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Grid Technologies in the new EU Research Framework Programme

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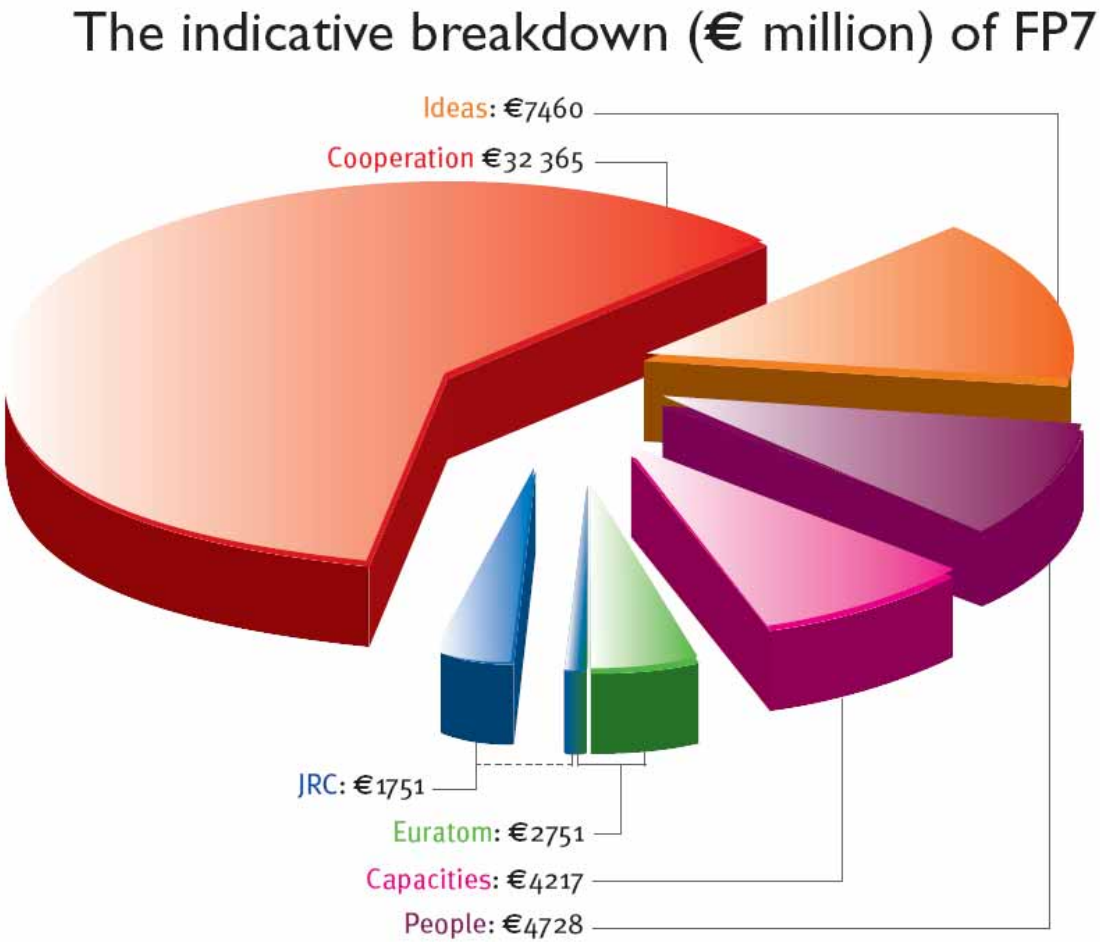
FP7 – Specific Programmes

7 years duration

€ 53.27 billion



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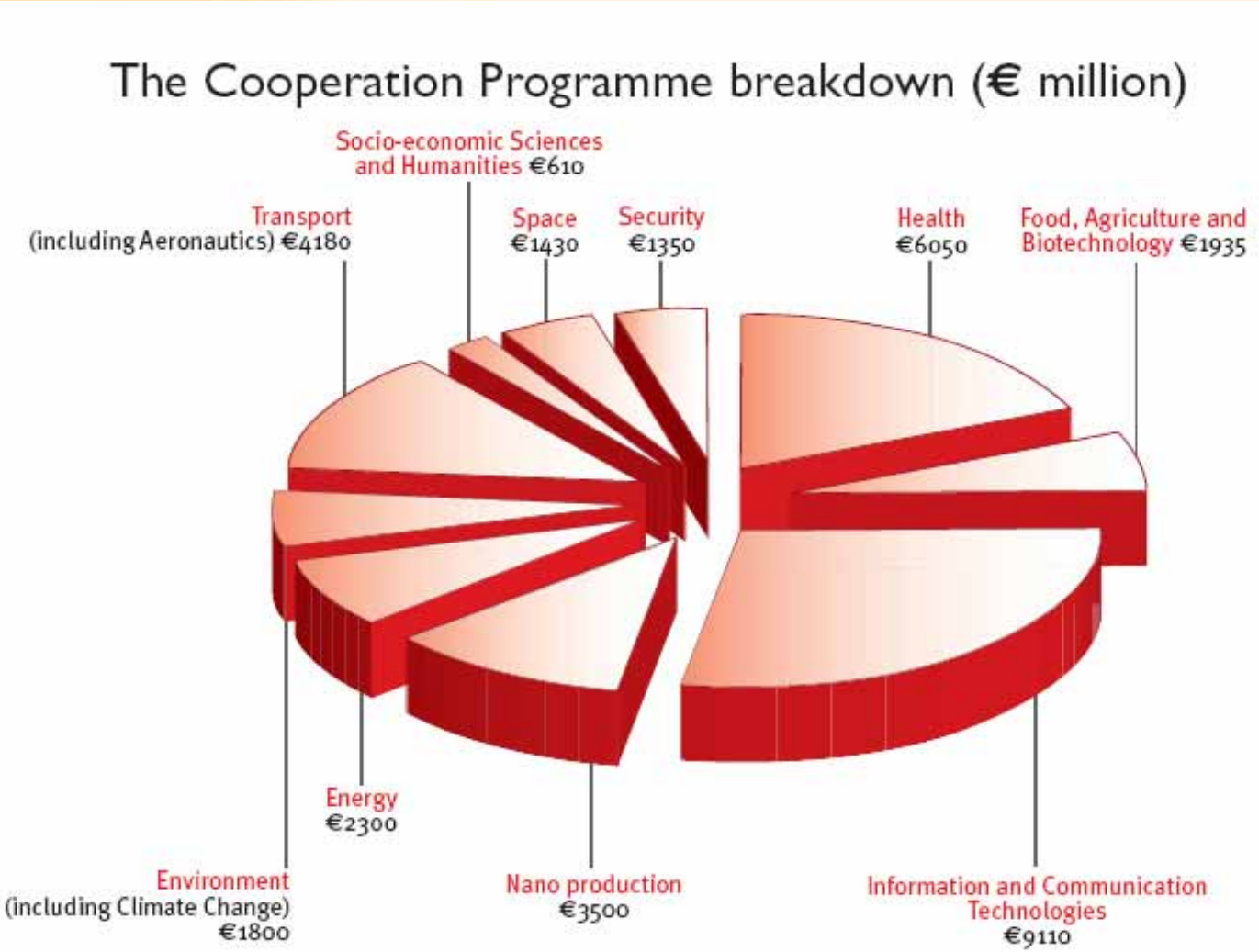
Cooperation - Themes



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EU funded research projects: some facts

- Collaborative research projects: involving industry, research centers and universities from several member states
- Partial European Commission funding
- Four types of instruments: Integrated Projects, STREP, Networks of Excellence, Support Actions
- Submission of proposals: On the initiative of the participants. EC just defines the content of the call
- Evaluation by external experts (1 out of 7 is funded)

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Presentation outline

- Overview of the ICT cooperation programme
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ICT – The largest priority theme of FP7

- ICT Technology Pillars
  - pushing the performance and functionality of technology
- Integration of Technologies
  - integrating multi-technology sets that underlie new services
- Applications Research
  - providing the knowledge and the means to develop a wide range of innovative ICT applications
- Future and Emerging Technologies
  - supporting research at the frontier of knowledge

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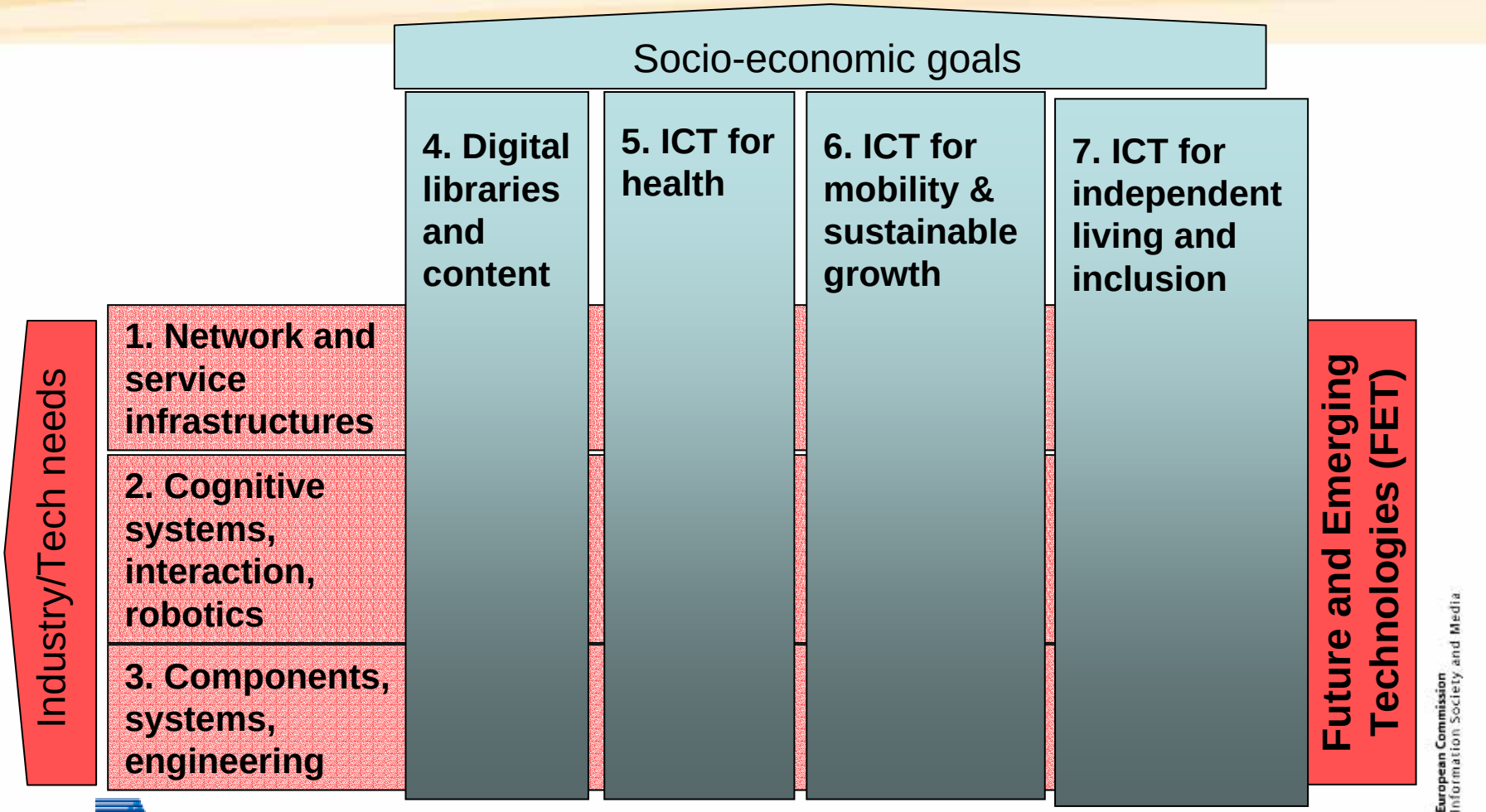
Work Programme 2007 *Challenges*



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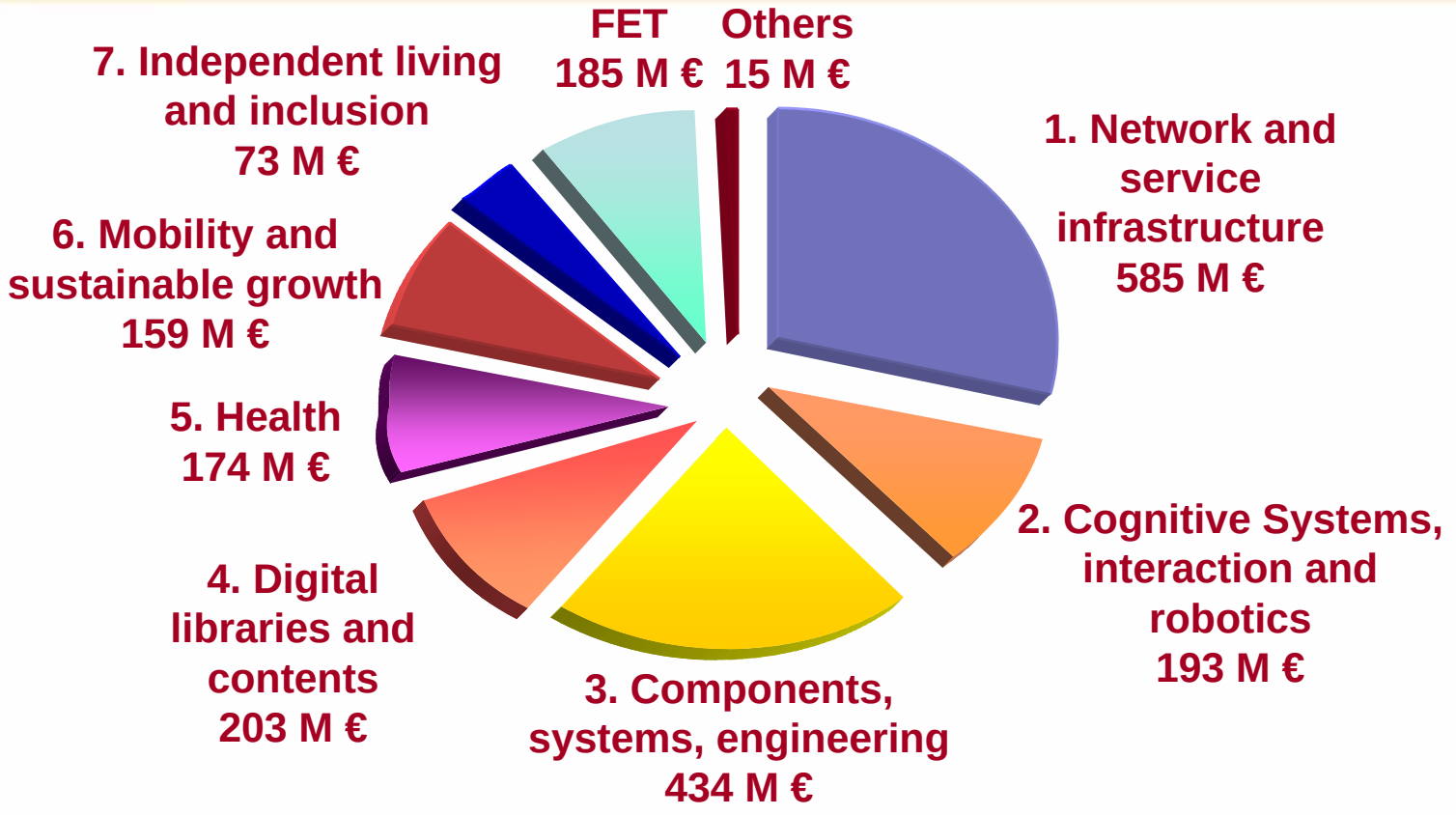
ICT WP 2007-08 Budget



Total budget : 2021 M€

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Challenge 1: Pervasive and trusted network & service infrastructures

- Network and service infrastructures underpin economic progress and the development of our societies
  - 2 billion mobile terminals in commercial operation, 1 billion Internet users, 400 million internet enabled devices
- A growing and changing demand
  - for increasing user control of content/services
    for networking 'things' - TV/PC/phone/sensors/tags …
    for convergence: networks|devices|services - video/audio/data/voice/.
- Current technologies can be, and need to be improved significantly
  - for scaling up and more flexibility
    for better security, dependability and robustness
    for higher performance and more functionality
- Europe is well-positioned: industry, technology and use
  - networks equipment and services, business software, middleware, security, home systems …

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Challenge 1: Pervasive & Trusted Network & Service Infrastructures

- The network of the future
  - mobile, broadband … spectrum-efficient, high-speed … managed …
- Networked media
  - multimedia networks, platforms, services …
- New Paradigms and experimental facilities
  - advanced networking architectures, interconnected testbeds …
- Service & software architectures, infrastructures & engineering
  - tools for service development, software design, virtualisation …
- ICT in support of the networked enterprise
  - Inter-enterprise operation and collaboration, integrated enterprise …
- Secure, dependable and trusted infrastructures
  - resilience in networks, trust in services, identity, privacy …
- Critical infrastructure protection
  - secure, resilient, always available information infrastructures …

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Services & Software: Some Trends

- **From Products to Services**
  - » eServices, SOA, Software as a service
- **ICT infrastructures**
  - » Need for more flexibility and reduction of TCO
- **Digital convergence**
- **Collaborative development and distribution**
- **Global competition**
- **Our societies and economies depend more and more on software**
  - » Growing requirements for reliability and dependability
  - » Laws, regulations, habits and culture

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Work programme

1.2. Service and Software Architectures, Infrastructures and Engineering

Research Topics

- Service Architectures
- Virtualisation tools, Grid middleware and network-centric operating systems
- Service/Software Engineering
- Mastery of Complexity and Dependability

Expected Impact

- Dynamic Services and networked applications
- Resources sharing and system software
- Efficiency, productivity, reliability in Services and Software

Estimated budget 120 M €

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Work Programme Text

- … including Grid-based systems that orchestrate unlimited, heterogeneous and dynamic resources distributed across multiple platforms as a single entity, and provide platform-independent access and sharing of knowledge, processing, communication, storage and content …
- Service architectures, platforms, technologies, methods and tools that enable context-awareness and discovery, advertising, personalisation and dynamic composition of services …

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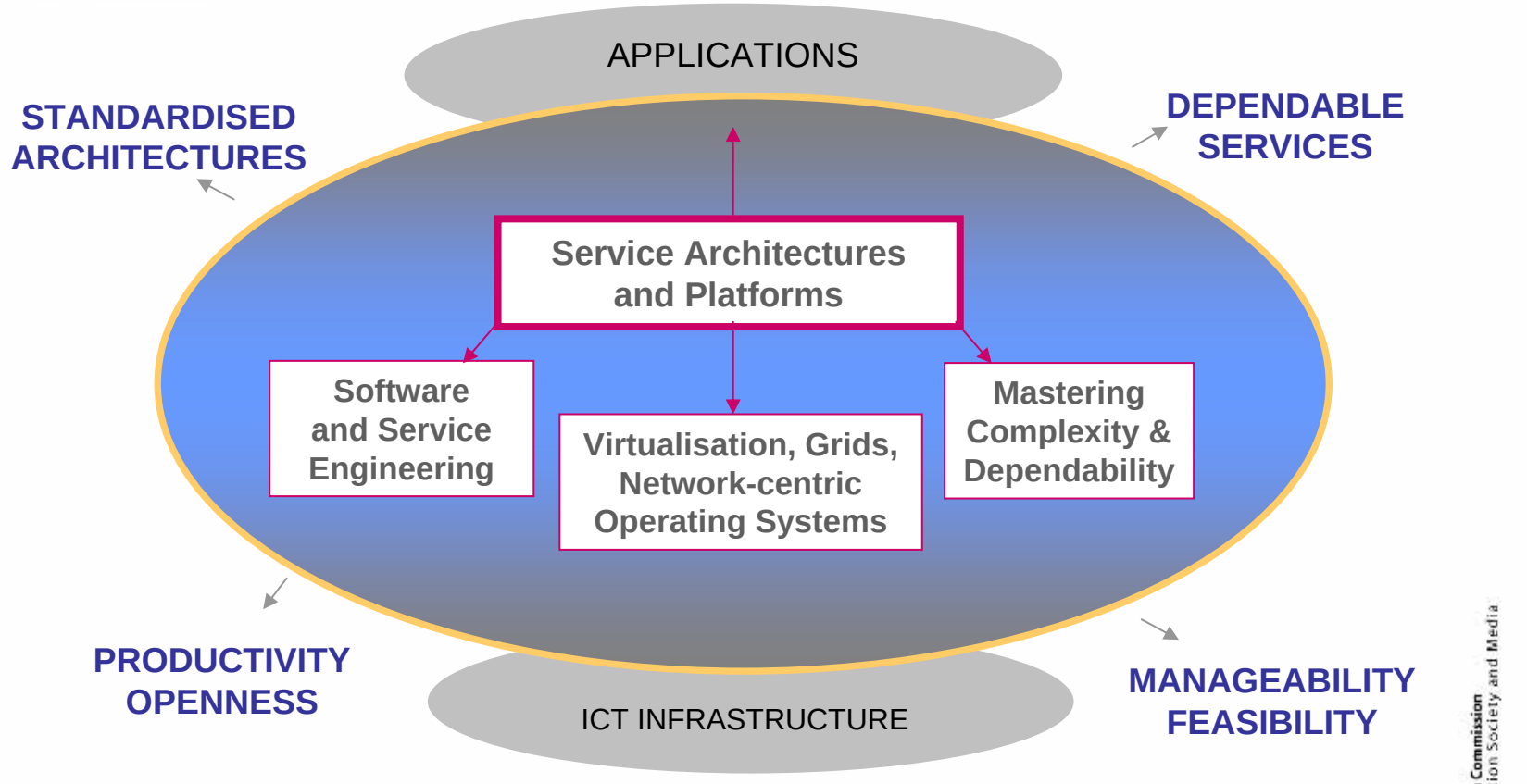
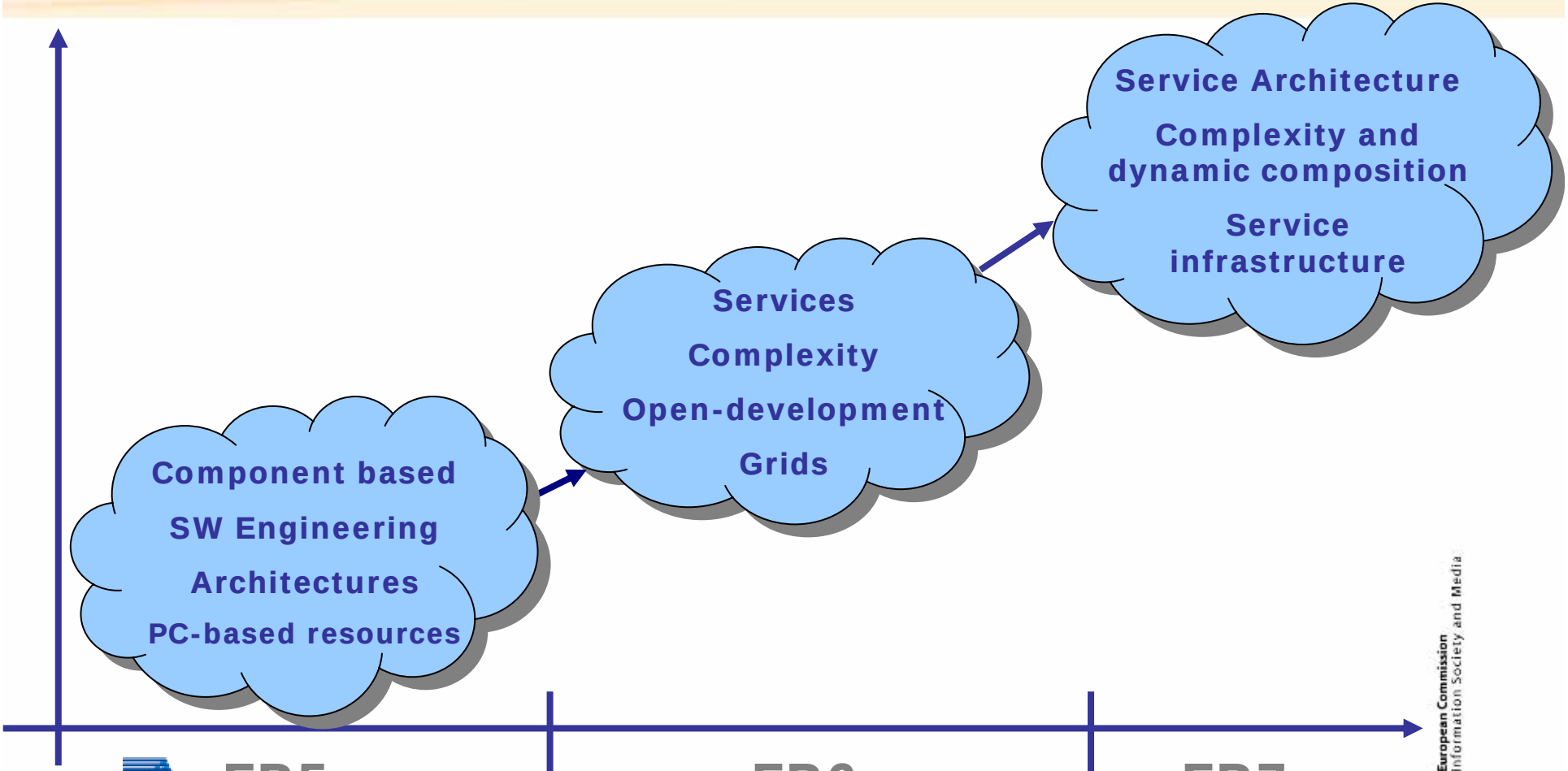
Service and Software Architectures, Infrastructures and Engineering



- *Exploiting future infrastructure*
- *Fostering advanced applications*

R & D Evolution



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Targets

TODAY	5-10 YEARS
• Pre-programmed Services	• Dynamic composition of services
• Software coding, decomposition	• High level modeling, composition of modules
• Complexity of devices and networks are apparent to the user	• Complexity transparent to the user
• Limited to use own resources to access networked services	• Unlimited capacity, virtualised resources
• "Convergence" emerging at the device level but: User handles separate networks, a multiplicity of devices, disparate services	• Anywhere, anytime, any device –Unlimited capacity –Reconfigurability, adaptability, Interoperability, Service composition

Conclusions

Grid and Service Oriented Architectures

- Enable more efficient business processes
- Support dynamic provision of resources and virtual organisations
- Are evolving towards general-purpose service infrastructures
- Are key drivers for the evolution of the service and knowledge economy

Grid, SOA and service infrastructures are a the heart of FP7 IST challenge 1 “Pervasive and Trusted Network and Service Infrastructures”

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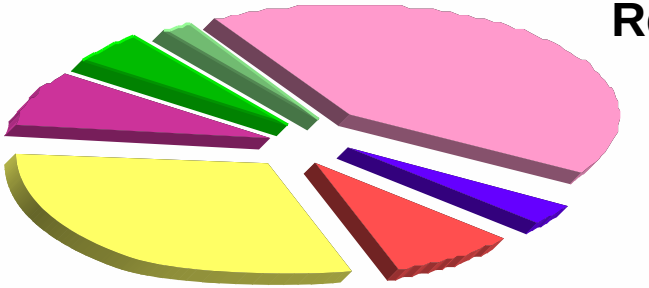
RI in FP7 - Objectives

"To optimise the use and development of the best research infrastructures existing in Europe, and to help to create in all fields of science and technology new research infrastructures of pan-European interest… to remain at the forefront of the advancement of research, and able to help industry to strengthen its base of knowledge and its technological know how"



Research Infrastructures
42% of Capacities
1715 M€

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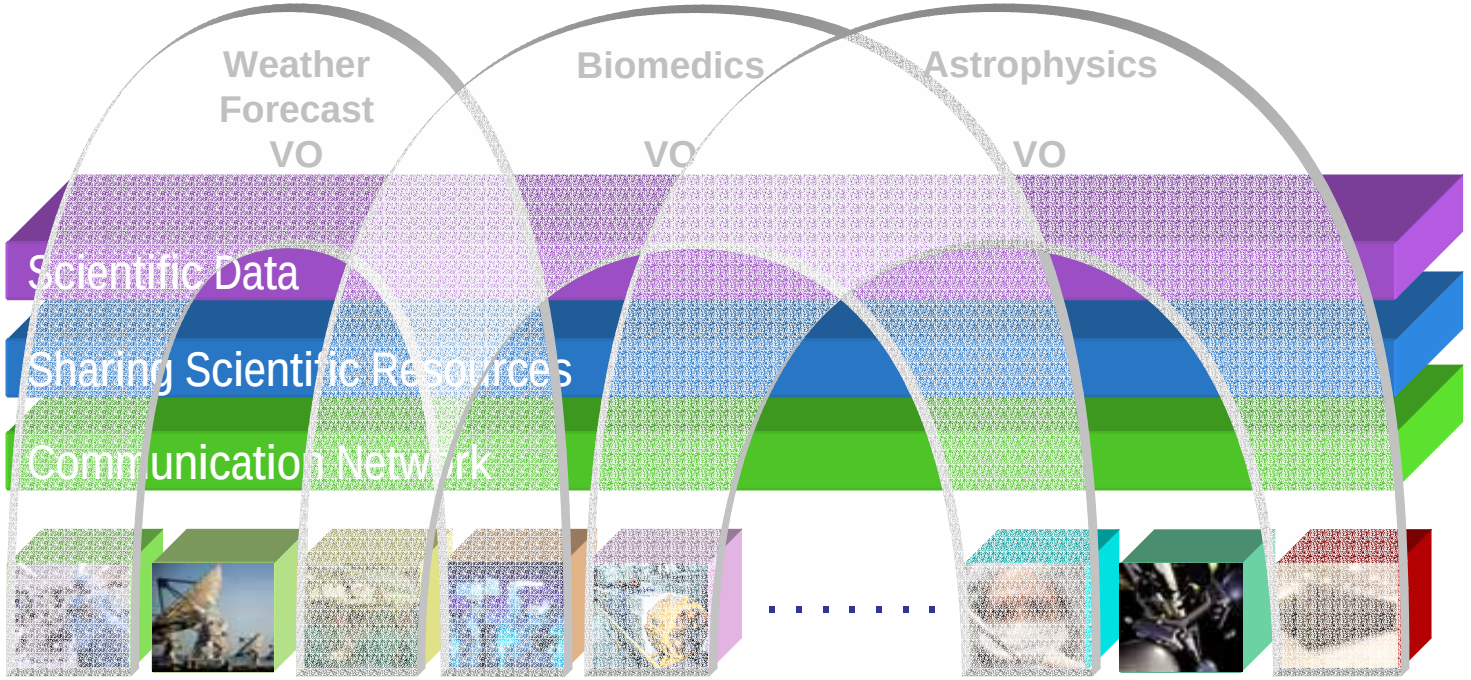
FP7 - e-Infrastructures strategy



Bringing the best brains together and sharing the best scientific resources for producing the best science

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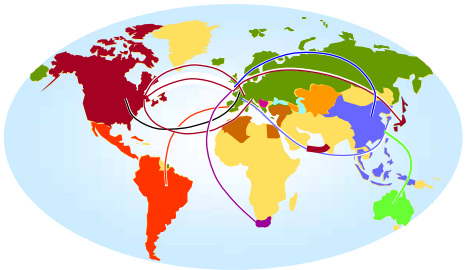
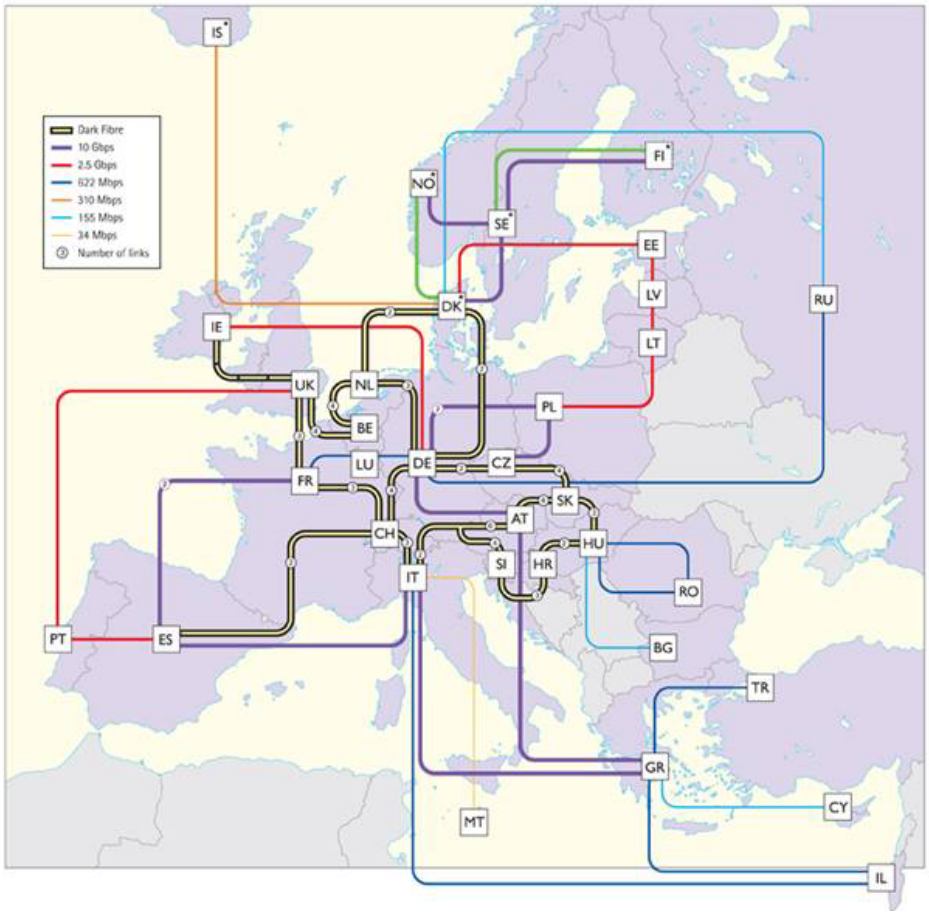
GÉANT – Call2, 95M€

- Deployment and evolution of the pan-European high-capacity and high-performance communication network (GÉANT)





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Existing e-Infrastructures

- **e-Science Grid infrastructures (call1, 50M€)**
  - **Deployment of grid-empowered e-Infrastructures exploiting the sharing of more resources**
- **e-Infrastructures for new communities (call1, 24M€)**
  - **Consolidation and expansion of e-Infrastructures by addressing the needs of new scientific communities**
- **Scientific Digital Repositories (call1, 15M€)**
  - **Deployment of digital repositories for the scientific communities**
- **Scientific Data Infrastructures (call2, 20M€)**
  - **Support the deployment of standardised mechanisms to handle scientific data**

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New e-Infrastructures

- **Design studies (call1, 8M€)**
  - **“Emerging” infrastructure & major updgrades**
    - **ESFRI ‘emerging’ infrastructures**
    - **Include new sustainable approach to e-Infrastructures**
  - **Outcome: ‘Conceptual design reports’**
    - **Readiness for strategic decision**
- **Construction – preparatory phase (call1, 15M€)**
  - **Identified in ESFRI roadmap**
  - **Outcome: Readiness to start construction work**
    - **Proved technical, financial and legal maturity**
    - **MoU signed by consortia**

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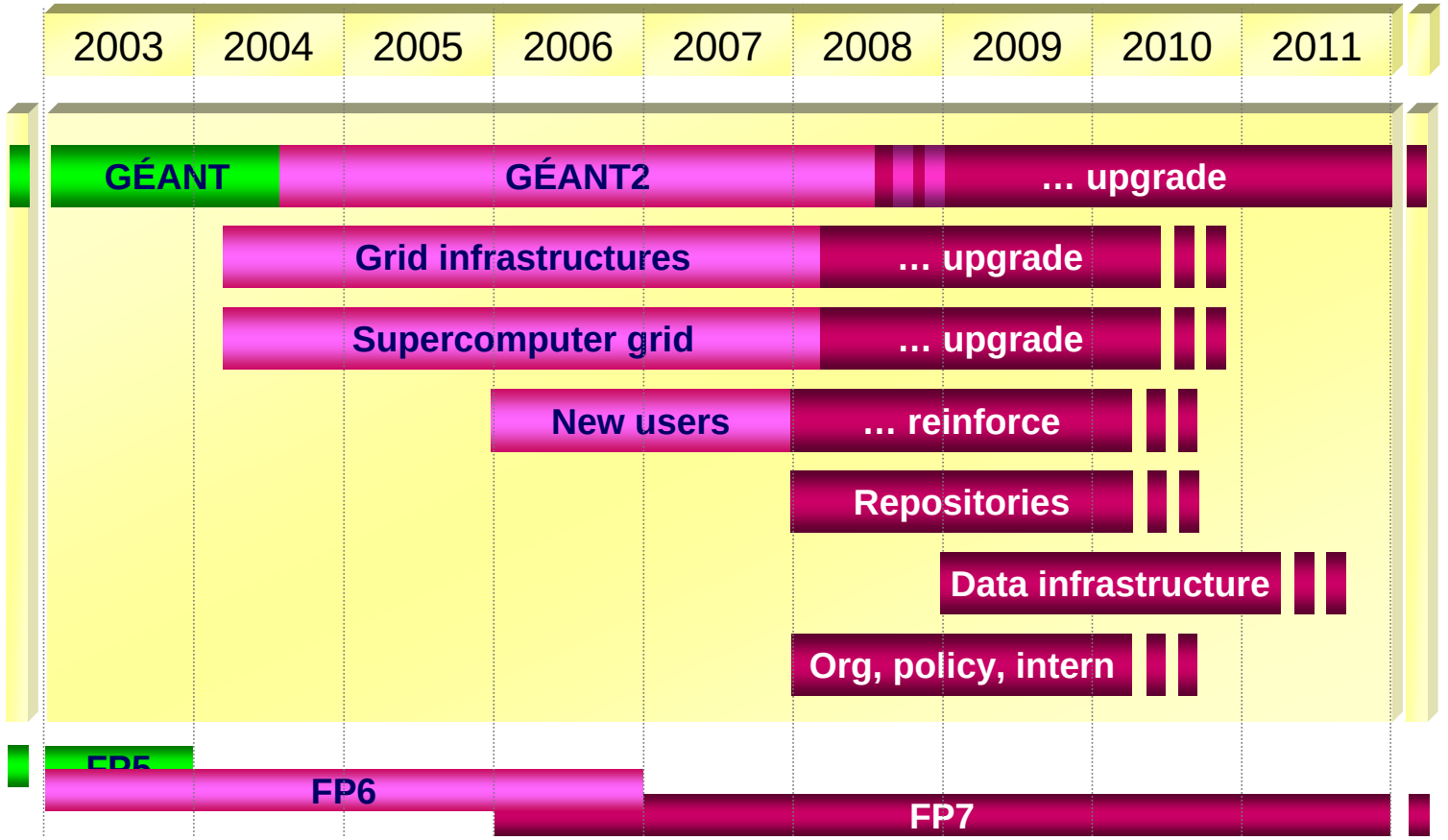
e-Infrastructures from FP6 to FP7



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Drivers for international cooperation

Build S&T partnerships based on mutual interest

Enhance Europe's competitiveness

Contribute to implementing EU policies and international commitments effectively

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Benefits of international cooperation with developing regions

Human Resource Development:

- helps retain top-class researchers and attract international expertise

Contribute to joint knowledge generation:

- maximise benefits from national investments

Share in experience and expertise:

- building local capacity

Leverage international investment in R&D

Allows for international benchmarking and identification of best practices

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In FP6, Grids and Research Infrastructures have been two of the most active IST areas in international cooperation:

- GEANT
- EGEE
- Grid Technologies with East Asia

USA (NASA, Abilene, EsNet, Canet4)

GEANT2

Japan Connection (SINET)

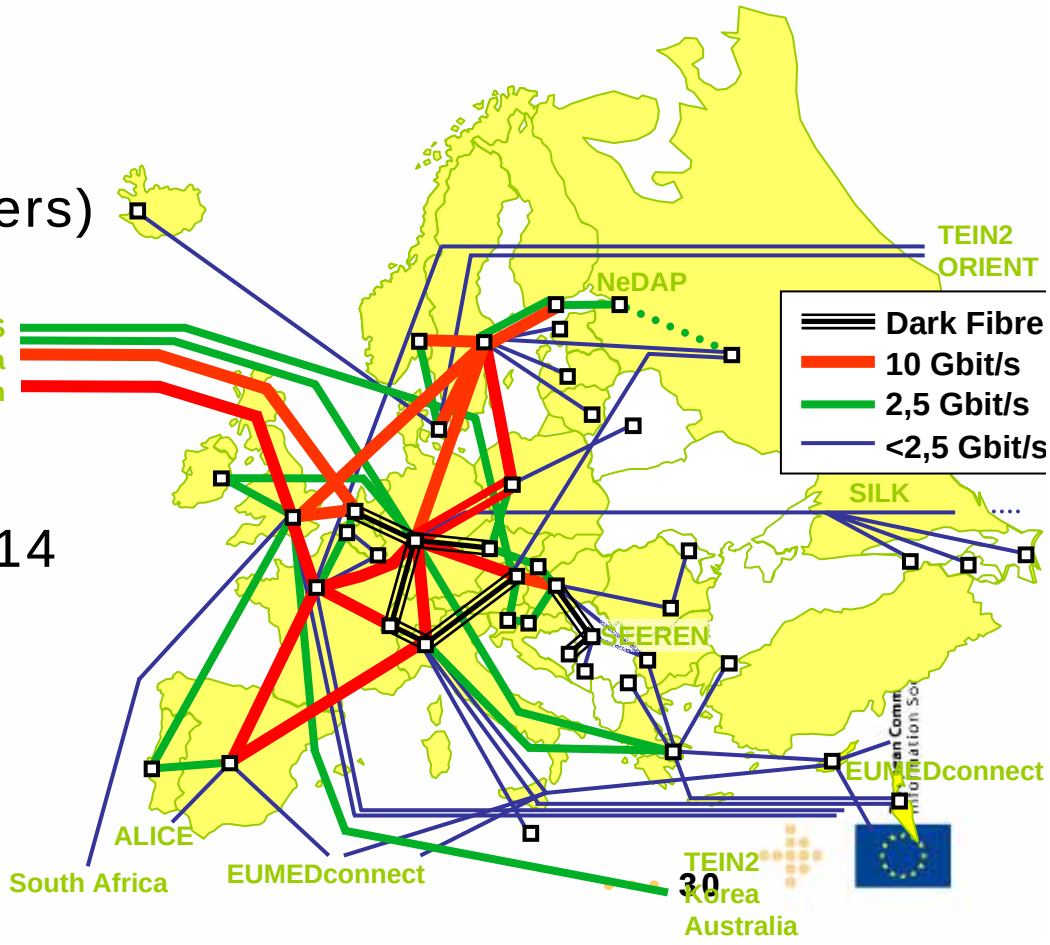
RedCLARA (18 NREN, 22 partners)

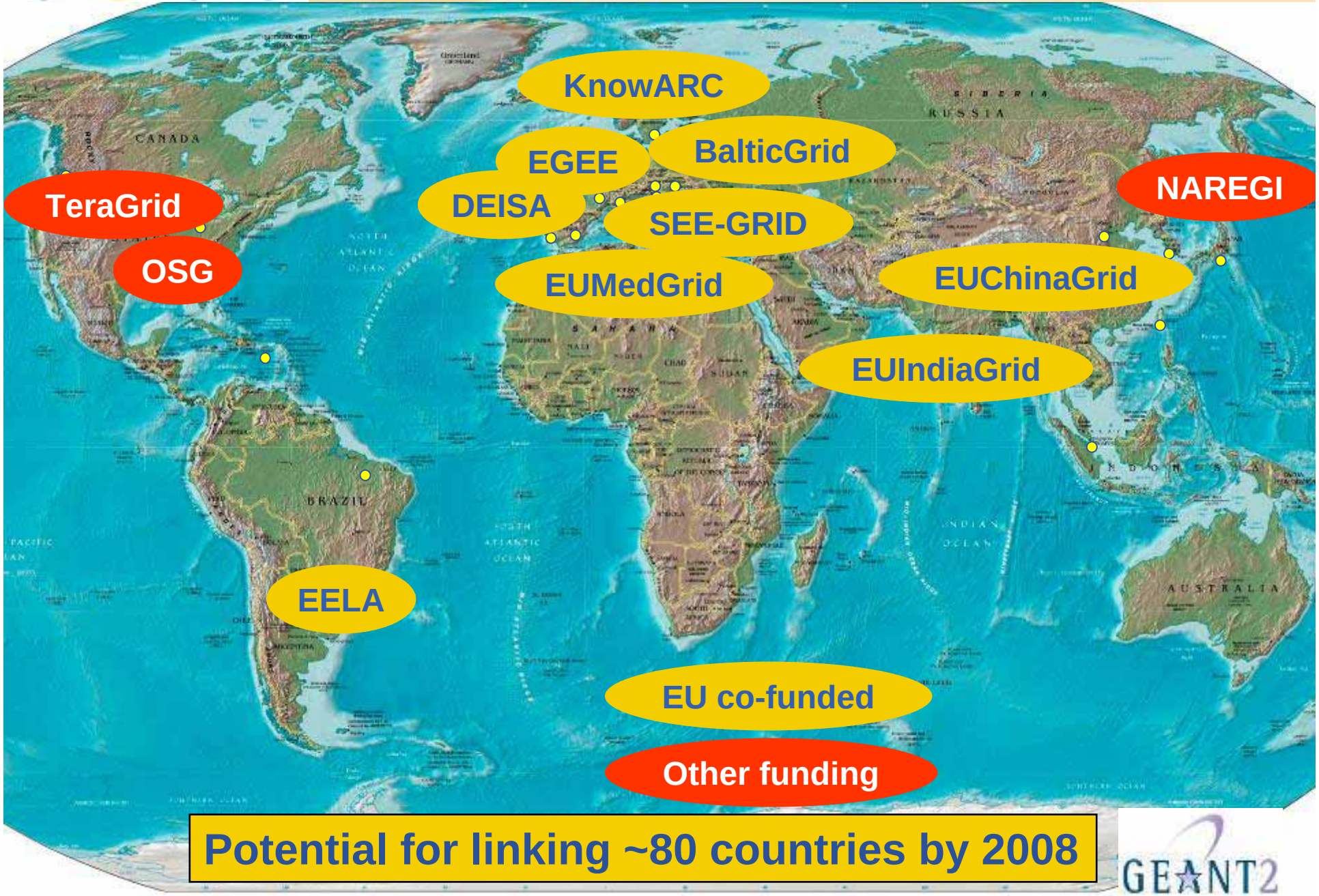
SEEREN2 (9 NREN, 11 partners)

TEIN2 (10 Asia NREN, 13 partners)

EUMEDConnect (12 NREN, 14 partners)

ORIENT (China)




KnowARC
BalticGrid
EGEE
DEISA
SEE-GRID
NAREGI
TeraGrid
OSG
EUMedGrid
EUChinaGrid
EUIndiaGrid
EELA
EU co-funded
Other funding
Potential for linking ~80 countries by 2008

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International cooperation on Grid Technologies – Call 3 and Call 5

Grid@Asia selected in Call 3

- Supporting cooperation on Grids between EU and East Asia

Call 5: 6 projects with East Asian partners

- XtreemOS: Inst. of Computing Technology – CAS; Red Flag Software
- BeinGrid: Beijing Hydraulic Research Institute
- Gredia: Inst. of Computing Technology – CAS;
- GridComp: Tsinghua University
- ArguGrid: Asian Inst. of Technology – Thailand
- Sorma: Sun Singapore

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International cooperation on Grid Technologies – Call 6

Dedicated call on cooperation with China

- Leverage and integrate existing initiatives
- Focus on Grid research and industrial applications

STREPs

BRIDGE

Builds on IP SIMDAT and CNGRID to develop Grid-enabled simulation and design applications for aerospace, drug discovery and environmental disaster prediction

EC-GIN

Design and implementation of new network protocols for increasing the speed and performance of Grids. Builds on Grid 5000, Austrian Grid, UKGrid and ChinaGrid

SSAs

ECHOGRID

Research visions and agendas, road-mapping, standardisation, exchange of researchers. Links CoreGrid NoE and NESSI ETP with the Chinese 863 High-Tech programme. Research and industrial focus

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International cooperation in IST – FP7

Specific international cooperation actions

- Collaborative projects in a certain area addressing the participation of international cooperation partners countries (ICPC)
- Minimum 4 participants of which 2 in different MS or AS and 2 in (different) INCO countries

Opening of mainstream activities

- Participation from third countries in addition to the required minimum number of partners

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Marie Curie international fellowships

- International outgoing fellowships
- International incoming fellowships
- Partnerships to support exchange of researchers
- Support of common initiatives between European organizations and countries with S&T agreements
- Measures to counter the risk of 'brain drain' from developing countries/emerging economies

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Concluding remarks

FP7 opens new opportunities for Grid related research

- Research Infrastructures
- Service and Software Architectures, Infrastructures and Engineering

International cooperation continues to be an important aspect of the programme

- EU – East Asia: Building on existing FP6 initiatives
- EU – East Asia: exploring new opportunities for collaboration