

Opportunities for European Cloud Computing

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Cloud Computing

Why are we interested?

- Not a new technology
 - A change in the use of technology
-
- Internet of Services
 - Benefits for Industry
 - Greener IT

*Cloud Computing = Leveraging the power of the Internet
within a globalised economy*





Expert Group

- Set-up in Spring 2009 by DG INFSO/D3
- Act as advisory body
- Prepare a Cloud Computing strategic vision and research directions
- Met twice (May & Oct) and produced a report





Cloud Computing Challenges

➤ ***No clear understanding of the term:***

- Various companies have rebranded their services as “clouds”

➤ ***Wide variety of open issues:***

- Vendor lock-in & standards
- Cloud Interoperability & Portability
- Reliability
- Privacy & legal issues
 - Where is my data?
 - Who can access it?
 - Whose law applies?
 - What rights do I have?





Structure of the report

- Definition of clouds
- State of the Art Analysis
- SWOT Analysis for Europe
- Opportunities for Europe
- Recommendations
 - **Prioritization**
 - **Expected Research Timeline**





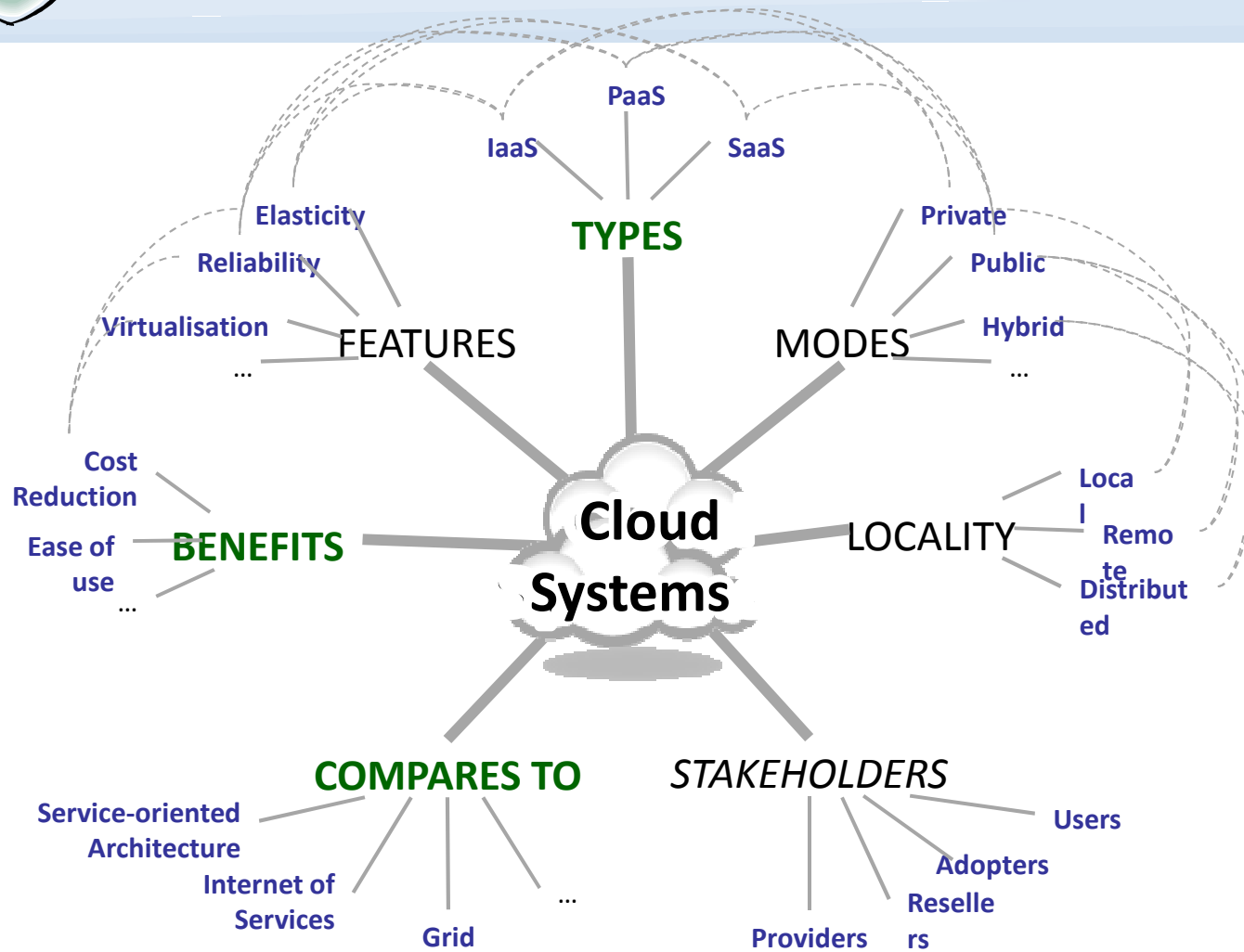
Definition

Cloud *an elastic execution environment of resources involving multiple stakeholders and providing a metered service at multiple granularities for a specified level of quality (of service).*





Cloud System Terminology





State of the Art and Gaps

- Manageability and Self-*
- Data Management
- Privacy & Security
- Federation & Interoperability
- Virtualisation, Elasticity and Adaptability
- APIs, Programming Models & Resource Control

Technical Gaps

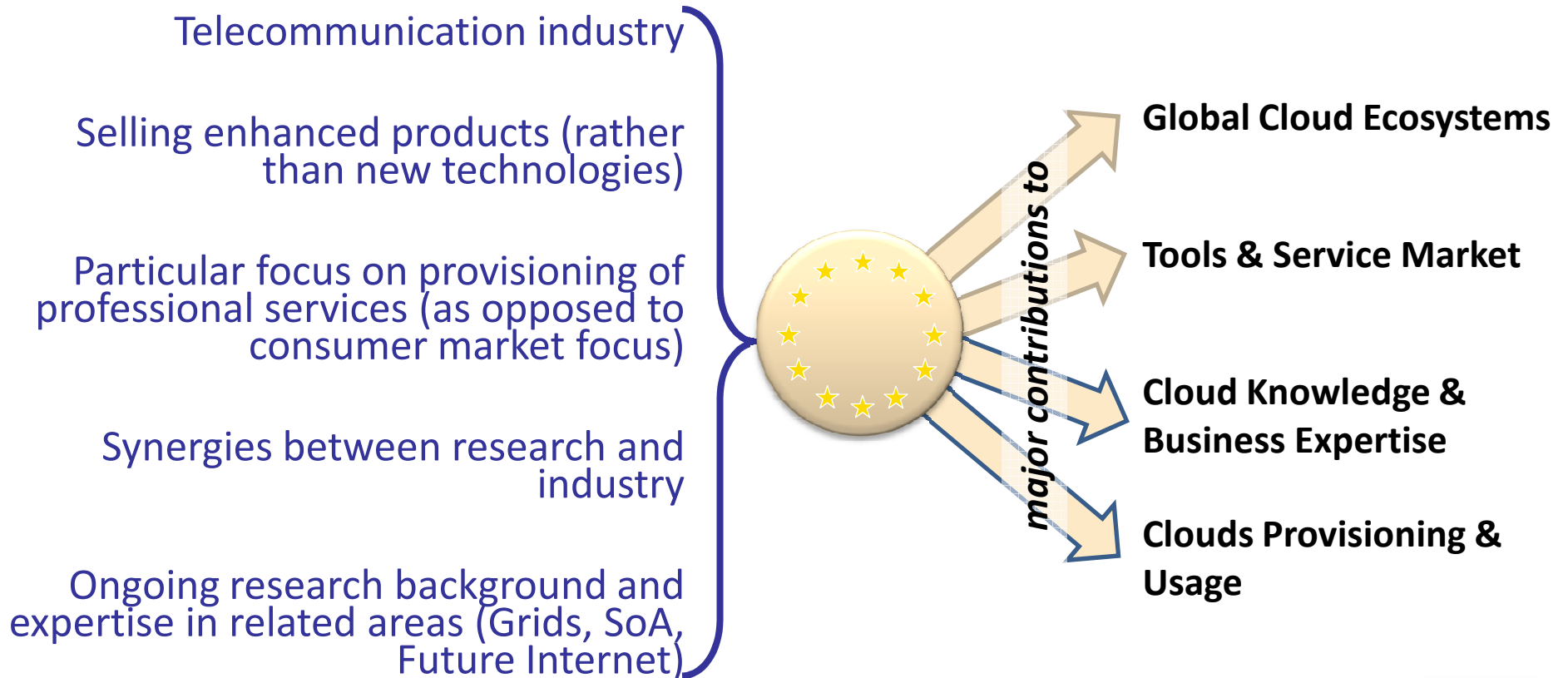
- Legislation, Government & Policies
- Economic Concerns

Non-Technical Gaps





Key Factors & Opportunities for Europe





Research Issues

Technological:

- Cloud Systems development and management *3+ years*
- Data handling & management *3 years*
- Scale and elastic scalability *5+ years*
- Cloud Programming models and resource control *5+ years*
- Trust, security and privacy *on-going*

Legislation, Government & Policies:

- Economic aspects *3+ years*
- Legalistic *5+ years*





Recommendations

1. The EU needs large scale **research** and **experimentation** test beds
2. The EC together with industrial and public stakeholders should develop joint **programmes**
3. The EC should encourage the development and production of :
 - ✓ (a) CLOUD interoperation **standards**;
 - ✓ (b) an **open source reference implementation**;
4. The EC should promote the European leadership position in software through commercially relevant open source approaches
5. The EC together with Member States should set up the right regulatory framework to facilitate the uptake of Cloud computing





Conclusions

- Cloud computing will play a **relevant** role in (at least) the next 10 years
- Current clouds are **insufficient** for future business needs

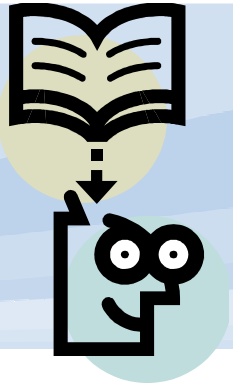
⇒ **Europe** can contribute in particular with

- R&D in the technological and non-technological areas
- Legislative & governmental support
- Business & economical expertise

⇒ Relevant business **opportunities** for Europe

- IaaS Cloud Provisioning
- PaaS Cloud Provisioning
- Cloud Adopters and Service Vendors (Enhanced Service Provisioning)
- Cloud Consultancy



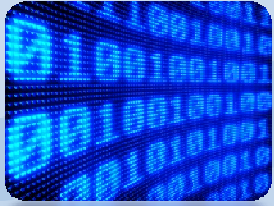


Next Steps

- FP7 Workprogramme 2011-2012 (and Future Internet)
 - WP11-12 available in summer 2010
 - Calls closing dates in last quarter 2010
- Expert Group activities are to be continued
- Promote International cooperation e.g., open standards
- Address present concerns on legal framework

➤ *But.. It is for the Industry to take lead!*





More Information

- The Expert Group Report is public
- You can download it from:



<http://cordis.europa.eu/fp7/ict/ssai/docs/cloud-report-final.pdf>

- Software & Services Architectures and Infrastructure web site:

http://cordis.europa.eu/fp7/ict/ssai/home_en.html

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