



# **IEEE ICC 2013 Budapest, Hungary**

## **Industry & Business Panel: Cloud Computing and Communication**

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# Political background

27 September 2012: COM on "Unleashing the Potential of Cloud Computing in Europe"

+ accompanying Staff Working Document

[http://ec.europa.eu/information\\_society/activities/cloudcomputing/docs/com/com\\_cloud.pdf](http://ec.europa.eu/information_society/activities/cloudcomputing/docs/com/com_cloud.pdf)

# Cloud computing strategy

"Unleashing the potential of cloud computing in Europe"

- Deliver a net gain of 2.5 million jobs
- Boost of €160 billion to the EU GDP by 2020

The strategy is designed to stimulate the uptake of cloud computing across all sectors of the economy

# Main barriers to cloud adoption

## Non-technical barriers:

- Lack of trust
- Data protection and data portability
- Lack of uniform privacy rules
- Contractual terms and jurisdiction
- Service level agreements (between different parties)

## Technical barriers:

- Storage capacity
- Faster networks
- Minimum set of standards and security certificates

# Main points of the strategy

- Foster **interoperability**, **data portability** and **reversibility** (mapping of standards by the end of 2013)
- EU-wide **voluntary certification** schemes for trustworthy provision of cloud-based services
- Address **environmental** challenges (metrics for energy and water consumption, and carbon emissions)
- Development of 'safe and fair' **contract terms and conditions**, including Service Level Agreements
- Launch **European Cloud Partnership** (Member States and industry) to leverage the power of public sector procurement
  
- 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

# Digital Agenda for Europe

The DAE review adopted on **18 December 2012** identified **seven** key areas for further efforts to stimulate the conditions to create **growth** and **jobs** in Europe:

1. A new and stable broadband regulatory environment
2. New public digital service infrastructures through Connecting Europe Facility loans
3. Launch a Grand Coalition on Digital Skills and Jobs
4. Propose a EU cyber-security strategy and a Directive
5. Update the EU's Copyright Framework
- 6. Accelerate cloud computing through the public sector buying power**
7. Launch a new electronics industrial strategy – an "Airbus of Chips"

<http://ec.europa.eu/digital-agenda/en/news/digital-do-list-new-digital-priorities-2013-2014>

# Digital Agenda Assembly 2013

Dublin, Ireland, 19-20 June 2013 (invitation only)

## Workshop 4: Broadband demand stimulation: the impact of cloud

- How cloud computing will foster demand for broadband
- Infrastructure requirements for cloud services
- Role of the public sector in stimulating broadband demand
- Role of cloud providers in creating demand for high speed broadband
- Experiences of collaboration between cloud providers and telecom operators in order to guarantee minimum QoS
- Private and public sector business models

<https://ec.europa.eu/digital-agenda/en/workshop-4-broadband-demand-stimulation-impact-cloud>

## 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 investment: €341.5 million over 7 years**

**Average = €48.8 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

78 projects ... plus 16 new projects from Call 10

Total: 94 projects (average: €3.6 million/project)

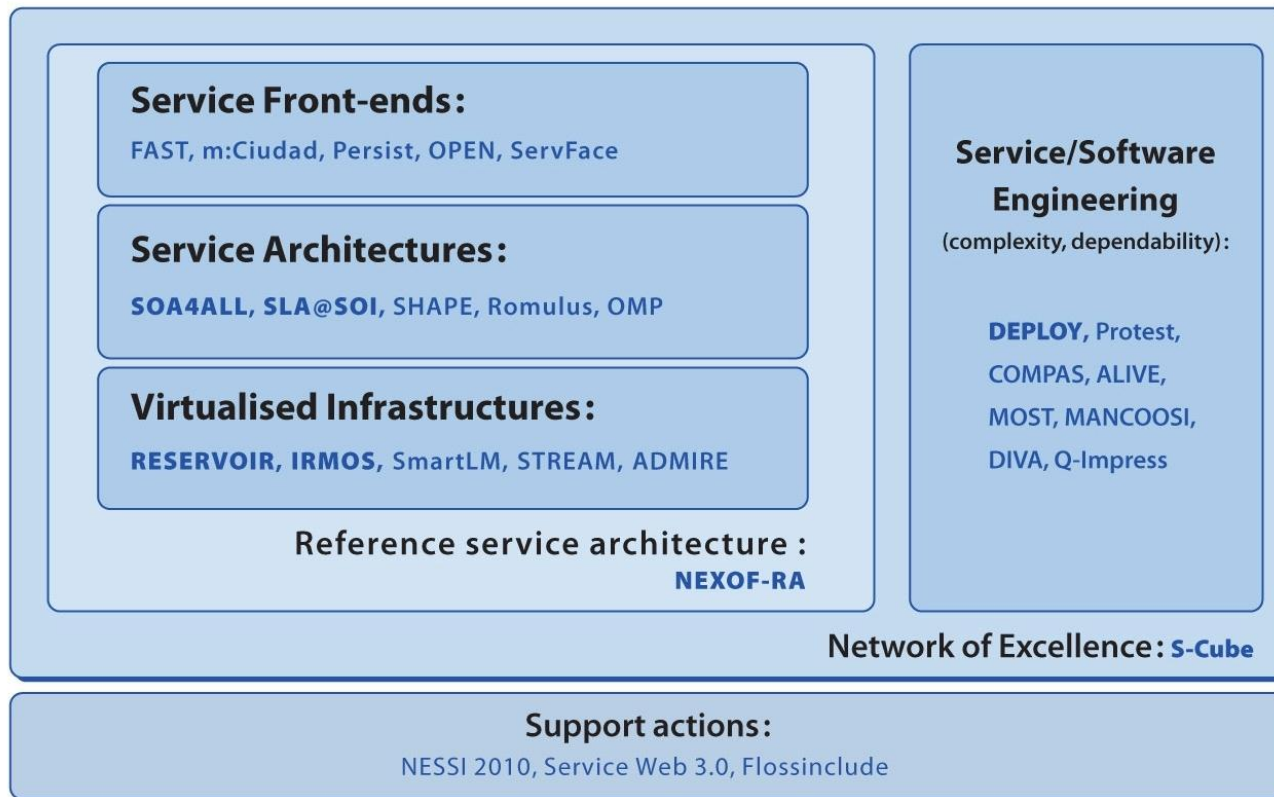
# FP7 ICT Call 1: target outcomes

Service architectures, platforms, technologies, methods and tools

Services/software engineering approaches

Strategies and technologies enabling mastery of complexity, dependability and behavioural stability

Virtualisation tools, system software, middleware and network-centric operating systems



\*IP/NoEs in bold

**Call 1: EU contribution = €120 million**

[http://cordis.europa.eu/fp7/ict/ssai/projects-call1\\_en.html](http://cordis.europa.eu/fp7/ict/ssai/projects-call1_en.html)

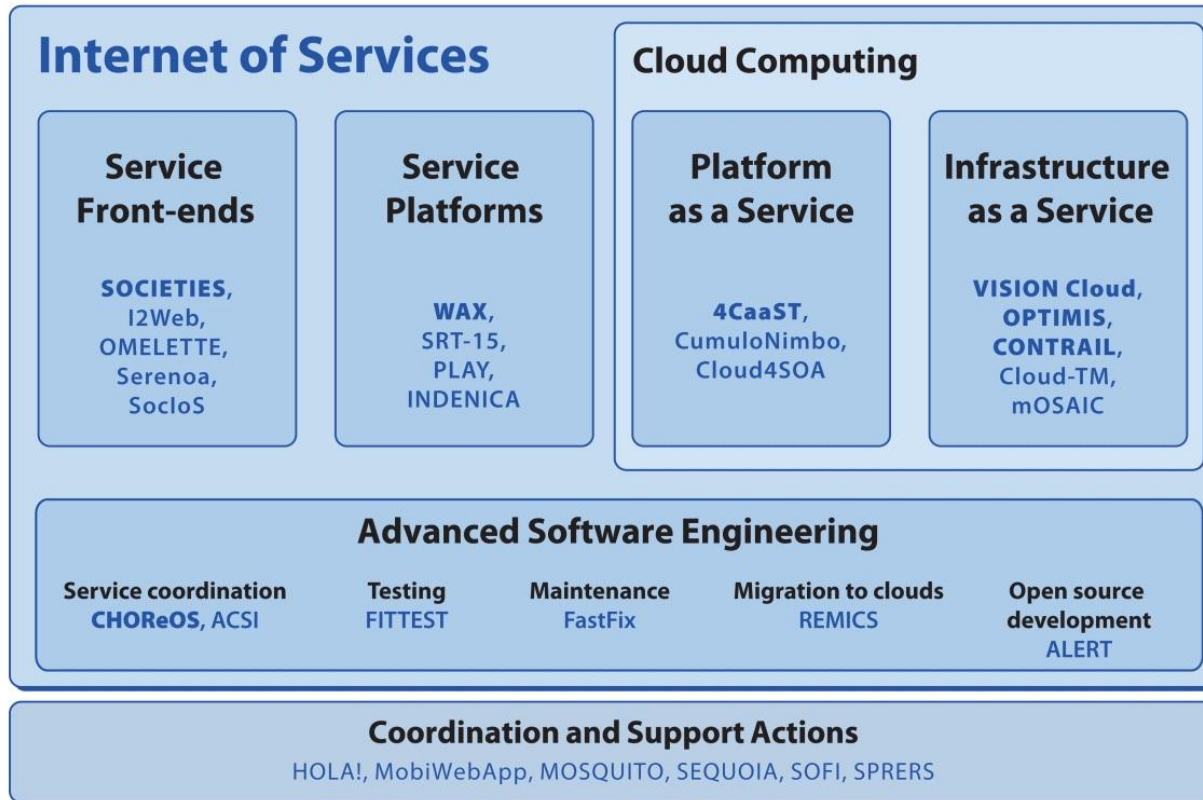
# FP7 ICT Call 5: target outcomes

## Service architectures and platforms for the Future Internet

- Service front ends
- Open, scalable, dependable service platforms, architectures and specific platform components
- Virtualised infrastructures

## Highly innovative service/software engineering

- Service/software engineering methods and tools (re: automatic support)
- Verification and validation methods and tools (re: large scale systems)
- Methods and tools supporting open source software



\* IP/NoEs in bold

## Call 5: EU contribution = €110 million

<http://cordis.europa.eu/fp7/ict/ssai/docs/2010-3197-call5factsheets-final.pdf>

\*SPRERS is a Call 4 coordination and support action

# FP7 ICT Call 8: target outcomes

## Cloud computing

- Management of cloud resources
- Infrastructure virtualisation
- Interoperability, portability, data protection

## Internet of Services

- Service engineering methods and tools
- Integration of real and virtual worlds, Internet of Things
- Management of internet-scale applications

## Advanced software engineering

- Architectures and front ends
- Quality assurance techniques
- OSS development, composition and life cycle management

## Internet of Services

Broker@Cloud  
**COMPOSE**  
CloudScale  
BETaaS

## Cloud Computing

**PaaSage**  
Celar  
LEADS  
BigFoot  
CloudSpaces  
HARNESS  
OpenI

## Advanced Software Engineering

**MODAClouds** **ARTIST** PROWESS U-QASAR MIDAS  
MARKOS RISCOSS OSSMETER

## Coordination and Support Actions

PROSE OCEAN SUCRE

**Call 8: EU contribution = €70 million**

<http://cordis.europa.eu/fp7/ict/ssai/docs/projects/factsheets-call8-brochure.pdf>

## FP7 ICT Call 10: target outcomes

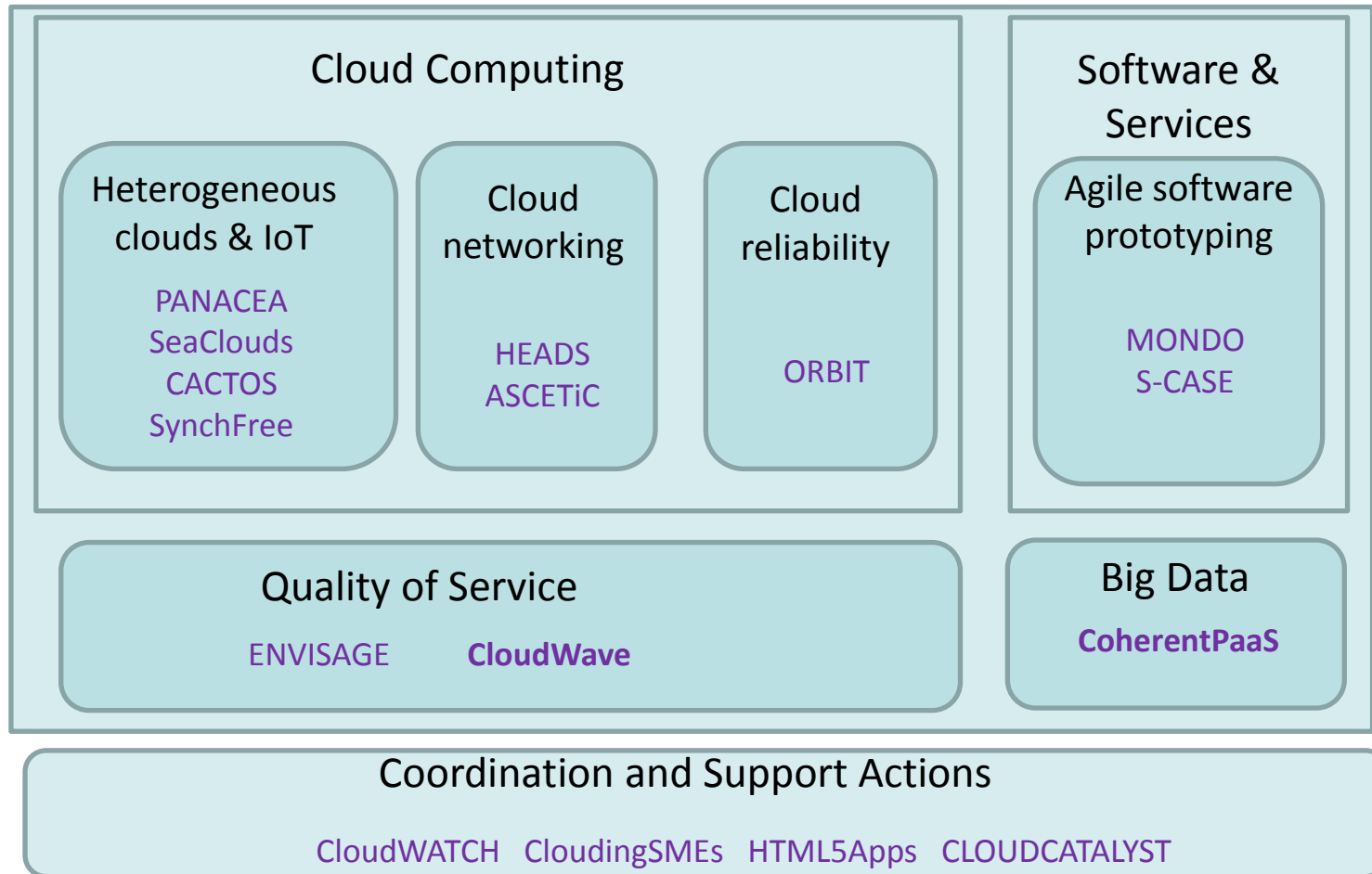
Advanced **computing architectures** and **software engineering** for the **cloud** and beyond

- Efficient and secure usage of distributed computing resources
- Advancing cloud architectures and standards

Innovative **software and tools for services**

- Self-adaptive Internet-based services
- Widely distributed architectures, large data sets and sensors
- Social, open and collaborative software development





**Call 10: EU contribution = €41.5 million**

**DRAFT DIAGRAMME**

## Focus of projects (1)

PANACEA: addresses the ability of self-recovery after failure

SeaClouds: supports orchestration of modules across the cloud

CACTOS: optimise deployment based on dedicated simulation techniques

SynchFree: conflict-free replication of data in the cloud

HEADS: framework to manage heterogeneity of the network

ASCETiC: aims to reduce energy consumption

ORBIT: new paradigm for virtualised resource consolidation

## Focus of projects (2)

MONDO: increased scalability of models used in software engineering

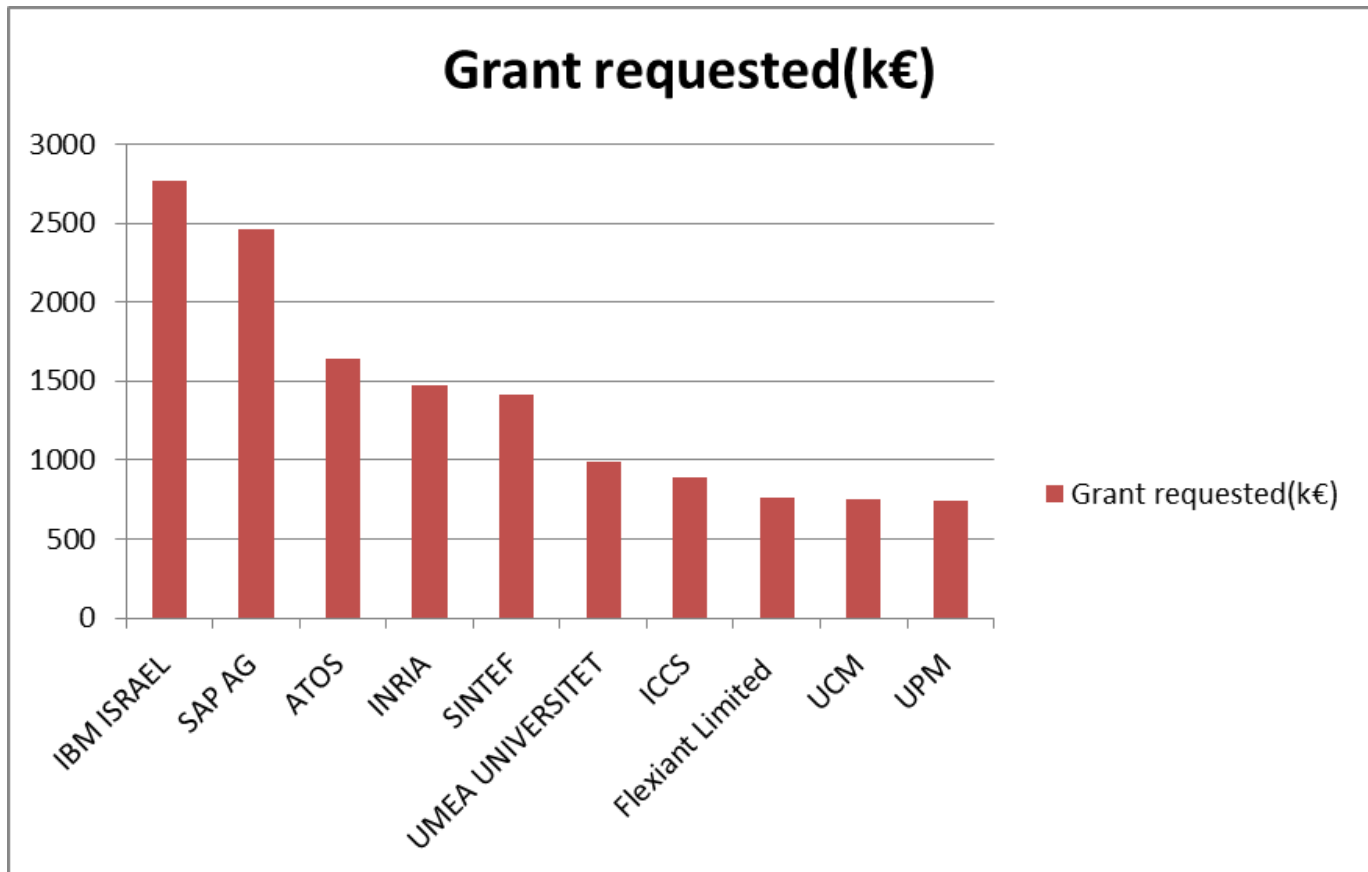
S-CASE: agile paradigm to automate mapping of user requirements to software development

**CoherentPaaS**: federated query language to access multiple data sources

ENVISAGE: open-source framework to develop SLA-aware services; automated analysis using formal methods

**CloudWave**: agile development of adaptive cloud services providing end-to-end QoS

# Main beneficiaries: FP7 Call 10



# H2020 Work Programme preparation

Public consultation: 27 Feb – 17 Apr 2013

**Objective 1:** Advanced cloud infrastructures and services (3/4 of resources)

- High performance heterogeneous cloud infrastructures
- Federated cloud networking
- Cloud security
- Automated service composition

# H2020 Work Programme preparation

Public consultation: 27 Feb – 17 Apr 2013

## Objective 2: Tools and methods for software development (1/4 of resources)

- Software tools and methods for large complex and data-intensive systems
- Software architectures and tools for highly distributed applications

# H2020 Public Consultation

All contributions, all presentations, full report and slides available at:

<https://ec.europa.eu/digital-agenda/en/public-consultation-advanced-cloud-infrastructures-and-services>

# The process towards H2020

Public Consultation launched on 26 February 2013

42 contributions received by 2 April 2013; 30 speakers invited;  
26 presentations and 72 participants on 17 April 2013

Internal DG Consultation: March – June 2013

First Work Programme draft: summer 2013

European Commission interservices consultation: autumn 2013

Consultation of the EU Member States: autumn 2013

Networking activities during ICT 2013, Vilnius, 6-8 Nov 2013

WP2014 adoption + first H2020 call: by the end of 2013