



Enabling Grids for
E-science in Europe

*EGEE GR Third Parties
Induction Course,
May 26-27th, 2004*

Project Overview and Update

*Fotis Karayannis
EGEE SEE Fed. Representative in PMB, GRNET*



Presentation is based on a Fabrizio Gagliardi EGEE presentation - 25/3/04

EGEE is a project funded by the European Union

Outline

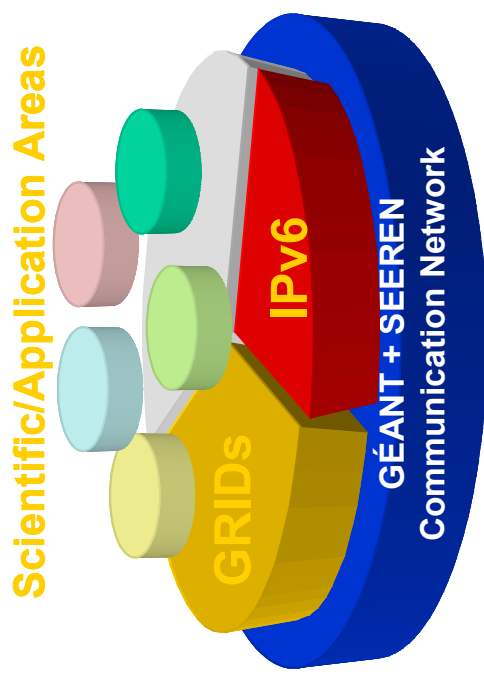
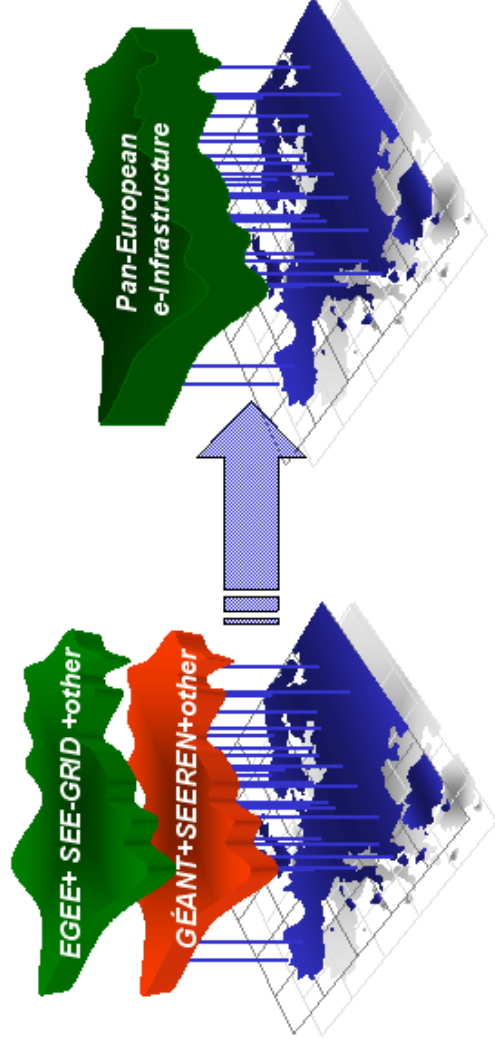
- Background
- GEANT success
- EGEE Overview
- EGEE Figures and Organization
- EGEE Activities
 - Service Activities
 - Middleware Activities
 - (Human) Networking Activities
- EGEE Timeline

Background

- **GEANT Success: pan-European high-speed research network**
 - 33 states & 3900 institutes connected (www.dante.net/geant)
 - fully fledged administrative & operational support
 - Multi-tier architecture (campus-(regional MAN)-NREN-(regional WAN)-GEANT)
 - Implemented "eEurope 2002" directives
 - Successful extensions to our region through **SEEREN** and Eumedconnect projects
- **Grid technologies getting mature**
 - Multiple successful FP5 Grid projects (e.g. Datagrid, CrossGrid)
 - Grid middleware getting stable (Globus, Unicore, Condor)
 - Applications becoming "grid-ready" (High Energy Physics, Bio-informatics, other)
- **Getting ready for eInfrastructures:**
 - unified high-speed networking + grid middleware environment for distributed computing
 - storage - networking sharing platform (www.einfrastructures.org)
 - allows new methods of global collaborative research: "**eScience**"
 - Implementing "eEurope 2005 directives: World Wide Grid" and FP6 RI objectives
 - EU has heavily invested in FP6 RI projects: EGEE, DEISA, SEE-GRID!

Getting ready for eInfrastructure

- Grid layers should be considered as infrastructure layers
- Network + Grid M/W = *electronic Infrastructure*
- Applications run on top of the *eInfrastructure*



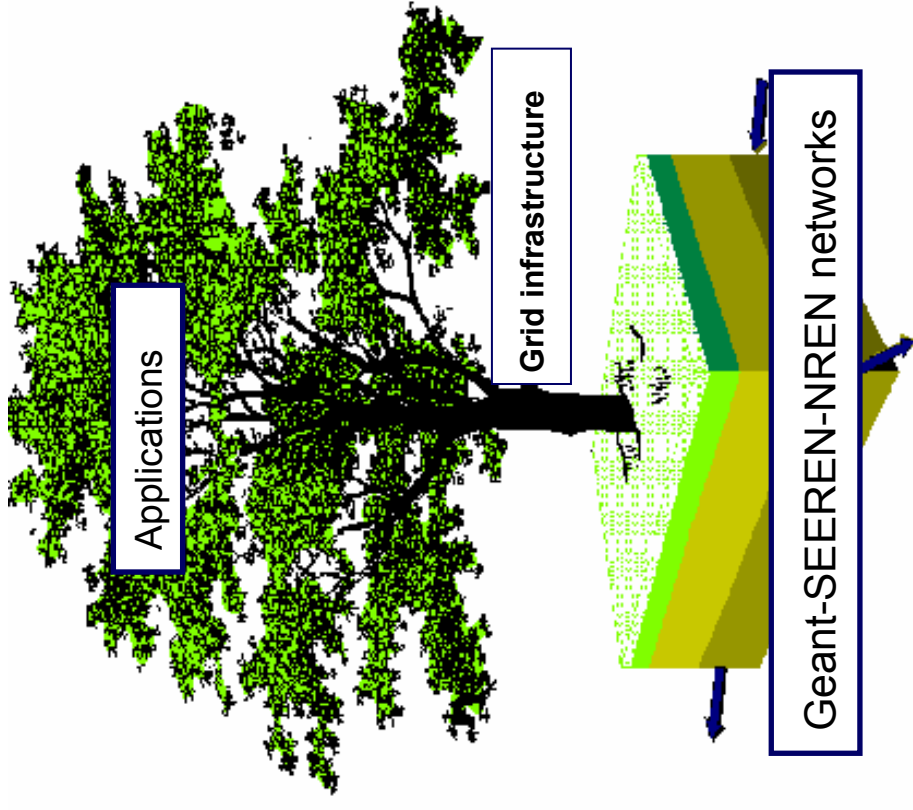
eInfrastructure background

- **But still missing...**
 - **Production-quality (stable, mature) Grid middleware**
 - **Production-quality operational support**
 - Grid Operation Centres (as NOCs), Helpdesks, etc.
 - **Multi-discipline grid-enabled application environment**
 - Now led by HEP, Bio-info
 - **Administrative and policy decision framework in order to share resources at pan-European scale (and beyond)**
 - Areas such as AAA (Authentication, Authorisation, Accounting)
 - End-to-end issues (also network related, i.e. QoS and/or CoS)
 - Funding Policies (Grid economics)
 - Resource Sharing Policies
 - Usage Policies
- **EGEE project** will tackle most of the above issues

EGEE Overview (I)

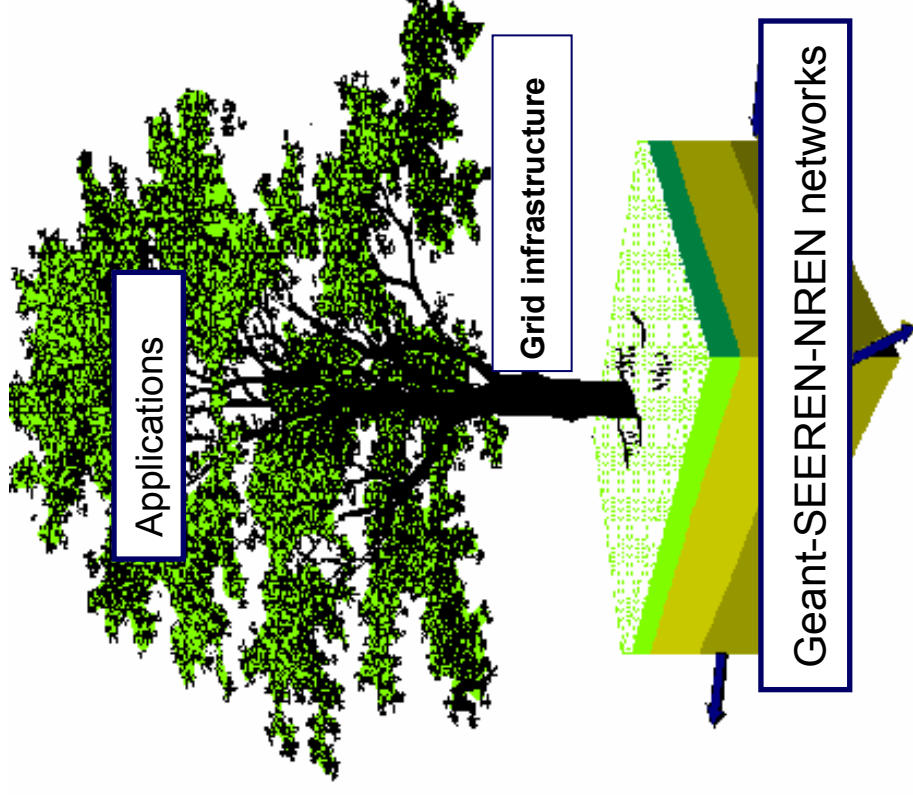
- **Goal:**
 - Create a Europe-wide production-quality Grid infrastructure for e-Science on top of present and future EU Research Networking infrastructure
- **Build on:**
 - EU and EU member states major investments in Grid Technology
 - International connections (US and AP)
 - Several pioneering prototype results
 - Large Grid development teams in EU require major EU funding effort
- **Approach**
 - Leverage current and planned national and regional Grid initiatives and infrastructures
 - Work closely with relevant industrial Grid developers, NRENs and US-AP projects

- <http://www.cern.ch/egee>



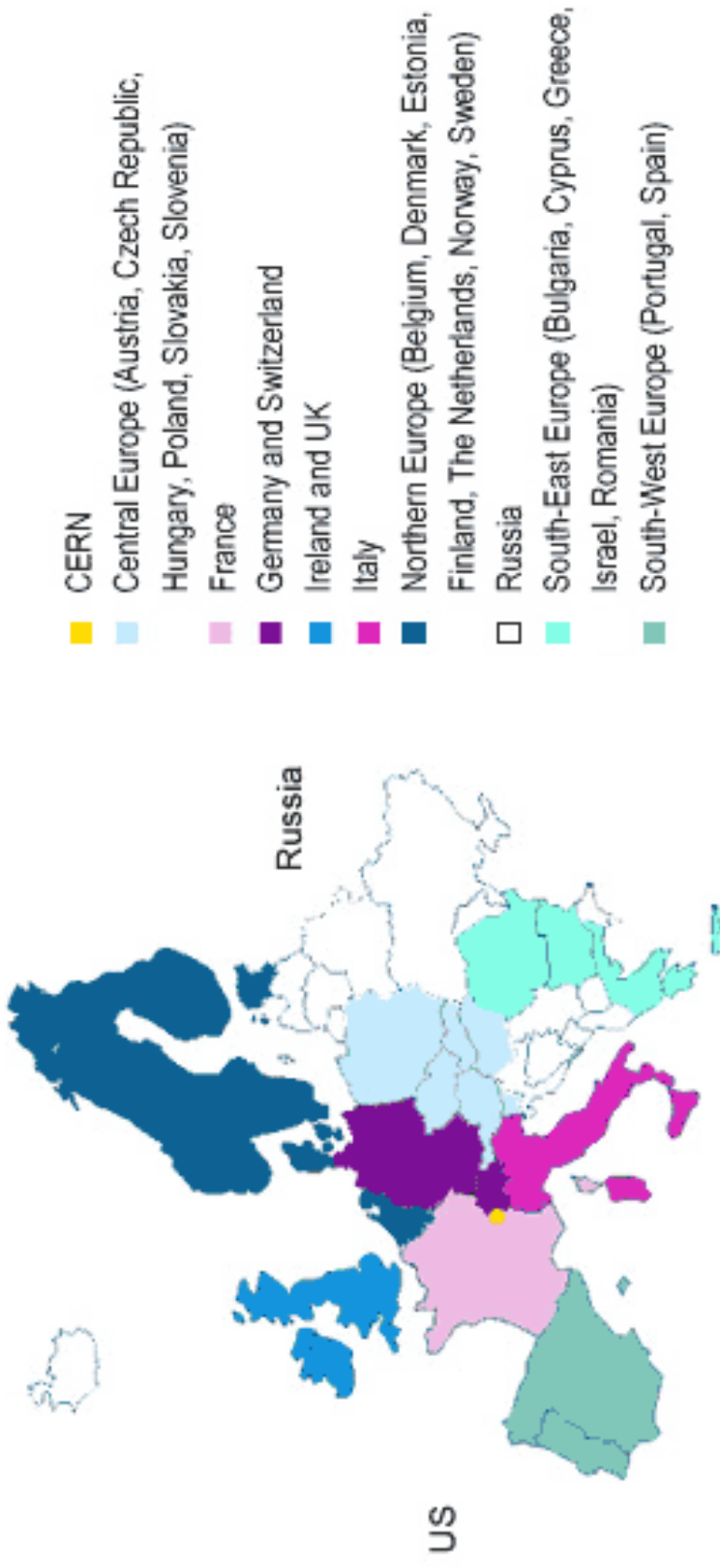
EGEE Overview (II)

- **In plain words:**
 - EU does not fund infrastructures (CPUs, Storage, etc.)
 - Infrastructures (in terms of resource centres) will be funded by National Projects
 - Resource Centres' (RCs) integration is eligible for EU funding support
 - EU supports mainly labour – e.g. middleware, operations, training teams
 - GEANT + SEEREN NREN networks will be used to interconnect the Resource Centres



EGEE Figures & Organization

- Coordinator: European Organization for Nuclear Research - **CERN**
- **70** leading institutions in **27** countries, federated in regional Grids
- **32 M € EU** fundina in 2004-2005 (twice from partners)



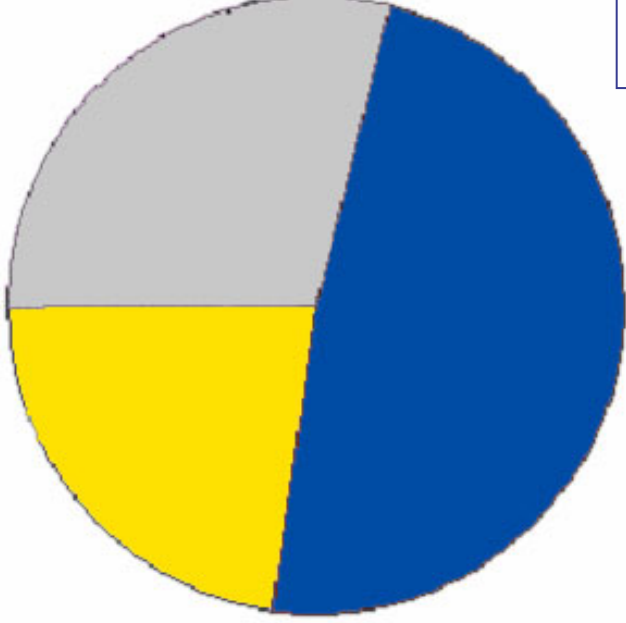
EGEE Activities

24% Joint Research

- JRA1:** Middleware Engineering and Integration
- JRA2:** Quality Assurance
- JRA3:** Security
- JRA4:** Network Services Development

28% Networking

- NA1:** Management
- NA2:** Dissemination and Outreach
- NA3:** User Training and Education
- NA4:** Application Identification and Support
- NA5:** Policy and International Cooperation



48% Services

- SA1:** Grid Operations, Support and Management
- SA2:** Network Resource Provision

Emphasis in EGEE is on operating a production-quality grid including end-users' support

EGEE Service Activities (I)

- Create, operate, support and manage a production quality infrastructure
- Offered services:
 - Middleware deployment and installation
 - Software and documentation repository
 - Grid monitoring and problem tracking
 - Bug reporting and knowledge database
 - VO services
 - Grid management services



- Operations Management Centre
- Core Infrastructure Centre
- Regional Operations Centre

EGEE Service Activities (II)

- Resource Centers

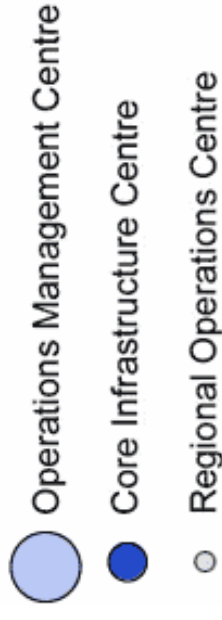
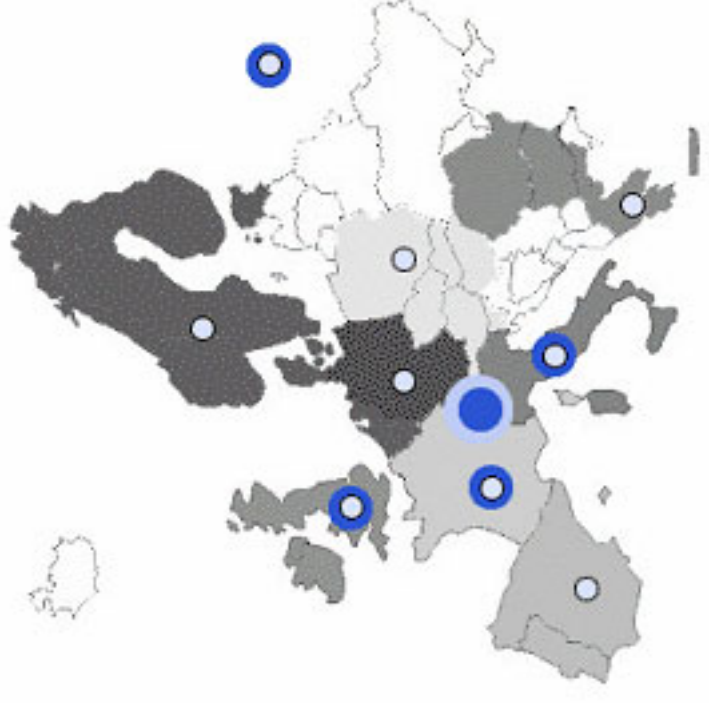
Month 1: 10

Month 15: 20

Region	CPU nodes	Disk (TB)	CPU Nodes Month 15	Disk (TB) Month 15
CERN	900	140	1800	310
UK + Ireland	100	25	2200	300
France	400	15	895	50
Italy	553	60.6	679	67.2
North	200	20	2000	50
South West	250	10	250	10
Germany + Switzerland	100	2	400	67
South East	146	7	322	14
Central Europe	385	15	730	32
Russia	50	7	152	36
Totals	3084	302	8768	936

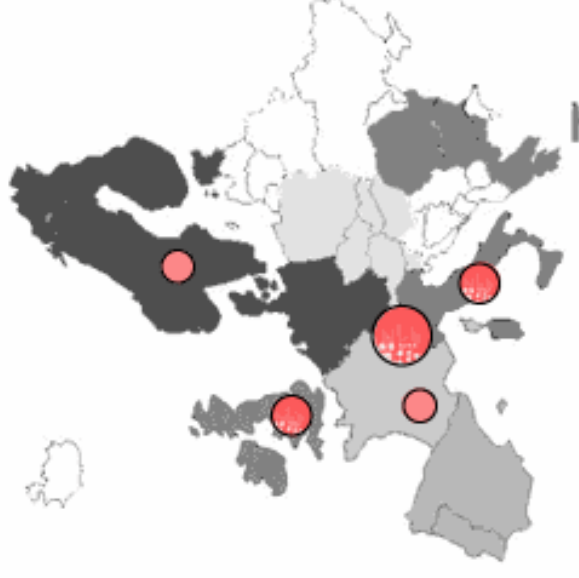
EGEE Service Activities (III)

- **Production service**
 - Main production service for production apps
 - MUST run reliably, runs only proven stable, debugged middleware and services – start with LCG2 M/W
 - Full support – 24x7 as soon as possible
 - Start with 16x(5-7?) – rotation of coverage between CICs
- **Pre-production service**
 - For testing purposes (ops, m/w, apps)
 - Running next M/W version
 - For year 1 pre-prod will run EGEE 1
 - When EGEE M/W ready – move to production and pre-prod service will be next EGEE candidate release
 - Initial resources from test-bed sites



EGEE Middleware Activity

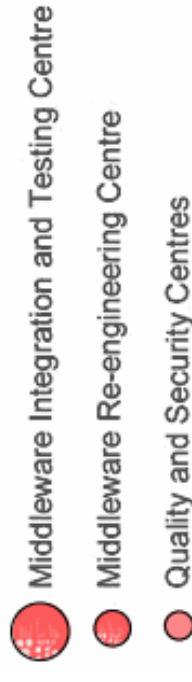
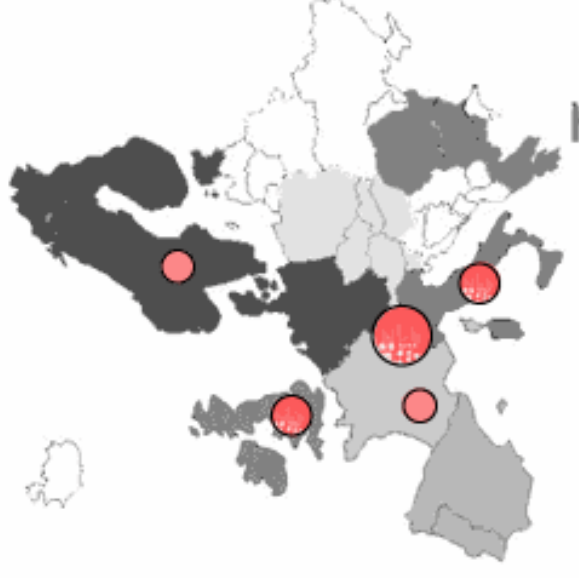
- Re-engineering of existing middleware functionality, leveraging the experience of partners
- Activity concentrated in few major centers
- **Key services: Resource Access**
 - Data Management (CERN)
 - Information Collection and Accounting (UK)
 - Resource Brokering (Italy)
 - Quality Assurance (France)
 - Grid Security (Northern Europe)
 - Middleware Integration (CERN)
 - Middleware Testing (CERN)



- Middleware Integration and Testing Centre
- Middleware Re-engineering Centre
- Quality and Security Centres

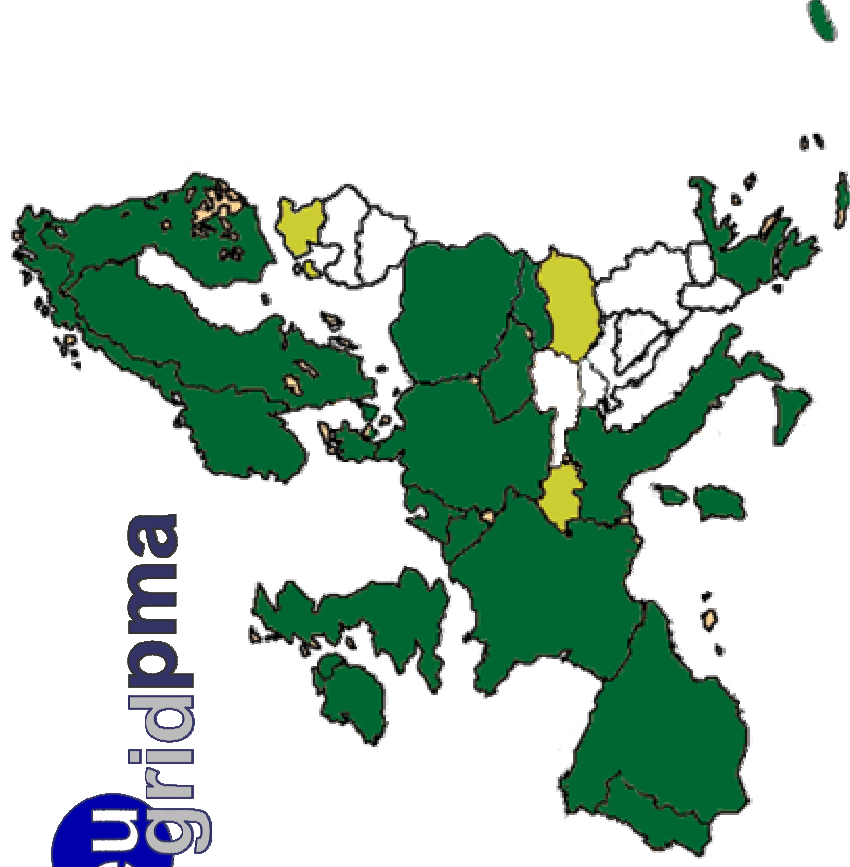
EGEE Middleware Activity (II)

- Middleware delivery to SA1
- Release management
- Deployment scenarios
- Middleware configuration
 - Configuration files and documentation with examples
- **Platforms to be supported in JRA1**
 - Primary platform: Red Hat Enterprise 3.0, gcc 3.2.3 and icc8 compilers (both 32 and 64-bits) .
 - Secondary platform: Windows (XP/2003), vc++ 7.1 compiler (both 32 and 64-bits)
- Versions for compilers, libraries, third party software
- Programming languages
- Packaging and software distribution



EGEE Authentication Scheme- EUGridPMA

- *Policy Management Authority: “Club” of trusted Certification Authority managers www.eugridpma.org*



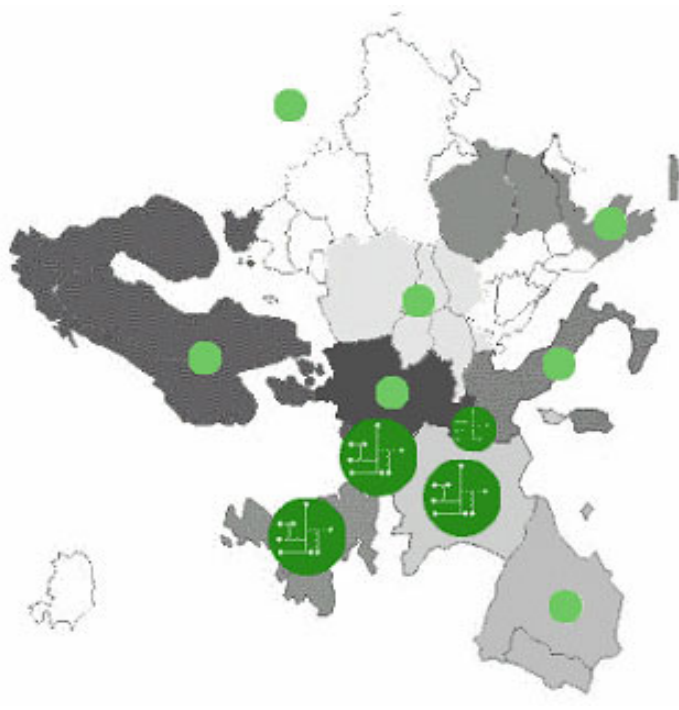
- **Green: CA Accredited**
- **Yellow: being discussed**

Other Accredited CAs:

- DoEGrids (US)
- GridCanada
- ASCCG (Taiwan)
- ArmeSFO (Armenia)
- CERN
- Russia (*HEP*)
- FNAL Service CA (US)
- Israel
- Pakistan

EGEE (Human) Networking Activity (I)

- Dissemination and outreach
 - Lead by TERENA
- User training and induction
 - Lead by Unv Edin. (NeSC)
- Application identification and support
 - Two pilot application centers (for high energy physics and biomedical grids)
 - One more generic component dealing with longer term recruitment and support of other communities
- Policy and International cooperation
 - Established eInfrastructure Reflection Group
 - Coordinate relations with other projects (EU and beyond)



Lead Networking Centre



Pilot Application Centre

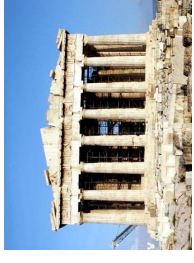


Regional Networking Centre

*map points indicate federations
and are not geographically precise*

EGEE Conferences - Training

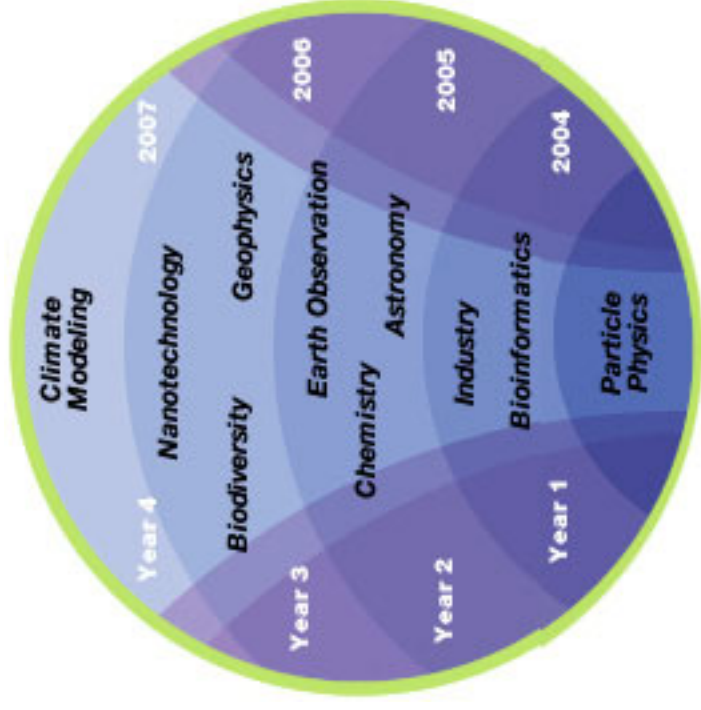
- 1st project conference held at Cork- Ireland, April 18-22, 2004
- 2nd project conference: the Netherlands, 18-26 November, 2004
- 3rd project conference: Greece, end of April and beg. of May 2005
- 4th project conference: UK-Scotland, fall 2005



Course Type	Average Attendance	Course Requirements	Number per Year
Induction	50	2 Day, Web Access	≥ 10
Application Developer Training	25	4 Day, Workstations	≥ 8
Advanced Courses	25	5 Day, Workstations	≥ 2
Technical Activity specific Retreats	30	2 Day	≥ 6

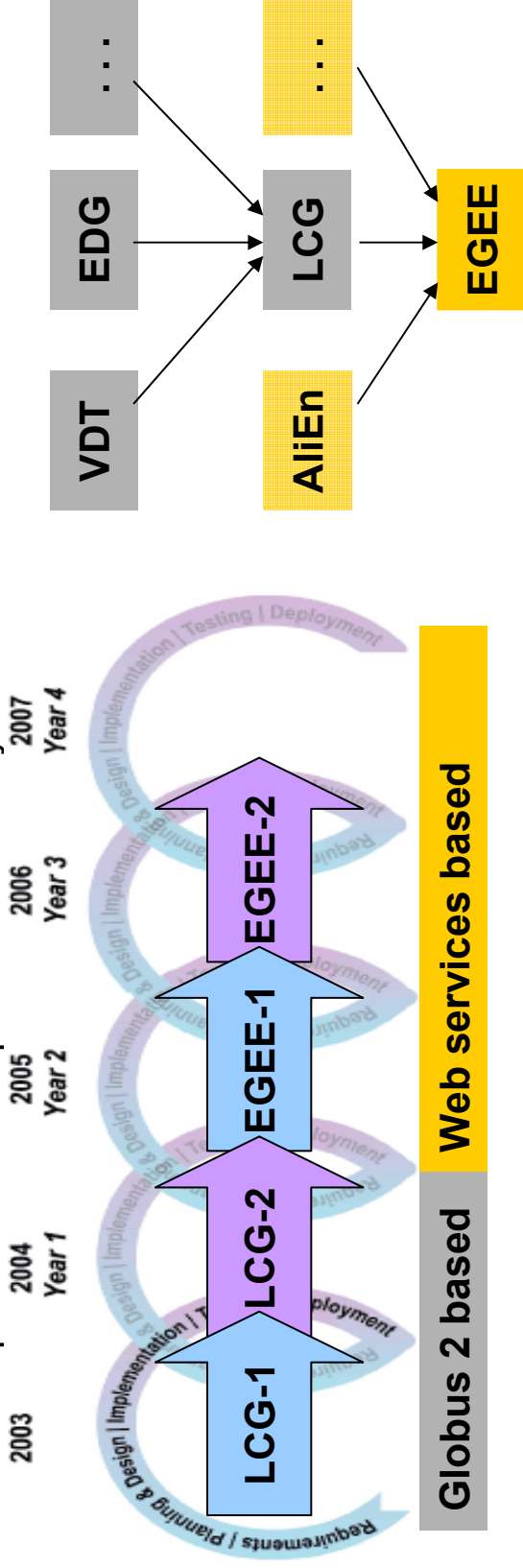
EGEE Applications

- EGEE Scope : **ALL-Inclusive** for academic applications (open to industrial and socio-economic research world as well)
- The major success criterion of EGEE: how many satisfied users from how many different domains ?
- 5000 users (3000 after year 2) from at least 5 disciplines
- Two pilot applications selected to guide the implementation and certify the performance and functionality of the evolving infrastructure:
Physics & Bioinformatics



TimeLine

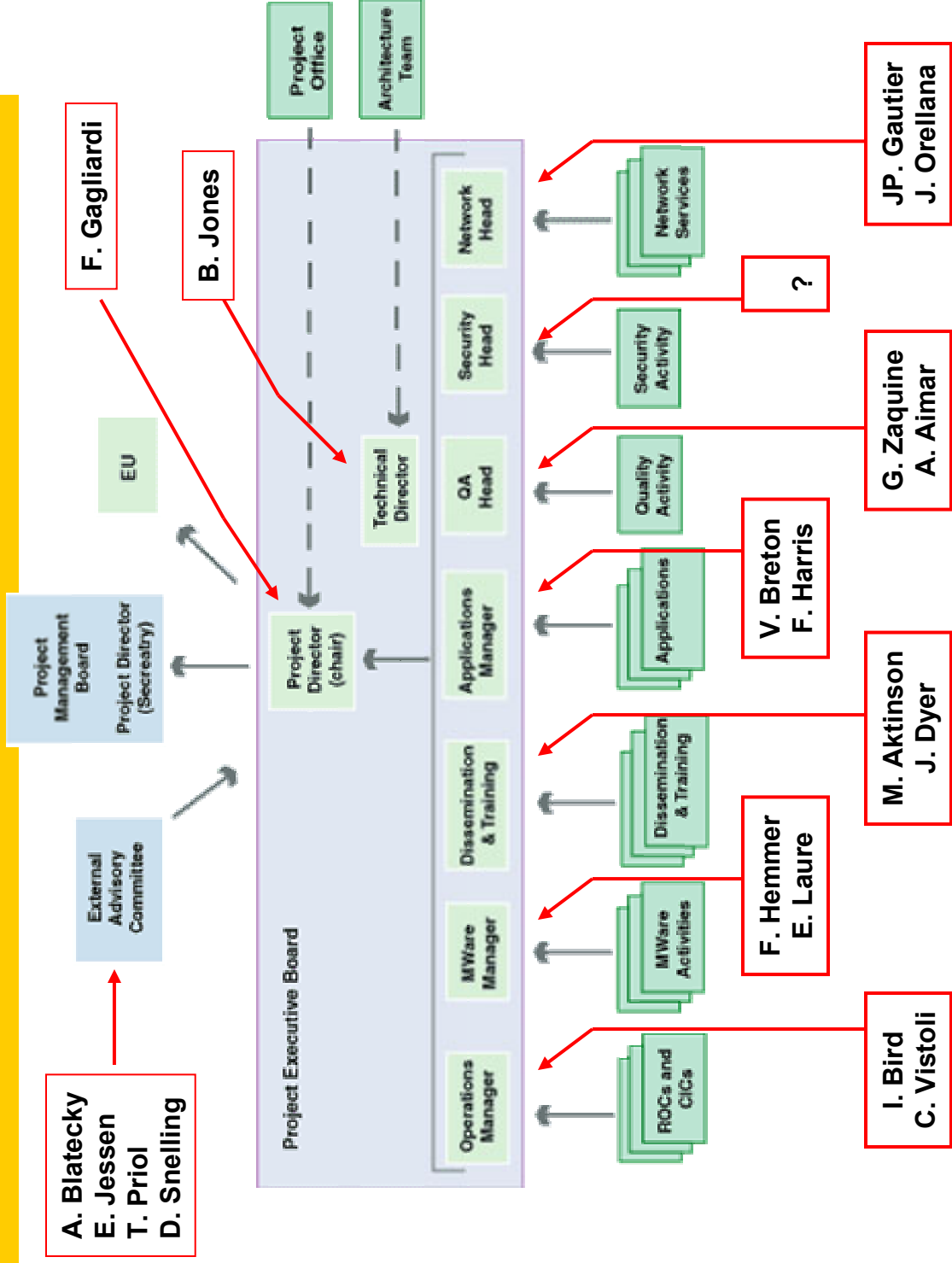
- From day 1 (1st April 2004)
 - Production grid service based on the LCG* infrastructure running LCG-2 grid middleware (*LCG= *Large Hadron Collider Computing Grid* – www.cern.ch/lcg)
 - LCG-2 will be maintained until the new generation has proven itself (fallback solution)
- In parallel develop a “next generation” grid facility (*JRA*)
 - Produce a new set of grid services according to evolving standards (Web Services)
 - Run a development service providing early access for evaluation purposes
 - Will replace LCG-2 on production facility in 2005



Project Boards

- **Project Management Board – PMB (former ExC)**
 - Meets once per month (conf calls) + face to face (at project conferences)
- **Project Executive Board – PEB (Activity leaders)**
 - Meets weekly with extended meetings once per quarter
- **Project Collaboration Board (1+1 per contractor)**
 - Meets twice per year (at project conferences)
- **Project Administration Federation Board – Admin issues**
 - Meets once per quarter (AFM meetings)
- **External Advisory Committee**
 - Meets twice per year (at project conferences)

Project management



EGEE-S-EE Effort

Part, Number	Part, Short name	Cost Mode	Amounts (€)	Networking activities (NA)								Specific service activities (SA)			Total expected	Max Community contribution
				NA1	NA2	NA3	NA4	NA5	All NA	SA1	SA2	All SA				
49	CLPP-BAS	A	exp. budget	6 000	70 000						76 000	192 000		192 000	268 000	268 000
		C	req. contrib	6 000	70 000						76 000	192 000		192 000		
50	UCY	A	exp. budget	6 000	70 000						76 000	192 000		192 000	268 000	268 000
		C	req. contrib	6 000	70 000						76 000	192 000		192 000		
51	GRNET	F	exp. budget	6 000		240 000				230 000	476 000	775 000	115 000	890 000	1 366 000	1 366 000
		C	req. contrib	6 000		120 000				115 000	241 000	387 500		387 500		
		F	exp. budget	6 000		70 000					76 000	191 500		191 500		
52	TAU	A	req. contrib	6 000		70 000					76 000	191 500		191 500	267 500	267 500
		C	exp. budget	6 000		70 000					76 000	191 500		191 500		
53	ICI	F	exp. budget	6 000		140 000					146 000	383 000		383 000	529 000	529 000
		C	req. contrib	6 000		70 000					76 000	191 500		191 500		

Conclusions

- EGEE (together with DEISA www.deisa.org, SEE-GRID www.see-grid.org) will provide the Grid layer of the **eInfrastructure** on top of GEANT
- EGEE will provide a **production-quality** Grid infrastructure for European Researchers and students
 - enabling distributed resource (CPU, storage, etc.) sharing
- We have accomplished so far all we committed-to more than one year ago:
 - All **partners** are on-board, the contract has been signed, the administrative procedures fulfilled
 - The **federations** are working very well
 - Our **US partners** are on-board with funds provided by the US NSF, this very promising for the future international collaboration and extremely appreciated by our member states authorities and the EU
 - The various technical activities' meetings have shown that the project has started with unfunded resources and leveraging the good progress of LCG
- In a few words: “we have hit the ground running...”
- Still a major challenge to make the project a reality!