

The EUChinaGrid project's experience

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EUChinaGrid*

ECHOgrid workshop, Athens, 9.06.2008

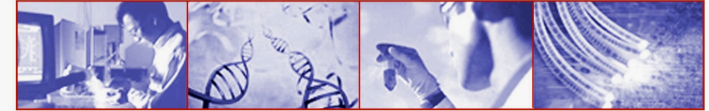


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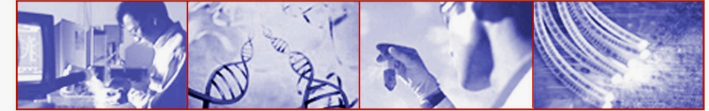
Information Society
and Media

<http://www.euchinagrid.org>



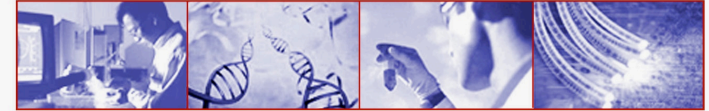
Project Information

- ▶ EUChinaGRID
 - Specific Support Action (SSA) funded under the EU VI Framework Program
 - Started on the 1 January 2006. 24 + 3 months duration.
 - 10 partners (6 from Europe and 4 from China).
- ▶ More information is available on the project web site: www.euchinagrid.eu.



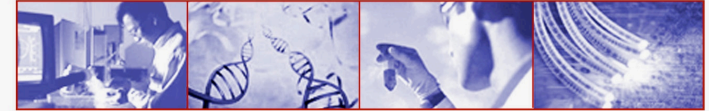
EUChinaGRID Main Objectives

- ▶ Support the interconnection and interoperability of Grids between Europe and China.
- ▶ Dissemination of advanced knowledge in Grid technology
- ▶ Strengthening the collaboration between scientific groups in both regions



Work Packages

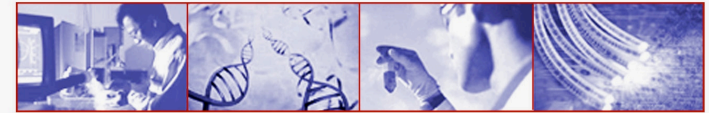
- ▶ WP1: Project administrative and technical management
- ▶ WP2: Network planning and interoperability study
- ▶ WP3: Pilot Infrastructure operational support
- ▶ WP4: Applications
- ▶ WP5: Dissemination



WP2 Objectives

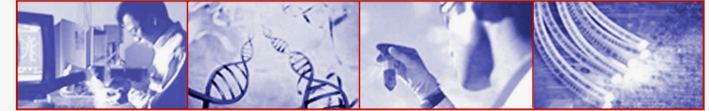
- ▶ Activity 1: EU-China Network Connectivity plan
 - Network monitoring and routing
 - Status and studies
 - Achievements

- ▶ Activity 2: Multi protocol Grid connectivity
 - IPv6 compliance of GRID middleware
 - gLite : activities and outcome
 - GOS/DAS : activities and outcome



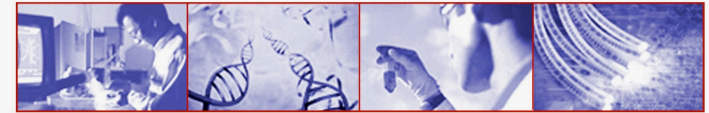
Network connectivity plan: Routing

- ▶ A new link has been set up to reach China from the EU via ORIENT/TEIN2 – connecting directly the Chinese networks to GEANT crossing Russia.
- ▶ New route available from June 2007 from EU to China – avoiding to pass through the USA
- ▶ Network connection performances improved sensibly
 - Exploited and monitored by EUChinaGRID WP2
- ▶ EUChinaGRID played an important role in triggering the relevant actors and pushing for this upgrade



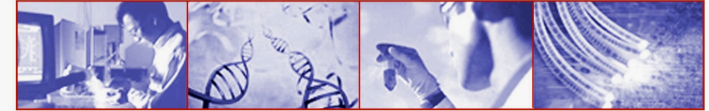
IPv6 compliance of the GRID middleware

- ▶ *Activity started in 2006, significantly consolidated during 2007. Carried out in China and in Europe by two groups of developers and testers, within the EUChinaGRID activity coordination*
- ▶ **General assessment on the IPv6 compliance of European and Chinese middleware distributions (and their external dependencies) :**
 - gLite (EGEE)
 - GOS/DAS (CNGrid, SDG)
- ▶ For gLite, started an extended, fruitful collaboration with EGEE and ETICS about the gLite IPv6 compliance – *Started in 2007*
 - ETICS is a s/w quality project used to build and produce gLite releases
- ▶ Set up a gLite-based testbed in Europe to perform tests on IPv6 compliance of selected gLite components (CERN, UREC, GARR)
 - BD-II
 - Workload Management System
 - DPM-LFC
- ▶ Set up of GOS/DAS IPv6 testbed in China (CNIC, BUAA)



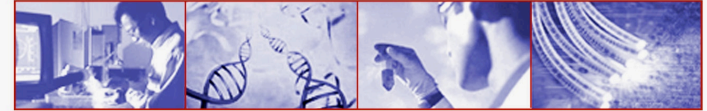
gLite IPv6 compliance

- ▶ *gLite IPv6 compliance* ETICS test project
 - **Key idea:** use the natural, right tool for gLite developers in the process of porting gLite to IPv6 : ETICS
 - ETICS is the **gLite build system**, daily accessed by all gLite developers to implement new code, functionality, tests
- ▶ A test project has been set up aimed at implementing IPv6 tests on selected gLite components (*for example the IPv6 ported BD-II*)
- ▶ **Succeeded** in the first demo test job on April 5, 2007
 - Manually pre-installed IPv6 BD-II server in Paris
 - Test commands defined within ETICS gLite IPv6 compliance project
 - ldap query to the top level IPv6 BD-II in Paris(UREC) from the IPv4 NMI node (CERN) – job run and managed from GARR
- ▶ Both client CLI submission and remote test via Web Application successfully exploited
- ▶ ETICS team very collaborative and responsive to our requests related to IPv6



WP3 Objectives

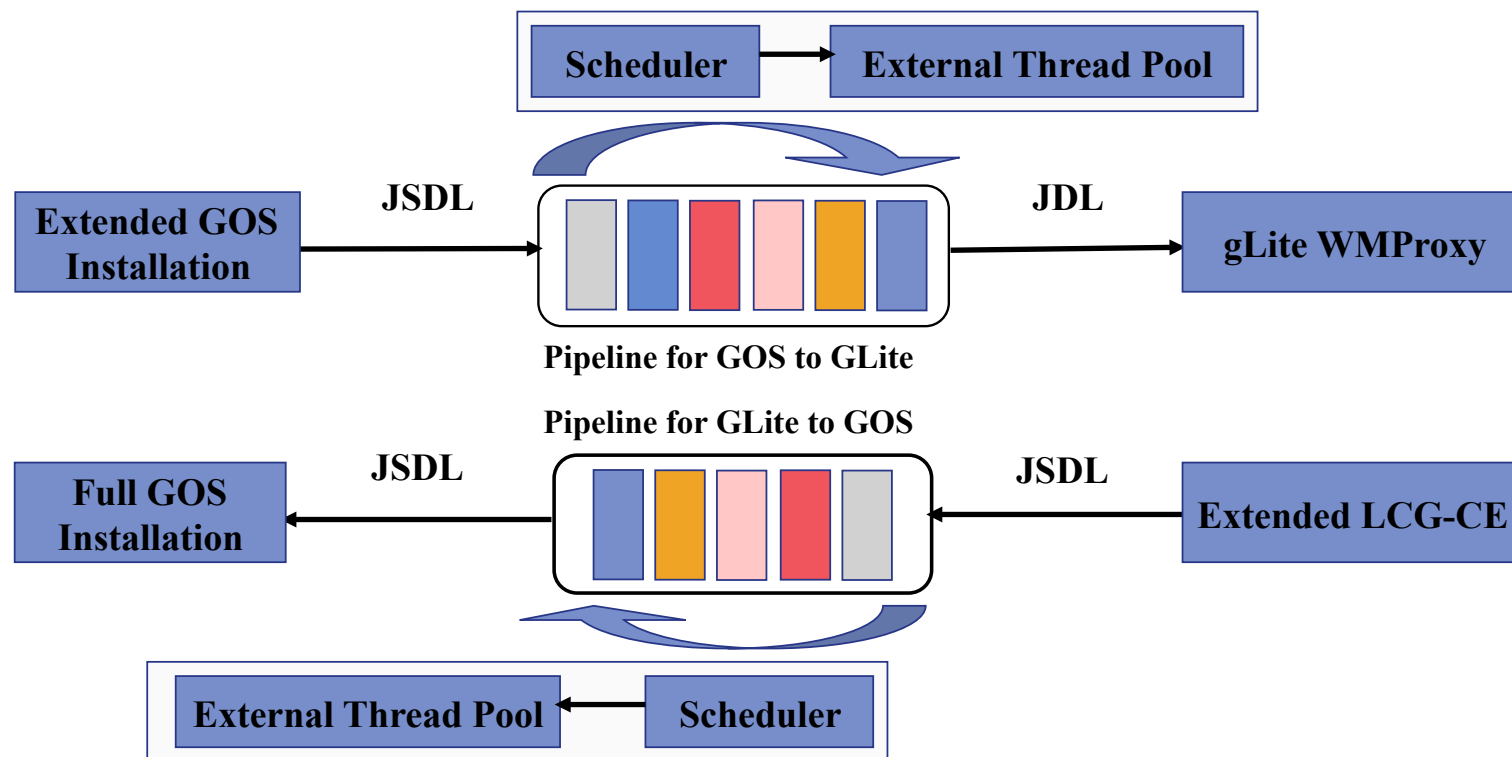
- ▶ Carry out studies on CNGrid and EGEE interoperability
- ▶ Define a common policy for authentication and security
- ▶ Carry out studies on how to deploy advanced services
- ▶ Carry out activities aimed to promote interconnections with other Asian grids, pre-existing or induced.



CNGrid and EGEE interoperability

- ▶ The prototype of the gateway was implemented and has been extensively tested and consolidated
- ▶ Testing gave some ideas on how to improve and evolve the design of the gateway: this will be implemented soon
- ▶ We presented our job to important conferences:
 - EU-IndiaGrid Conference (13-14 December 2007)
 - e-Science 2007 Conference (10-13 December 2007)
 - EU-IndiaGrid Workshop @ OGF23 Barcelona, Spain (2-6 June 2008)
- ▶ We wrote a chapter on a GRID collaborative book:
 - <http://www.beds.ac.uk/departments/computing/staff/nik-bessis/chapter-call>

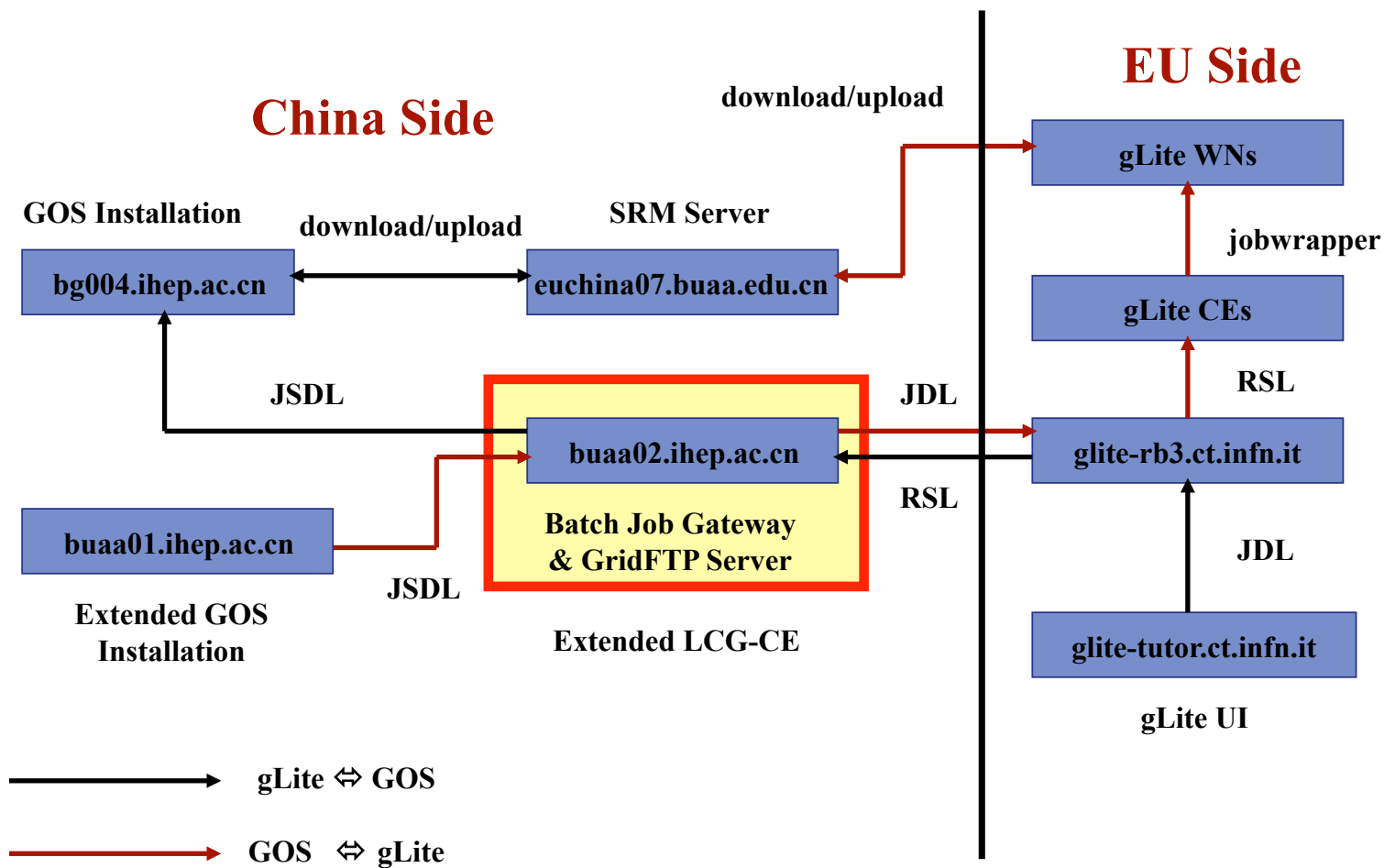
Pipeline-based gateway

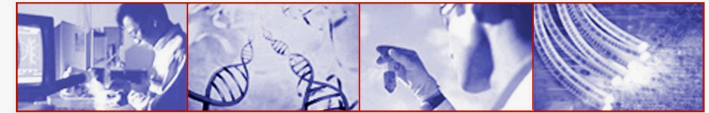


JSDL: Job Submission Descriptor Language
 JDL: Job Descriptor Language

Different colors in pipeline stand for different stages performing concrete functions such as data stageIn and data stageOut

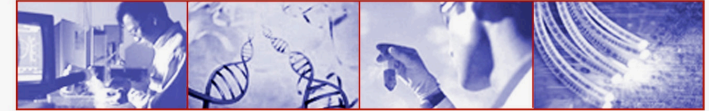
Interoperability Testbed





Authorization and security harmonization

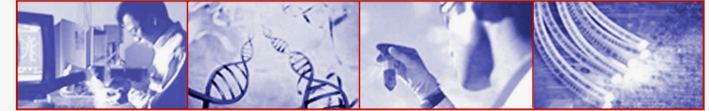
- ▶ Policies from IGTF
- ▶ Produced document on CA procedures and best practices
- ▶ Accredited by Asian-Pacific Grid Policy Management Authority (APGridPMA)
 - CNIC Grid CA (<http://ca.grid.cn/en>)
 - Scientific DataGrid CA (<http://ca.sdg.grid.cn/en>)



Infrastructure Services deployment

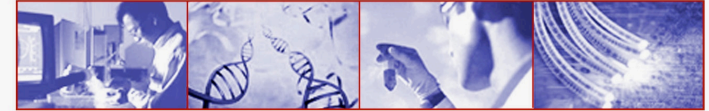
- ▶ gLite services, configured and currently maintained:

<i>Type of node</i>	<i>Where</i>	<i>Functionality</i>
RB/BDII/UI	Italy (INFN-CNAF)	Resource Broker and Catalog, User Interface
Secondary RB	China (IHEP)	Resource Broker
GridICE collector	Italy (INFN-CNAF)	Grid Monitoring Service
VOMS	Italy (INFN-CNAF)	Virtual Organization Management Service
Secondary VOMS	China (CNIC)	Virtual Organization Management Service
SAM	China (IHEP)	Service Availability Monitor
GStat	Taiwan (ASGC)	Grid Information System stats



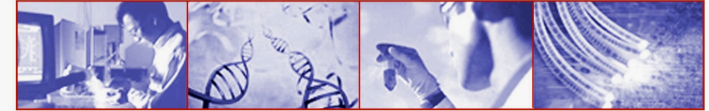
ROC-on-Duty Tutorial

- ▶ Target: to train new site administrators and to discuss possible operations activities in the next future.
- ▶ The main topics covered during the tutorial have been:
 - Installation and configurations of gLite middleware
 - Explanation of European monitoring and ticketing systems and comparison with Chinese counterpart
 - How to improve efficiency of shifts
- ▶ After the tutorial we set up a round table on how to create a common operations infrastructure and wrote a document as a starting point.



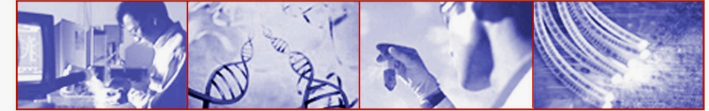
Promote new Asian Grid infrastructures

- ▶ Consolidated and finalized the report on “The Status of Grid Activities in Asia” which was annexed to QR7
- ▶ The report reviewed the status of grid activities in several Asian regions and countries as of the end of 2006
 - 18 countries targeted, of which 9 confirmed they have established or in the process of establishing a national/regional funded grid project or grid initiative
- ▶ The process involved reviewing existing project documentations and conducting a survey to gather additional information
 - https://edms.cern.ch/file/772559/1/SummaryAsianGridActivities_forQR.doc



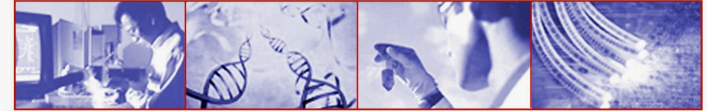
Inter-Monitoring activity

- ▶ The target is to show, in a unique interface (GridICE), monitoring data concerning the EUChinaGrid pilot infrastructure and CNGrid sites
- ▶ Implementation: first studies
 - BUAA studied the possibility to publish through a gLite BDII the CNGrid resources information
 - INFN studied the possibility to collect and present the published data through a GUI of a GridICE server
 - Due to limited time and human resources, no real implementation is available currently



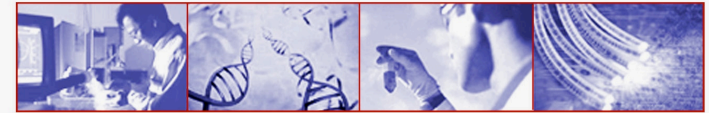
Future plans

- ▶ Planning to keep the testbed infrastructure up and running on a best-effort basis
 - Memorandum of Understanding under development among the participating institutes
- ▶ Use ideas and expertise gathered on interoperability task to develop a more generic gateway, capable to interoperate with different middlewares

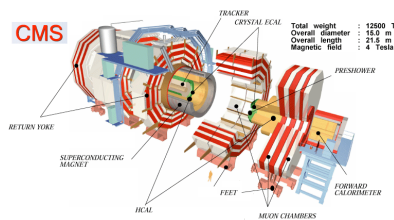


WP4 objectives

- ▶ **Broader scale uptake of grid technology across user communities**
 - *Involved the communities already engaged in grid applications (High Energy Physics, HEP)*
 - *Ported astroparticle physics and biological applications in grid.*
 - *All applications running on the EUChinaGRID infrastructure (since early 2007).*
 - *Selected and involved additional communities through the “School for Application Integration on Grid” held in Beijing*
 - *Further involvement of new communities in EUChinaGRID-2 proposal*
- ▶ **Harmonize European, and Chinese users requirements**
 - *Users requirements have been collected.*
 - *No other issues arised*



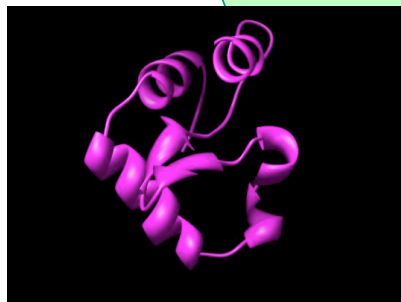
Applications

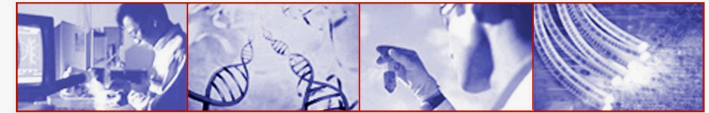


EGEE
ATLAS and CMS
support

ARGO
Data mover
MEDEA++
Corsika

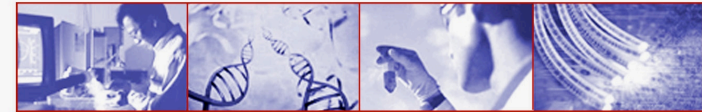
NBP Application
Rosetta
Early/Late Stage





EGEE applications

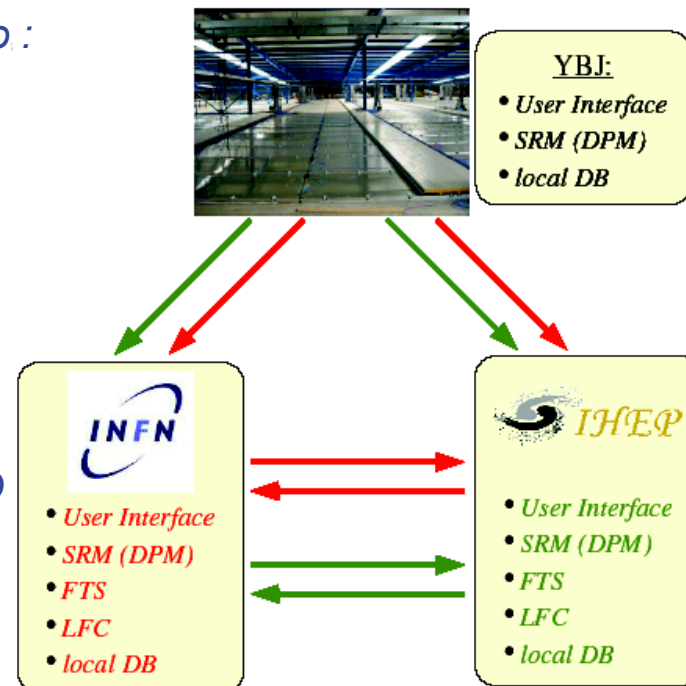
- ▶ **Support of Worldwide LHC Computing Grid (WLCG) deployment in China**
 - *Tier-2 center built at IHEP based on the gLite middleware (more than 2500 CPUs and about 100 TB of disk space)*
 - *Tier-2 center and all the WLCG sites support the ATLAS and CMS experiments.*
 - *developed DISCOVERER, a distributed computing and visualized environment for physics computing on LCG*
 - *Chinese and European partners took part in huge amount of data exchanges on a scale of 2 Tb per day*
 - *start up of Peking University site for CMS in LCG*
 - *analyzed large CMS MC dataset stored at CNAF*
 - *provided configuration files for CMS collaboration*

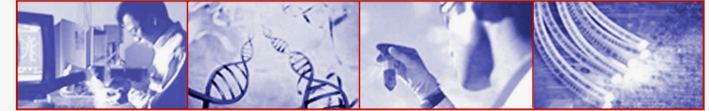


ARGO applications

- ▶ **ARGO-YBJ experiment data transfer deployed and optimized**
 - *Set of scripts designed and implemented to :*
 - *Transfer the files via FTS servers*
 - *Mirror the catalogs and SE contents*

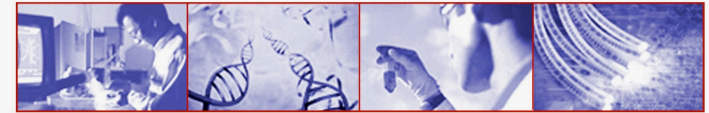
- ▶ **Applications deployed**
 - *MEDEA++ and Corsika deployed on the pilot infrastructure by IHEP, Roma Tre and INFN-Catania groups*
 - *Ported job submission scripts to ARGO VO resources*





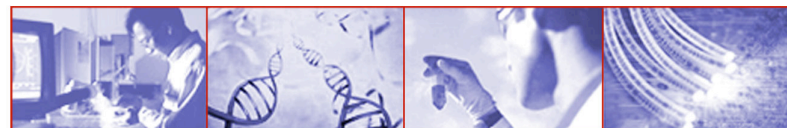
Biological applications

- ▶ **Random, non-natural amino acid sequences data base generated**
 - *RandomBlast software*
 - *Database size grown from 10^4 to $> 2 \times 10^4$ at the end of the project*
- ▶ **Software running on the pilot infrastructure**
 - *Early/Late Stage protein folding prediction software*
 - *Rosetta modelling software*
 - *AMBER molecular dynamics NMR refinement software*
- ▶ **User friendly web services developed**
 - *GridSphere-based portal for Early/Late Stage*
 - *Genius-based portal for Rosetta*
- ▶ **High throughput protein structure prediction and analysis**
 - *Approx. 2×10^4 NBPs structures predicted*
 - *Physico-chemical parameters calculated*
 - *Consensus structures for validation selected*
 - *Structure characterization on-going*

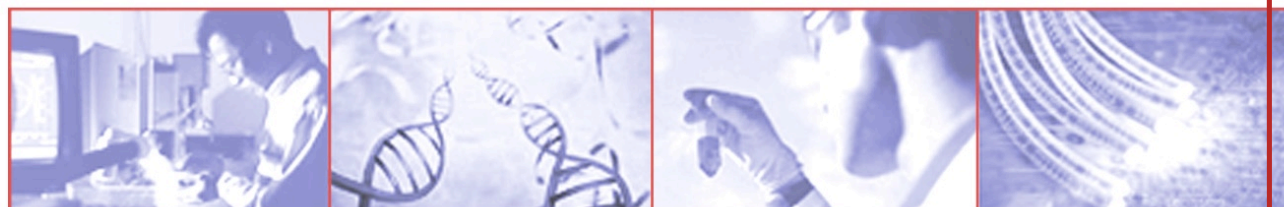


Conclusions

- ▶ EUChinaGrid's roadmap
 - Researched on current network routes and “pushed” the implementation of new ones
 - Defined basic standards and implemented a prototype for the gLite <-> GOS gateway
 - Used the EGEE's experience on grid monitoring and resources information services (GridICE, SAM tests, BDII) and studied cases for using them on GOS
- ▶ Work to be done (Second EUChinaGrid?)
 - polishing the standards
 - middleware development on interoperability



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Thank you



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