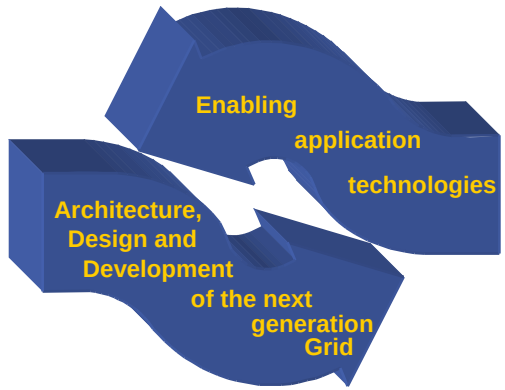
Global utilities for the 21st century

Franco Accordino

DG Information Society and Media

Grid Technologies

http://www.cordis.lu/ist/grids



Summary

- Grid Research and Deployment in FP6
- Emerging Trends in ICT
- Service Oriented Knowledge Utilities
- European Grid strategy
- Conclusions

Grid Research and Deployment in FP6

Application-oriented Strategic Objectives
e.g. eBusiness, eGov, eWork, eHealth, risks management

R&D

Grid Technologies

- Architecture, design and development of the next generation Grid
- Enabling application technologies
- Industrial and business applications

Research Infrastructures

- Deployment of specific high performance Grids
- Deployment of high-capacity and high-speed communi-cations network - GEANT

Research & Development

125 M€ (IST)

Technology-oriented strategic objectives
e.g. semantic web, software and services

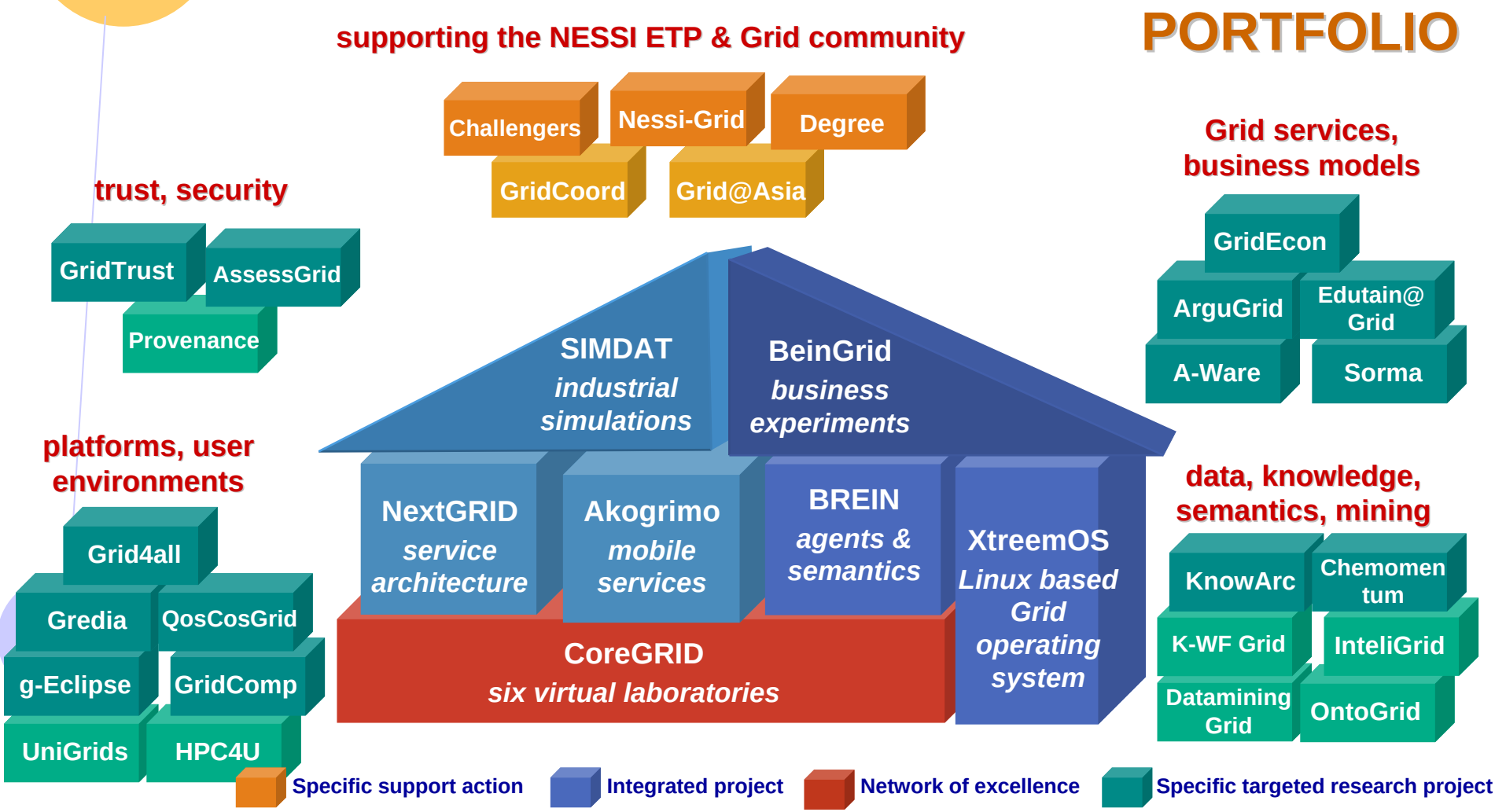
R&D

Deployment

200 M€ RI

Information Society and Media

FP6 Grid Technologies Projects – Calls 2, 3, 5

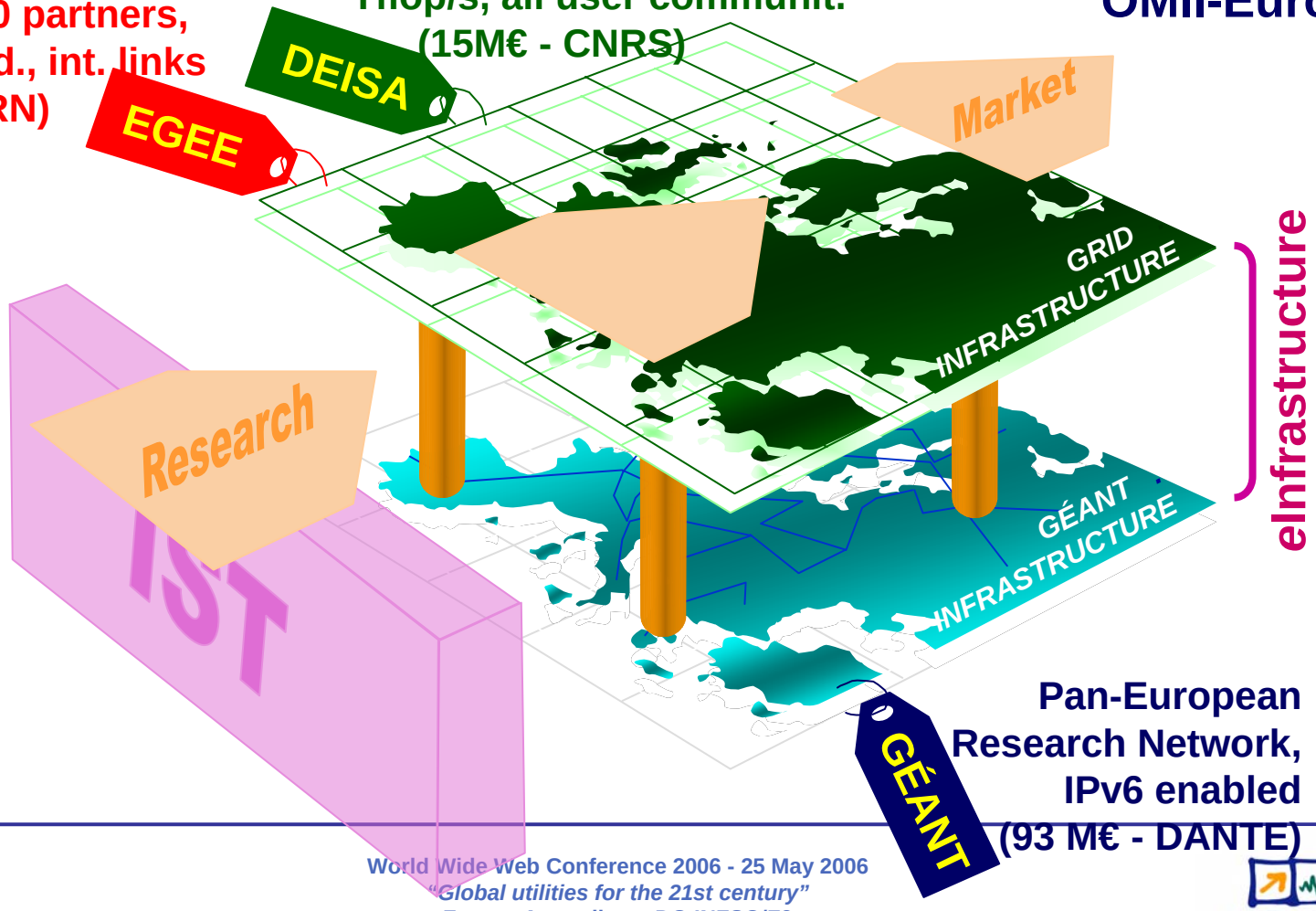


*e*Infrastructure - Strategic building blocks

production quality grid, 20000 CPUs, ~4PB storage, training, 27 countries, 70 partners, HEP, Biomed., int. links (32 M€ - CERN)

grid of 6 supercomputers networked at 1 Gbps, focus on global filing systems,>30 Tflop/s, all user communit. (15M€ - CNRS)

OMII-Europe



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

Information Society and Media

Emerging Trends in Grids and RI

Flexible control and sharing of **global** resources

Resources can be distributed world-wide

Resources can be of any information type (computing, storage, networking, etc)

Access to them is provided in a secure, coordinated, seamless, dynamic and inexpensive way

Dynamic, multi-domain virtual organisations

Information Society and Media

Emerging Trends in ICT

- Mass spread of “ambient” systems of ICT objects pervading all aspects of business and life
- Explosion of users and “things” connected through Internet
- Need for more flexibility in private and public ICT infrastructures
- Paradigm shift from product selling to service provision
- OSS as a new production paradigm and business model

Service-Oriented Knowledge Utility

A flexible, powerful and cost-efficient way of building, operating and evolving IT intensive solutions for business, science and society.

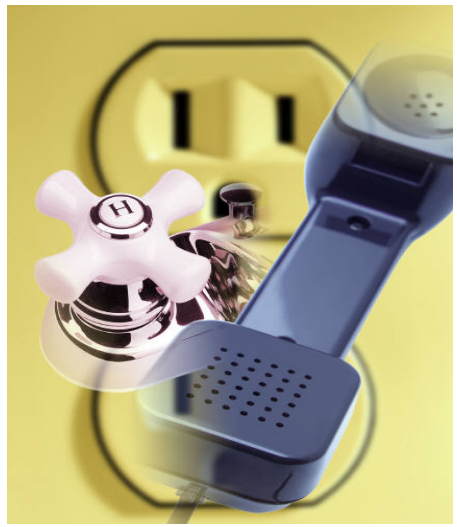
- building on existing industry practices, and emerging technologies
- (r)evolution of concepts from Web, Grid & Knowledge technologies
- support ecosystems that promote collaboration and self-organization
- towards increased agility, lower TCO, broader availability of services for all
- empowering service providers, integrators and end-consumers of ICT
- as safe, ease und ubiquitous as existing utilities such as electricity or water

The primary difference to earlier approaches is a switch from a prescribed layered view to a multi-dimensional mesh of concepts, applying the same mechanisms along each dimension across the traditional layers.

Next Generation Grids Report 2005: Future for European Grids: GRIDs and Service Oriented Knowledge Utilities – Vision and Research Directions 2010 and Beyond, December 2006 (NGG3)

Service-Oriented Knowledge Utility

The architecture comprises services which may be instantiated and assembled dynamically, hence the structure, behaviour and location of software is changing at run-time

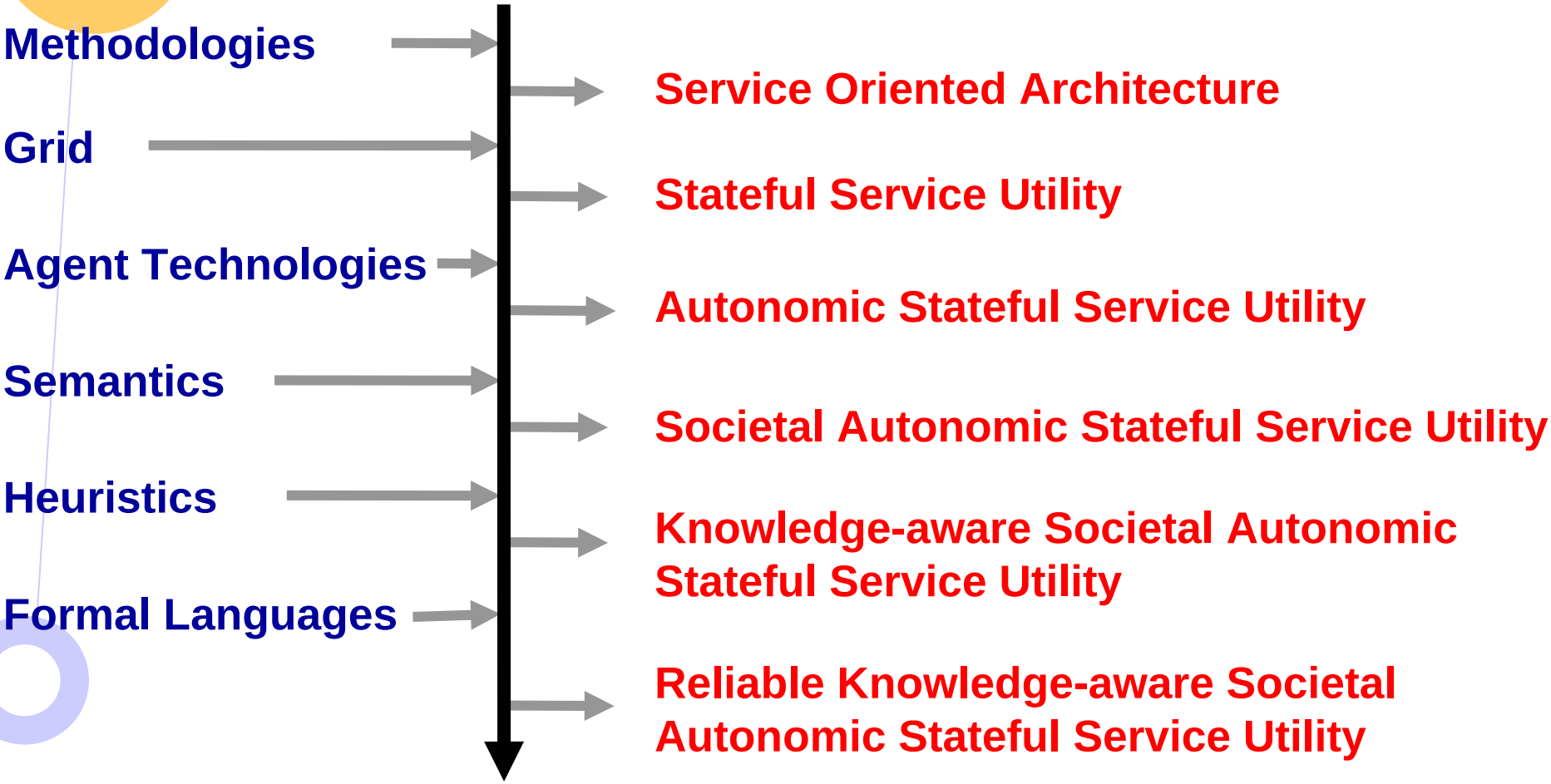


Services are knowledge-assisted ('semantic') to facilitate automation and advanced functionality, the knowledge aspect reinforced by the emphasis on delivering high level services to the user

A utility is a directly and immediately useable service with established functionality, performance and dependability, illustrating the emphasis on user needs and issues such as trust

The services (r)evolution

Internet, Web and Web Services



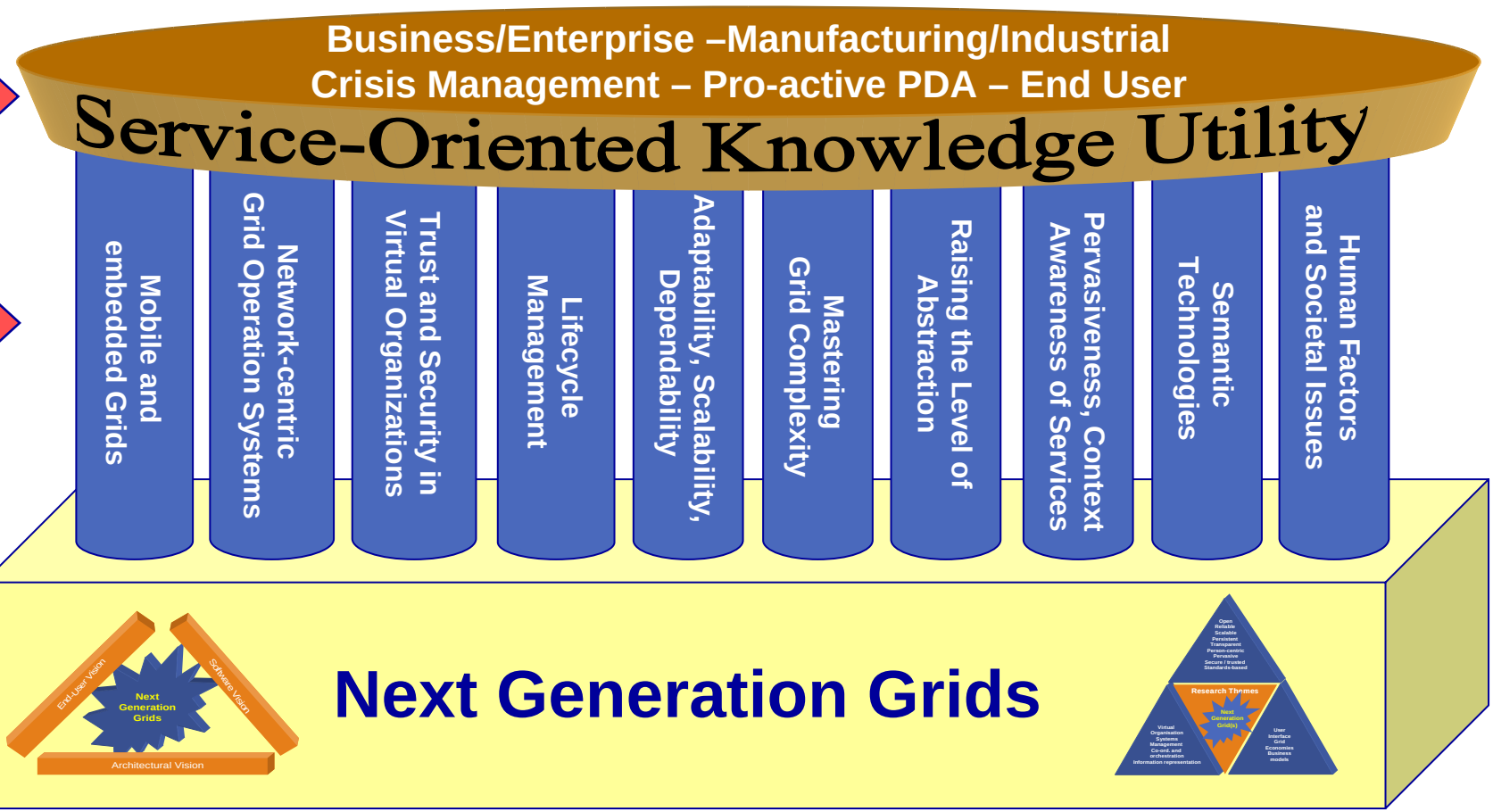
Service Oriented Knowledge Utility

Research Topics

NGG3: Future for European Grids: GRIDs and Service Oriented Knowledge Utilities – Vision and Research Directions 2010 and Beyond, December 2006

Driving Scenarios

Research Topics

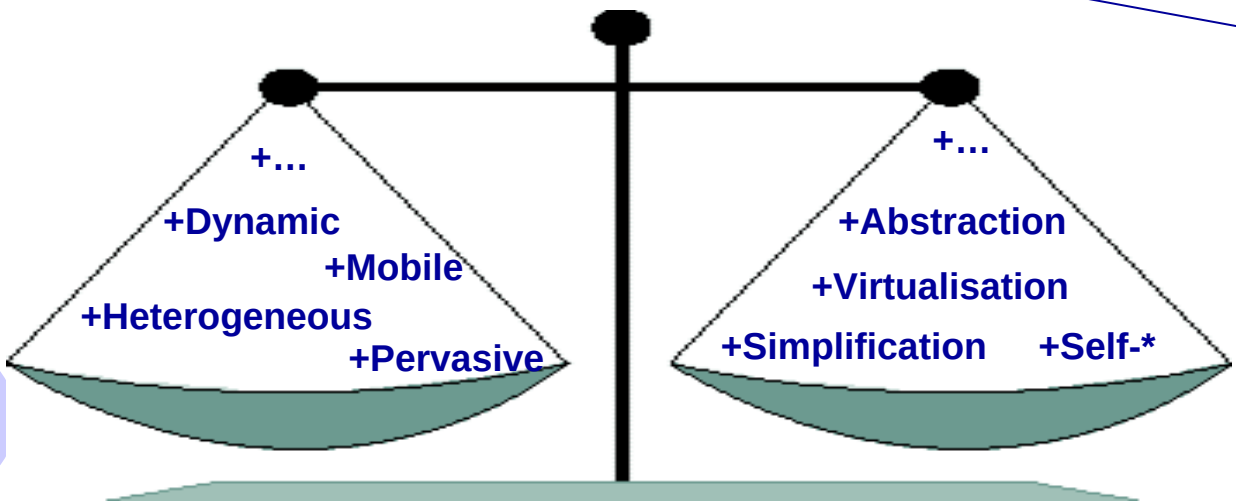


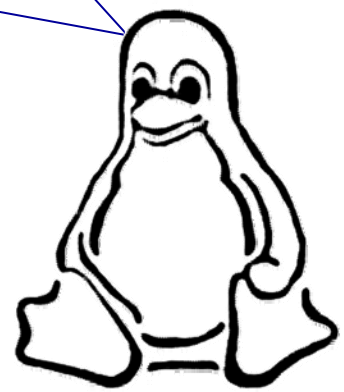
Information Society and Media

Network-Centric Operating Systems

The computing and knowledge capabilities of the Information Society are escaping from the "bottle" to pervade our everyday lives.

Grids will "orchestrate" this immense power in the same way that Operating Systems did in the past 30 years for the capabilities "in-the-box"





… enabling scalable, dynamic, cross-domain Virtual Organizations

Trade-offs to ensure: interoperability, scalability, performance, security, QoS, easy of use-program-install-configure-upgrade, decreasing TCO, …

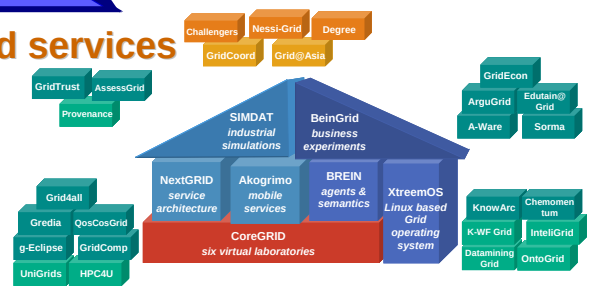
Information Society and Media

Realising the NGG/SOKU vision

- ⇨ Coordination of National Programmes
- ⇨ Opening-up of National Programmes
- ⇨ International cooperation
- ⇨ Build critical mass
- ⇨ Derive standardisation strategy

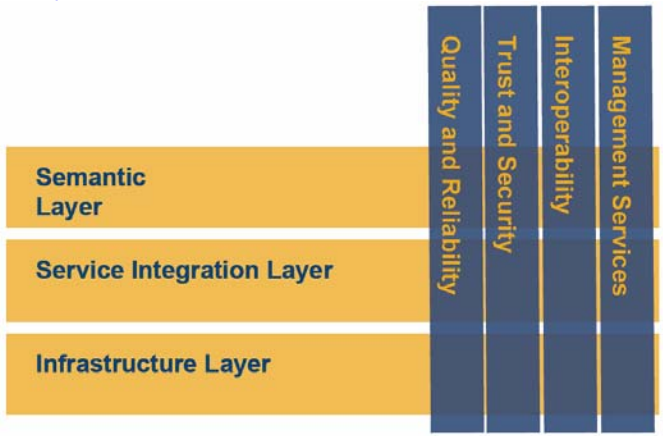
- ⇨ Leadership
- ⇨ Competitiveness
- ⇨ Addressing standardization, regulation, …
- ⇨ Innovation framework to increase adoption
- ⇨ Aligning business and research agendas

- ⇨ Developing new methods, tools, systems and services
- ⇨ Advance excellence and know-how
- ⇨ Long-term and ***business-driven*** R&D
- ⇨ Integration – structuring – standardisation



Networked European Software and Services Initiative

A European Technology Platform for SW, Grids & e-Services



Mission:

Develop a visionary strategy for Software, Grids and Services driven by a common European Research Agenda where innovation and business strengths are reinforced

launched in Brussels on 7 September 2005

www.nessi-europe.com

Conclusions

- **Grid Research and Deployment programmes**
  - ⇨ Consistent project portfolio: 130ME + 200ME
  - ⇨ Long-term research + Industry orientation
- **Global Service Oriented Knowledge Utility**
  - ⇨ Building on SOA/Grids/Semantic Web
  - ⇨ The backbone of the future economy & society
- **Strengthening EU competitiveness in Grids, SW & Services**
  - ⇨ Exploiting inter-sector dynamics
  - ⇨ Building on a coherent R&D agenda: NESSI & NGG/SOKU
  - ⇨ Capitalising on the highly innovative potentials of EU SMEs
  - ⇨ Building on the emergence of Open Source
- **Making Europe influential in developing related standards**
- **The future of the Grid is tightly linked to the future of the Web and Internet**

Further Info on Grid Research

- **Brochure: Building Grids for Europe**

  FP6 Grid Project Fact Sheets, FP5 Grid Project Achievements

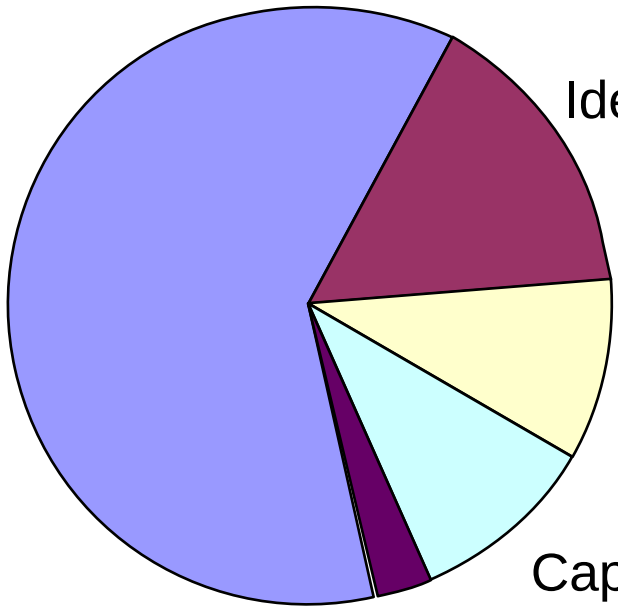
- **NGG Expert Group Reports**
  - ⇨ "Next Generation Grid(s) – European Grid Research 2005 - 2010", 2003
  - ⇨ "Next Generation Grids 2 – Requirements and Options for European Grids Research 2005–2010 and beyond", August 2004
  - ⇨ "Next Generation Grids 3 – Grids and service oriented knowledge utilities: vision 2010 and beyond", publication expected February 2006

- **NESSI: http://www.nesi-europe.com**

and more: **www.cordis.lu/ist/grids**

FP7 Specific Programmes

Cooperation: 44735 m€ (61%)



Ideas: 11942 m€ (16%)

People: 7178 m€ (10%)

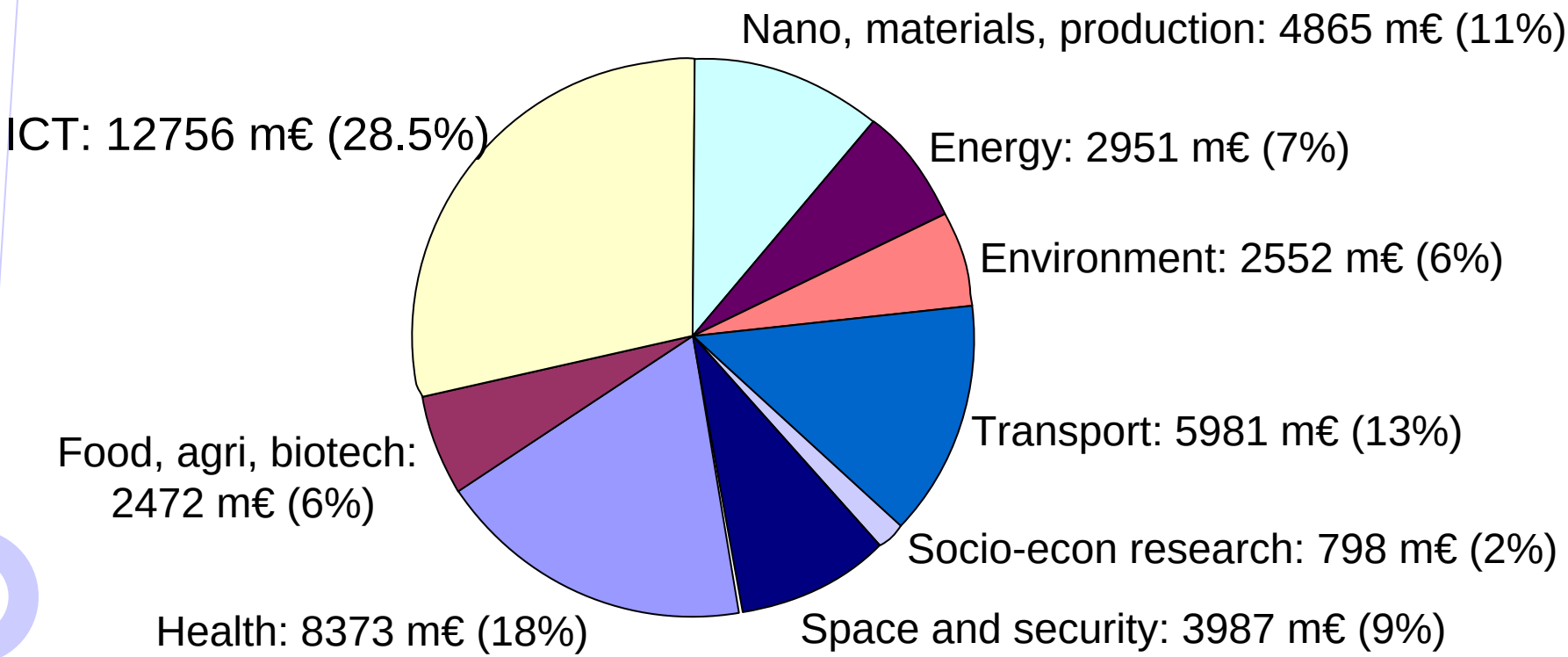
Capacities: 7536 m€ (10%)

JRC: 1824 m€ (3%)

Commission's Proposals of 6 April 2005

Information Society and Media

“Cooperation” – Collaborative Research – Themes

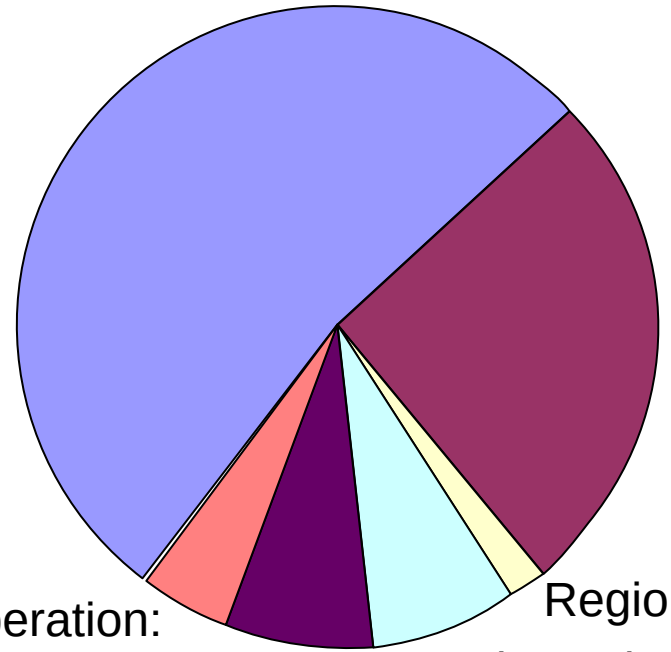


Commission’s Proposals of 6 April 2005

FP7 “Capacities” – Research Capacity – 6 Parts

Commission’s Proposals of 6 April 2005

Research infrastructures: 3987 m€ (54%)



Research for benefit of SMEs: 1914 m€ (25%)

Int’l cooperation: 359 m€ (5%)

Regions of knowledge: 160 m€ (2%)

Science in society: 558 mé (7%)

Research potential: 558 m€ (7%)

Information Society and Media