

e-Infrastructures for connectivity and information processing: EC viewpoint

Workshop
Aveiro, 24 May 2011

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Géant and e-Infrastructures

The policy perspective

- **ERA and “5th freedom” in Lisbon Treaty**
- **ICT infrastructures for e-Science** (March 2009)
- **EU2020: smart, sustainable and inclusive growth** (March 2010)
 - Digital Agenda
 - Innovation Union

Consultation on next Framework Programme

- CSF, Feb 2011

E-Infrastructures Strategic orientations

ICT infrastructures for e-Science

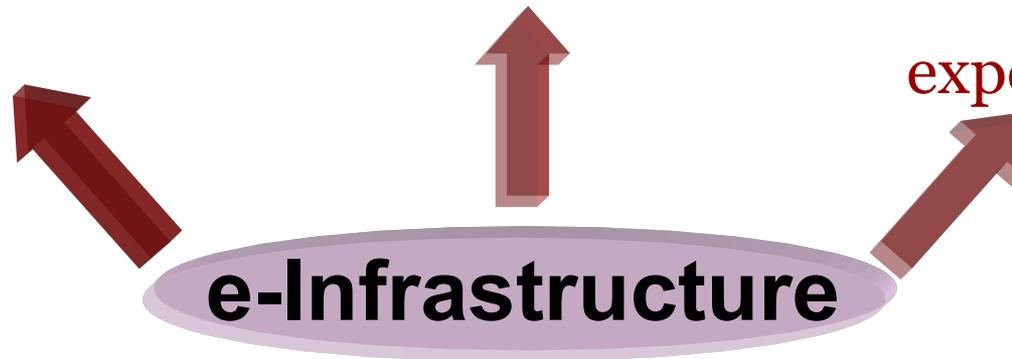
COM(2009) 108

Three vectors of a renewed European strategy:

Europe as hub
of excellence in
e-Science

**Sustainable and
continuous services**
of production quality
24/7

Innovation by
exploiting know-how
beyond science
(public services,
large scale
experimentation,...)



European HPC update

- IDC: Europe lost 10% of its HPC capabilities in the last 2 years while Asia and the US increased by 30% and 40%
- China overtakes Europe (all 27 Member States combined) in terms of HPC capacities available
- Fragmentation of European HPC efforts across countries: PRACE unites efforts at top of pyramid
- Very little use of pre-commercial procurement
- Europe has full value chain of HPC including some system production capabilities (but EU IPR often benefits others)
- Race to exascale offers new opportunity
- Europe strong in application software but lack of structure

Towards a European HPC Strategy

Basic elements:

- **High ambition**
 - Europe addressing grand challenges through HPC and winning the exascale race
- **More investment**
- **Deploying services for industry and SMEs**
- **Ensuring European native capability in systems and software**
- **Linking supply and demand through PCP**
- **Governance**

Communication on HPC in December 2011

Towards a European Cloud Strategy

Clouds for Science (1)

Digital Agenda for Europe:

"Ensure sufficient financial support to joint ICT research infrastructures and innovation clusters, develop further eInfrastructures and establish an EU strategy for cloud computing notably for government and science"

Three broad areas of the cloud strategy (presented by VP Neelie Kroes in Davos) :

1. Legal framework: users' rights; data protection and privacy, including the international dimension of cloud computing.
2. Technical and commercial fundamentals: support research and focus on critical issues such as trust & security and availability of cloud services; standardisation and interoperability are very relevant in this context.
3. Market: support to pilot projects aiming at cloud deployment to stimulate demand.

Clouds for Science (2)

Relevant activities:

- eIRG white papers; eInfranet workshop
- VENUS-C and StratusLab as initial deployments to evaluate potential of clouds
- Progressive deployment of clouds and virtualisation technologies in EGI (focus of EGI Technical Forum)
- SIENA European roadmap on grid and cloud standards for eScience and beyond



How will clouds affect existing e-Infrastructures?

How to deploy? What level (Institution/nation/EU/community...)?

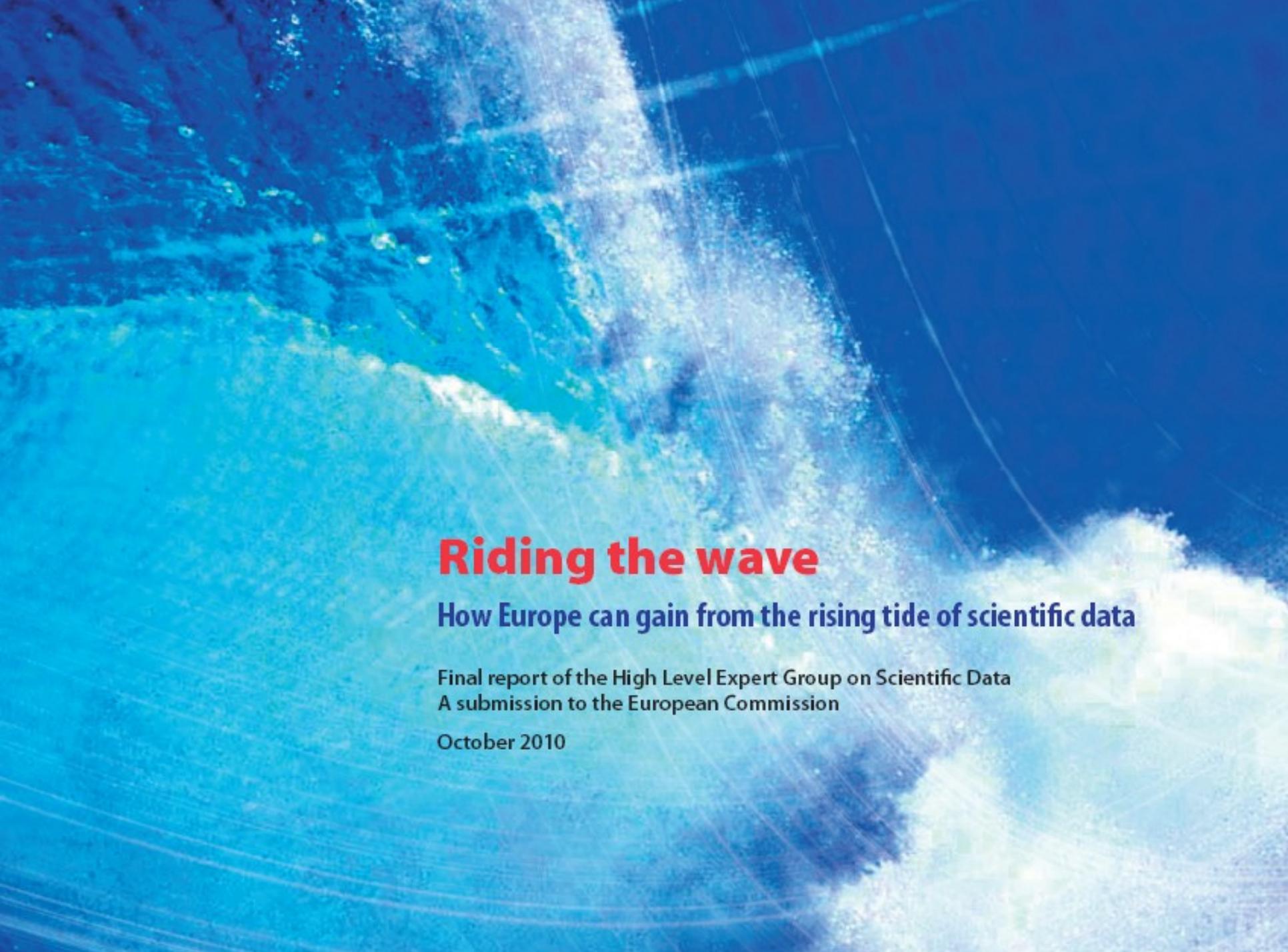
What business model? What relation to industry?

How can the “market weight” of e-Science promote European policies?

Géant Experts Group

- Articulate a 2020 vision and action plan for European Research and Education Networking
- Set up in December 2010; to deliver report to Vice-President Kroes in Autumn 2011
- Interviews with stakeholders: Dante, Surfnet, DFN, Bavarian CIO, Terena, Janet, Internet2, CERN, EBI, JIVE, CLAREN, Alcatel-Lucent, Level3, ETNO, Elsevier, Nordunet, e-IRG, ...
- Composition:
 - Ziga Turk (Chair)
 - Arnd Bode, Vassilis Maglaris, Dorte Olesen, Roberto Saracco, Peter Tindemans, Pedro Veiga



An aerial photograph of a large waterfall cascading down a rocky cliff into a pool of water. The water is a vibrant blue, and the surrounding landscape is rugged and mountainous. The waterfall is the central focus, with water splashing and creating white foam as it falls.

Riding the wave

How Europe can gain from the rising tide of scientific data

Final report of the High Level Expert Group on Scientific Data
A submission to the European Commission

October 2010

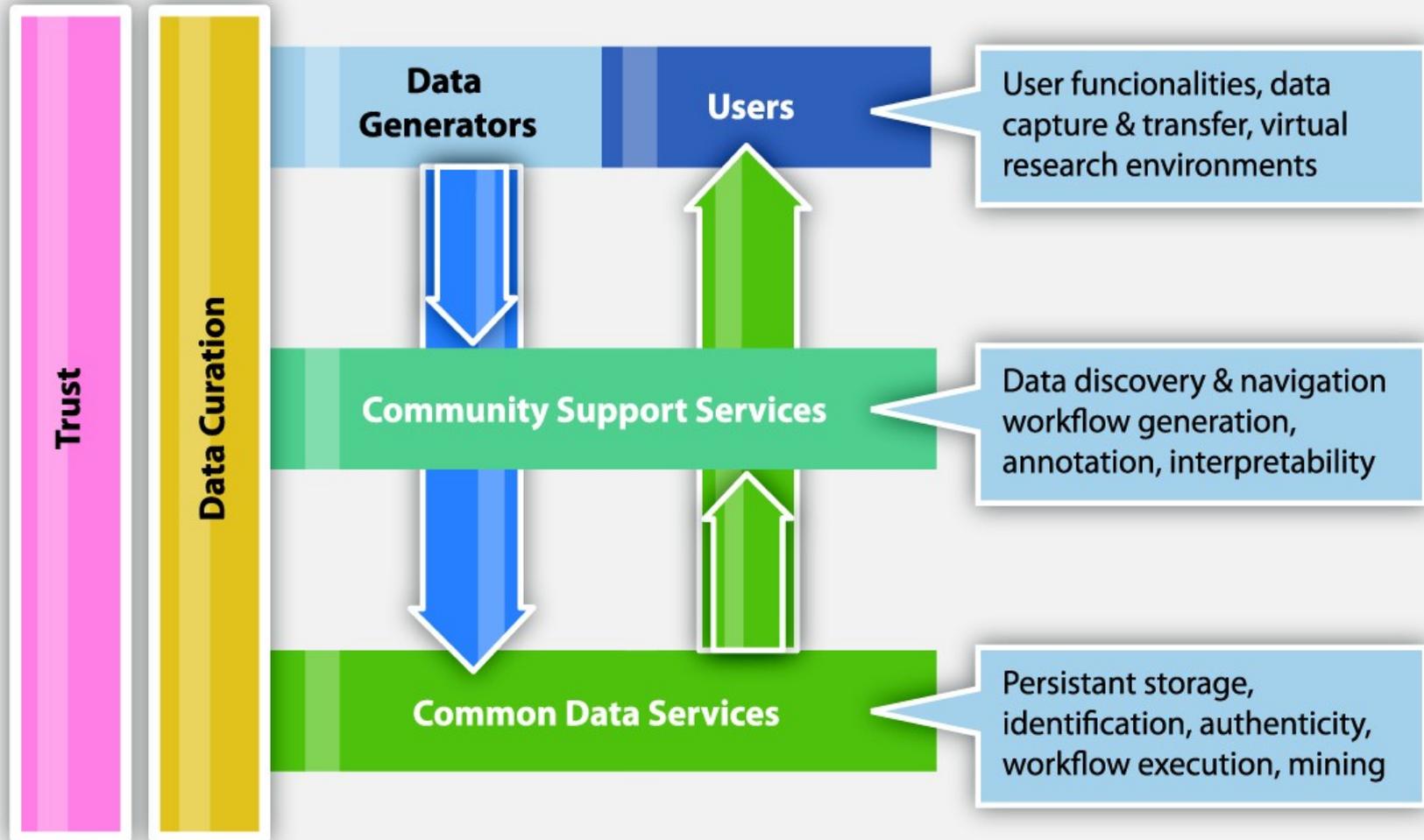
vision 2030

high-level experts group on Scientific Data

“Our vision is a scientific e-infrastructure that supports seamless access, use, re-use, and trust of data. In a sense, the physical and technical infrastructure becomes invisible and the data themselves become the infrastructure – a valuable asset, on which science, technology, the economy and society can advance.”

high-level experts group on Scientific Data

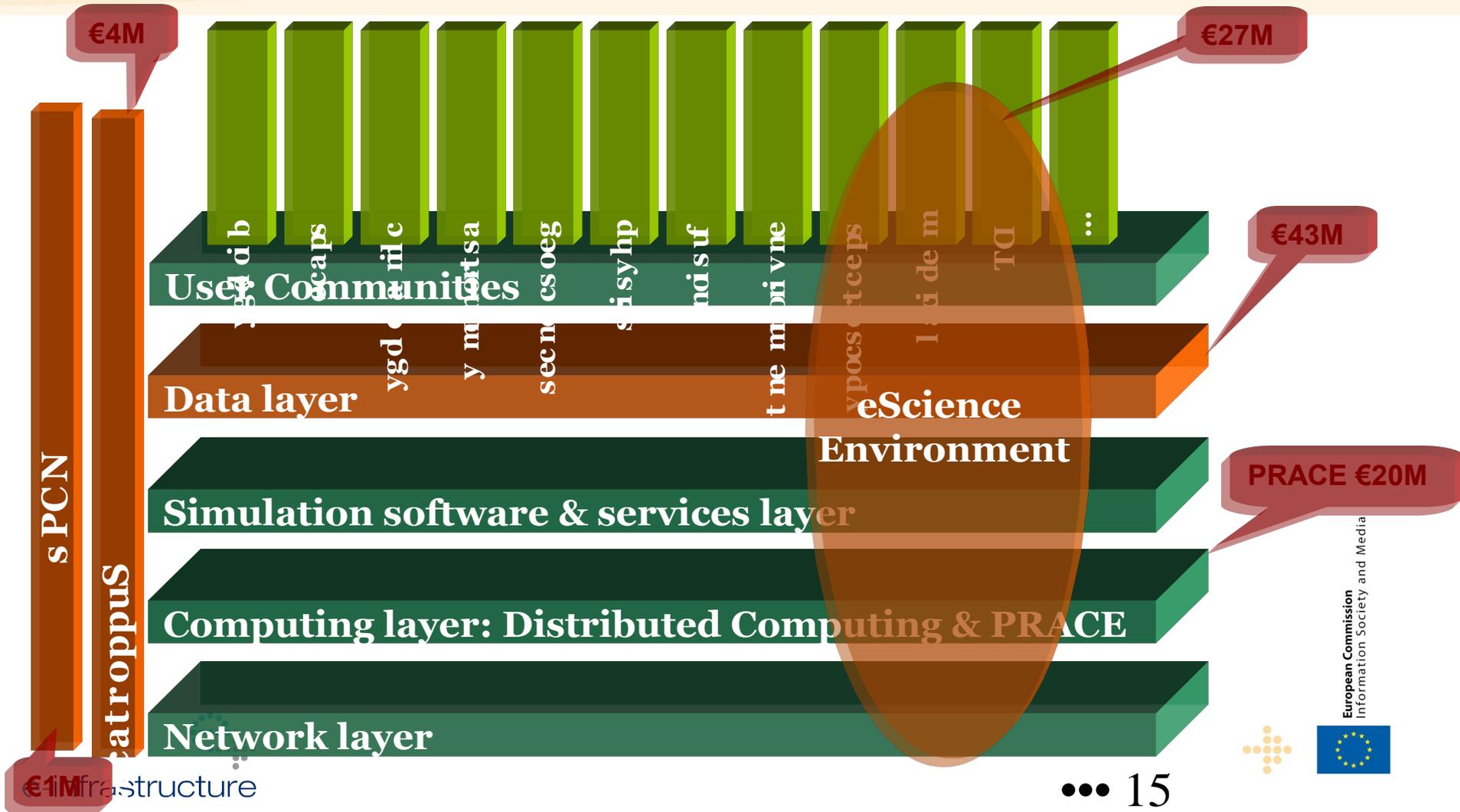
The Collaborative Data Infrastructure - a framework for the future



Update on RI Call 9



e-Infrastructures Call 9



Call 9: e-Science environments

Scientific areas covered by proposals

- Good number of proposals pursue multidisciplinary activities, others are focused on specific research areas, covering a wide range of disciplines
 - Earth Sciences (4)
 - Astronomy (3)
 - Spectroscopy (1)
 - Chemistry (1)
 - Bio-sciences (4)
 - Medicine (3)
 - ICT (3)
 - Technology Enablers (6)

Future opportunities and perspectives

Research Infrastructures calls in FP7

- Call 10 (July 2011 – November 2011)
 - Support to existing RI
 - Support to new RI
 - Third implementation phase of PRACE
 - Support to policy development and programme implementation
 - International cooperation with the USA on common data policies and standards relevant to global research infrastructures in the environment field and on common e-infrastructure for scientific data
 - Coordination actions, conferences and studies
- Call 11 (July 2012 – November 2012)
- 2013 deployment, operation and evolution of the pan-European high-capacity and high-performance communication networking (GÉANT)

Future perspectives - CSF

- Vision: e-Infrastructure as a service to get “every researcher digital”
- e-Infrastructures in CSF: what, for whom and how much
- Communications on HPC and on Access to Scientific Information
- Topics being discussed
 - Services to industry, education, citizens, public sector,...
 - Cloud computing
 - Relation between ICT innovation and e-Infrastructure deployment
 - Governance and financial models
- International dimension important

Why a Common Strategic Framework?

- Increasing IMPACT -

- **FROM** different priorities in each programme and initiative
 - **TO common strategic priorities**, focusing on societal challenges, competitiveness and research excellence
- **FROM** gaps between the stages (R&D, demonstration, market take up, etc)
 - **TO coherent support for projects and organisations** across the innovation cycle

Why a Common Strategic Framework?

- Achieving SIMPLIFICATION -

- **FROM** a large variety of funding schemes within and between programmes
 - **TO a rationalised toolkit** of schemes across the Common Strategic Framework
- **FROM** different rules in each programme and initiative
 - **TO more standardised rules** across all initiatives – which meet the different needs and with flexibility where needed
- **FROM** multiple websites, guidance documents, applications
 - **TO common entry point**, one stop shop, common IT platform

Questions for consultation ...

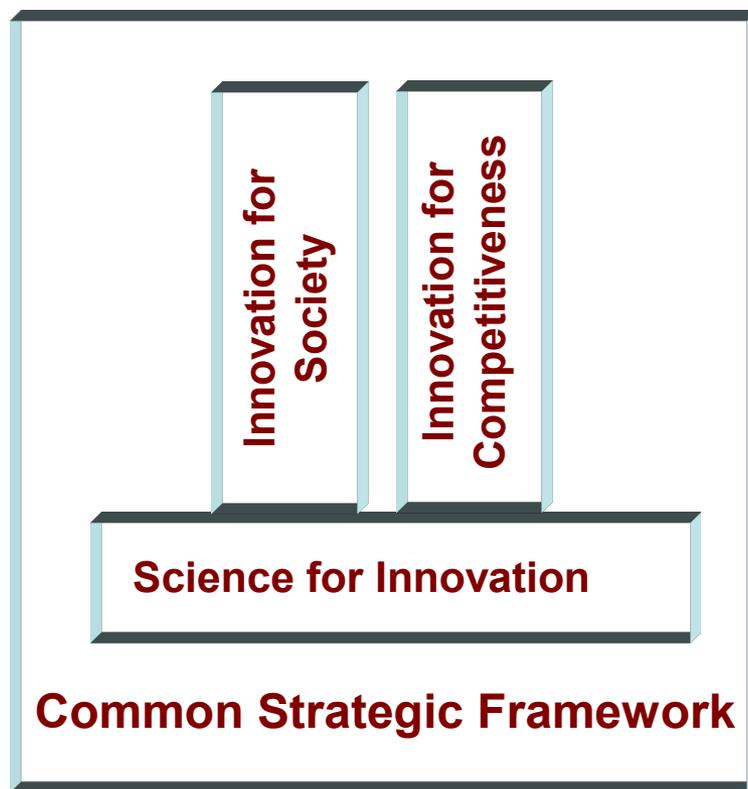
- Working together to deliver on Europe 2020
 - e.g. where to act at EU level? ...
how to best pool / leverage resources? ...
- Tackling societal challenges
 - e.g. how focus on societal challenges affect balance
curiosity-driven research / agenda-driven activities? ...

... Questions for consultation

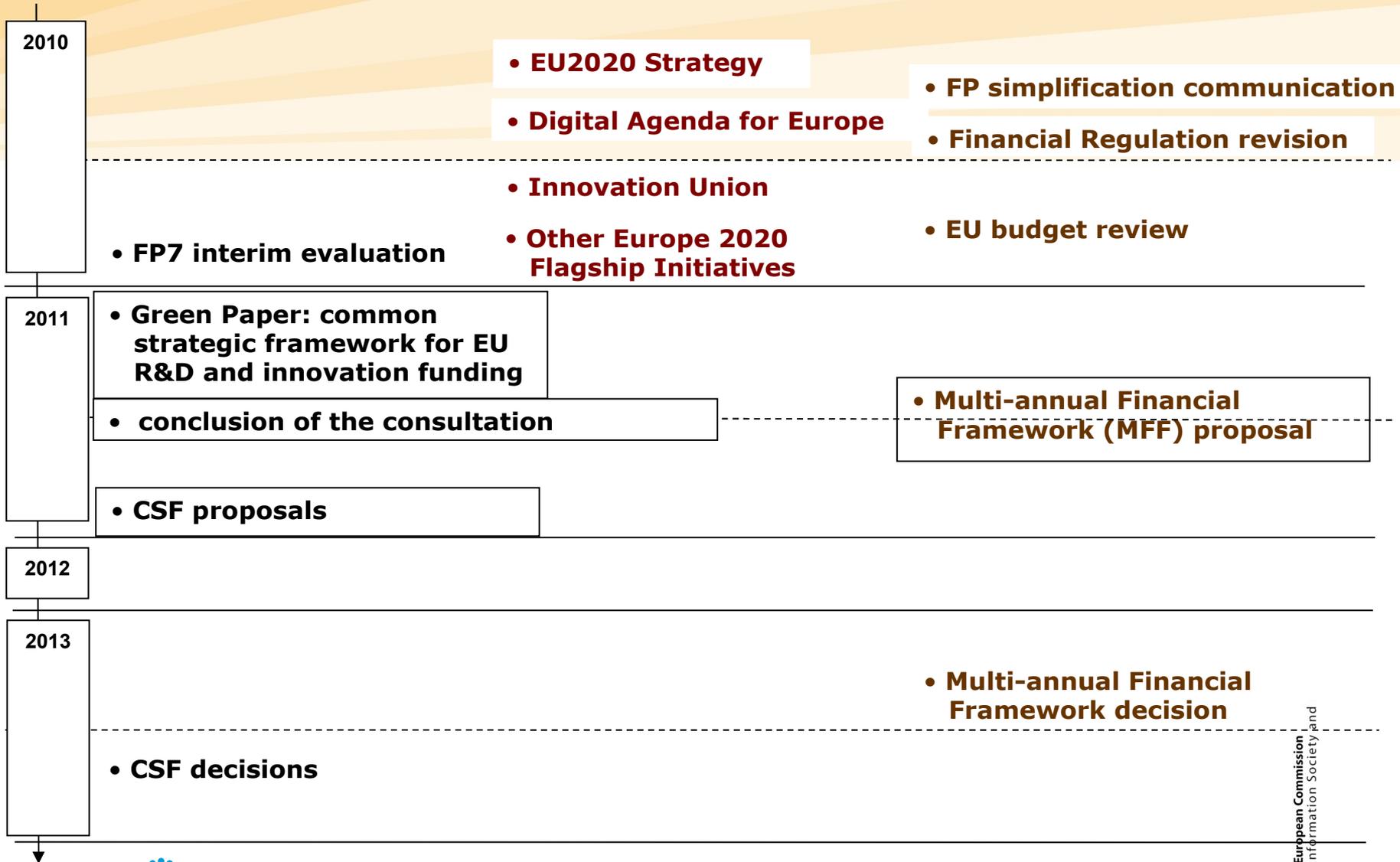
- **Strengthening competitiveness?**
 - e.g. how to strengthen industrial participation? ... JTIs? PPPs? ETPs? ... how to support SMEs? ... open schemes? ... pre-commercial procurement? ...
- **Strengthening the science base and the ERA**
 - e.g. ERC? ... Marie Curie actions? ... research infrastructures? ... int'l cooperation? ...

Research infrastructures in CSF

- Three main components
- RI's under “Science for Innovation



Timeline



... Questions for the radio astronomy community 1

- E-infrastructures forerunners (not only for radio astronomy)
 - Dynamic allocation of bandwidth, network caching, intensive cloud computation, HPC etc. ...
- Ability to be a model for integration both in technology and governance areas
 - Understanding best practices in multi-domain international collaboration projects

... Questions for the radio astronomy community 2

- Are there any generic ICT challenges for SKA
 - Identify specific and reusable technologies and interact with industry and standardisation bodies
- Ability to disseminate developments to other communities
 - bridging the gap with ICT experts in other astronomy disciplines and even wider
- Develop further the understanding of the economical and societal impact of the envisaged infrastructures

Connecting
the finest
minds

- Linking ideas at the speed of light

Sharing the
best scientific
resources

- Harnessing the unlimited power of computers, instruments and data

Building virtual
global research
communities

- Innovating the scientific process



e-infrastructure



géant | grids | scientific data | supercomputing

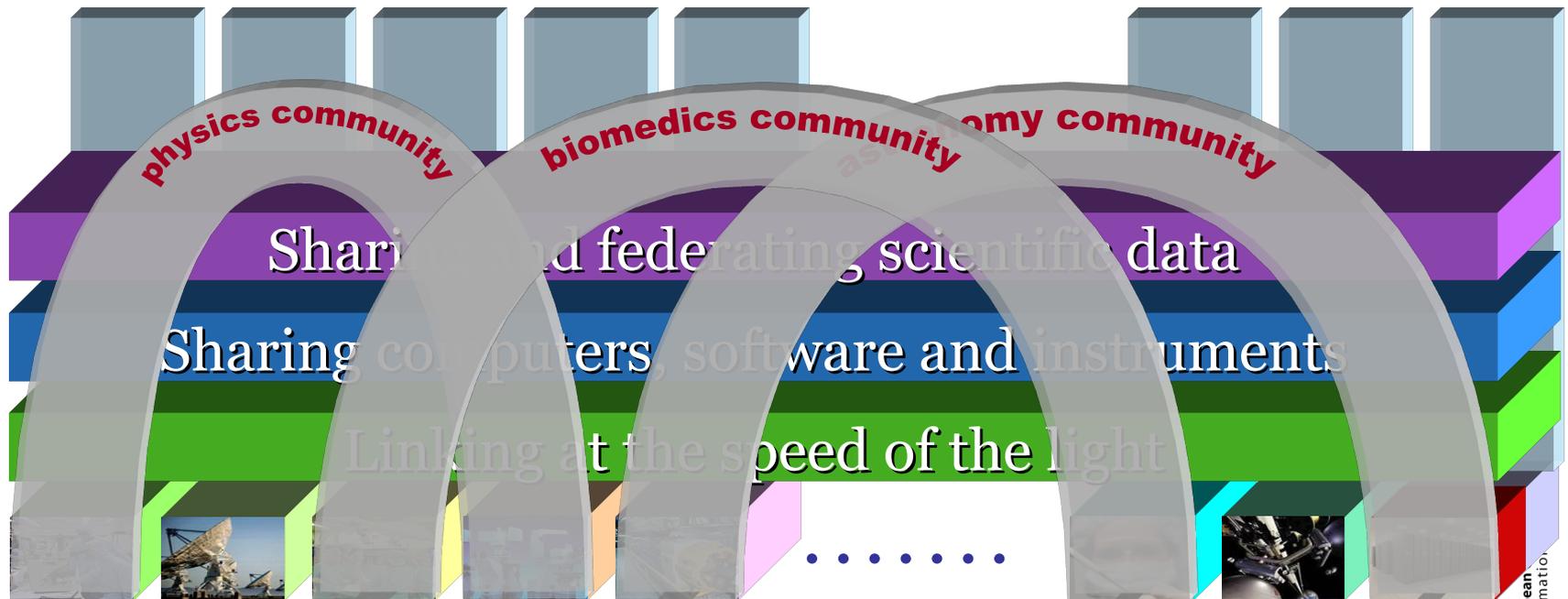


Additional slides



e-Infrastructures Vision

empower research communities through ubiquitous, trusted and easy access to services for data, computation, communication and collaborative work



Scientific facilities, research communities

Competitiveness Council

Conclusions of 3 December 2009 (1/2)

Member States should (art. 15):

- Coordinate investments in ICT research infrastructures in order to develop research and innovation clusters
 - FI, HPC, green ICT, nano, cognitive, photonics, embedded,...
- Foster trans-national coordination of e-Infrastructures
 - Optimise resources
 - Seamless and safe access for end users

The Commission should (art. 16):

- Propose financial incentives for jointly developing and sharing research infrastructures in ICT



E.g. in exa-scale computing



Competitiveness Council

Conclusions of 3 December 2009 (2/2)

Member States and the Commission should (art. 17):

- **Extend e-Infrastructures** to industrial research and innovation, to public services and SMEs
- Explore **governance models** for efficient, seamless and technologically leading public services
- Examine incentives for **pre-commercial procurement**, including for the deployment of e-Infrastructures
- Better coordinate efforts and develop/share strategies in key areas such as [...] the GEANT network; avoid fragmentation
- **Pool investments in HPC under PRACE**
 - ...use, development and manufacturing
- Major research infrastructures to enjoy e-I support
- Broaden **access to scientific data** and open repositories and ensure **coherent approach to data access and curation**