



# H2020 LEIT ICT "Future Internet"

## Topic ICT 7: Advanced cloud infrastructures and services

[Francisco.Medeiros@ec.europa.eu](mailto:Francisco.Medeiros@ec.europa.eu)

**DG CONNECT**

**Deputy Head of Unit E2**

**Software & Services, Cloud Computing**

# Vision and Priorities for Cloud Computing

Commission Communication of 27 September 2012

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0529:FIN:EN:PDF>

Also known as the "EU Cloud Strategy"

Strategy designed to speed up the adoption and increase the use of cloud computing across all sectors of the economy

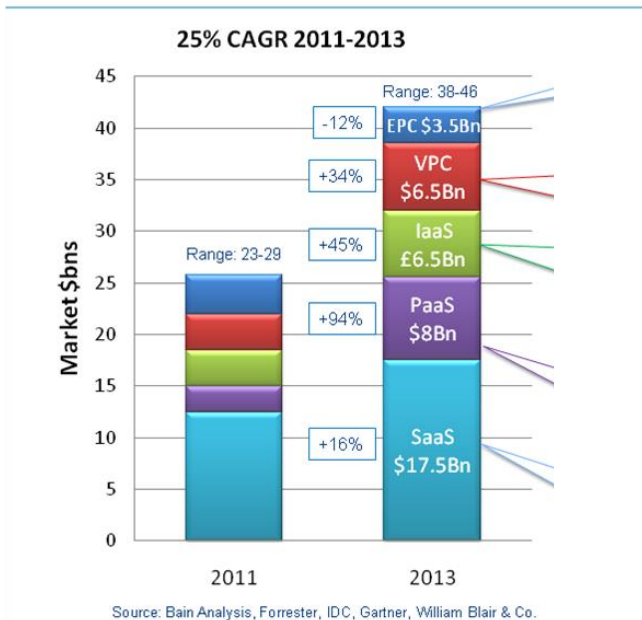
[http://europa.eu/rapid/press-release\\_IP-12-1025\\_en.htm](http://europa.eu/rapid/press-release_IP-12-1025_en.htm)

# Expected benefits

- **Motivation for the fast adoption of cloud computing**
  - **Cost savings** in the deployment of **IT services** (infrastructures, installations, human resources)
  - Forecast of expenditure for 'public cloud' services in the EU until 2020:  
[http://ec.europa.eu/information\\_society/activities/cloudcomputing/docs/quantitative\\_estimates.pdf](http://ec.europa.eu/information_society/activities/cloudcomputing/docs/quantitative_estimates.pdf)
    - €35 billion without policy intervention
    - €78 billion if appropriate policy initiatives are implemented
- **Impact in all sectors of the economy**
  - Increase of the EU GDP in the year 2020 **due to cloud computing**:
    - €88 billion without policy intervention
    - €250 billion if appropriate policy initiatives are implemented

# Cloud Computing: a fast growing market

## Cloud services: market forecast



### Global cloud computing market

**Gartner:** worldwide 'public cloud' services  
\$111 billion in 2012

**Gartner:** worldwide 'public cloud' services  
\$131 billion in 2013 (estimate)

**Gartner:** worldwide 'public cloud' services  
\$154 billion in 2014 (forecast)

EPC = Enterprise Private Cloud  
VPC = Virtual Private Cloud

# What about research and innovation?

COM(2012)529 of 27 September 2012:

- *Make full use of other instruments, notably through **research and development** support under **Horizon 2020** on long term challenges specific to **cloud computing** as well as assisting the migration to cloud-based solutions*

Current status: significant resources allocated to support **cloud computing** research and innovation within the **H2020 LEIT ICT WP2014-2015**

Additional possibilities: under **Societal Challenges** and through other instruments e.g. **SME Instrument**



## FP7 ICT Work Programmes

**WP 2007-2008** (Call 1): Service and Software Architectures, Infrastructures and Engineering: **€120 million**

**WP 2009-2010** (Call 5): Internet of Services, Software and Virtualisation: **€110 million**

**WP 2011-2012** (Call 8): Cloud Computing, Internet of Services and Advanced Software Engineering: **€70.0 million**

**WP 2013** (Call 10): Software Engineering, Services and Cloud Computing: **€41.5 million**

**Total EC funding** for Software & Services and Cloud Computing: **€341.5 million + parts of the Future Internet PPP over 7 years**

**Average: more than €50 million per year**

# FP7 implementation

	Budget [MEUR]	IP +NoE	STREP	CSA	Total
Call 1	120.0	6+1	18	3	28
Call 5	110.0	7	16	5	28
Call 8	70.0	4	15	3	22
Call 10	41.5	2	10	4	16

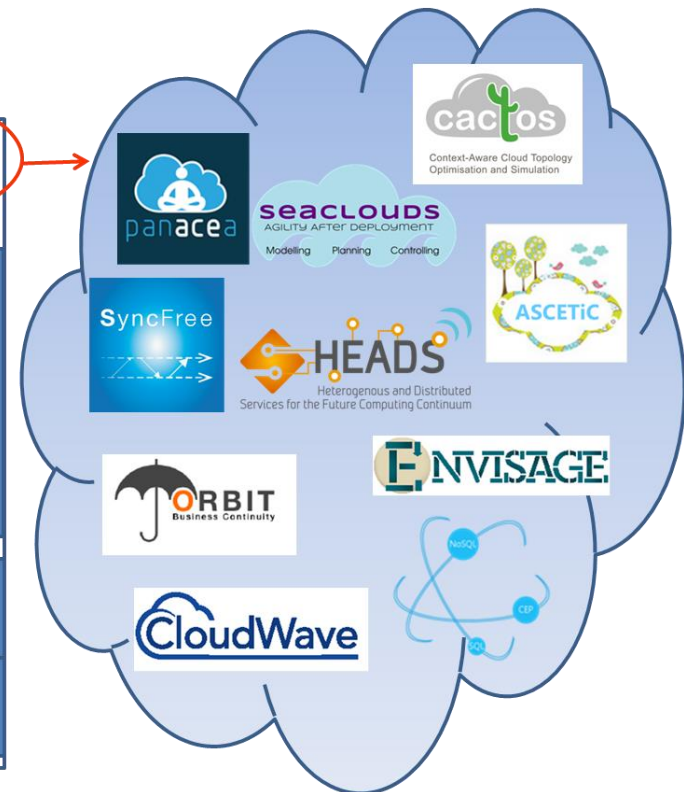
Total EU contribution: €341.5 million

Total: 94 projects

Average: €3.6 million/project

- 10 out of 12 research projects from FP7 Call 10 focused on cloud computing
- Research priorities have adapted to the fast evolution of cloud computing and related services

Software based Services	Cloud Computing		
Agile Software Prototyping  <i>Mondo</i> <i>S-Case</i>	Heterogeneous clouds & IoT  <i>Panacea</i> <i>SeaCloud</i> <i>Cactus</i> <i>SynchFree</i>	Cloud Networking  <i>Heads</i> <i>Ascetic</i>	Cloud reliability  <i>Orbit</i>
	Quality of Service	<i>Envisage</i> <i>Cloudwave</i>	
	Big Data	<i>CoherentPaas</i>	





## Advanced cloud infrastructures and services

The challenge: develop infrastructures, methods and tools for high performance, adaptive cloud applications and services

### Research and innovation actions: €66 million budget

- High performance heterogeneous cloud infrastructures
- Federated cloud networking
- Dynamic configuration, automated provisioning and orchestration of cloud resources
- **Automated discovery and composition of services**
- Cloud security

*Expectation: mix of proposals requesting small (€2M-€4M) and large contributions (€5M-€8M); one or more themes, not necessarily all themes*

## Automated discovery and composition of services

*"Innovative ways to facilitate collaboration between public administrations, users and other stakeholders as to produce, discover, mix and re-use different service components and create new public services through pooling and sharing of resources, data, content and tools, even across national borders"*

## Automated discovery and composition of services

The research will build upon the "cloud of public services" concept

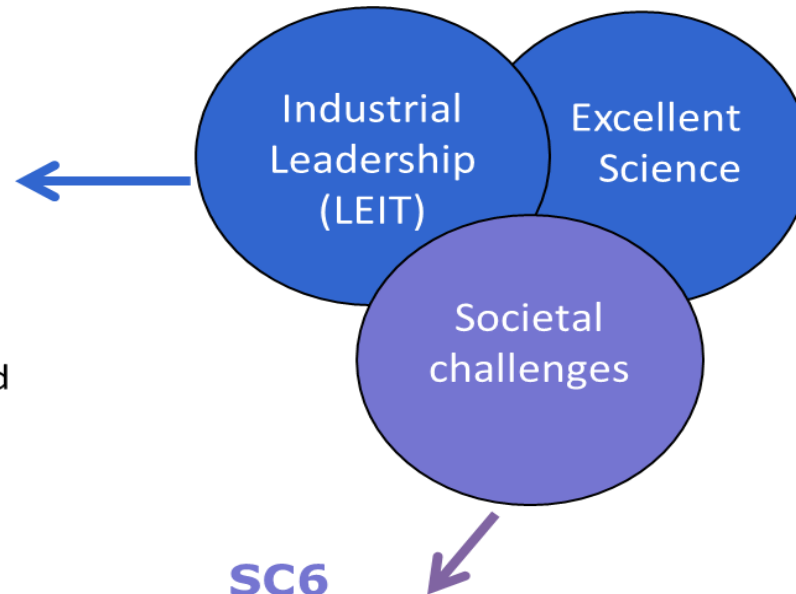
[http://ec.europa.eu/digital-agenda/sites/digital-agenda/files/smart2010-0074summaryreport\\_0.pdf](http://ec.europa.eu/digital-agenda/sites/digital-agenda/files/smart2010-0074summaryreport_0.pdf)

*"The notion of a 'cloud' is often associated with 'cloud computing' and the technical aspects of enabling a cloud environment.*

*However, 'cloud' refers to a collection of public services serving as building blocks, which can be offered in an open, interoperable way and reused and combined by public administrations and third parties as part of other services, based upon an Universal or Global Service Oriented Architecture (SOA)"*

## LEIT: ICT-7 Advanced Cloud Infrastructures and Services

- Automated discovery and composition of services



## SC6 News forms of innovation

- Innovation in the public sector by using emerging ICT technologies
- ICT-enabled open government
- Innovative mobile e-government applications for SMEs

<https://ec.europa.eu/digital-agenda/en/ict-enabled-public-sector-innovation-through-open-government>

## Advanced cloud infrastructures and services

Innovation actions: €5 million budget

- Platforms for trusted cloud systems: collaborative development, adaptation and testing of **open source software** for innovative and trusted cloud-based services

*Expectation: proposals requesting small (€2M-€4M) contributions*

## Advanced cloud infrastructures and services

### Coordination and support actions: €2 million budget

- Support the definition of common reference models for SLAs in the cloud
- Support to the adoption of cloud infrastructures and services (legal, economic and social factors)
- Support collaboration among research projects
- Support dissemination, exploitation and "road mapping"

*Expectation: all topics to be covered, not necessarily by one single proposal*



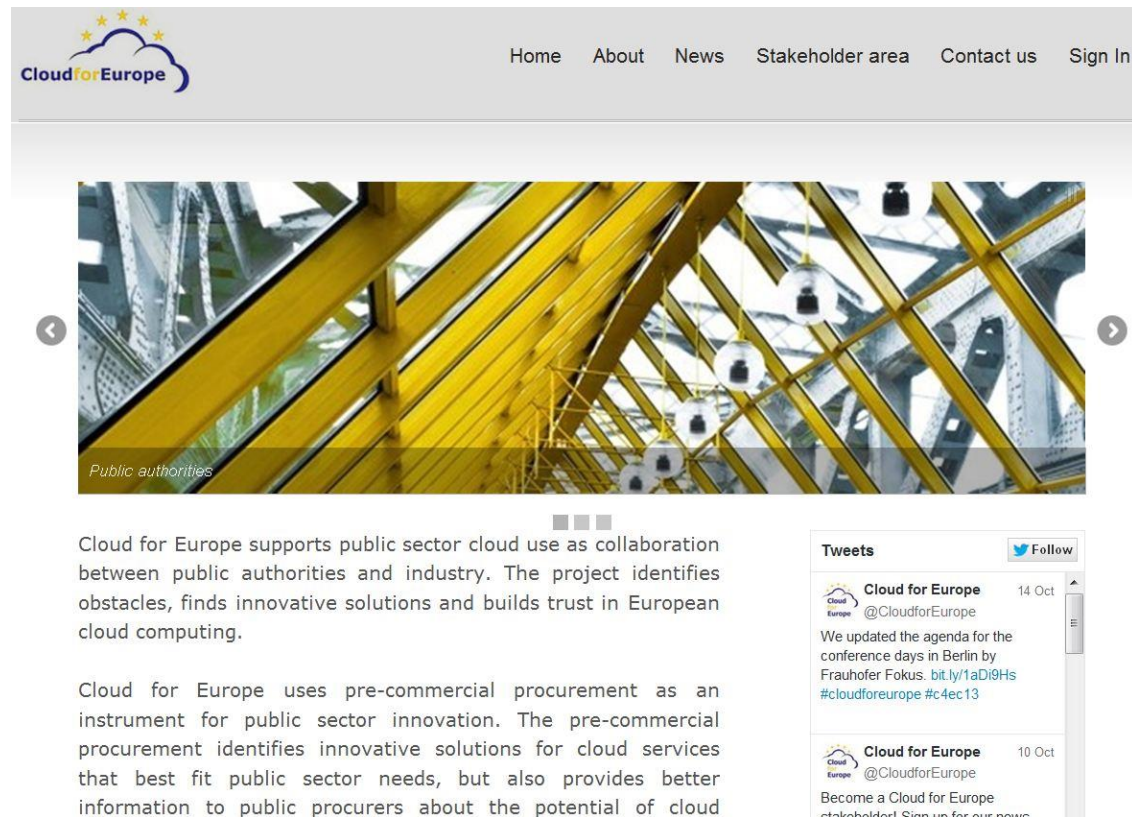
## Pre-commercial procurement for public sector cloud computing services (PCP)

- Proposals will define common requirements and terms of reference for future procurement of cloud computing services.
- **€9 million budget**; proposals requesting large contributions are expected

## Public procurement of innovative cloud computing solutions (PPI)

- Proposals will organise joint procurement of innovative cloud services by public authorities.
- **€13 million budget**; proposals requesting large contributions are expected

## Building on work undertaken by the FP7 project C4E: [www.cloudforeurope.eu](http://www.cloudforeurope.eu)





The screenshot shows the Cloud for Europe website. At the top left is the logo, which consists of a stylized cloud with yellow stars above the text "Cloud for Europe". To the right of the logo is a navigation menu with the following items: Home, About, News, Stakeholder area, Contact us, and Sign In. Below the navigation menu is a large banner image showing a modern building's interior with a complex network of yellow structural beams and white spherical pendant lights. The text "Public authorities" is overlaid on the bottom left of the banner. Below the banner are three small grey squares. To the right of the banner is a "Tweets" section with two tweets from @CloudforEurope. The first tweet, dated 14 Oct, says: "We updated the agenda for the conference days in Berlin by Fraunhofer Fokus. bit.ly/1aDi9Hs #cloudforeurope #c4ec13". The second tweet, dated 10 Oct, says: "Become a Cloud for Europe stakeholder! Sign up for our news".

Cloud for Europe supports public sector cloud use as collaboration between public authorities and industry. The project identifies obstacles, finds innovative solutions and builds trust in European cloud computing.

Cloud for Europe uses pre-commercial procurement as an instrument for public sector innovation. The pre-commercial procurement identifies innovative solutions for cloud services that best fit public sector needs, but also provides better information to public procurers about the potential of cloud

**Tweets** [Follow](#)

 **Cloud for Europe** @CloudforEurope 14 Oct  
We updated the agenda for the conference days in Berlin by Fraunhofer Fokus. [bit.ly/1aDi9Hs](http://bit.ly/1aDi9Hs) #cloudforeurope #c4ec13

 **Cloud for Europe** @CloudforEurope 10 Oct  
Become a Cloud for Europe stakeholder! Sign up for our news



## Further information

### *Horizon 2020*

<http://ec.europa.eu/programmes/horizon2020/>

### *Digital Agenda – Cloud Computing*

<https://ec.europa.eu/digital-agenda/en/telecoms-and-internet/cloud-computing>

### *Magazine: Net-Cloud Futures*

<https://ec.europa.eu/digital-agenda/en/our-media-library>