Towards long-term sustainability for European Grid infrastructures:
Meeting for an exchange of views between France, Spain, Portugal, CERN and the EU
Barcelona, 28 March 2006

EU e-Infrastructure plans for FP7

- The discussion on evolution of the service provisioning model -

Kyriakos Baxevanidis
Deputy Head of Unit
Research Infrastructures
European Commission, DG INFSO
kyriakos.baxevanidis@cec.eu.int

e-Infrastructure: http://www.cordis.europa.eu.int/ist/rnl

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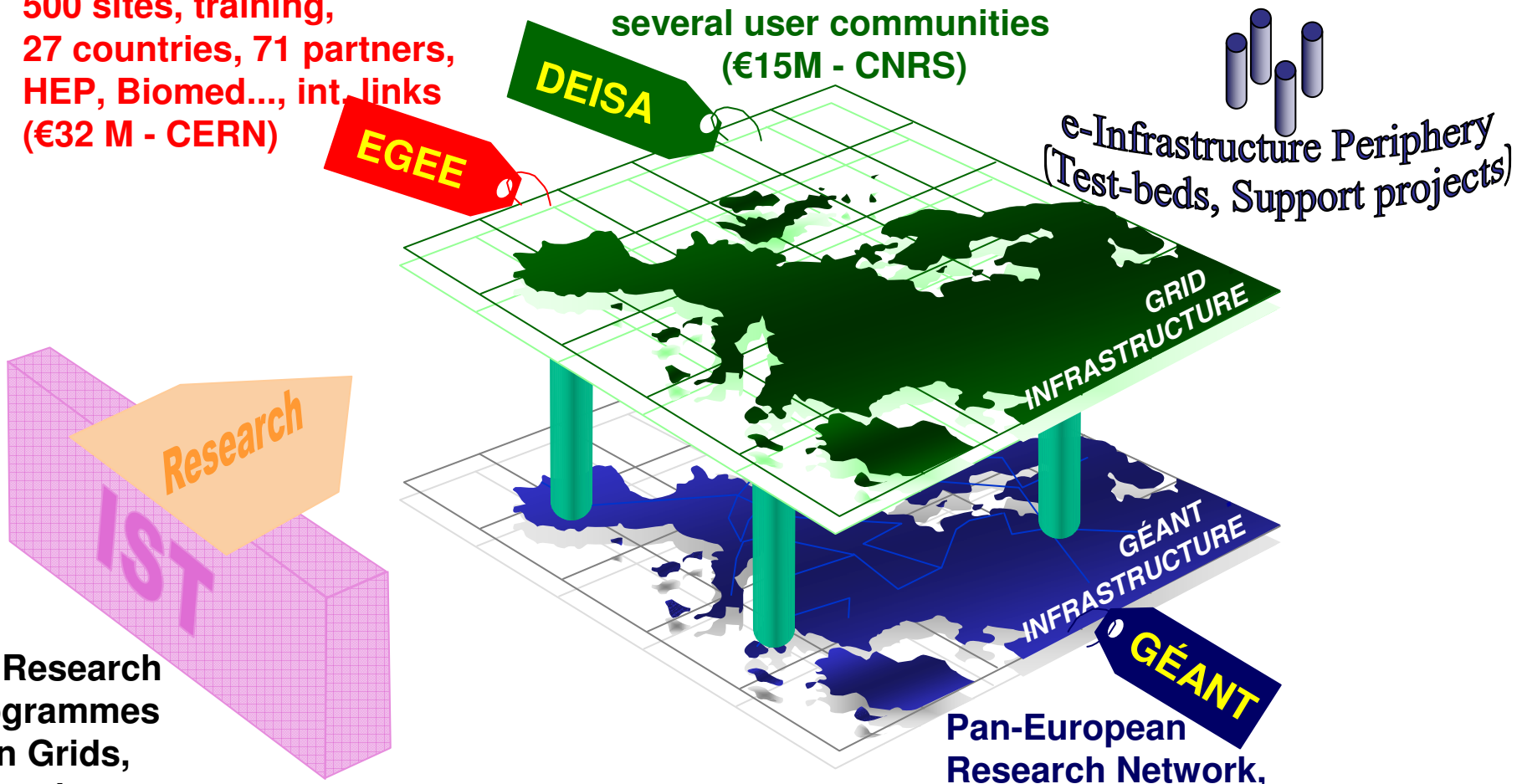
Role of EU investment on Research Infrastructures (RI)

- Each 1€ of public R&D leads to 93 cent of business R&D investment (FP7 Impact Analysis)
- Effect typically much bigger when investment concerns multiple purpose and cross-border RI (notably ICT)
  - Higher economic multiplier effect from trans-national collaboration
  - Lower investment risk through involvement of key research players and of broad range of expertise
  - Used and exploited by large community of scientists & industries
- Research increasingly based on cross-organisational, cross-national virtual collaborations…sharing of knowledge and resources through the use of appropriate facilities becomes key

Strategic building blocks of the e-Infrastructure today

production quality grid,
20000 CPUs, ~5PB storage,
500 sites, training,
27 countries, 71 partners,
HEP, Biomed..., int. links
(€32 M - CERN)

grid of EU supercomputers
networked at Gbps, focus on
global filing system, >120 Tflop/s,
several user communities
(€15M - CNRS)



EU Research
programmes
on Grids,
networks, etc

➢ €250m in FP6

Pan-European
Research Network,
3700 institutes,
IPv6 enabled
(93 M€ - DANTE)

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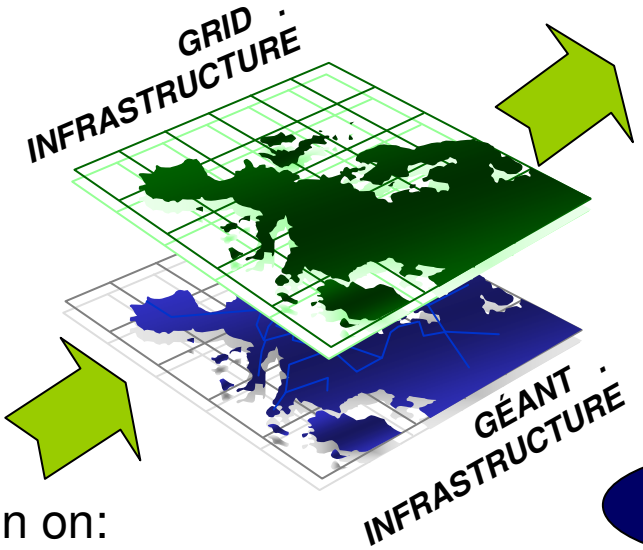
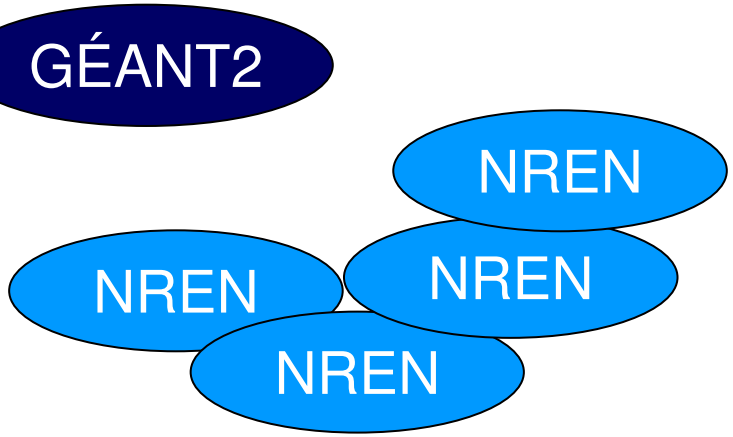
Evolution of the e-Infrastructure (Research Networks)



Core connectivity project

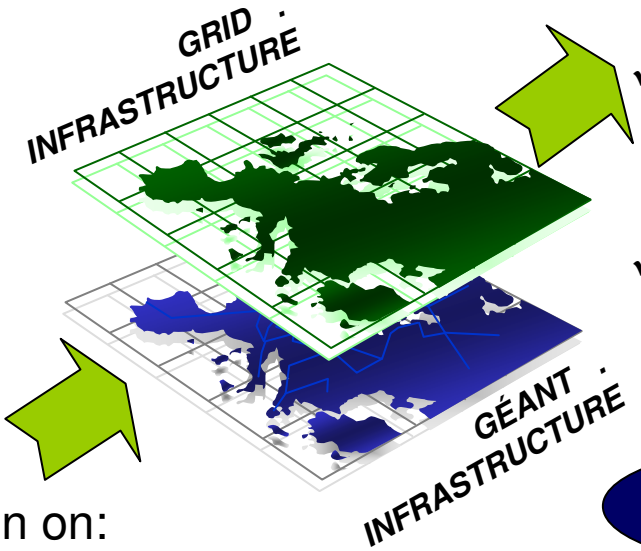


Focus has been on:

- ✓Provision of a pan-European and reliable communication backbone
- ✓Service to 30 Million users in 35 countries (production quality infrastructures)
- ✓A test platform for advanced communication experiments

RN: Research Network
NREN: National Research Network

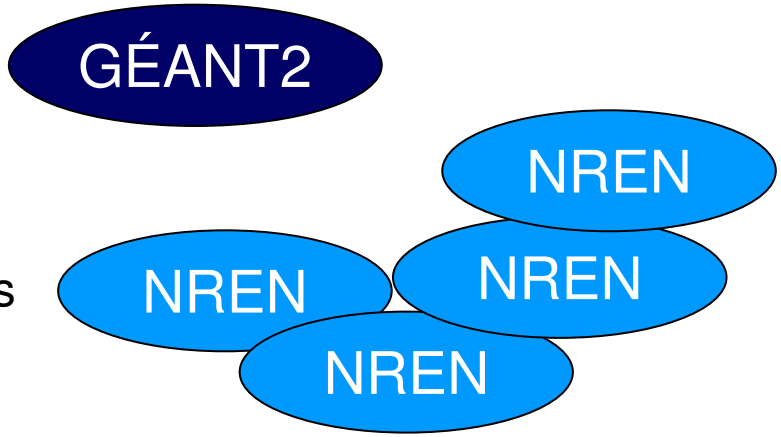
Evolution of the e-Infrastructure (Research Networks)



New emphasis now on:

- ✓End-to-end service provision
- ✓Deployment of light-paths (12 000 km fibre, 400+ active elements)
- ✓New services to the users (AAI, high speed transfers, access to network measurement data, interface to Grid layer)
- ✓Hybrid network (photonics + IP)

Core connectivity project



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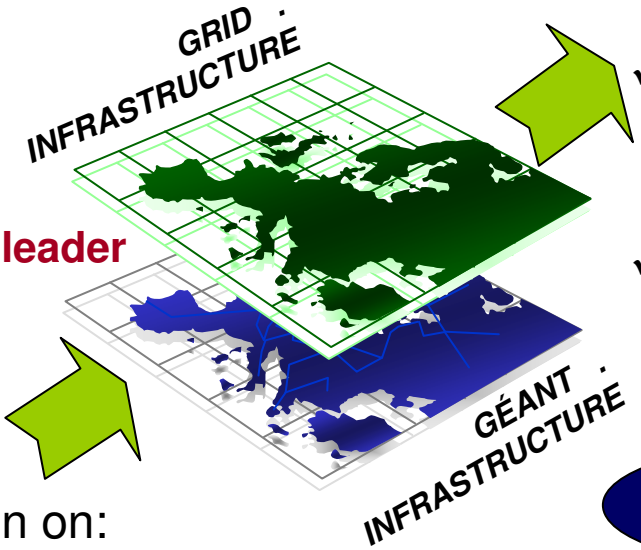
Evolution of the e-Infrastructure (Research Networks)

Stay the global leader for advanced communication technologies



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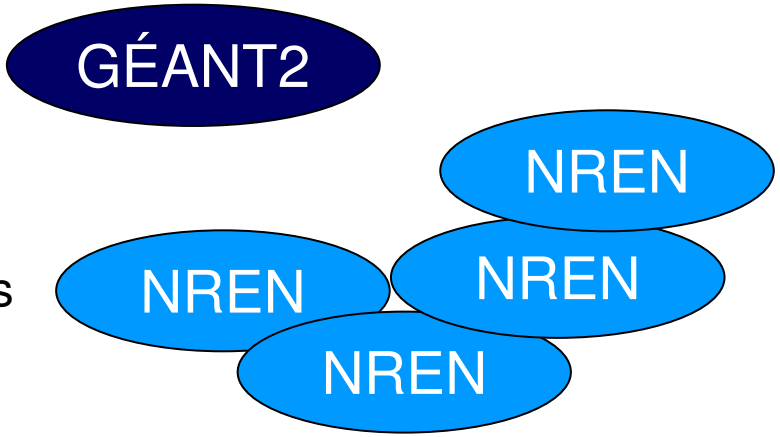

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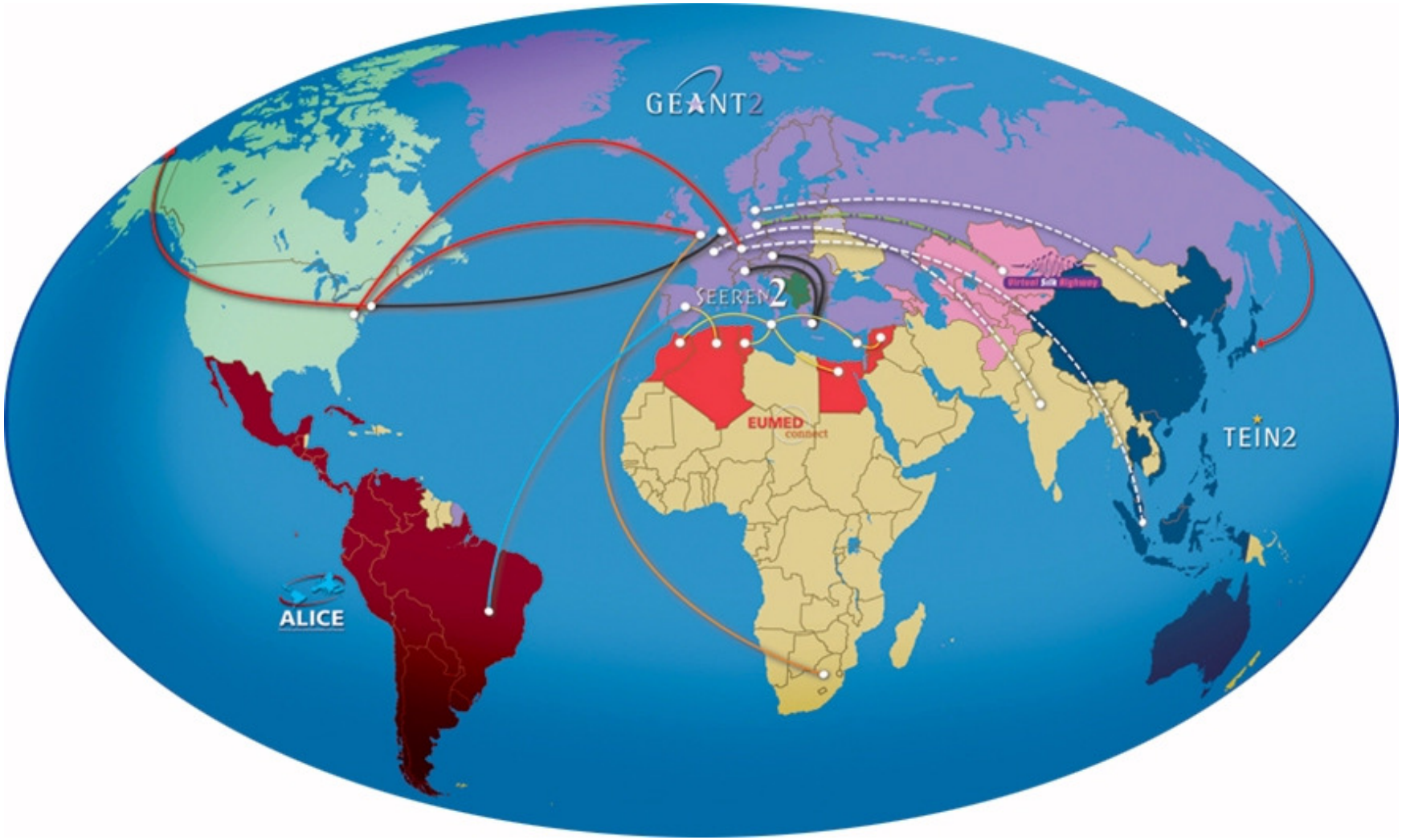
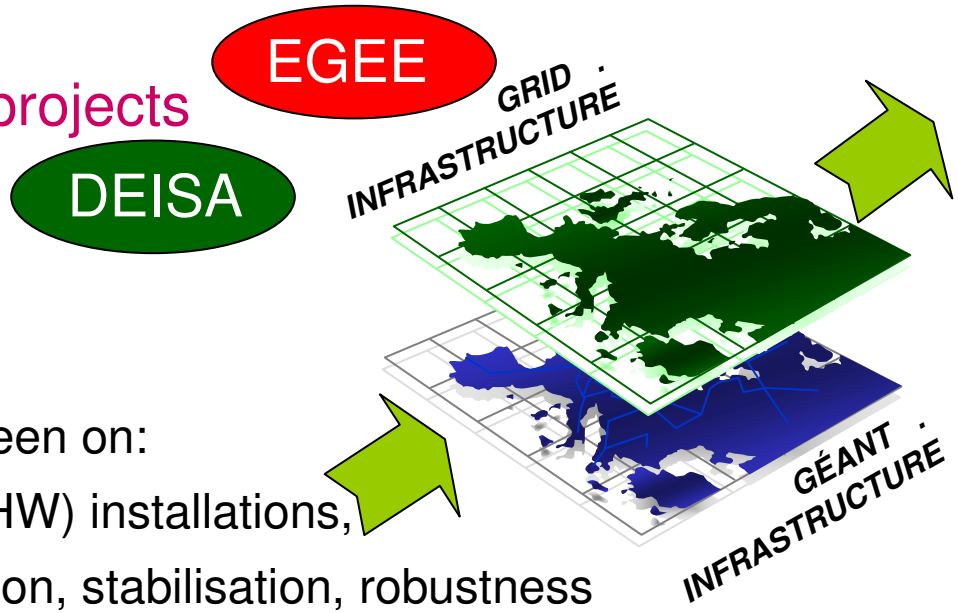
Interconnecting international RNs



Evolution of the e-Infrastructure (Grids)

Core Grid projects



Focus has been on:

- ✓New (SW/HW) installations, configuration, stabilisation, robustness
- ✓Provision of 24/7 operation service (production quality infrastructures)
- ✓Resource sharing procedures & policies

Evolution of the e-Infrastructure (Grids)

- interoperability, inclusiveness…

New emphasis now on:

✓Interoperability, standards

✓Integration of off-the-shelf components, SW-certification, increased functionality

✓Outreach new user communities, all-inclusive infrastructures, lower digital divide

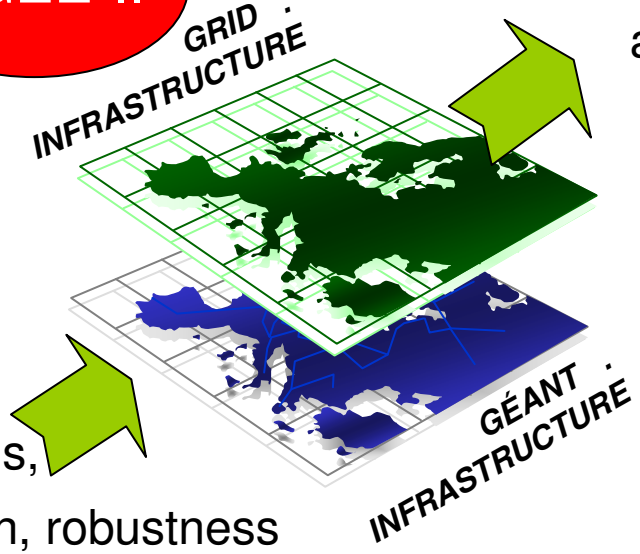
✓Strengthening intern. links

Core Grid projects

EGEE-II

OMII-Europe

eDEISA



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Evolution of the e-Infrastructure (Grids)

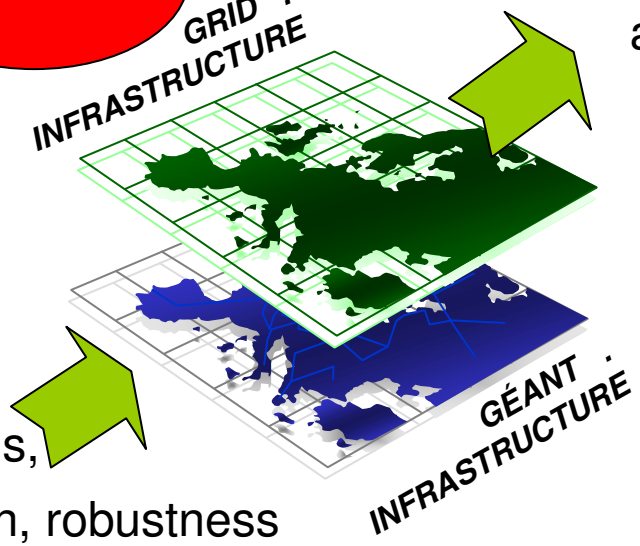
- interoperability, inclusiveness…

Re-engineer, provide building blocks for grid-infrastructures to be constructed in a flexible and robust way; build on EGEE (gLite), UNICORE, GLOBUS

EGEE-II

OMII-Europe

eDEISA



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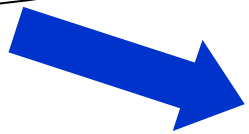
e-Infrastructure periphery expanding fast

Geographical expansion of collaboration

Eastern Europe, NIS, Caucasus	OCCASION, PORTA OPTICA STUDY
Latin America	ALICE, EELA, AUGERACCESS
Asia (China)	TEIN2 (EUChinaGrid, ORIENT)
Baltic States	BalticGrid
Mediterranean	EUMedConnect, EUMedGrid, ITHANET
South-Eastern Europe	SEEREN(2)/SEEFIRE, SEEGRID(2)

e-Infrastructure



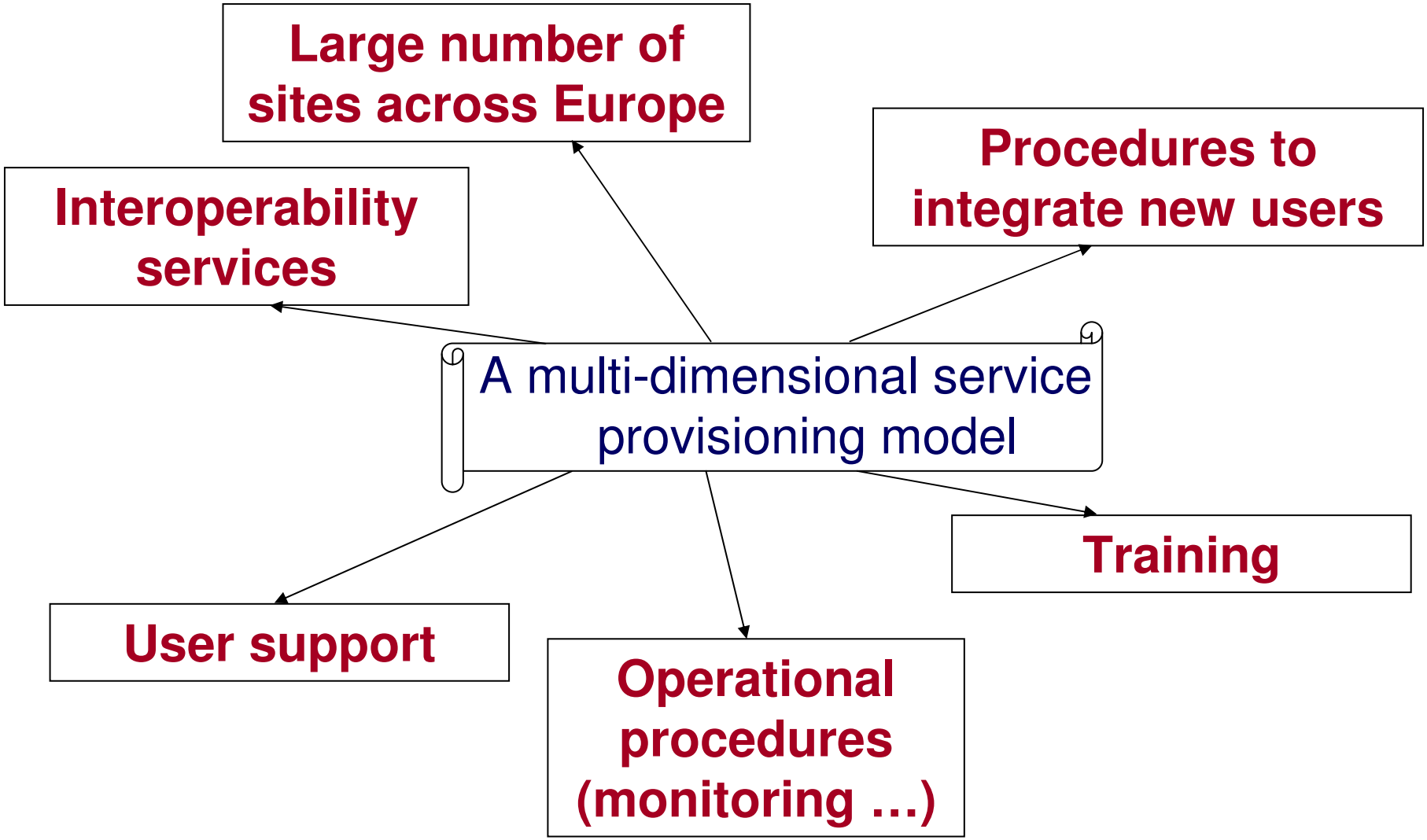
New Applications

Molecular, Clinical	ITHANET
Bioinformatics, Biology	BioInfoGrid
Civil Protection	CYCLOPS
Astronomy	EuroVO-DCA, EXPRES
Grids & Digital Libraries	DILIGENT
Applications on IPv6	6DISS, IPv6TF

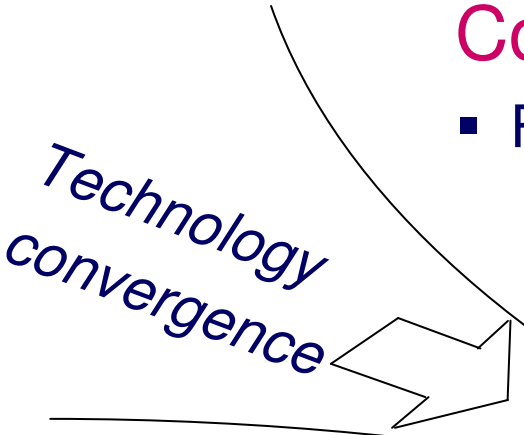
Support, Enhancements

Synergy, Outreach, Users	BELIEF, GO4IT
Security, Policy support	ISSeG, E-IRGSP
Training	ICEAGE
SW-interoperability, testing	ETICS
Grid interactive services	int.eu.grid
Control remote instruments	GridCC
QoS, Traffic Monitoring	EUQoS, LOBSTER
Optical networks	MUPPED
Connected Test-beds	EUROLabs

e-Infrastructure : a service oriented approach



Production quality facilities but various service models



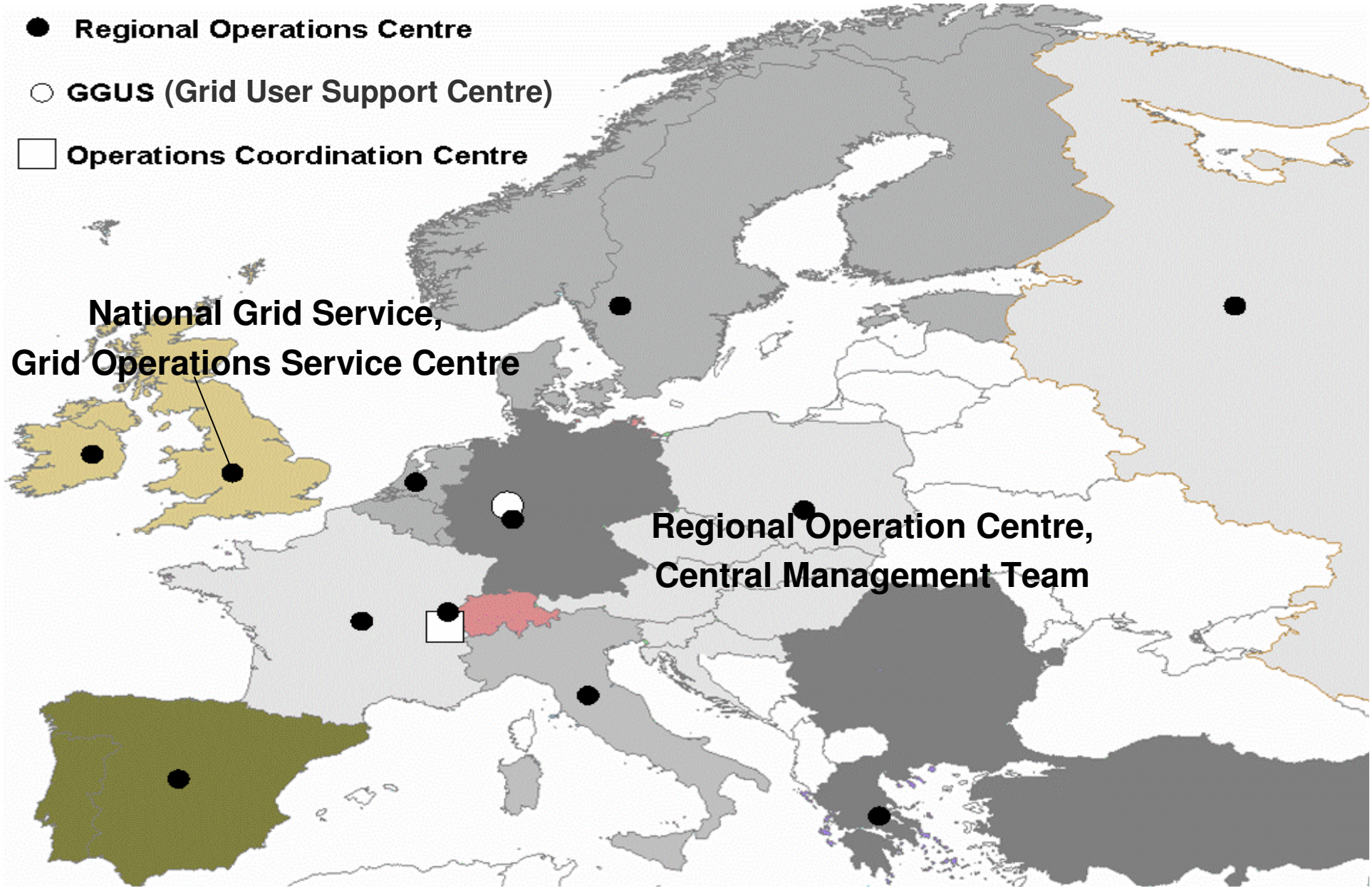
Connectivity service model

- Full-fledged operational service to all research institutes in Europe
- "One-stop-shop" service on National (NREN) and EU-level (DANTE/GÉANT)
- Policy-committee to harmonise policies across Europe
- Stable funding scheme

Grid service model

- Based on two core projects (EGEE, DEISA); others enhance, expand or use the infrastructure that above projects provide
- Strong role of some user communities (HEP, Biology); new user communities can only join within the limited resources, structure, duration and support of above projects
- Current EC-funding scheme/instrument reaching its limits in view of continuous enlargement of the core projects (geographical expansion, more and more organisations…)

EGEE/national service provisioning model



DEISA service provisioning model

Service layer on top of National supercomputing service schemes using grids

Enabling new applications through re-engineering national production quality codes to operate on DEISA (EU-level) grid

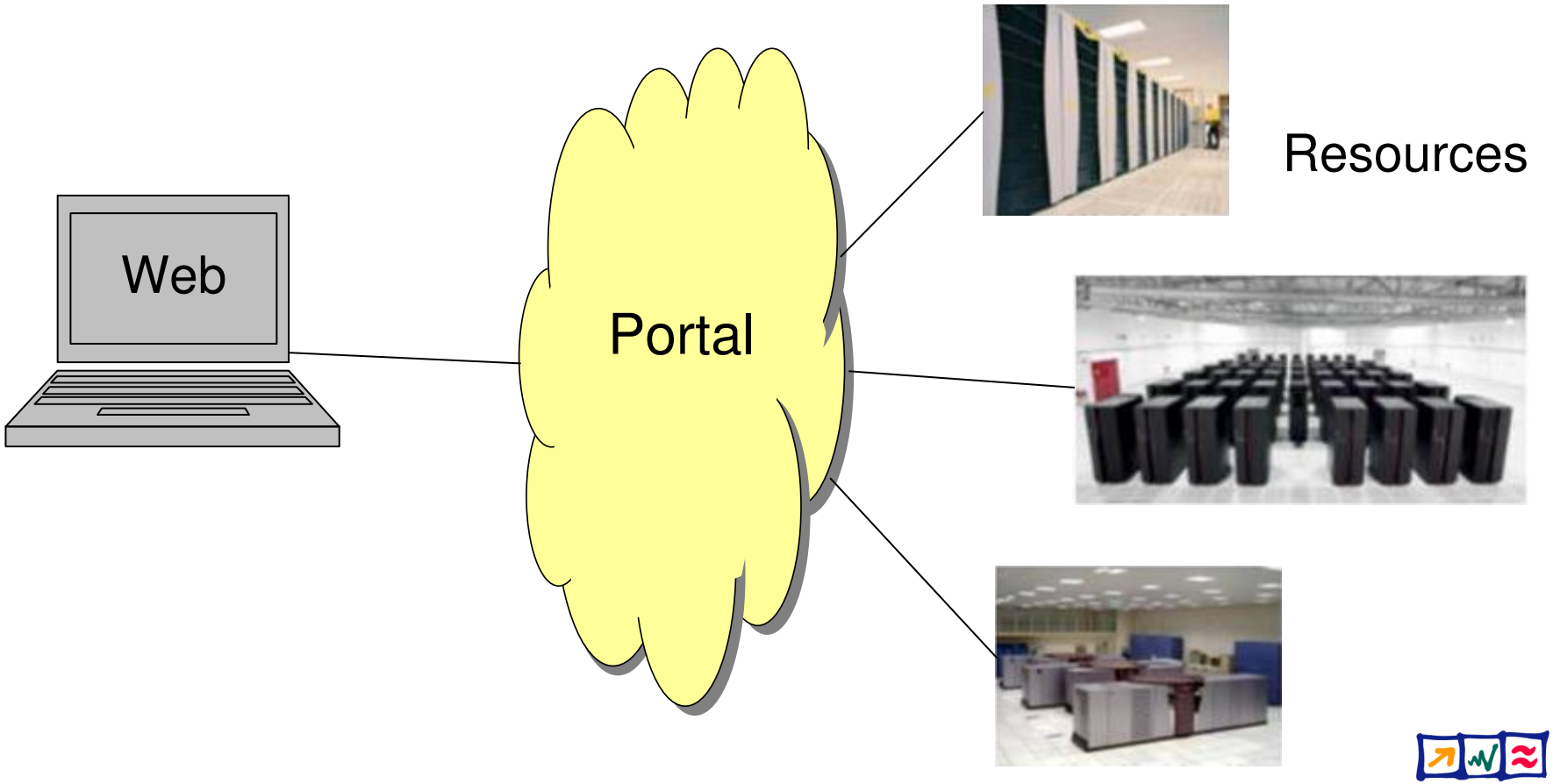
Extreme Computing initiative to enable use of DEISA by “grand challenge” applications in science and technology

- Calls for proposals to select new applications (29 in operation, e.g. Cosmology, Materials Science, Fluid Dynamics, Biophysics)
- Support by Applications Task Force (ATASKF) (consultancy…)
- Service differentiation for different classes of applications

DEISA service provisioning model

Portals and Science gateways

- Connect supercomputing resources as “backend” resources to existing discipline oriented infrastructures
- Plans to deploy portal in bio-informatics & life-sciences (2006-7)



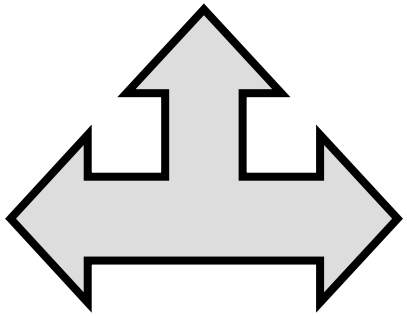
Possible evolution scenarios of current service models

Other…

Converge (e.g. on one or more of the following levels):

- Operations, support
- Interoperability
- Info-service point, Training
- Dissemination, Outreach
- Resource sharing policies, coherent policies on creation of new resources
- Budget-management, admin.

Follow independent evolution paths



Driving forces…

User needs (efficiency, simplicity, stability…) – *one entry point to infrastructure*

…

Funding agency needs (address user-needs on longer term, maximise efficiency of investment, lower operational costs…)

Long-term preservation of current grid-based service provisioning model poses significant challenges

- Non-optimal pace of integration of new user-communities, pooling of resources, know-how transfer across scientific disciplines
- Non-optimal use of infrastructure across different application fields
- High turn-over of key-personnel (in many cases leaving Europe) due to short employment/project cycles

Committees like the e-IRG point that the current project-based financing model of grids presents continuity and interoperability problems, and that new financing and governance models need to be explored taking into account the role of national Grid Initiatives…

Discussions on possible convergence scenarios focus on following aspects

- A coherent Grid-based service scheme based on National/ Regional Grid Initiatives and a central co-ordination activity
  - ✓ Operate production grid e-Infrastructures for a wide range of application communities and performance levels
  - ✓ Provide training and support to users
  - ✓ Promote *one-stop-shop* service entry point
  - ✓ Enable a more stable funding scheme independent of (short in general) project cycles
  - ✓ Promote interoperability among infrastructures, promote harmonized access and use policies (e.g. AAA, resource-sharing)
  - ✓ Support implementation of a governance model for both computing and data resources
  - ✓ Promote collaborations with industry (based on more stable operational environments, economies of scale…)

Discussions on possible convergence scenarios focus on following aspects

- Facilitate a longer-term strategic plan for e-Infrastructures in Europe
  - ✓ Long-term strategy and support issues to be addressed on appropriate level (e.g. by a committee of EU national representatives – *the GÉANT Policy Committee provides a useful paradigm)*
- Emphasis on establishment of advanced National Grid infrastructure initiatives and on relevant commitments by Member States and the Commission

A broad discussion on the topic is on-going in e-IRG Task Force on Sustainable e-Infrastrutures

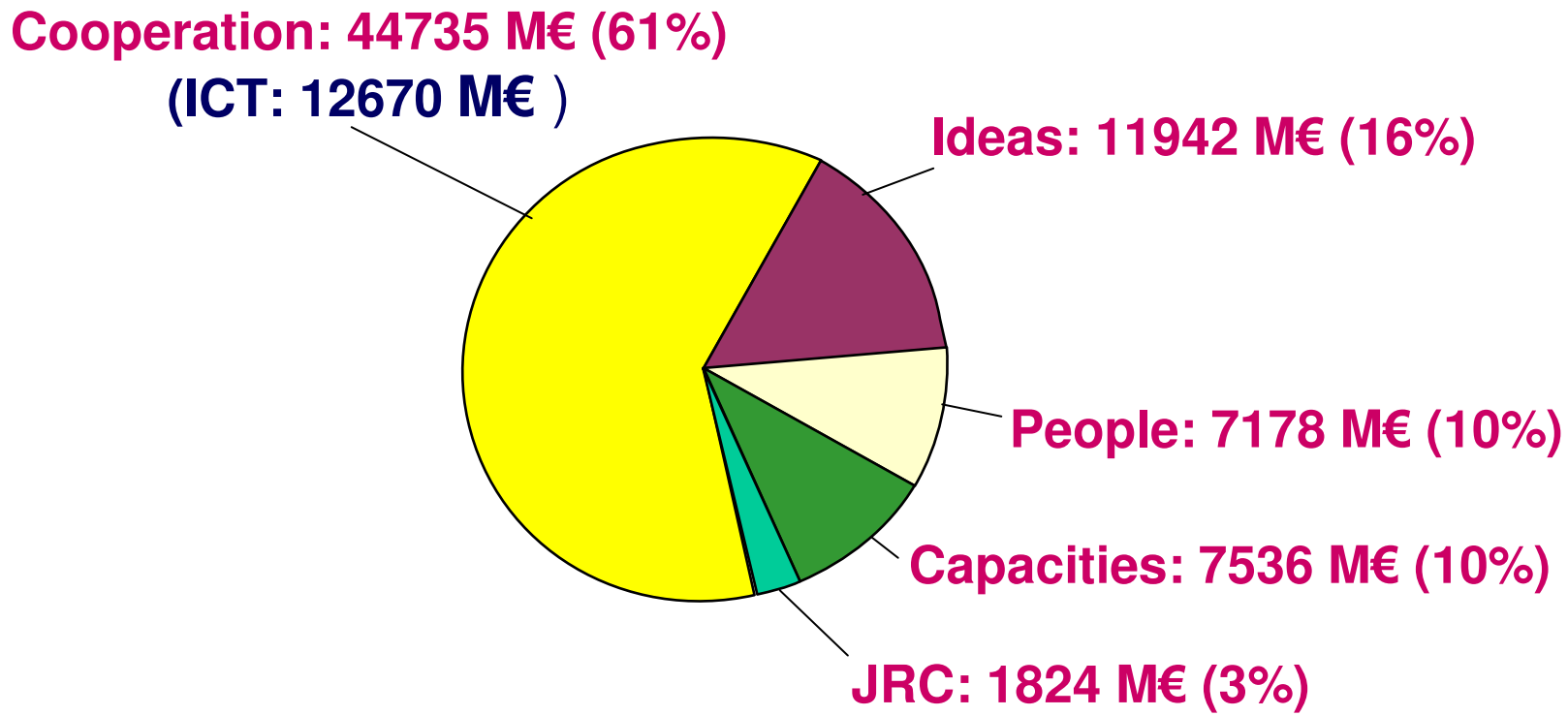
The EGI proposal

- Appears to address core objectives of a new service-provisioning scheme
- Its success depends on how well it addresses broad community needs (i.e. the support the broader Grid community in Europe is prepared to give to it) like:
  - Support broad range of applications
  - Easy integration of present & future (e.g. National) Grids
  - Interoperability with other international Grids…
- Of critical importance is the parallel evolution of National Grid infrastructures and initiatives

Implementing the EGI

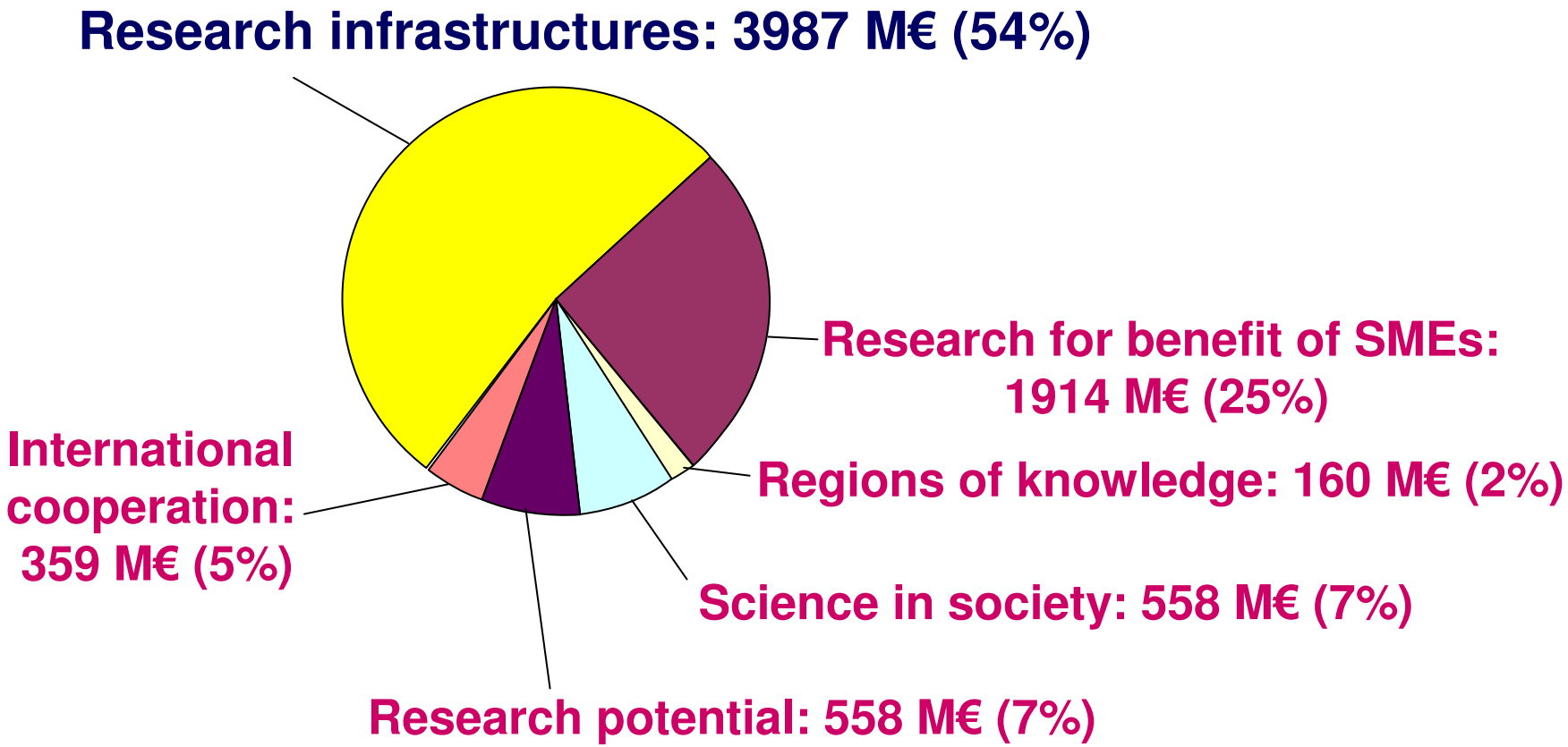
- Of high importance the works of the ESFRI Expert Group on Computing and Data Treatment and of the e-IRG Task Force on Sustainable e-Infrastructures – *the Task Force and the e-IRG need to adopt a clear position on the new service scheme*
- The financial resources for e-Infrastructures in FP7 will be critical for the EU to support a new service scheme
- An EGI proposal will have to pass through a selection process
- Options that the “New” and the “Continued” FP7-schemes provide need to be carefully evaluated (as well as the selection criteria in each case)

FP7 overview (Commission proposal) – 2007-2013



http://europa.eu.int/comm/research/future/documents_en.cfm

The Capacities Specific Programme of FP7

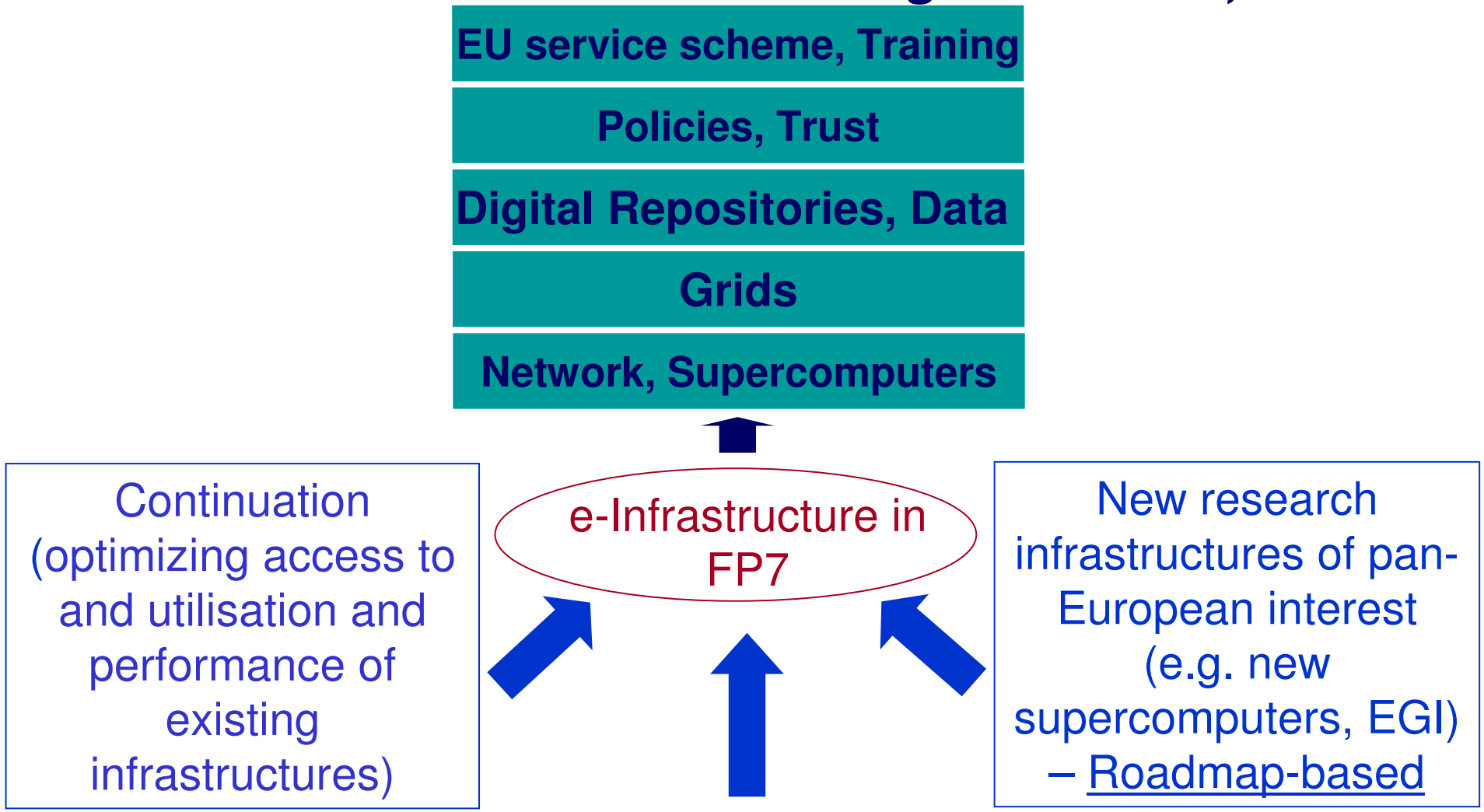


http://europa.eu.int/comm/research/future/documents_en.cfm

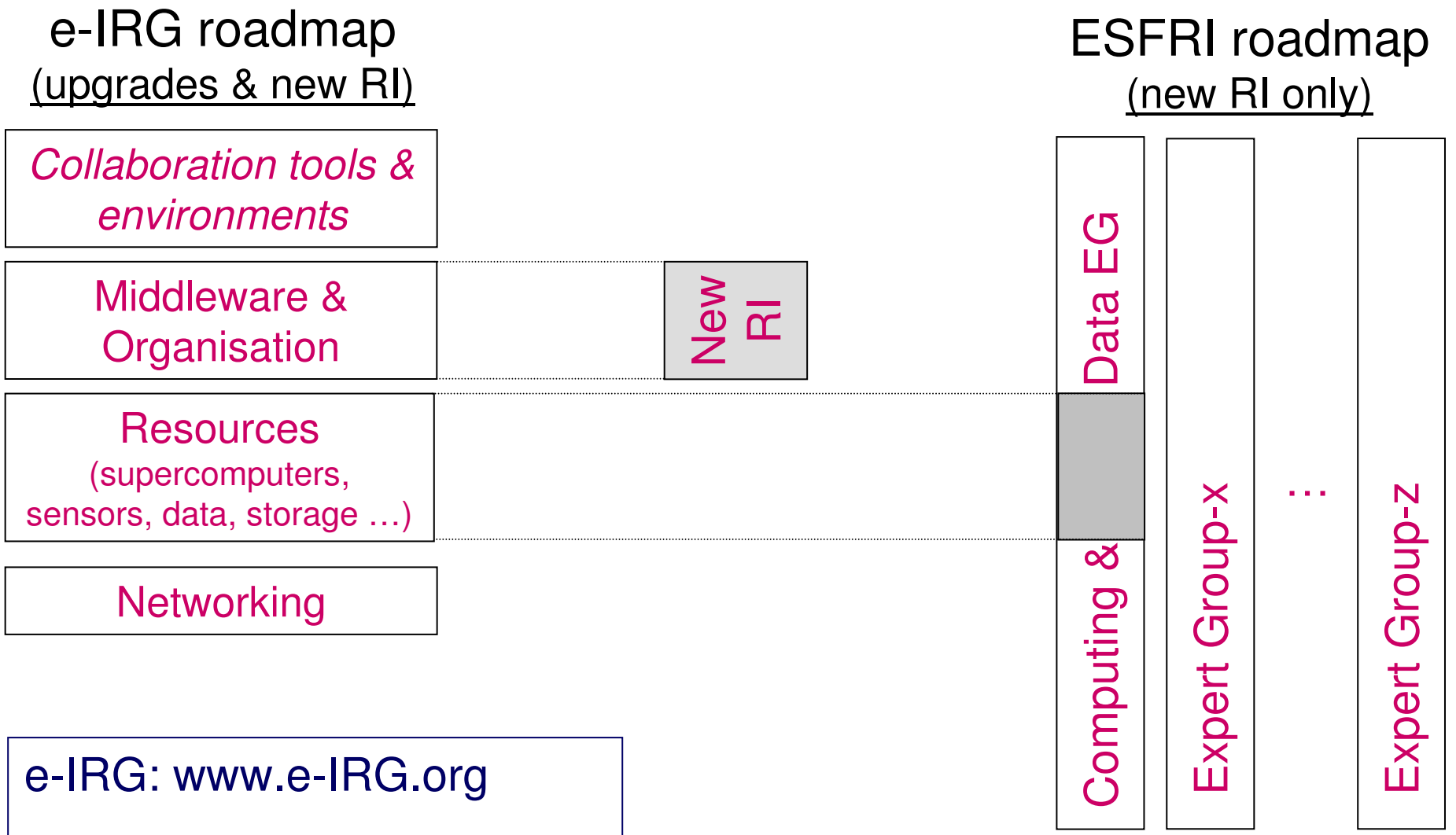
Discussions on FP7 financial resources are on-going

- Total proposed FP7 financial resources by Commission: **~73 €B**
- European Council Dec 2005 meeting on EU financial perspectives suggested FP7 financial resources to adjust to ~**50 €B**

The 7th EU Research Framework Programme (FP7),2007-2013



Roadmap for e-Infrastructure: e-IRG & ESFRI



e-IRG: www.e-IRG.org

ESFRI: www.cordis.lu/esfri

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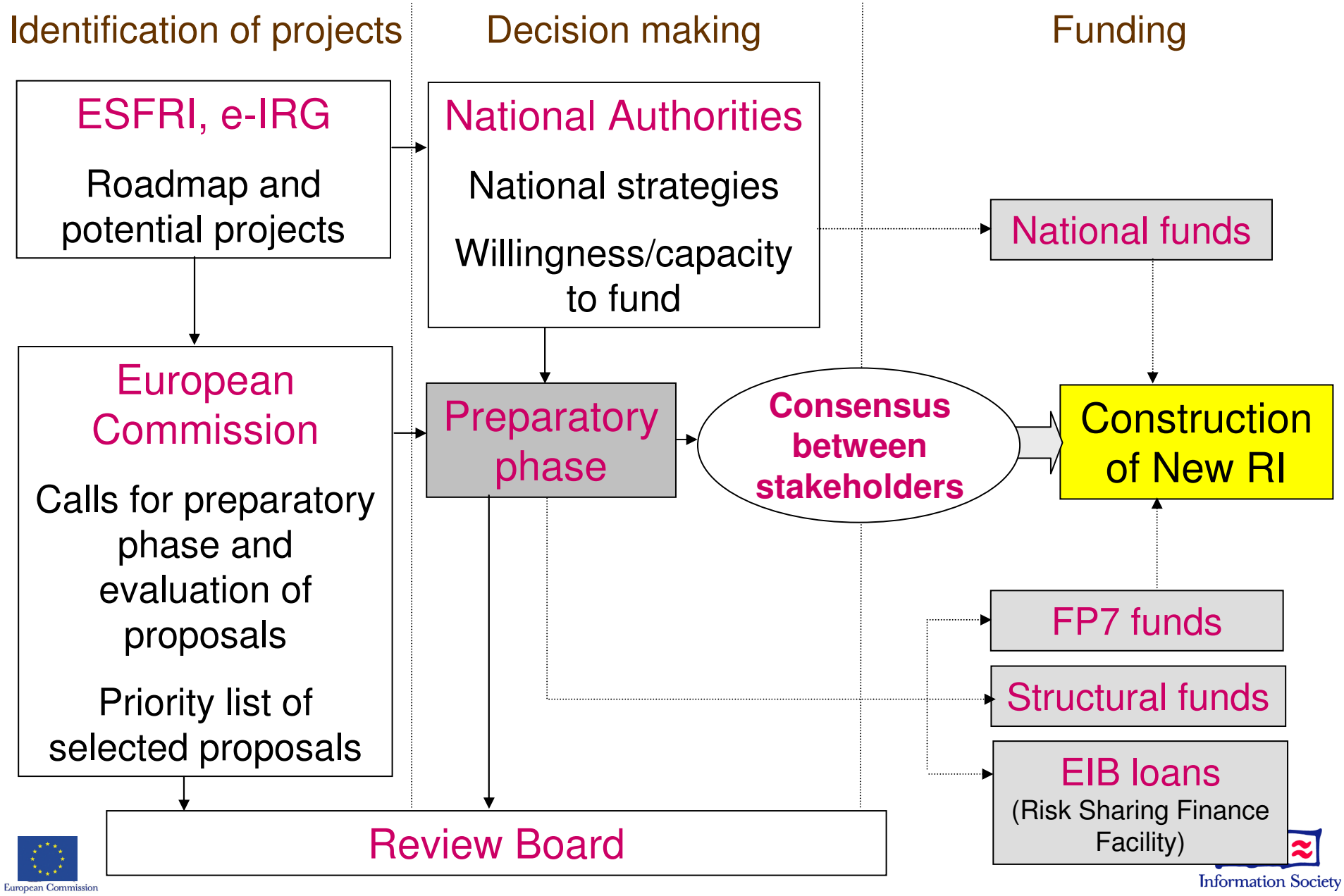
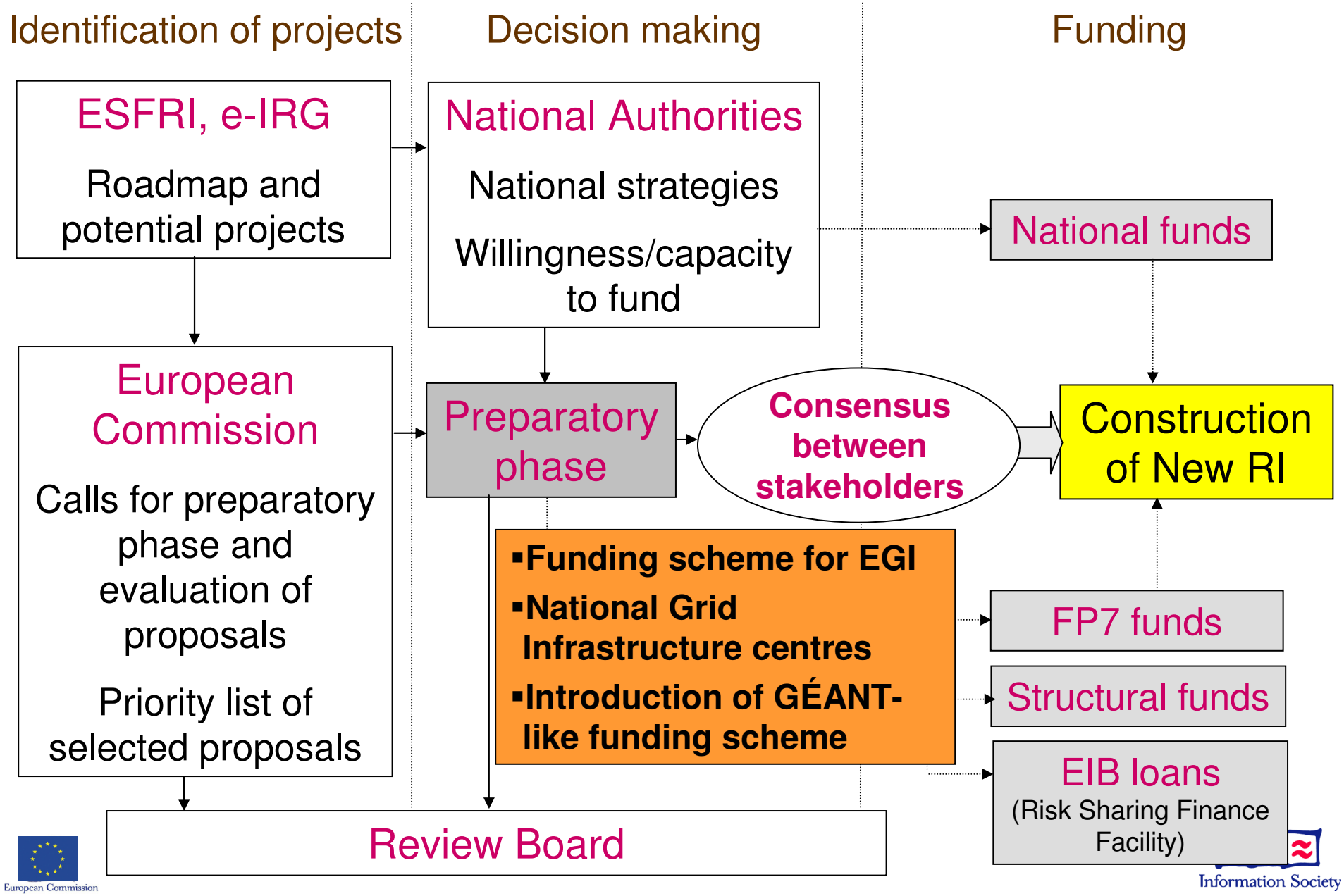
e-IRG meeting in Dec 2005 under UK-presidency

- Synergy between the e-IRG and the ESFRI Expert Group on Computing and Data Treatment (important that EGI also appears in ESFRI-priority list)
- Task-Force on Integrated Data Management
- New Task-Forces
  - Sustainable e-Infrastructure (address requirements for a more advanced and stable service-provisioning model of grid-based e-Infrastructures)
  - Education and Training

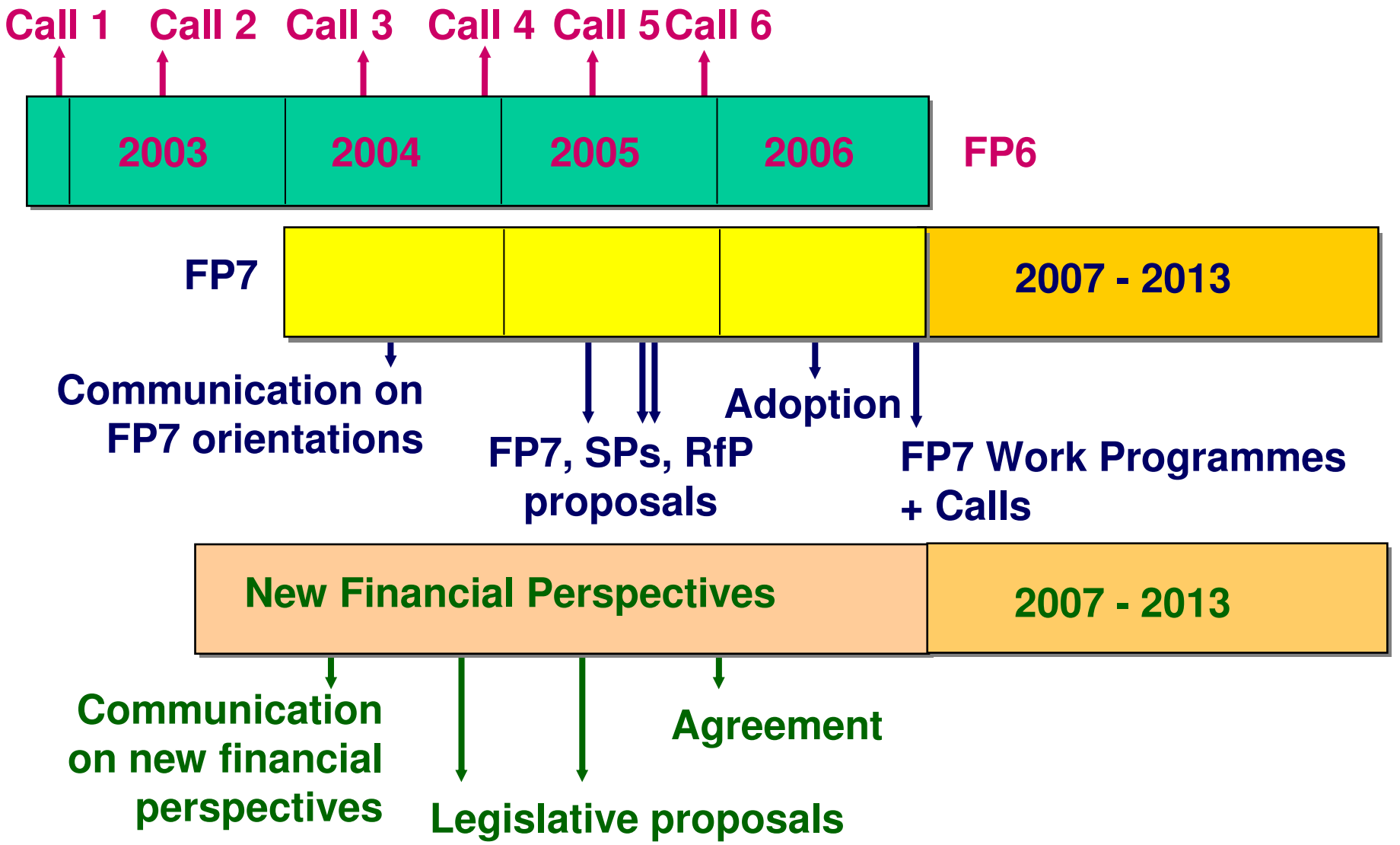
A stage-gate process towards new RI in FP7



A possible working scenario for EGI...



FP7 implementation: Timetable



Summary

- Need for the grid-based e-Infrastructure service provisioning scheme to evolve
- A coherent model for both computing and data resources
- EGI appears addressing important elements of new scheme
- The openness and inclusiveness of EGI will be key for its success
- Important political and technical issues involved; commitments necessary on EU and National level
- Options that the “New” and “Continued” FP7-schemes provide need to be carefully evaluated – *of high importance the FP7-budget to be made available for e-Infrastructures*
- Emphasis on the roadmap and the works of the e-IRG and ESFRI relevant Task Force/Expert Group