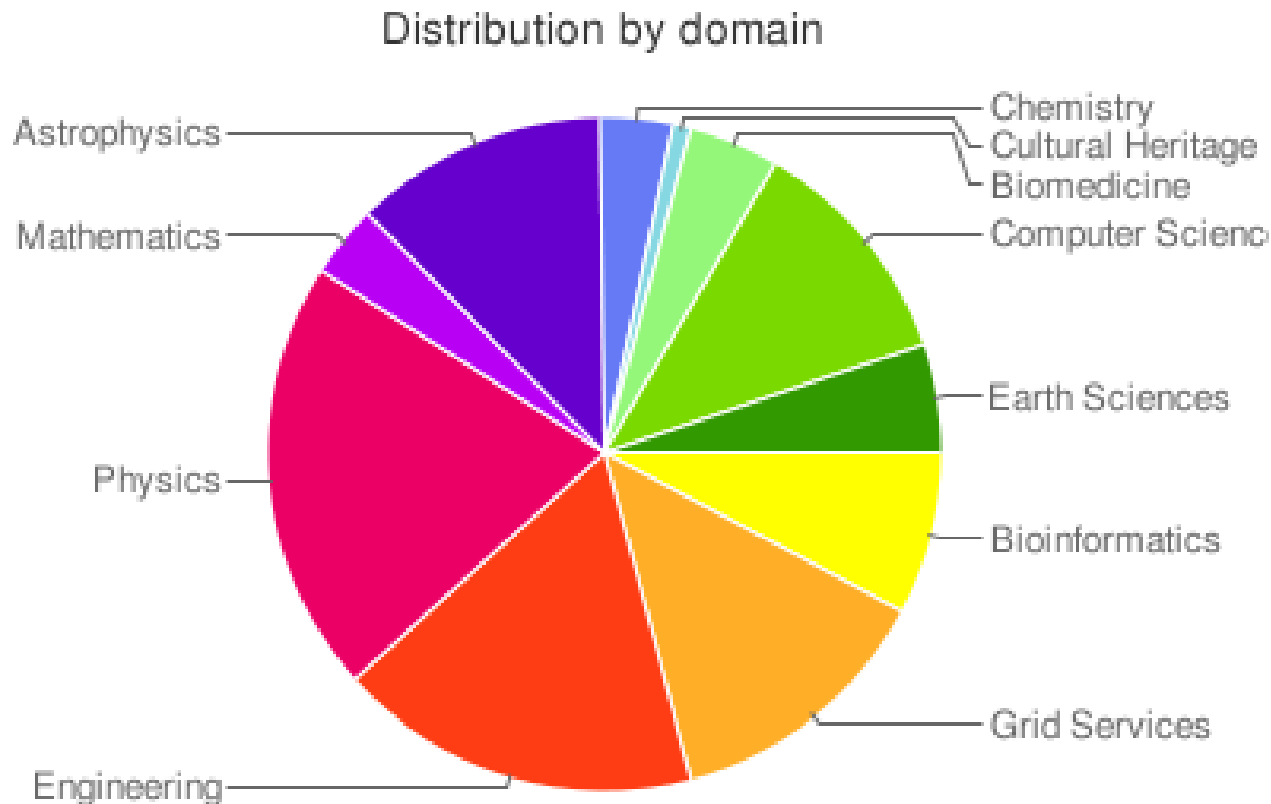
Accesses to the infrastructure (cumulative)





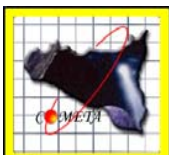
The Applications of COMETA

- **A comprehensive database is available at:**
 - www.pi2s2.it/applications (**116** entries as of today)



- **A volume edited by COMETA is also available at:**
 - indico.ct.infn.it/materialDisplay.py?materialId=12&confId=24

Some examples... (www.pi2s2.it/applications)



PI2S2 Application Support - Mozilla Firefox

http://www.pi2s2.it/application/application_details.php?ID=10

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GENERAL INFO
FLASH - Jet-FLASH
 Domain: Astrophysics

Abstract:
 FLASH is an expansion of the well known FLASH code, aiming at simulating the interaction of a relativistic jet originating from an Active Galactic Nucleus into the Interstellar/Intergalactic Medium. FLASH is currently used to study the feedback which Supersymmetric Black Holes can have on the ISM/IGM of their host galaxies, and to make predictions of their impact on the star formation and evolution. Using ISM4E, a joint team of researchers from INFN/Catania and the University of Oxford, UK, have recently demonstrated the possibility of positive feedback, where the weak shocks produced by the jet can enhance star formation before negative feedback eventually takes place.

Software requirements: MPI2, HPF, PARAMESH

Website: http://www.pi2s2.it/application/application_details.php?ID=10
Website: Not available
Wikisite: Not available

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GENERAL INFO
GammaKnifeRS - Stereotactic Radiosurgery with Gamma Knife
 Domain: Physics

Abstract: Stereotactic Radiosurgery with Gamma Knife allows to treat brain disorders by means of focalized gamma beams. A Monte Carlo simulation of the complex geometry of the device has been developed with the toolkit Geant4, in order to verify the dose distribution calculation by the Treatment Planning System (TPS). The porting on the GRID infrastructure of the application, has reduced noticeably the long calculation time necessary for a good statistic. Transport of the gamma beams inside the machine and the interactions with a water-phantom are simulated; moreover a complete clinical treatment is reproduced. A large number of jobs with different initial seeds are submitted by using a "N-out-of-M" strategy based on scheduling more subtasks than really required.

Software requirements: Geant4 toolkit libraries

Website: <http://geant4.infn.it/spacesys/GammaKnifeRS-Simulation-of-a-Treatment-Plan-System-Gamma-Knife>
Website: Not available
Wikisite: Not available

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GENERAL INFO
GridVideo - GridVideo
 Domain: Engineering

Abstract: GridVideo is a multimedia application for the distributed tailoring and streaming of media files. A solution as the kind could represent the base of a Video On Demand (VOD) service widely used into both educational or commercial environments. The development of GridVideo has been carried out using the Grid Toolkit built within the FDS2 Project. A mixture of Java classes and Bash shell scripts has been used. Nevertheless, in order to accomplish GridVideo requirements, some other open source components have been exploited. In particular:
 1) Mortbay Jetty, used as servlet container, was selected due to its limited memory requirements and the simplicity to be embedded into custom programs;
 2) Mpeg4 has been exploited as movie splitter;
 3) Ffmpeg, which is one of the most famous and used audio/video codecs, was selected for the transcoding;
 4) Apache ActiveMQ, an open source (Apache) implementation of the Java Message Service (JMS), was used to solve the issues related with the coordination between different application elements across Grid infrastructure. All components, except Apache ActiveMQ, no need to be installed on VME. They are included into the GridVideo jobs. Apache ActiveMQ, instead, must be installed on a public server (now it runs on SE of Messina) which can be reached from all VMs in the site.

Website: Not available
Website: Not available
Wikisite: Not available

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http://www.pi2s2.it/application/application_details.php?ID=17

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GENERAL INFO
Resonance ALICE - Resonances with ALICE
 Domain: Physics

Abstract: We provide a set of C++ programs and initialization macros that allow resonance identification in proton-proton and proton-neutron collisions under the ALICE [1] software environment, via an ALICE-specific interface to GRID (see [2]). A first package provides the possibility to filter reconstructed tracks according to unidentified quality and/or kinematical criteria. A second package creates from the set of filtered tracks the resonance invariant-mass spectra and performs background subtraction with (a) likelihood and (b) minimum variance procedures.

Experiment: ALICE

Website: <http://www.cern.ch/ALICE>
Website: <http://www.alice-project.org/>
Website: <http://www.pi2s2.it/checked/checkedview.html#home>

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http://www.pi2s2.it/application/application_details.php?ID=17

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GENERAL INFO
BM Portal - Bio Medical Portal
 Domain: Chemistry

Abstract: Experiment - Nowadays medical studies are starting to deal with large, distributed, and heterogeneous repositories as well as with computationally demanding analyses. Data access, algorithm deployment and integration solutions are more often required to handle this complexity, especially when applications are distributed: the particular scenario is frequently found in neuroinformatics, where the health care provider is not a single institution but a collection of actors that play different roles in the territory following a patient during years and collecting several kind of data and information. The complexity requires an integrated approach, where the additional design paradigm is shifted to a service based paradigm.

Application: The platform is not designed and developed by a single actor or institution but a collection of services supporting hardware and software resources in the territory. The software architecture must be designed to exploit the existing Grid services since the most important components (security, storage, databases) are already available and integrated. Such a complexity requires a collaborative approach at different levels of the technology stack: doctors, bioinformatics engineers, application developers, browser and tool developers, middleware developers, grid service providers, infrastructure maintainers.

IRCCS-AI Laboratory at IZST, University of Catania started in early 2007 the development of a container for bioinformatics application (BM Portal). This involved a more general bioinformatic portal and it is currently used to integrate previously developed bioinformatic applications. A use case for the early diagnosis of Alzheimer's disease will be shown in the poster. The work is undertaken at IRCCS-AI (application development based on HPC) (Engelrange Grid Portal and engineering activities coordinated by INFN-Grid). Security, data and metadata management components are developed by researchers and INFN in Catania (Grid ST, LAMOS/SL INFN Catania, University of Catania). The infrastructure (grid services) is the one provided by the FDS2 project managed by the COMETA Consortium. The scope of the work is both to present a Grid application with its own medical use case and emphasize the benefit that a new Internet of Services based on Grid could provide to related research groups.

Software requirements: Java 1.5, gLite 3.1.1, engine@inf.v-so.it

Website: Not available
Website: Not available
Wikisite: Not available

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REFERENCES
Abstract: A New Paradigm in Design, Implementation and Delivery of a Chemical Use Case In: Grid Open Days at the University of Palermo, Palermo (Italy), Proceedings of the Symposium GRID Open Days at the University of Palermo ISBN 978-88-95860-00-9, p.109-120, 2007.

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PI2S2 Application Support - Mozilla Firefox

http://www.pi2s2.it/application/application_details.php?ID=14

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GENERAL INFO
GridWin - GridWin
 Domain: Grid Services

Abstract: Nowadays, many research domains are capitalizing on grid computing. From engineering to medicine, from Financial Services to High Energy Physics. However, to be able to properly use the current Grid infrastructures, usually it is required that the user has advanced skills on the based systems, since available middleware are based on such platforms. Even if the Linux distributions are in full growth, many users still prefer to use Microsoft Windows. The GridWin project aims at "opening" the grid services to Microsoft applications and integrating MS Windows clusters into existing Grid infrastructures. Such initiative may enable the Windows' users in the high computational-power offered by Grid computing. To do so, the GridWin group is working on porting the gLite middleware to Windows platform.

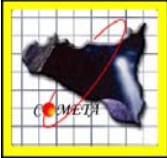
The gLite middleware is a collection of software tools and services developed by the EGEE project, gLite is built on top of Globus Toolkit (GT) in order to solve issues related to the security of grid, data management and many other aspects.

The GridWin project is still in development state, but many features are already implemented. The User Interface GUI is fully functional with a graphical interface built on .Net. Also the Torque/MAN based scheduling Element is implemented and the Compute Cluster Server (CCS) - the first native Windows batch system - was integrated into the gLite middleware.

Website: <http://www.gridwin.it/>
Website: <http://www.cern.ch/checked/checkedview.html#home>
Website: Not available

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SABERIO, Roberto <roberto.saberio@oact.infn.it> INFN Catania

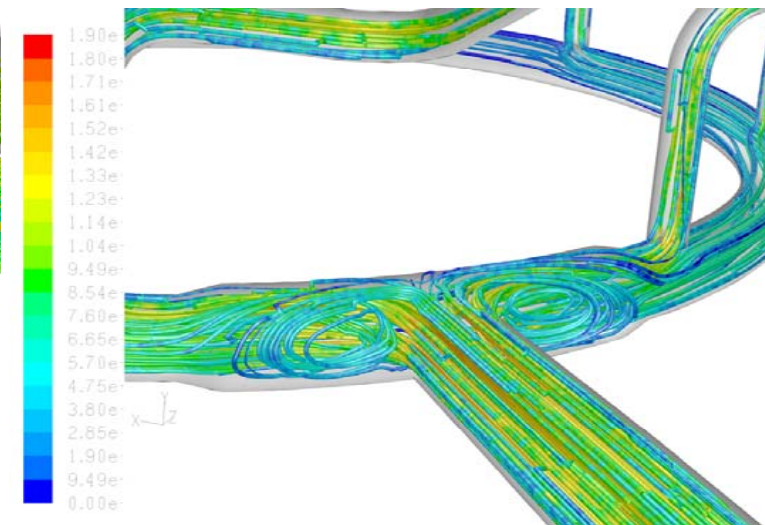
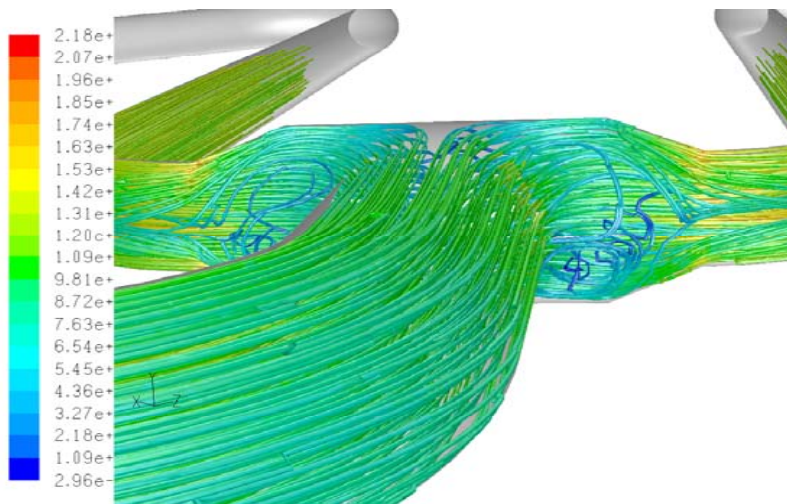
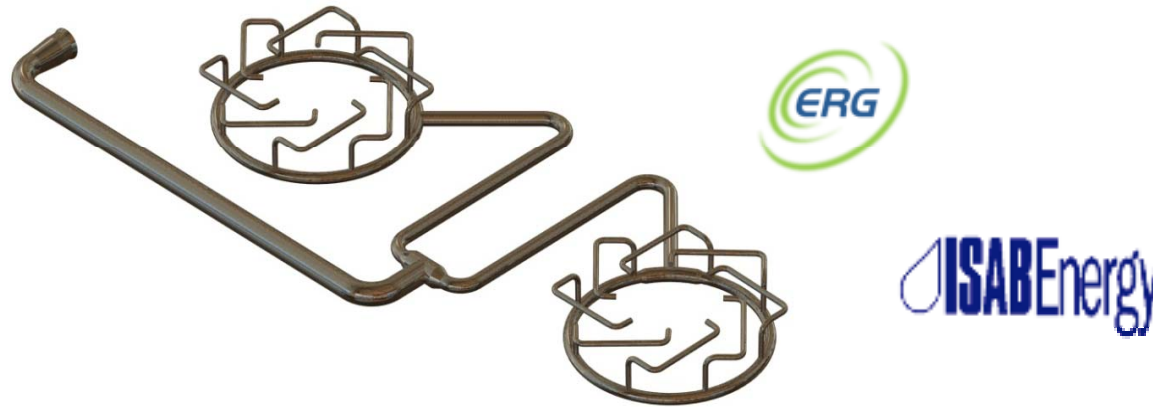
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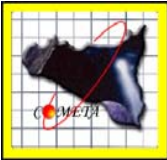


Industrial/Commercial Use Cases (1/4)

- Study of the syngas adduction system to check out the fluid-dynamics of the inlet of the Siemens V94.2K turbine, the “topper” of the IGCC ISAB Energy plant.

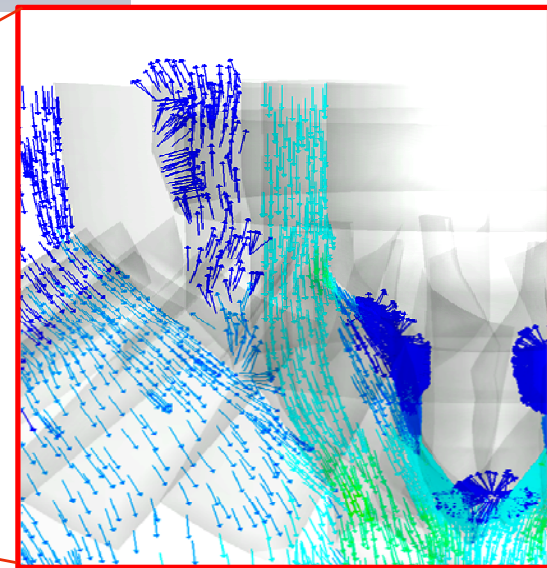
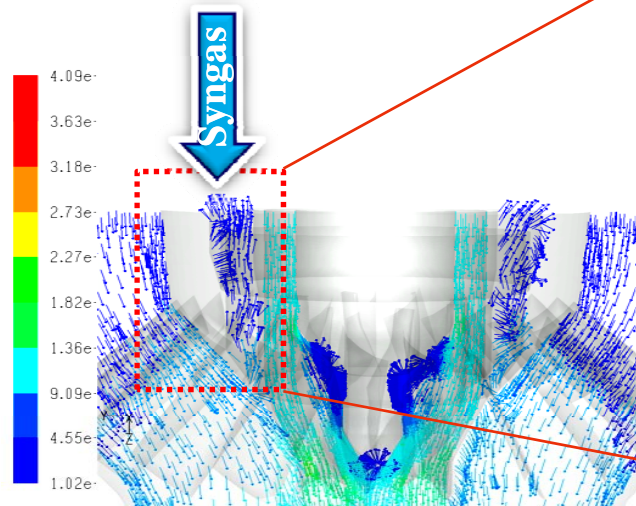
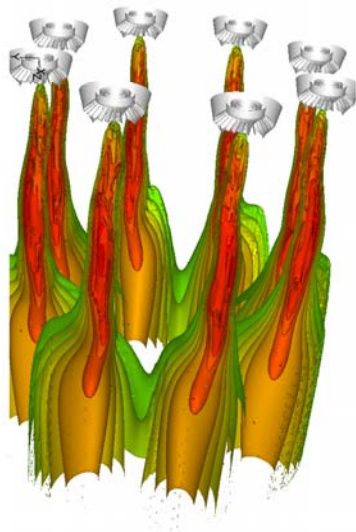
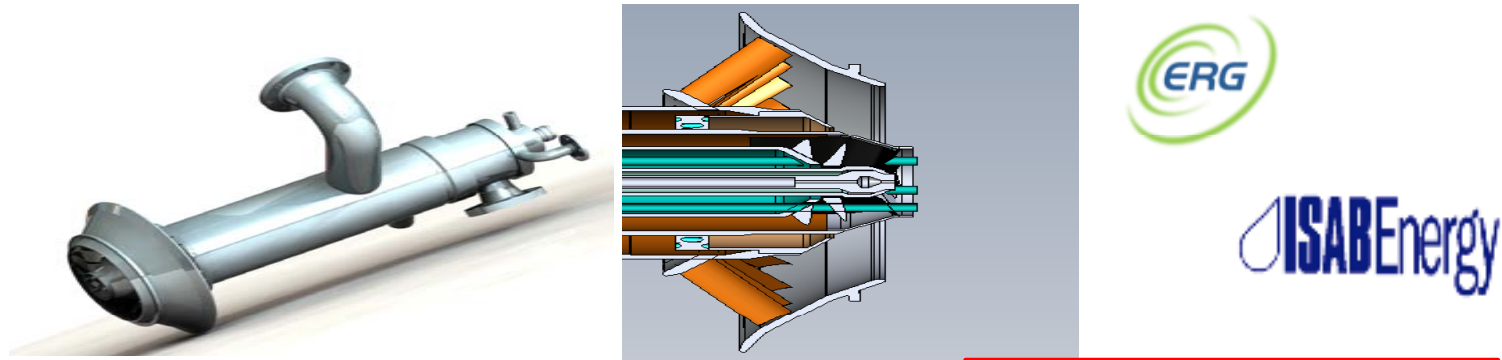
(Courtesy: Prof. R. Lanzafame, UNICT)



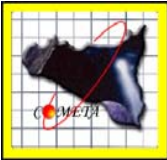


- Fluid-dynamics study of the hybrid burning in the Siemens V94.2K turbine, “topper” of the IGCC ISAB Energy plant.

(Courtesy: Prof. R. Lanzafame, UNICT)

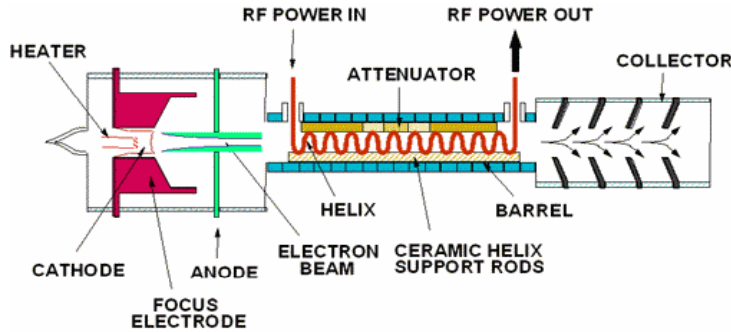


Hot air flow in the syngas pipe

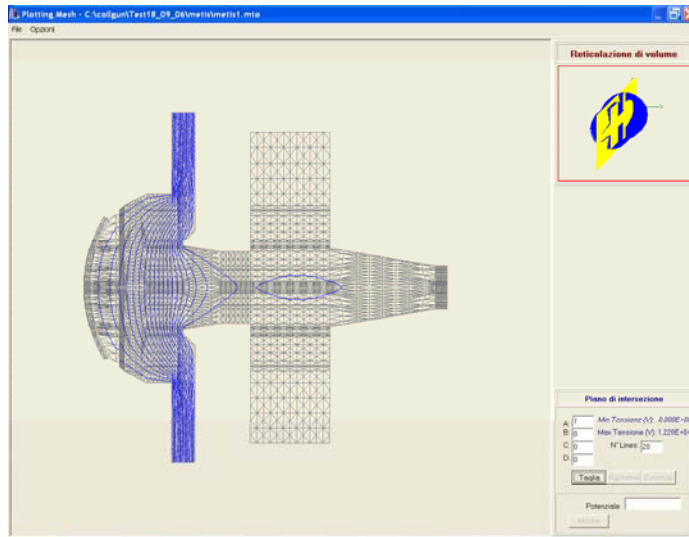


Industrial/Commercial Use Cases (3/4)

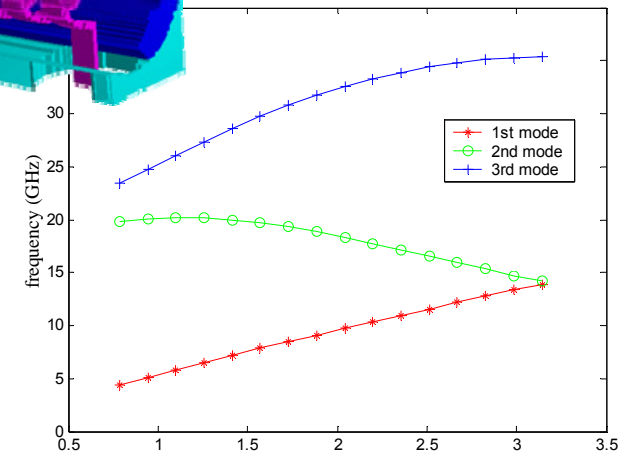
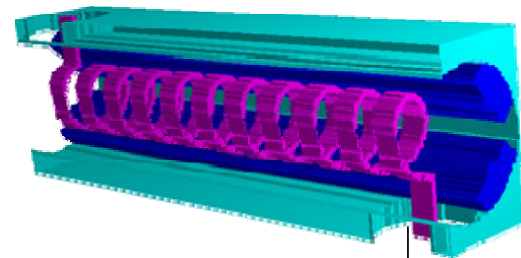
- Electromagnetic Analysis of Progressive Wave Tubes.



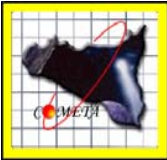
(Courtesy: Dr. G. Pollicino, UNICT)



Simulation time on 1 PC: 400 min.
Simulation time on Grid: 30 min.



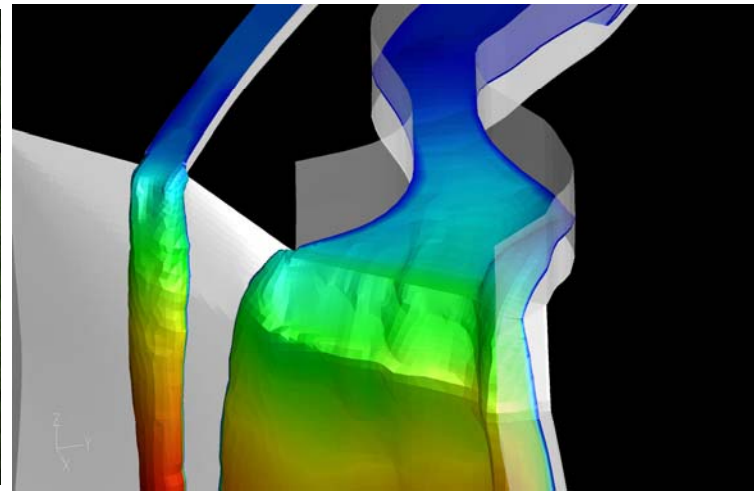
Simulation time on 1 PC: 8 h.
Simulation time on Grid: 45 min.



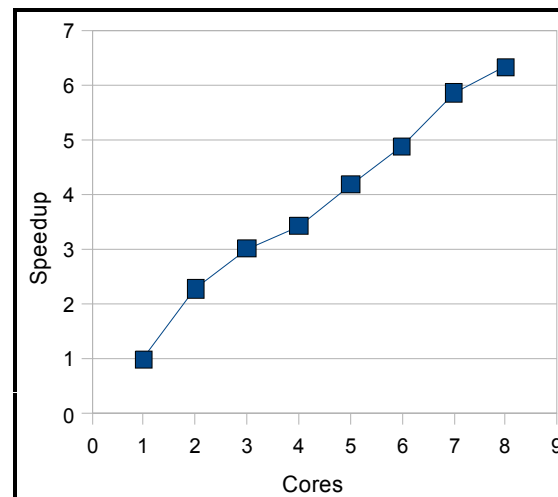
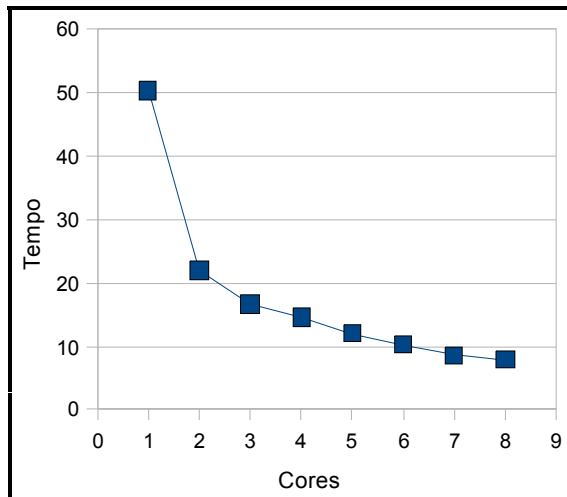
Industrial/Commercial Use Cases (4/4)

(Courtesy: Dr. E. Leggio, COMETA – Dr. M. Testa, Numidia)

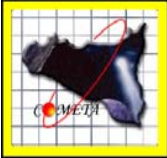
- Fluid-dynamics simulation of the “Le Marmore” falls to determine the critical points of the path in various conditions of flow.



Numidia srl

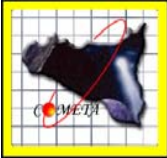


3.1 millions of volumes



Summary and conclusions

- The Consorzio COMETA and the PI2S2 project have changed the perspective of scientific computing in Sicily, conjugating in a unique way Grid and HPC;
- The gLite middleware has been extended with new services thought, since the beginning, with the needs of Industrial applications in mind;
- Training material has been developed along with educative formats customized for the world of industry and business;
- **More than 115** applications and services have been developed and deploys; several of them have industrial/ commercial interest;
- **The Sicilian e-Infrastructure is open to all Industrial subjects interested in using it and/or establishing partnerships with COMETA. Feel free to contact me.**



Thank you for your kind attention !

Any questions ?

