Industry Day, Thessaloniki-Greece, 10 Sep 2007

New opportunities for business through the EU e-Infrastructure

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e-infrastructure

"The views expressed in this presentation are those of the author and do not necessarily reflect the views of the European Commission"

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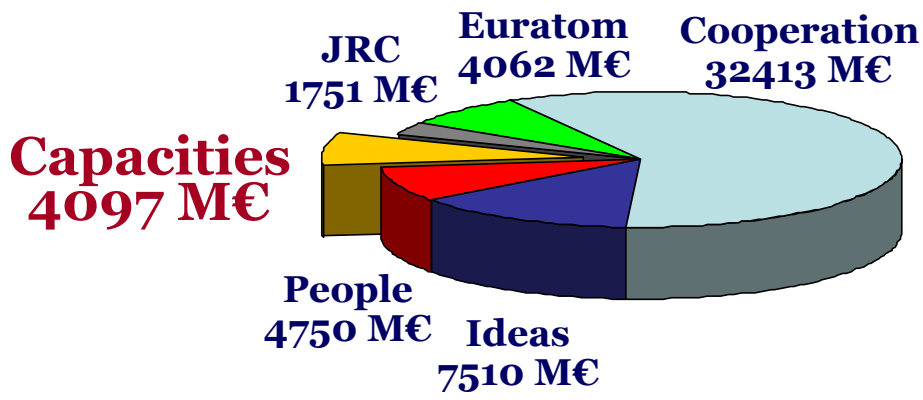
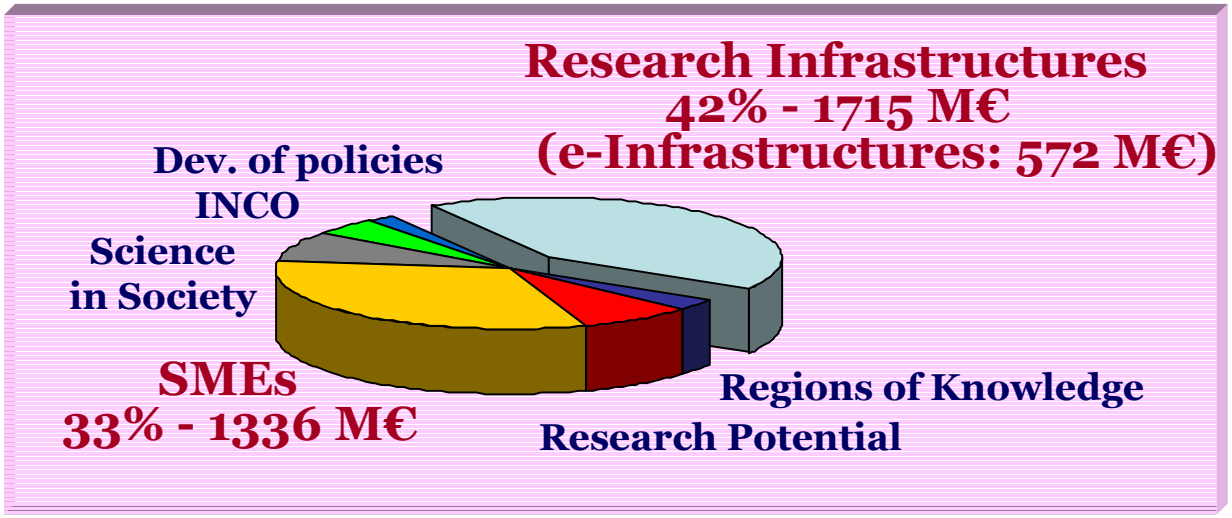
Research & Innovation defines the future of the nations - role of ICT

- Lisbon strategy: Research and Innovation are the most important factors in determining Europe's success through next decades
- Innovation is the societal and economic manifestation of hope *("Innovate America", Dec 2004)*
- ICT: EU's most innovative and research intensive sector (standing for 25% of total EU research effort, 5.6% of GDP, and 45% of EU productivity gains in 2000-2004) *(EU i2010 Annual Report 2006)*
- However in ICT research Europe invests half as much as its main competitors; EU growth (2% in 2006) still well below annual GDP growth in the US (2.7% on average in 2000-2005)

EU efforts to support SMEs

Framework Programme 7 (2007-2013)





Research for the benefit of SMEs in the context of FP7

Objective

- Aim is to strengthen the 'innovation capacity' of SMEs in Europe and their contribution to the development of new technology based products and markets. The programme will help them outsource research, increase their research efforts, extend their networks, better exploit research results and acquire technological know how, bridging the gap between research and innovation.

Actions

- Supporting SMEs outsourcing research activities
- Developing and coordinating support to SMEs at national level (Financial support [e.g. Art.169], coordination through **ERA-NETs**,…)
- Support measures

http://cordis.europa.eu/fp7/capacities/research-sme_en.html

The Competitiveness and Innovation (CIP) Framework Programme

Objective

- Provide a single, coherent legal basis for all Community action relating to competitiveness and innovation within the framework of the Lisbon Strategy. Covers entrepreneurship, industrial competitiveness, SME policy innovation, ICT development & use, environmental technologies and intelligent energy. The CIP is expected to result in greater coherence and more synergies between different Community support measures.

Work-programmes

- Entrepreneurship & Innovation Programme, with special focus on SMEs
- ICT Policy Support Programme, supporting use of ICT in businesses
- Intelligent Energy Europe Programme

Budget:

- 4,213 M€ (2007-2013)

http://cordis.europa.eu/fp7/cip_en.html

http://ec.europa.eu/cip/index_en.htm

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Entrepreneurship & Innovation Programme (EIP)

- Better access to finance for SMEs through venture capital investment and loan guarantee instruments
- Business and innovation support services delivered through a network of regional centres
- Promotion of entrepreneurship and innovation
- Support for eco-innovation
- Support for policy-making that encourages entrepreneurship and innovation

ICT Policy support Programme (ICT PSP)

- Developing a single European information space
- Strengthening the European internal market for ICT and ICT-based products and services
- Encouraging innovation through the wider adoption of and investment in ICT
- Developing an inclusive information society and more efficient and effective services in areas of public interest
- Improving quality of life

Intelligent Energy Europe (IEE)

- Fostering energy efficiency and the rational use of energy sources
- Promoting new and renewable energy sources and energy diversification
- Promoting energy efficiency and new energy sources in transport

Grids – a technology (potentially) suitable for business

Enterprise IT pain-points

Martin Walker, HP, EGEE'06 (Geneva, Sep. 2006)

IT executives will invariably list at least some of these as their principal issues

- Increasing data-center complexity
- Increasing management/administration spending
  - Think of this as the staff/asset ratio
- Low resource utilization
- "Brittle" nature of IT resources
- Inability to share resources
- Lack of alignment and sync with the business
- Heterogeneity
- Application provisioning and life cycle management

Transformation via "grid"

Martin Walker, HP, EGEE'06 (Geneva, Sep. 2006)

Today	Future
Labor intensive IT administration	Automated administrative tasks
Islands (silos) of technologies (OS/architecture dependent)	Modular re-deployable hardware and applications
Dedicated server and/or application stacks	Reconfiguration and scaling without physical rewiring
Static production deployment	Model-based deployment/flexing
Multi-O/S, multi-architecture data center environments	Run IT as a shared service utility
Cost/complexity improved primarily via IT consolidation	Resource utilization dynamically allocated

Conclusion

Martin Walker, HP, EGEE'06 (Geneva, Sep. 2006)

- The grid solution space is congruent to the enterprise problem space
- Caution needed here since it is a journey to make it true in practice
  - We are on the way but there is a long way still to go
- Top issues preventing Grid adoption:
  - Security
  - Social engineering
  - Standards
  - …

Grids in Industry

Tony Hey, Microsoft, OGF-20 (Manchester, May 2007)

- Google, Amazon, Yahoo, eBay & Microsoft are the major 'Cloud Platform' providers
- All have infrastructures of hundreds of thousands of servers
- Many large data centers, distributed across multiple continents
- Have developed proprietary technologies for job scheduling, data sharing and management
- Care about power consumption, fault tolerance, scalability, operational costs, performance, etc

Industry and Grid-standards?

Tony Hey, Microsoft, OGFF20 (Manchester, May 2007)

- Why are they not more involved in Grid standards?
  - –See competitive advantage in their proprietary infrastructure and proprietary services
- No need for interoperation between companies
  - –Will not see map-reduce tasks from Google being offloaded to Amazon's infrastructure any time soon
- Security and privacy are still major concerns
- Probably still cheaper for them to maintain their own infrastructure than to offload to someone else's

Customer demand can drive interoperability solutions

Tony Hey, Microsoft, OGFF20 (Manchester, May 2007)

Example of Security

- Customers want secure access/confidentiality no matter what service they use
- No competitive advantage in doing simple security in a proprietary way

  - Customer demand is forcing Microsoft's Passport, Google's ID, Liberty Alliance, OpenID to interoperate

- More complicated 'VO' scenarios have yet to be proven widely useful

  - Require cross organization trust, credential delegation, id federation
  - VOs required for some research collaborations
  - …

Well informed customers (e.g. SMEs) can maximise benefit of their investment in IT-solutions!

Roles the e-Infrastructures (can) play

EU investments in grid-research and grid research infrastructures

FP7: 100 M€ in 2007 (estimate)

FP6 (2003-2006): 300 M€

FP5 (1998-2002): 50 M€

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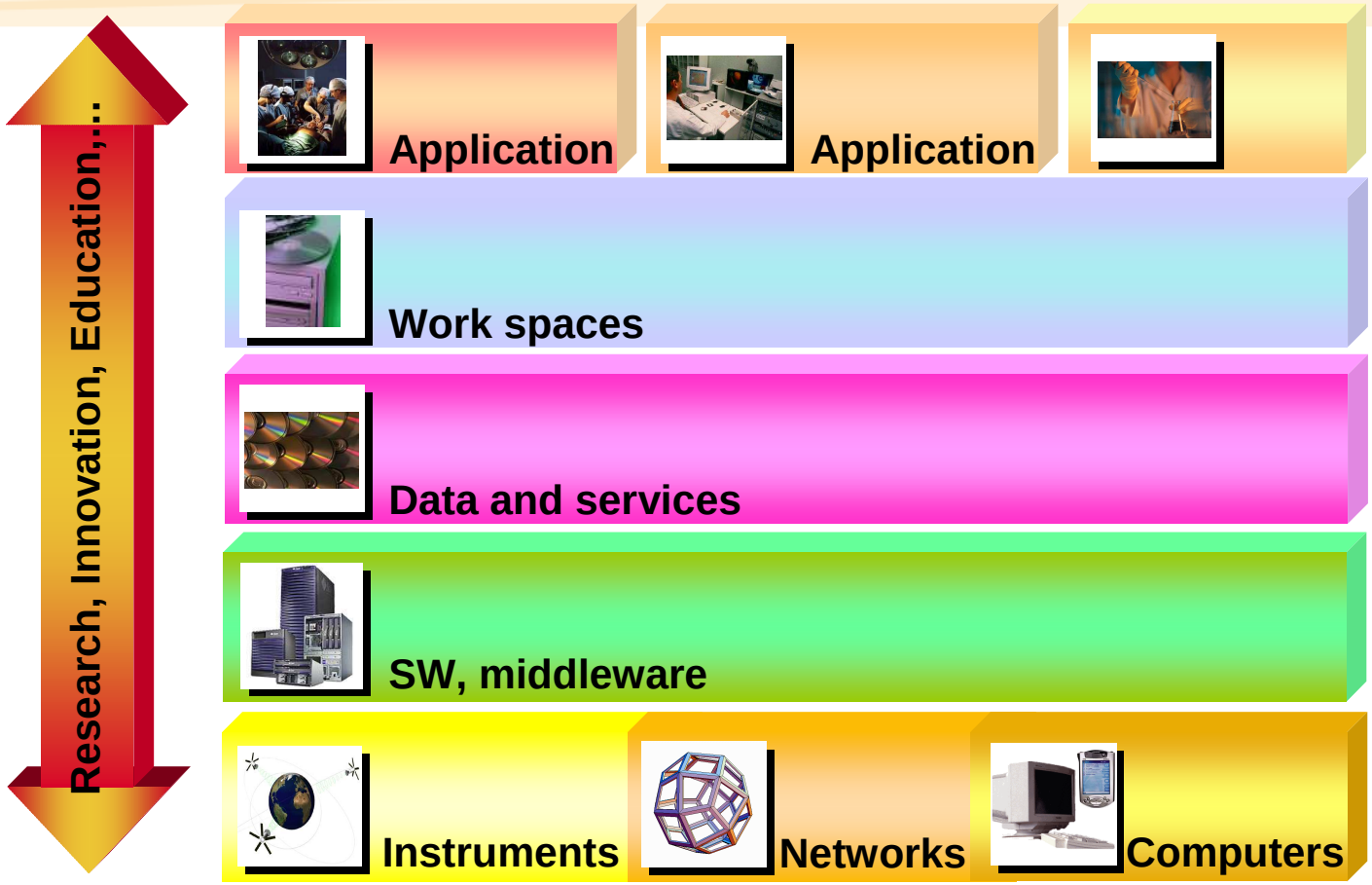
e-Infrastructures

Domain-independent ICT-based RIs designed to support research; they integrate in a seamless way networks, computers, SW, data resources, experimental & training facilities to enable collaborative science & engineering



www.cordis.europa.eu/fp7/ict/e-infrastructure/

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e-Infrastructures

Domain-independent ICT-based RIs designed to support research; they integrate in a seamless way networks, computers, SW, data resources, experimental and training facilities to enable collaborative science and engineering

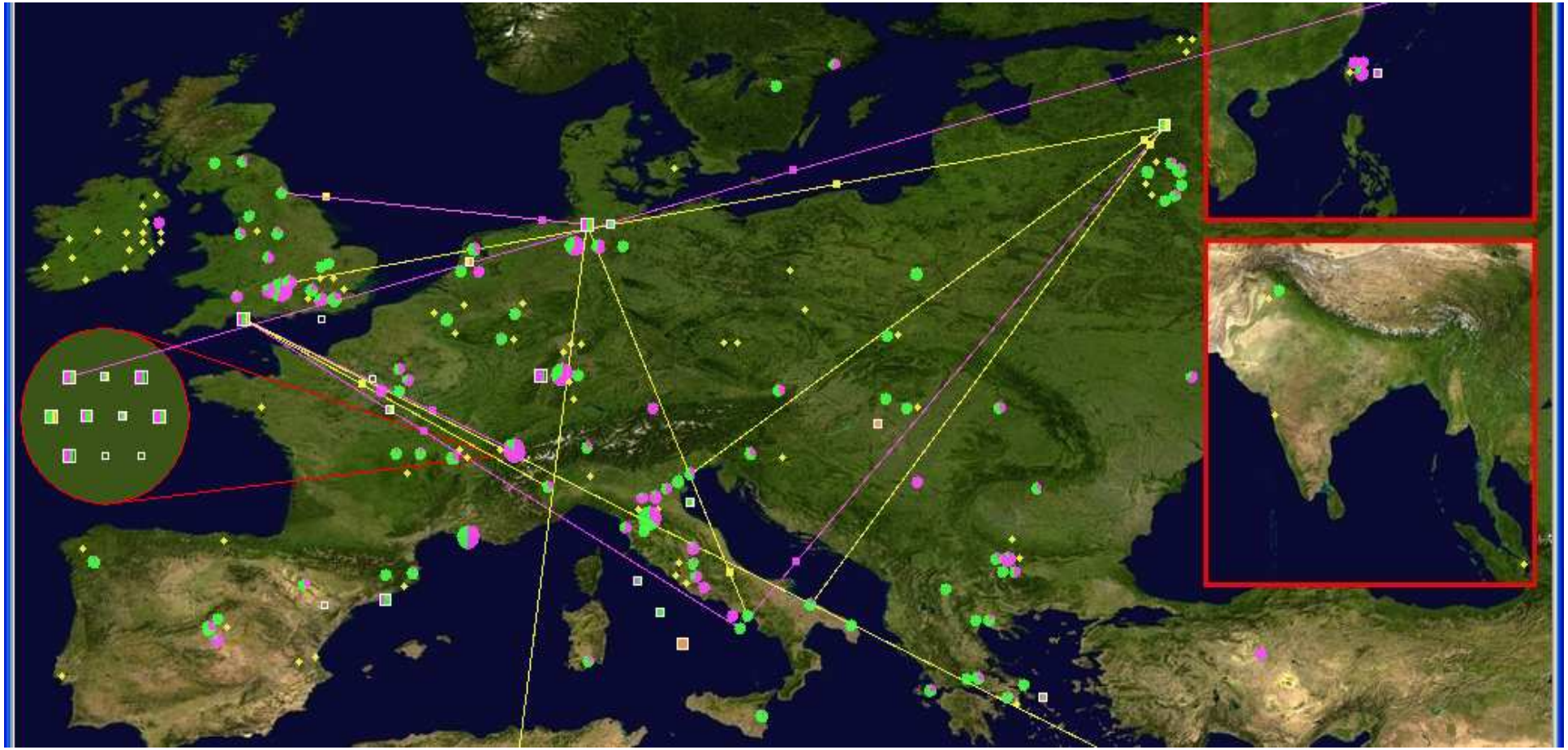
- **enabling researchers to face new challenges**
- **creating new methods in doing science & engineering**
- **building economies of scale, creating larger economic effects**

EGEE: global collaborations in science

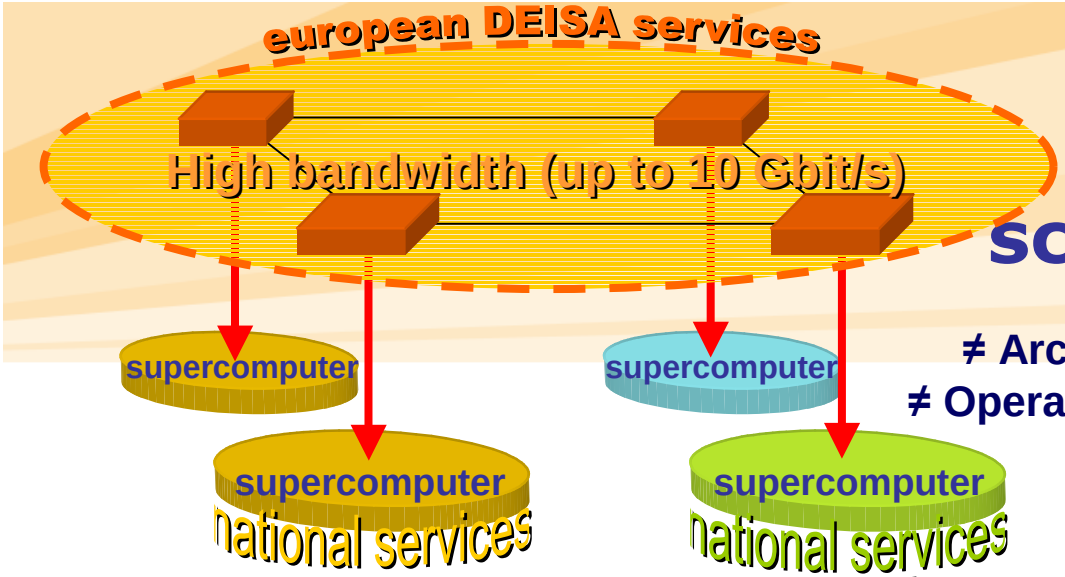
- ~ 500 sites in 40 countries
- > 60 Virtual Organisations
- ~ 30 000 CPUs
- > 5 PB storage
- > 20 000 concurrent jobs/day

- Scientific communities

High Energy Physics	Biomedics
Astrophysics	Earth Sciences
Computational Chemistry	Finance
Fusion	Geophysics
Life Sciences	Multimedia…



DEISA: High End Computing for next science breakthroughs



≠ Architectures
≠ Operating systems

21.900 processors and 145 TF in 2006, more than 190 TF in 2007

AIX IBM domain


RZG (DE)


IDRIS (FR)


ECMWF (UK)

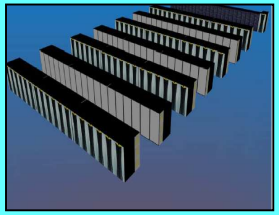

CSC (FI)


CINECA (IT)


FZJ (DE)

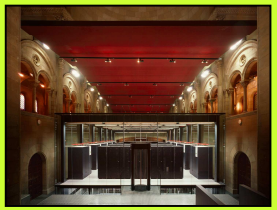
LINUX SGI


SARA (NL)


LRZ (DE)

High Performance Common Global File System

LINUX Power-PC


BSC (ES)

GÉANT: linking the world

Portfolio of projects

Geographical expansion of collaboration

Eastern Europe, NIS, Caucasus	OCCASION, PORTA OPTICA STUDY
Latin America	ALICE, EELA, AUGERACCESS
Asia (China, India etc)	TEIN2, EUChinaGrid, EC-GIN, Orient, EUIndiaGrid
Baltic States	BalticGrid
Mediterranean	EUMedConnect, EUMedGrid, ITHANET
South-Eastern Europe	SEEREN-2, SEEGRID-2

e-Infrastructure

New Applications

Molecular, Clinical	ITHANET
Bioinformatics, Biology	BioInfoGrid
Civil Protection	CYCLOPS
Astronomy	EuroVO-DCA, EXPRES
Earth science	DEGREE
Chemical	Chemomentum
Industrial Applications	SIMDAT
Grids/GÉANT & DLs	DILIGENT,DRIVER
Applications on IPv6	6DISS, IPv6TF

Support, Enhancements

Synergy, Outreach, Training	BELIEF,Go4IT,Iceage
Security, Policy support	ISSeG, E-IRGSP
SW-interoperability, testing	OMII-Europe, ETICS
Grid services *(interactive, workflow-centric, quasi-supercomputing,…)*	int.eu.grid, KnowARC Chemomentum QosCosGrid
Control remote instruments	GridCC, RINGrid
Traffic Monitoring, e2e QoS	Lobster, Phosphorus
Optical networks	MUPPED
Connected Test-beds/NREN	EUROLabs, WEIRD

e-Infrastructures as icebreakers for industry

- Technology validation in real world settings (communities of practice, test-beds, production-quality facilities, sustainable environments)
- Academia-Industry partnerships → innovation
- Policy challenges
- Education/Training → skilled workforce
- Support to standards
- *New:* Pre-commercial procurement

Enhancing interaction between e-Infrastructure and industry groups?
- Can Technology Parks play a role there?

- e-Infrastructures principally play a bottom-up role in enhancing deployment of new technology (e.g. by industry) *(lowering barriers, providing skilled workforce, demonstrating use of technology in real-world settings…)*
- Extending their reach to industry mainly involves more intensive interaction between research and industry groups
- Technology Parks, NGI/EGI could provide mechanisms for that
- More than one scenarios possible (Grid nodes, Data Centres, Training/Education/Consultancy schemes…)
- National and European dimension

Examples

- Australia's first Access Grid node was built at Sydney VisLab at the Australian Technology Park in August 2001
- MCNC (NC,USA):
  - AccessGrid for Education/Training
  - Grid Technology Evaluation Centre (GTEC)
    - Testbed for Grid Technology (free use by industry)
      - Standards, interoperability, heterogeneity, integration, deployment, implementation,…
    - Education and Training
      - Grid partners and customers
      - Create awareness for grid benefits
      - ROI, TCO, Time to Market, Productivity
      - Best practices, use cases,…
    - Benefits for Partners
      - Early access to a professional and independent testing and evaluation facility
      - Real-life production environment
      - Heterogeneous components; meet the competition
      - Come in with customers to build customized solutions
- CERN OpenLab…

NGI/EGI: new opportunities

Some functions under consideration:

- Operation of a Grid infrastructure
- Coordination of middleware development and standardization
- Development and operation of build and test systems
- Components selection, validation, integration and deployment
- Mechanisms for resource provisioning to Virtual Organisations
- Application support
- Training efforts
- Outreach and dissemination
- Policy and international cooperation

The NGI/EGI activity space is congruent to the enterprise problem space

Some conclusions

- A rich set of instruments at EU level to support SMEs
- Grids: well informed customers (notably SMEs) can increase demand for interoperability, better solutions by vendors
- e-Infrastructure:
  - integrates broad range of technologies, services, actors
  - One of largest production quality grid-based facilities in the world – *this could be further explored by business!*
- Increasing interaction between e-Infrastructure & industry groups enhances know-how transfer and rate of deployment of new technology by business

  (Technology Parks can provide an interesting mechanism for that)
- Combining EU instruments (e.g. ERA-NETs, e-Infrastructures schemes, Structural Funds etc) can maximise benefit to SMEs

Info on FP7 Calls: http://cordis.europa.eu/fp7/dc/index.cfm