

Interactive European Grid

ANSWERS TO QUESTIONS POSED BY EVALUATORS

Presented at the Evaluation Hearing on 8th Nov 2005

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Interactive European Grid

*INCORPORATING INTO TECHNICAL ANNEX
THE RECOMMENDATIONS IN THE EVALUATION SUMMARY
REPORT*

Presented at the first meeting on 22th Dec 2005

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The **Interactive** European Grid Vision

*“An interoperable production-level e-Infrastructure for **demanding interactive applications** that will impact the daily work of **researchers**”*

- ✿ ***Distributed Parallel (MPI) Interactive Computing & Storage at the Tera level***
- ✿ ***User Friendly Access***
 - ✿ *Grid Interactive Desktop with powerful visualization*
- ✿ ***Supporting Virtual Organizations at all levels***
 - ✿ *Setup*
 - ✿ *Collaborative environment*
 - ✿ *Grid-enhancement of applications*
 - ✿ *Execution and monitoring*

Objectives: the **int.eu.grid** Mission

“To *deploy and operate a production-quality Grid-empowered eInfrastructure oriented to **service** research communities supporting demanding interactive applications.*”

Sub-objectives *through the I3 instrument:*

✚ **Deployment of e-Infrastructure**

- ▣ Oriented to interactive use
- ▣ Site integration support
- ▣ Grid operations service

✚ **Middleware for interactivity and MPI**

- ▣ Adapt/integrate existing middleware
- ▣ guarantee interoperability with EGEE

✚ **Provide a complete interactivity suite**

- ▣ Desktop
- ▣ roaming access
- ▣ scheduler with prioritization services
- ▣ complex visualization.

✚ **Support for interactive applications:**

- ▣ setup of collaborative environment and VO
- ▣ consideration of performance
- ▣ interactivity and visualization requirements
- ▣ identification and selection of research oriented interactive applications

✚ **Support remote collaboration activities:**

- ▣ research, management, integration, training

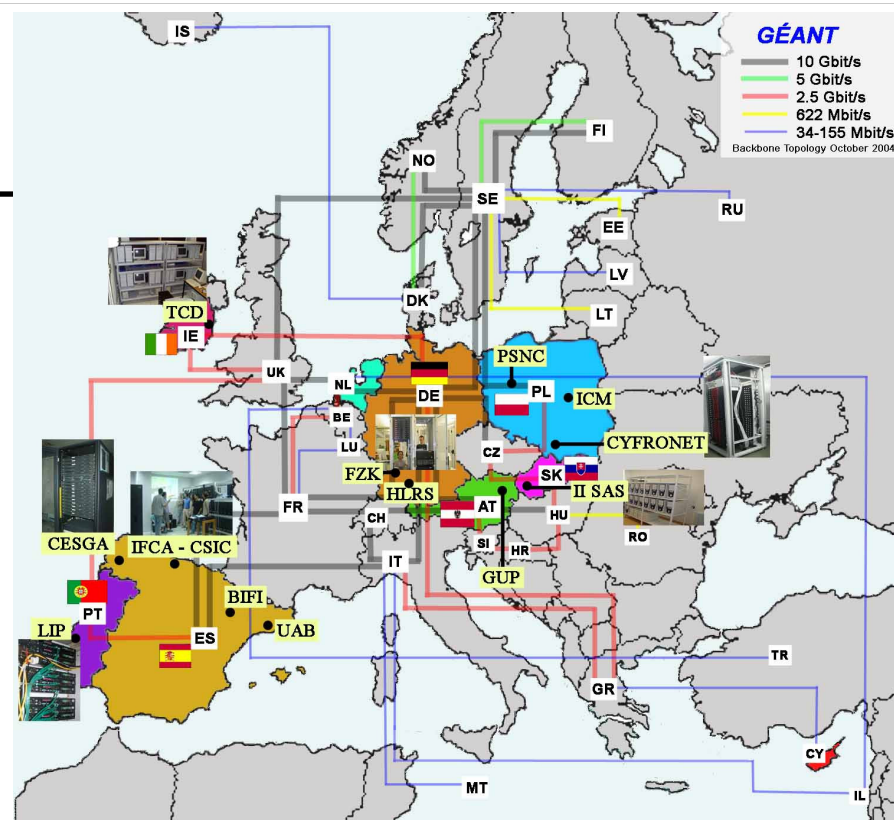
✚ **Approach target research communities**

✚ **Provide security measures for interactivity**

Project Resources

Grid-empowered Infrastructure

- Initial core: 13 sites in Europe
 - linked through GEANT
- Computers
 - Clusters with 10-100 Pentium/Xeon nodes
 - but also Itanium, Opteron, Power5
 - 4 processors nodes, large RAM config.
- Interoperable
 - EGEE batch jobs will be able to execute in background mode



Human resources

- Excellent subteams** already “in place”, examples:
 - CrossGrid WP4-sites & Integration Team, driven by FZK & LIP
 - PSNC-UAB-CSIC on interactivity, MPI use, and applications
- Operation of infrastructure
 - Continuous effort along the project
 - Benefit from support expertise for middleware Integration (experience from CrossGrid)

Innovation

- ✚ “*What innovation does the project offer over and above that of CrossGrid and similar US initiatives?*”
 - ⊠ The CrossGrid project demonstrated the feasibility of an interactive Grid framework showing applications running in a testbed using middleware developed on top of EDG/LCG services.
 - ⊠ **int.eu.grid** will provide a **production quality service** supporting **MPI and interactivity on top of EGEE services**
 - **Web Services approach** will be followed (gLite as underlying middleware)
 - ⊠ **MPI support will be based on PACX-MPI**
 - *European MPI software (HLRS)*
 - *MPI across sites without the need for public IP on WNs*
 - ⊠ **Interactivity support will integrate:**
 - *User friendly interface to the infrastructure*
 - *Powerful visualization capabilities*

Migrating Desktop

- ✚ Single sign-on / authorisation
- ✚ Platform independent
- ✚ Batch jobs
- ✚ MPI jobs
- ✚ Running interactive applications using java plugins or VNC
- ✚ Monitoring grid applications
- ✚ Flexible Application framework
- ✚ User profile management
- ✚ Easy application add on
- ✚ Local and grid file management

Desktop tools:

- ✚ Job Wizard
- ✚ Job Monitor
- ✚ Application Container and Plugin
- ✚ GridFTP Commander
- ✚ User Profile Manager
- ✚ Private Storage Management
- ✚ VNC/SSH console



Comment to Potential Impact / Q5

➊ **Greater user involvement would increase the impact. It is not clear that the project will be successful in expanding the portfolio of applications or engaging new user communities and providing them with operational support**

(Q5 was: "What user communities and industries are you already engaged with and what are your plans for engaging others")

INPUT TO OTHER PROJECTS

On experience, middleware, application support, training, test of infrastructure

Input to National Grid initiatives

DGRID, AustriaGrid, IrisGrid, GridIreland

Collaboration with EGEE

Aim for interoperability

Objective: two way synergy: transfer experience and middleware to/from EGEE

Training and Dissemination

Offer complementary services to a large user base

Dissemination effort

Presence in EGEE/GGF meetings

Addressing different research communities at their for a

National and international wide contacts

Ex. FZK, PSNC, LIP, TCD

Profit from multidisciplinary framework

Ex. CSIC: horizontal program

Letters of Support including description of applications:

Medicine:

Ultrasound Computer Tomography (FZK)

Simulation and Visualization (CSIC-HUMV Hospital in Santander)

Environmental studies:

Landscape modelling (IISAS)

In particular flooding (here contact with industries being already established)

Physics:

Astrophysics: Planck mission, analysis of large CMB images (CSIC)

Fusion: visualization and 3D transport codes (BIFI, in contact with CIEMAT, for ITER, coordinating this application in EGEE)

HEP: filtering of data produced by the ATLAS experiment (CYFRO)

Next: Archaeology (CESGA), etc.

Attracting others:

Through dissemination activities (NA2) + Identification of Applications (NA3):

Outreach: workshops, seminars, courses

Definition of requirements (and use cases) for a given application/community

Analyze the possibilities for use of the eInfrastructure

Test on real infrastructure and specialized training

Profiting from links with

National Grid Initiatives

EGEE NA2 (training and dissemination)

Other international projects

Comment to Potential Impact / Q8

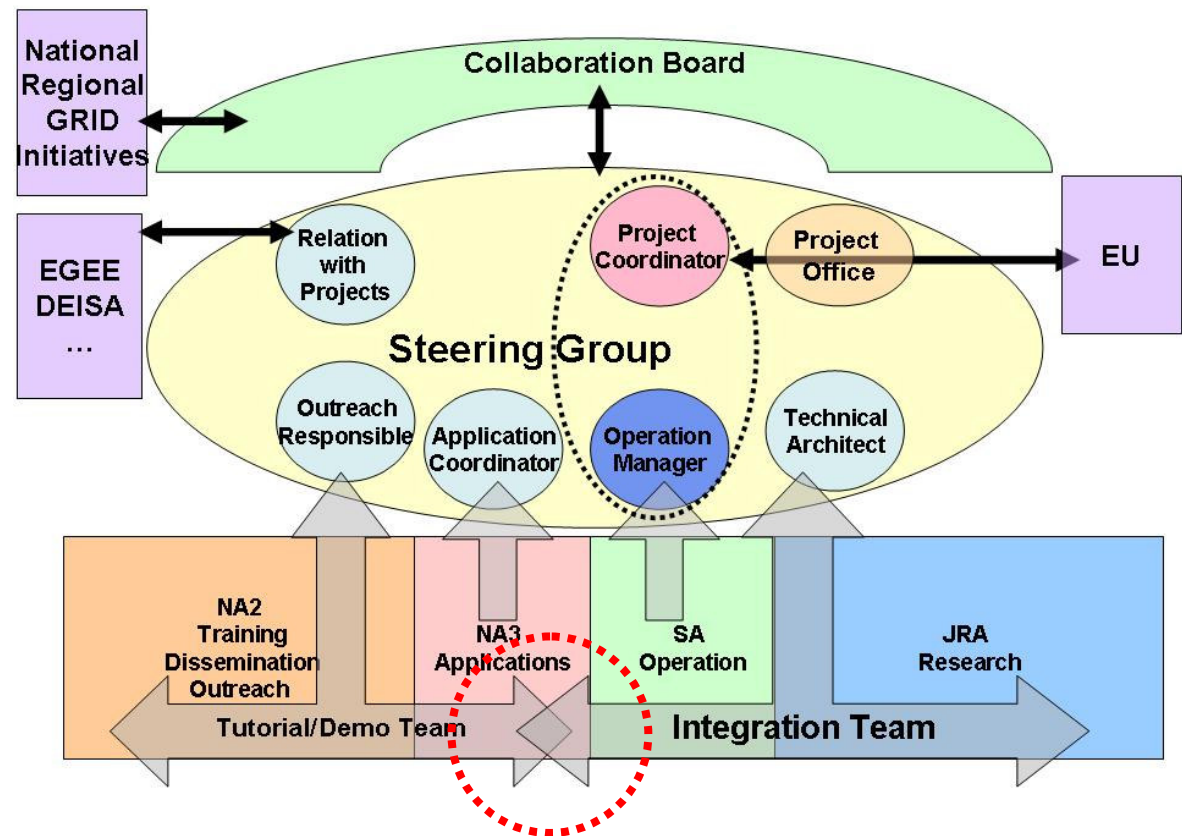
☉ *It is important that an open-source approach is adopted*
(Q8 was: “Can you clarify how the software will be licensed and if it will be the input into other Grid initiatives?”)

- ☒ **int.eu.grid** adheres to an open-source model
- ☒ License model will follow BSD/EDG style
- ☒ Need IPR document? CA?

Comment to Quality of the Management

- The management plan should ensure that the lessons learned in SA1 are fed back to NA2

- Explicitly into TA



S&T Excellence, Mobilisation of Resources, Overall Remarks (from Q2,Q4,Q6)

- ✦ *S&T excellence: “The proposal does not address the development of resource provider and user policies to guarantee the service level expected by users. Furthermore it does not explain how the interactive Grid will be supported at network layer” (Q2: “How will the interactive Grid be supported at the network layer, given that dynamic virtual objects may be involved”)*
- ✦ We are aware of the importance of the network
 - in contact/collaboration with NReNs in all involved countries
 - participation in NReNs-Grid meetings at European level
- ✦ No critical requirements at the network layer from **int.eu.grid**
 - Experience shows the bandwidth and latency between sites is adequate to support interactive use of the grid without explicit QoS
 - Final users should be supported by sites for demanding issues
 - Ex: provide AccessGrid environment for visualization and collaboration
 - Last mile support
- ✦ But tracking the progress...
 - QoS will be a focus when IPv6 gets operational
 - Definition of complete SLAs should include network support and consider end-to-end issues

S&T Excellence, Mobilisation of Resources, Overall Remarks (from Q2,Q4,Q6)

- ✦ *Mobilisation of the resources: “However 6 full time equivalent engineers working throughout the project on NA3 does not seem to be justified. In addition the effort on SA1 seems large given the expertise and tools inherited from other projects” (Q4: “Can you justify the effort on NA3 and SA2?”)*

- ✦ *The effort on NA3 is **key** for the success of the project:*
 - *Adapting to an interactive Grid-enabled MPI framework*
 - *Non-trivial, benefit is large but needs training and support*
 - *Support of specific research communities*
 - *Careful initial selection of applications*
 - *Covering wide range with demanding needs*
 - *Medicine, Physics, Environment, Astrophysics*
 - *Panel open to attract new ones (see next question)*
 - *Integration in a new e-Science environment*
 - *Collaboration*

- ✦ *There is no SA2 in this project*
- ✦ *The effort in SA1 has been carefully considered, see*

Question 6

✚ “Can you describe the resource provider policies and user policies that will guarantee that Service Level Agreements will be met?”

- ✚ NA3 (identification and support of grid applications) will have a coordination role in the establishment and enforcement of SLAs, in close interaction with SA1 (grid infrastructure operation)
 - Agreements: user <-> NA3 <-> SA1 <-> provider
- ✚ The end user requirements will be collected in the initial project stage, to assure that SLAs are the outcome of services quality delivered by the provider and a quality accepted by the end user
- ✚ Through monitoring and accounting it will be checked that:
 - Sites provide the agreed resources
 - Users in VO make an adequate use of these resources.
- ✚ Technically, several authorization mechanisms, at global level via the VOMS system, support this scheme, allowing an agreed support of a certain site to a given VO.

Main Discussion for TA

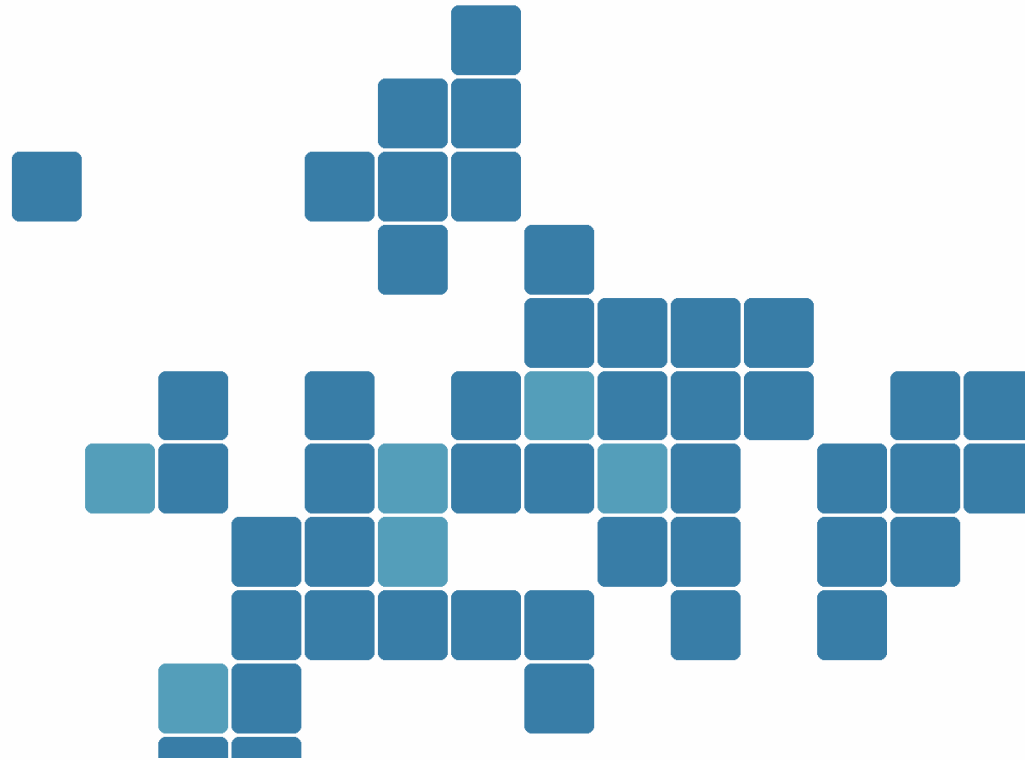
- Overall remarks: “NA3 & SA1 could achieve their objectives with about 20% less effort. The savings should be reallocated to JRA1 (e.g. on real time resource management, SLA compliance, fault tolerance, and availability)”

- Acknowledge the interest of the suggestion
- Actions:
 - Pilot application on HEP, includes Real-Time transfer of data, that could benefit from explicit QoS, and also needs interactive oriented SLA. Can be tested with GN-2 support
 - Application on Landscape, interested in SLA including advanced reservation
 - Fault tolerance actions are already included in SA1: redundant central services
 - Real time resource management is already included in JRA1: glide-in mechanism

- Best option is not to move resources
 - We have experience and have devoted a lot of time to this scheme

- To satisfy the recommendations:
 - From NA3 to JRA1: CSIC (32K), HLRS (45K), CYFRO (HEP app., subc. 39K), to reinforce application support on SLA compliance, fault tolerance, availability.
 - From SA1 to JRA1: CSIC (38K+ extra 70K), PSNC(43K), to explore network support

Green light...



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