The role of e-Infrastructures in PPP activities in ICT and in Future Internet R&D

Mauro Campanella

e-IRG Workshop, Budapest, 4-5 April 2011

Consortium GARR

A daunting subject… thoughts from a technologist

Agenda:

- The e-Infrastructure for/based on ICT now
- EC efforts for PPP in ICT
- The Future Internet PPP initiative
- Issue on establishing a PPP for an e-Infrastructure based on ICT (from personal experience).

e-Infrastructures now

- Various layers: communication, computing, data and services - are required to create pan-European virtual centers of excellence
- "Data Infrastructure" and user communities are becoming the key players
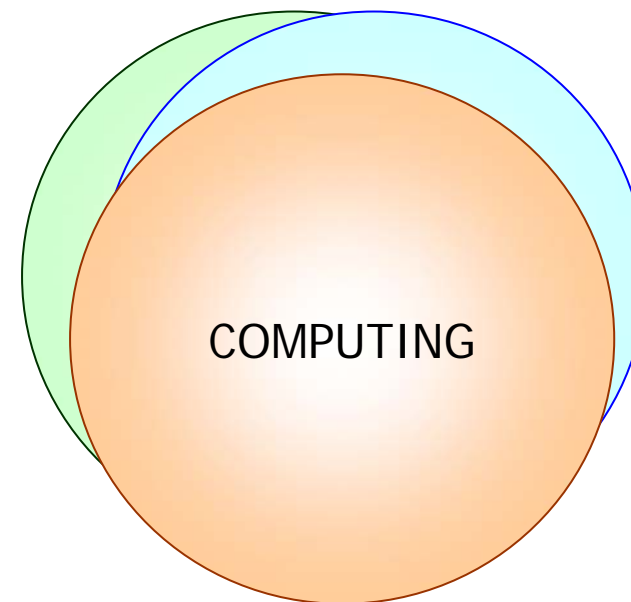- Convergence of all areas to user ICT-based networked e-Infrastructures
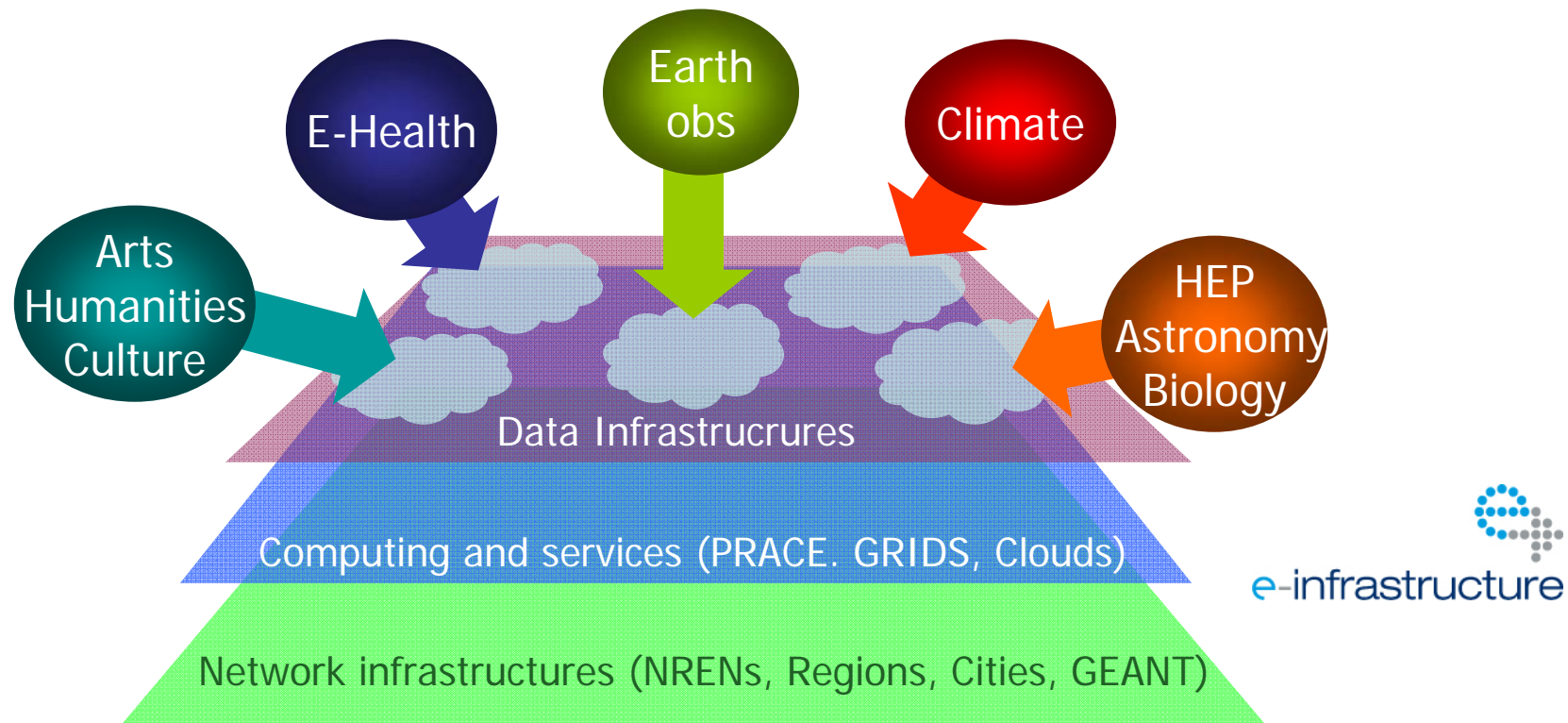
The e-Infrastructure layer evolution

QuickTime™ and a
decompressor
are needed to see this picture.
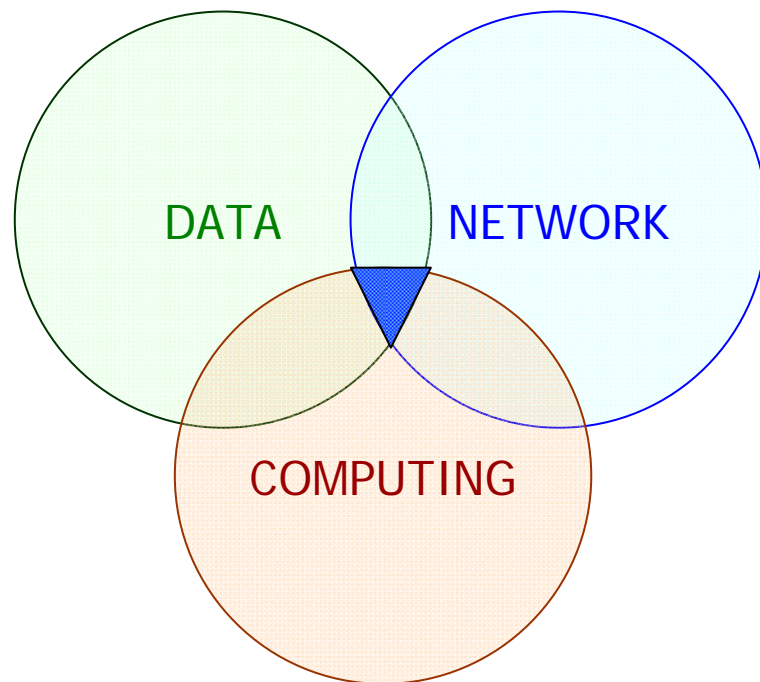
Today

In all area, from transport to e-Health
all layers are needed at the same time

Yesterday

DATA

NETWORK

COMPUTING

COMPUTING

A large, neutral, multidomain Europe wide
environment containing all layers is needed to
support innovation. It must be of production
quality and neutral to technologies

• The e-Infrastructure *for research*

- The e-Infrastructure we are interested in are

    - Targeted to support research from entities other than the managing ones

    - Have a need to be subject themselves of research

- To reach the ERA and Future Internet goal of a 'smarter' environment all the layers, communication, computing, data and services must be used to create the e-Infrastructure for the user.

- The services offered are non-standard and not in competition with available commercial ones. Even the communication layer requires multi-domain, innovative services. A research and development effort has to be devoted to the infrastructure itself.

• The e-Infrastructure *for research*

- They have to evolve in a time scale typical of ICT market (one or two years) to offer a constantly up-to date service. This is different from other types of infrastructure which stay stable for long periods of time (e.g. roads, water distribution systems).

- Innovation and R&D may and should proceed in parallel at all layers. Different Public to Private partnerships (e.g. on fiber deployments or data management) may insist on the same e-Infrastructure

- Layer independence also allows different models to be trialed in parallel inside each layer, whilst providing the same service to the user (e.g. GRID and Clouds).

Private to Public Partnership in EC ICT

The European Commission is encouraging Private Investment in ICT Research and Innovation through a number of initiatives:

- European Technology Platforms bring together companies, research institutions, and any other organisations, to define, at European level, a common strategic research agenda (SRA) which should mobilise a critical mass of national and European public and private resources

- Joint Technology Initiatives: In a limited number of cases, the scale of a research or technological objective and the resources involved justify setting up long-term public-private partnerships

- Joint Research Programmes: Member States sharing common needs and/or interests in a given research topic sometimes initiate jointly implemented national research programmes. Article 169 of the European treaty allows for the EU to also participate in such member state initiatives. In ICT there is one active JRP: ICT for Ambient Assisted Living (AAL).

- Pre-commercial Public Procurement: to drive innovation from the demand side

Private to Public Partnership

The ICT European Technology Platforms (ETPs) are : ARTEMIS, ENIAC, ISI (Satellites), eMobility, NEM (Electronic Media), NESSI (Software and Services) , EUROP (Roboticd), EPoSS (System Integration), Photonics21

Starting in 2005, six long-term public-private partnerships were identified in the "Cooperation" programme as a mean to implement the SRA in the form a Joint Technology Initiatives
"Innovative Medicines Initiative (IMI)"
"Embedded Computing Systems (ARTEMIS)"
"Aeronautics and Air Transport (Clean Sky)"
"Nanoelectronics Technologies 2020 (ENIAC)"
"Hydrogen and Fuel Cells Initiative (FCH)"
"Global Monitoring for Environment and Security (GMES)

In mid 2010, the European Commission has granted autonomy to the European Nanoelectronics Initiative Advisory Council (ENIAC)
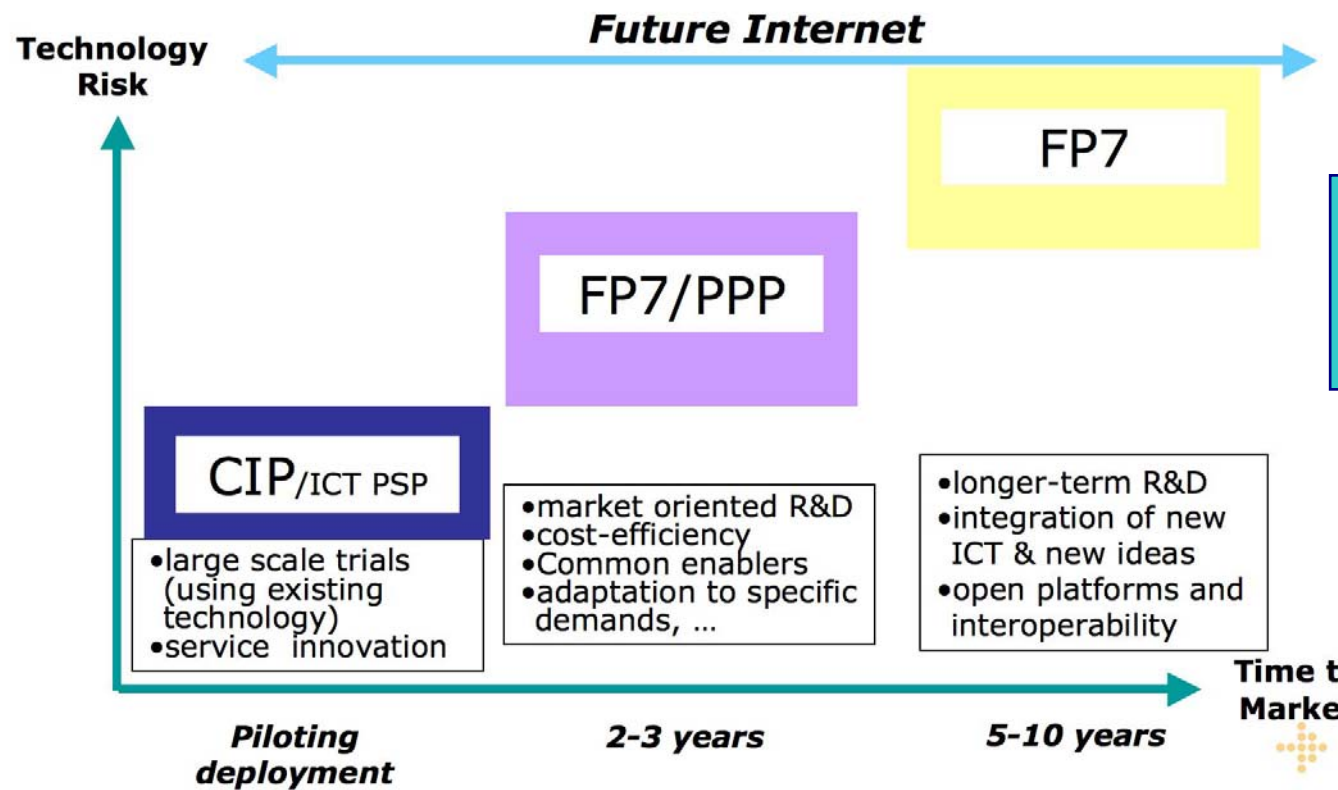
Private to Public Partnership in general

It refers to a government service or private business venture which is funded and operated through a partnership of government and one or more private sector companies.

The idea that private provision of infrastructure represented a way of providing infrastructure at no cost to the public has now been generally abandoned, but governments have come to rely on PPPs as an important means for the delivery of long-term infrastructure assets and related services.

The PPP is now effective procurement tool that is almost universally accepted.

Future Internet PPP (from M.Lemke)

Future Internet: A Comprehensive EU Approach

Future Internet

Technology Risk

FP7

FP7/PPP

CIP/ICT PSP

- large scale trials (using existing technology)
- service innovation

- market oriented R&D
- cost-efficiency
- Common enablers
- adaptation to specific demands, ...

- longer-term R&D
- integration of new ICT & new ideas
- open platforms and interoperability

European Commission Information Society and Media

Time to Market

Piloting deployment | 2-3 years | 5-10 years

The importance of the timescale for PPP in ICT !

Consortium GARR

Future Internet PPP (from M.Lemke)

Technology Foundation: FI Core Platform

- **Generic, trusted, open platform**
- **Capabilities and functionalities for**
  - upgraded network
  - information processing
  - sensor networks coupled to the Internet
  - versatile service infrastructure
  - real-time application
  - trust and identity
  - ad-hoc aggregation of resources
  → through open interfaces, API, SDK

Programme Architecture

- **Functionalities depend on the requirements of the use case scenarios**
- **Generic enablers → key feature in developing functionalities**
- **Build on existing research results and considering:**
  - system view
  - integration
  - adding missing components
- **Re-usable/composable in multiple usage contexts**
- **3rd party access under fair and open conditions (FRAND)**
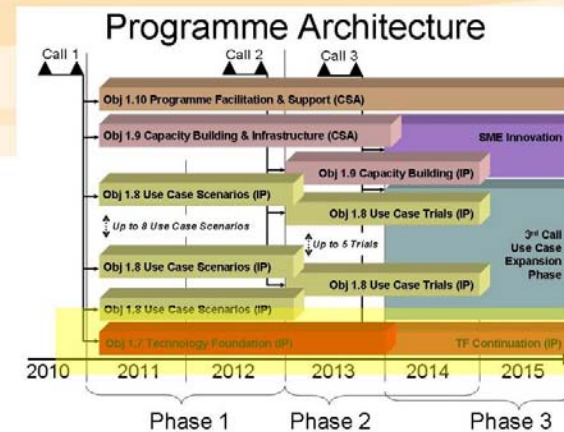
One IP (41 MEuro, 3 years) covering Phases 1 and 2:
- 30% flexible budget for meeting use case needs
- system design
- early prototyping
- early implementation and validation

11

Main PPP obstacles in e-Infrastructure

- The revenue/cost model. The e-Infrastructure is a production environment with researchers as users which are less prone to pay for the services. Other revenues may come from patents (see below), but there is no certainty of a constant income.

- The IPR policies. These restrict the publication and exploitation of results and make research more complex. Also patent will have to be shared with the public component, which should instead ensure a more general right of use of innovation.

- Privacy. Due to competition, a private entity will be reluctant to use an infrastructure managed by another one.

- The timescale for return of investment. For a private entity this is usually quite short, favouring evolution, rather than innovation.

- The need for frequent capex investments to maintain the infrastructure at the forefront of the research.

The main obstacles to PPP in this area

- **Holystic** approach vs collaborative (layered) . The private tend to have an attitude to manage the e-Infrastructure as a whole, making difficult collaboration and innovation by other entities

- **Multidomain** capabilities (federation). The infrastructure should be open to communicate/federate with other e-Infrastructure, possibly with open API.

- The e-Infrastructure size. It has to be large enough to allow scaling validation in a realistic environment, and therefore it should domprise more than one country.

- Investment in time of high level experts (opex espenses)

Conclusions

The requirements of a research infrastructure, ant its constant evolution, make the establishment of a PPP, for its creation and management, quite tricky and at high risk for the private partners.

Collaboration between industry and research works still well in EC ICT projects.

The sustainability of a e-Infrastructure is the main issue. While the e-Infrastructure must behave as a production environment for users, it takes a long period to be set-up, it must continuosly evolve itself to be attractive to users.

Principles like openness, transparency, neutrality, IPR, layered approach (vs holistic) must be gauged and agreed befor a PPP initiative is set-up.

Thank You
for your attention

References

E-Infrastructures

http://cordis.europa.eu/fp7/ict/e-infrastructure/

EC European Technology Platforms

http://cordis.europa.eu/technology-platforms/

EC Joint Technology Initiatives:

http://ec.europa.eu/information_society/tl/research/priv_invest/jti/index_en.htm
http://cordis.europa.eu/fp7/jtis/home_en.html

Future Internet PPP

http://ec.europa.eu/information_society/activities/foi/lead/fippp/index_en.htm

QuickTime™ and a
decompressor
are needed to see this picture.

Funding for each community according to infrastructure layers
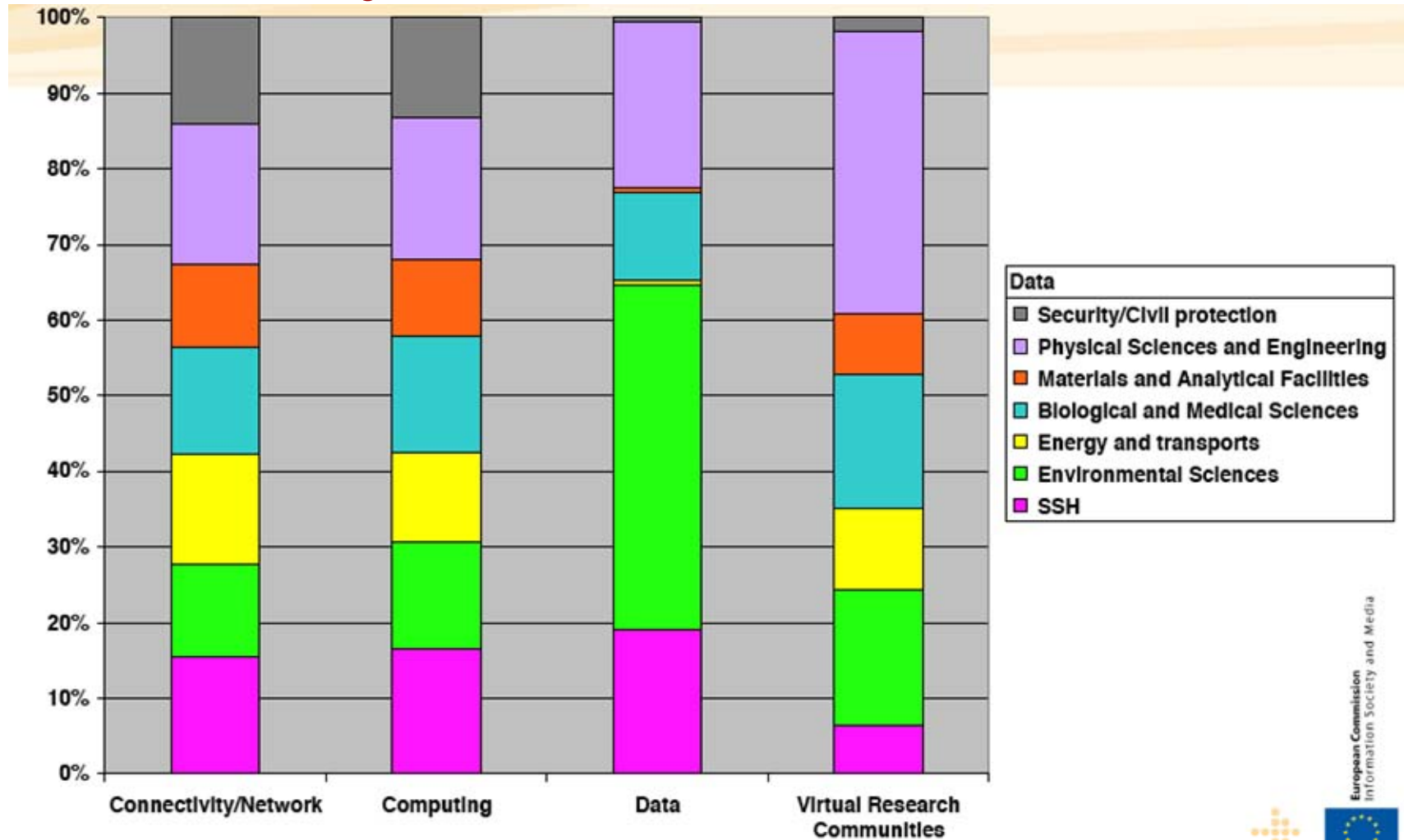
(from E.C., e-Infrastructures and GÉANT Unit, June 2010)

e-Infrastructure

From EC e-Infrastructure web site :

" 'e-Infrastructure' refers to a research environment in which all researchers - whether working in the context of their home institutions or as part of national or multinational scientific initiatives - have shared access to unique or distributed scientific facilities (including data, instruments, computing and communications), regardless of their type and location in the world.

Several infrastructural layers - computing, communication and services - are required to create pan-European virtual centers of excellence and research laboratories. On top of communication and computing capabilities, ICT research will provide technologies for collaboration, knowledge-sharing and experimentation in various areas of science and engineering."

Future Internet PPP (from M.Lemke)