SEQUOIA PROJECT
"Socio-Economic Impact Assessment for Research Projects"

Contract n° 258346

WP6: Final Conference and White Paper

Deliverable 6.2: Final SEQUOIA Conference Proceedings

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Author: Anne English (LSE)

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Louise Newton-Clare, Paolo Dini (LSE)

Internal Reviewers:

Martino Maggio (ENG)

Antonella Passani (T6 ECO)

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EXECUTIVE SUMMARY

This deliverable serves to report on the Final SEQUOIA conference held at the Commission premises in Brussels on Mach 13th 2012.

The purpose of the final conference was to disseminate the project results and bring together as far as possible European research networks, ongoing projects and their clusters as well as representatives of projects beneficiaries and users. The conference was a good occasion for the SaaS/IoS projects present to disseminate their own project outputs and network with some industrial players. And it was an opportunity for participants to learn more about the challenges, practices, learnings and success stories in socio-economic impact assessment of research projects.

The event was also an opportunity to carry out a final transfer of the SEQUOIA methodology and showcase the technological outputs of five selected projects that had used the methodology. It also served as an opportunity for the dissemination, to Call 5 consortia and other interested parties, of a set of best practices to help ensure that they achieve meaningful and impactful project goals and that they could, at every juncture during the project life-cycle, report and validate return on research investment.

As well as representatives from the top 5 projects that displayed best practice in impact assessment, the project endeavoured to have experts in socio-economic impact assessment as speakers for the conference as well as a senior representative from the Commission to open proceedings.

The Agenda

Moderator: Antonella Passani (T6 Eco)

09:00 Registration and welcome coffee
09:30 Welcome by Deputy Head of Unit, David Callahan
09:40 Introduction by Paolo Dini, LSE, SEQUOIA project coordinator
First session Socio-Economic Impact Assessment: Methodologies and Open Issues
10:00 Erik Bohlin
Measuring Direct and Indirect Impacts of ICT investments: Applying Several Methodologies for the ICT, Media and IPTV Sectors
Q&A
10:40 Jordi Molas-Gallart
Impact Blues: Symptoms and Treatment
Q&A
11:20 Coffee break

Second Session SEQUOIA Best Practices: Presentation by Projects Assessed
Moderated by Antonella Passani (T6 ECO)
11:40 S-CUBE – Klaus Pohl
12:00 MOSAIC – Beniamino Di Martino
12:20 I2WEB – John O'Flaherty
12:40 Lunch
14:00 CumuloNimbo – Ricardo Jimenez-Peris
14:20 SocioS – Konstantinos Tserpes
14:40 Panel discussion with Q&A about the projects (including the keynote speakers)
15:20 Coffee break

Third Session Parallel Round Tables
Chairperson: Antonella Passani (T6 ECO)

15:40 SEQUOIA's Methodology Transfer and Support for Personalisation
16:20 Reporting back to the plenary
16:40 Conclusions and close

Welcome

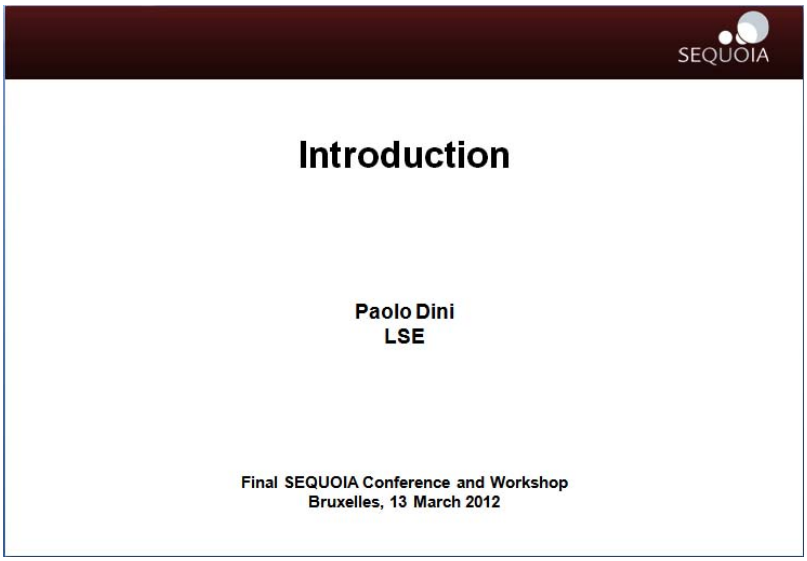
The conference was opened by Deputy Head of Unit "Software & Service Architectures and Infrastructures" David Callahan who represented Head of Unit Rainer Zimmerman. Mr Callahan delivered a pre-keynote talk on whether EC research projects are meeting their respective objectives and acknowledged the difficulty of determining this as well as the difficulty of measuring the extent to which impact might be achieved. He set the scene for the ensuing presentations by stating that for some projects impact achievement seemed almost an afterthought, adding that many proposals lacked a clear methodology for measuring impact. Mr Callahan said he hoped that a methodology such as the SEQUOIA one would help eliminate exaggerated expectations and lack of action from both sides: the EC and the projects.

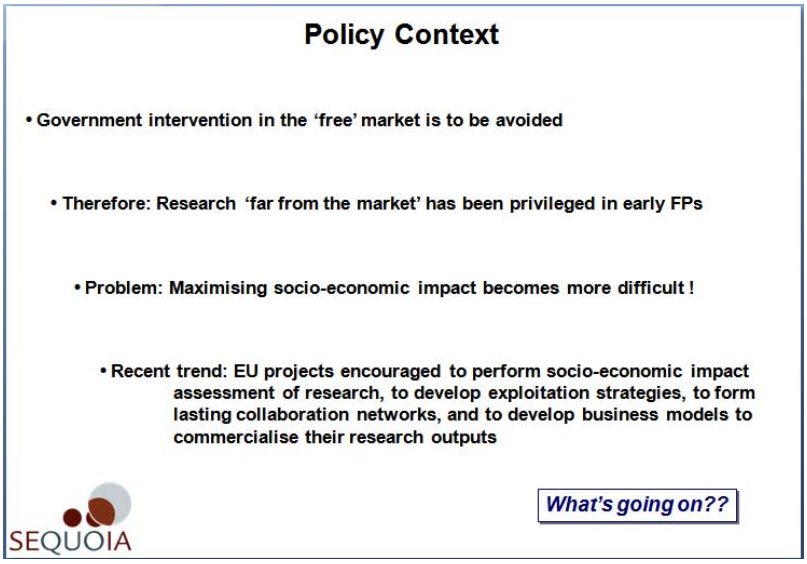
Introduction

Mr Callahan was followed by Dr Paolo Dini, Senior Fellow at the London School of Economics and Political Science and Coordinator of the SEQUOIA project.

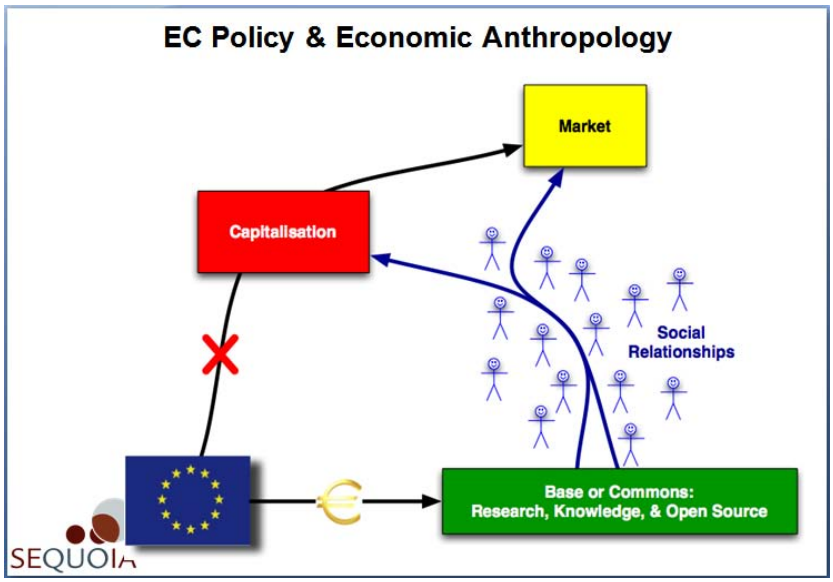
Dr Dini addressed the trend towards encouraging impact assessment and commercialisation of research outputs in EU research projects.

The following are the slides used by Dr Dini in his presentation.





Dr Dini began by stating that Government intervention in the free market has generally been considered undesirable. This led to an emphasis on funding research "far from the market" in the early framework programmes. The problem, however, is that it then becomes more difficult to maximise the socio-economic impact of research projects. He added that there is now a growing trend towards encouraging impact assessment and commercialisation of research outputs.



In this diagram Dr Dini showed the forbidden route of government intervention in the market. The diagram also shows the route that EC funding tends to follow: funded research facilitates the formation of collaboration networks between companies and academics, some of whom then develop business models around research outputs that contribute to capital accumulation and market activity.

This framework, which already exists as an empirical fact, can be usefully rationalised and understood from the point of view of economic anthropology, where the economy is composed of

four domains of value: Market, capital and accumulation, base or commons, and social relationships.

Interestingly, according to Dini, this view includes a scale effect, where the commons and social relationships tend to operate at the scale of community, whereas the market is globalising and the accumulation domain straddles the two.

Whereas neoclassical economics sees the market and accumulation as providing support for the social sphere, which is external to the economic sphere, the endogenous view of economic anthropology makes it easier to understand how investment in a commons can strengthen community, and lead to market activity through the embeddedness of business activity in social structure.

He explains however, that this is in fact what is already happening in the ICT domain through Web 2.0 phenomena. And states that SEQUOIA has developed a methodology that goes in the direction of allowing the assessment of the potential effectiveness of the arrows that link the commons to the accumulation and market domains through social relationships. For this reason, the SEQUOIA methodology places equal emphasis on quantifiable and non-quantifiable impacts.

Socio Economic Impact Assessment: Methodologies and Open Issue

The next section of the conference was dedicated to Socio Economic Impact Assessment: Methodologies and Open Issues. Speakers were Professor Erik Bohlin, Head and Professor in Technology Assessment at the Division of Technology & Society, Department of Technology Management & Economics at Chalmers University of Technology, Göteborg, Sweden and Professor Jordi Molas-Gallart, Research Professor at INGENIO, a research institute of the Spanish Council for Scientific Research (CSIC) and the Polytechnic University of Valencia.

Prof Erik Bohlin's talk was entitled: **Measuring Direct and Indirect Impacts of ICT investments: Applying Several Methodologies for the ICT, Media and IPTV Sectors.**

The following is an abstract of Prof Bohlin's talk:

> *To enable the analysis on what is going on in the ICT sectors, the Input-Output (IO) methodology is employed. Following the framework of ICT methodology, the matrix depicts the transaction flow across sectors, where each sector produces a certain output and, at the same time, consumes the inputs from another sectors. The methodology is capable of capturing both direct and indirect impacts of the sectors due to the inter-relatedness between the industries (Yan, 1968; the United Nations, 1999; Miller & Blair, 2009). Mahajan (2007) argues that the strength of IO method is its ability of reconcile the three different approaches to measuring the GDP (income, value added and expenditure approach) which is suitable when making the judgement on public policy issues. This presentation will give the example on how the IO method can be used at three level of investigation: sectoral (ICT), sub-sector (media and content) and product (IPTV). The sample in the analysis consists of 11 countries in the European region that are seen as having similar characteristics to those of the "information economies" (Eichengreen, 2008), while the time series of the investigation covers the period 1995-2005.*

The first study on ICT sector concludes that: (1) growth in the output of the ICT sectors declined significantly in the period 2000-2005 compared with 1995-2000; (2) the decomposition analysis found that the decline in the output of the ICT sectors can be attributed to loss of export advantage and technical change gain in the sectors; and (3) the decline in technical change effect is explained by a lack of connection between ICT sectors and the rest of the economy.

The study on sub-sector (media and content) summarizes that during the second half of the observation (2000-2005), the change in the media and content sectors was mainly driven by the technological change effect, especially in Germany, France, Italy, the Netherlands, and Spain. The most interesting result during this period is the evidence that the export effect decreased, with the media and content sectors in Germany showing substantial negative impacts. This means that, in general, the comparative advantage of the German media and content products exported to the rest of the world has been reduced.

The analysis on a particular product (IPTV deployment) was conducted by looking at two main sources of impact: the production phase, when the deployment is implemented by installing fiber and network to the households, and the diffusion phase, where the consumption of IPTV services increases after the completion of the investment project. Among fourteen European countries investigated, the study reveals that Sweden is the country which enjoys the highest level of impact due to the construction activities, while Austria gets the larger portion of the multiplier from the diffusion side.

Prof Bohlin is Head of the Division of Technology & Society, Department of Technology Management & Economics at Chalmers University of Technology, Gothenburg. He has published in a number of areas relating to the information society - policy, strategy and management. He is Chief Editor of Telecommunications Policy; Chair of the International Telecommunications Society; Member of the Scientific Advisory Boards of Communications and Strategies, the International Journal of Management and Network Economics, the Nordic and Baltic Journal of Information and Communication Technologies, and Info - the Journal of Policy, Regulation and Strategy for Telecommunications, Information and Media; Member of the Scientific Committee of the Florence School of Regulation (Communications & Media); Research Fellow of the Institute of Management, Innovation and Technology (IMIT) and Member of the Royal Academy of Engineering Sciences. Erik Bohlin obtained his graduate degree in Business Administration and Economics at the Stockholm School of Economics (1987) and his Ph.D. at Chalmers University of Technology (1995).

Prof Molas-Gallart's talk was entitled: **Impact Blues: Symptoms and Treatment.**

The following is an abstract of Prof Molas-Gallart's talk:

Over the last three decades there has been a substantial growth in the efforts to assess and measure the impact of research activities. Impact assessment is becoming a common element in the evaluation practices of many research funding organizations. Research policy is not alone in this trend: impact assessment is now a crucial building block of policy evaluation across countries, organizations and fields. One could assume that such popularity builds upon and contributes to the

construction of a robust and accepted battery of assessment methodologies. This assumption would be wrong. A section of the professional evaluation community and many among the evaluation subjects remain vocal about the shortcomings of impact assessment methodologies and even about the same notion of "impact assessment". Although hundreds of impact assessment studies have been carried out during the last two decades, funding agencies and analysts continue to search for a new approach that will deliver the promise of robust impact measures. The "blues" to which the title of the presentation refers is the result of a combination of scepticism and a degree of exhaustion. The presentation will discuss the causes of the current situation, present the debates that frame it, and will place the SEQUOIA efforts against this framework.

Prof Jordi Molas-Gallart is an economist with more than twenty years' experience as an analyst of science, technology and innovation policies. He is a Research Professor at INGENIO, a research institute of the Spanish Council for Scientific Research (CSIC) and the Polytechnic University of Valencia. Before joining INGENIO, Jordi worked for 13 years at SPRU, University of Sussex, as Research Fellow and Senior Research Fellow. His research interests include science and technology policy evaluation and impact assessment, and university-industry relations. He has led and contributed to many evaluation studies for the UK Economic and Social Research Council, the European Commission, INSERM, CSIC, Queen Mary College, the Russell Group of Universities, and several Spanish regional governments among others, focusing mainly on the analysis of the non-academic impact of research programmes. He has been a member of the European Commission "Lisbon Expert Group" for the follow-up of the research aspects of the revised Lisbon strategy. He is the author of one book, and of more than 70 articles, book chapters, monographs and reports.

SEQUOIA Best Practices: Presentations by Assessed Projects

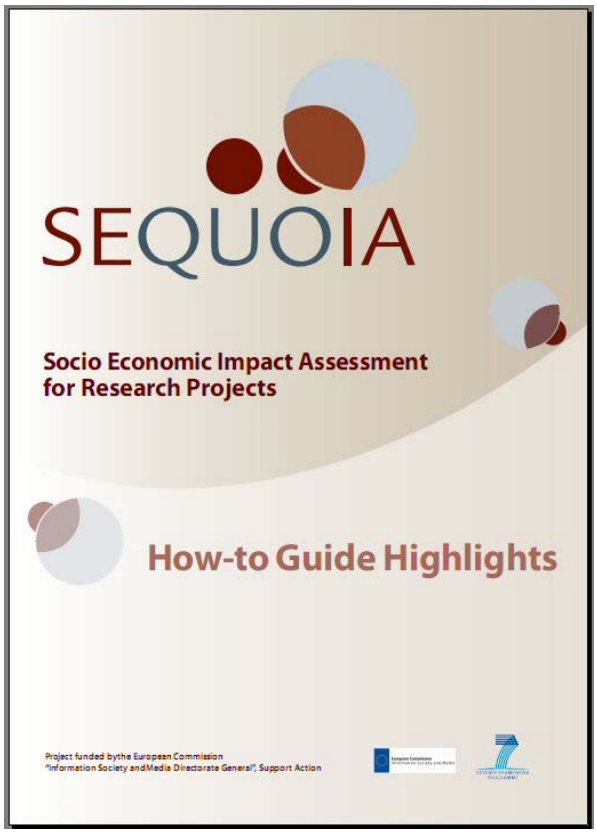
The final period of SEQUOIA was focused on fine-tuning the self-assessment methodology and the assessment of the different Call 1 and Call 5 projects that participated in several collaboration activities. One-to-one contact with each project was very important and helped create a good working relationship with and trust in the SEQUOIA team. Particular attention was paid to the organization of the online sessions and interviews with the Call 1 and Call 5 project members in order satisfy their needs in terms of time and effort spent on interaction with SEQUOIA. This close collaboration and good working relationship culminated in the top 5 projects in terms of impact assessment being asked to present their projects at the final conference.

This body of work was led by Dr Antonella Passani, Socio Economic Research Coordinator at T6 Ecosystems S.r.l., Dr. Passani also moderated the conference.

SEQUOIA disseminated and transferred the methodology not only through the official deliverables, during the Collaboration meeting and the FISE conference prior to the conference but also in an abridged brochure–like version - the "How-To Guide Highlights" at the conference (see D4.2.2 and D5.1).

How-To Guide

One of the most important SEQUOIA deliverables is the D3.3b "SEQUOIA Self-Assessment How-To Guide" the aim of which was to provide SaaS and IoS research projects with the necessary information to understand and apply the SEQUOIA methodology for socio-economic impact self-assessment. D3.3b is a step-by-step guide with practical examples and it also includes a complete questionnaire to use in the assessment process. The "How-To Guide Highlights" however is a more accessible version offering an overview of the methodology and how to use it with concrete examples. It was made available in soft and hard copy at the conference and can be downloaded from the project website at: http://www.sequoiaproject.eu/



How-To Guide Highlights

This booklet gives a first general overview of the SEQUOIA methodology allowing the reader to understand whether the methodology fits his needs: the How-To Guide does not substitute D3.3b but it is an introduction to the more complete contents of the deliverable.

Best Practices Video

In order to showcase the projects that scored highest in the SEQUOIA assessment process, the "best practices"[1], and highlight the results of the SEQUOIA project, the SEQUOIA team created a video for presentation at the final conference.

SEQUOIA Best Practices Video

The video, developed in the Prezi online tool[2], offers an overview of the SEQUOIA project and its main aims. It goes on to describe briefly the projects that displayed best practice explaining why they scored higher in the SEQUOIA assessment project. The relevant project teams were involved in the development of the project to validate the content and ensure that their projects were accurately portrayed. The projects involved were: S-CUBE, MOSAIC, I2WEB, CumuloNimbo and SocioS.

The video is available on the SEQUOIA website http://www.sequoiaproject.eu/

[1] See "Deliverable D3.2 – Best Practices Report"
[2] http://prezi.com/

Top five projects

The projects that rated top five of those that employed the self-assessment methodology from the Call 1 and 5 projects are as follows (in no particular order):

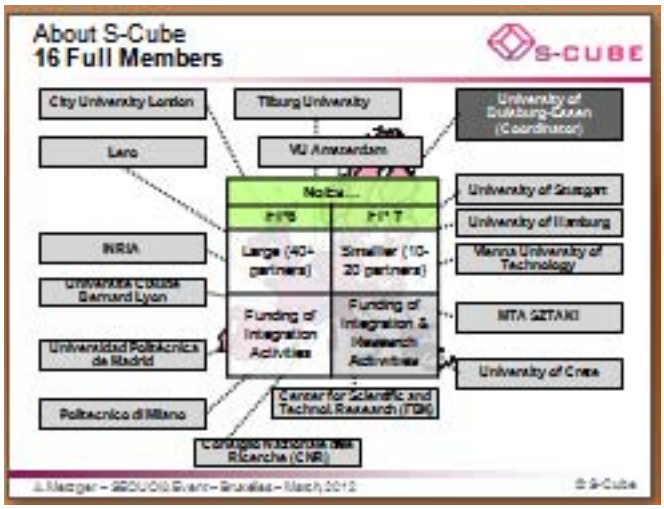
1. S-CUBE
2. MOSAIC
3. I2WEB
4. CumuloNimbo
5. SocioS

From the presentations of each of the projects it was clear that they welcomed the SEQUOIA self-assessment methodology, whilst also acknowledging that it was a little more time consuming that they expected. Each of the projects however stressed the good collaboration process that they enjoyed with the SEQUOIA team.

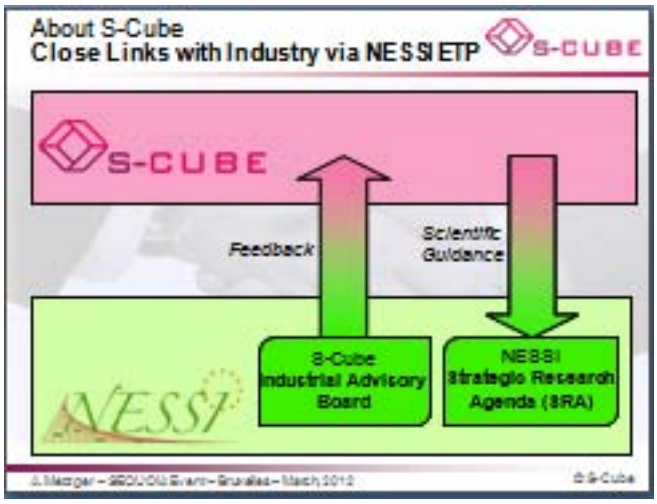
The following are the presentations presented by each of these projects:

1. **S-CUBE** – presented by Andreas Metzger

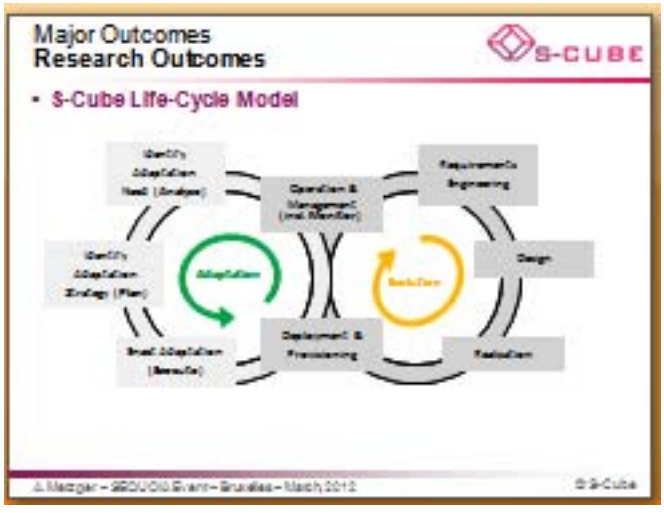

About S-Cube
Overall Objectives
S-CUBE
• Establish a unified, multidisciplinary, research community for software services and systems
S-Cube Integrated Research Framework


About S-Cube
16 Full Members
S-CUBE
City University London
Tilburg University
University of Duisburg-Essen (Coordinator)
Lero
VU Amsterdam
University of Stuttgart
University of Hamburg
Vienna University of Technology
INRIA
Large (40+ partners)
Smaller (10-20 partners)
Funding of Integration Activities
Funding of Integration & Research Activities
MTA SZTAKI
University of Crete
Politecnico di Milano
Center for Scientific and Technol. Research (FBK)


About S-Cube
17 Associate Members
S-CUBE
SINTEF
technische universität dortmund
Manchester Business School
university of groningen
KIT
cetic


About S-Cube
Close Links with Industry via NESSI ETP
S-CUBE
Feedback
Scientific Guidance
S-Cube Industrial Advisory Board
NESSI Strategic Research Agenda (SRA)
NESSI

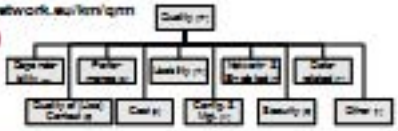

S-CUBE
About S-Cube
Major Outcomes
Beyond S-Cube


Major Outcomes
Research Outcomes
S-CUBE
• S-Cube Life-Cycle Model

Major Outcomes
Research Outcomes

S-CUBE

- Fundamental Monitoring and Adaptation Techniques
  - Cross-Layer Adaptation (avoiding conflicts)
  - Human-in-the loop & Context-aware Adaptation
  - Quality Prediction for Proactive Adaptation
- S-Cube Service Quality Models
  - Reference Model (QRM)
    http://www.s-cube-network.eu/km/qrm
  - Meta Model (QMM)



Major Outcomes
Research Outcomes

S-CUBE

- S-Cube Books

Major Outcomes
Integration of Communities

S-CUBE

- Dedicated Events
  - Conferences, including
    - ServiceWave
    - ICSOC
    - BPSC
  - Workshops, including
    - PESOS@ICSE 2009-2012
    - S-Cube@ICSE 2012

PESOS 2012

S-CUBE

ICSE 2012
June 2-9, 2012
Zurich • Switzerland

Major Outcomes
Integration of Communities

S-CUBE

- S-Cube Knowledge Model
  http://www.s-cube-network.eu/km
- Education
  - S-Cube Virtual Campus
    http://www.s-cube-network.eu/vc
  - Int'l Masters in Service Engineering
    http://www.erasmusmundus-lmse.eu
  - SOC Summer Schools
    http://www.summersoc.eu/

Major Outcomes
Socio-economic Impact

S-CUBE

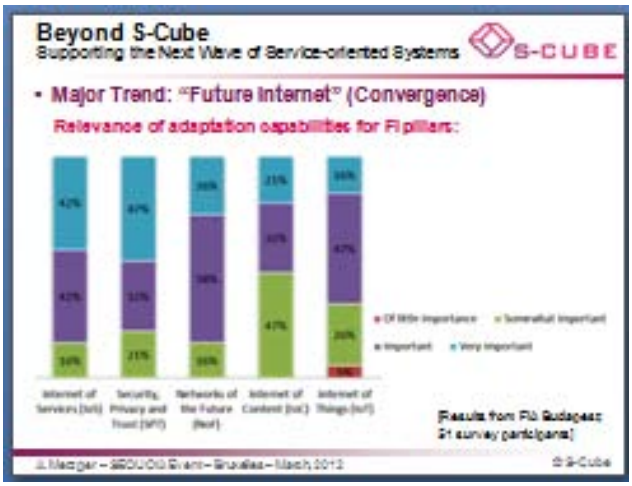
- SEQUOIA was instrumental in supporting us in....
  - Reflecting on stakeholders and relevance of S-Cube outcomes
    - Researchers and research communities: open, multi-disciplinary research topics to be addressed
    - Students: education material, programmes & events
    - Software & service engineers: fundamental research results
    - Industry: "shopping list" of techniques than may be transferred
  - Considering business impact
    - Difficult: S-Cube as an NoE has no business exploitation plan
    - But: S-Cube ensured sustainability: KM, VC, research networks
  - Understanding social impact
    - Well educated researchers and students
    - Initial investigations on Infrastr. resource efficiency/GreenIT

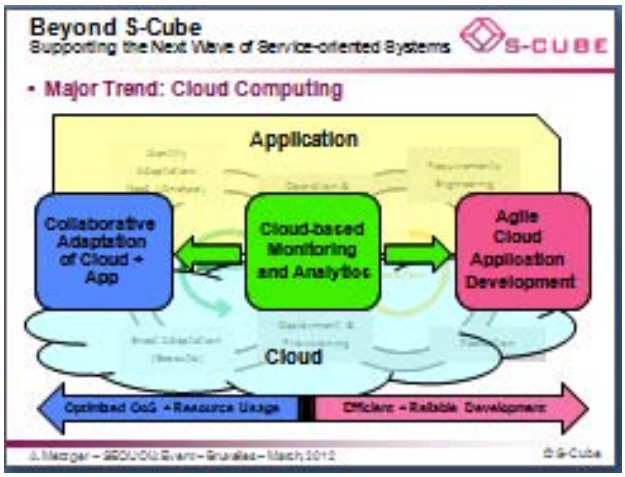
S-CUBE

About S-Cube

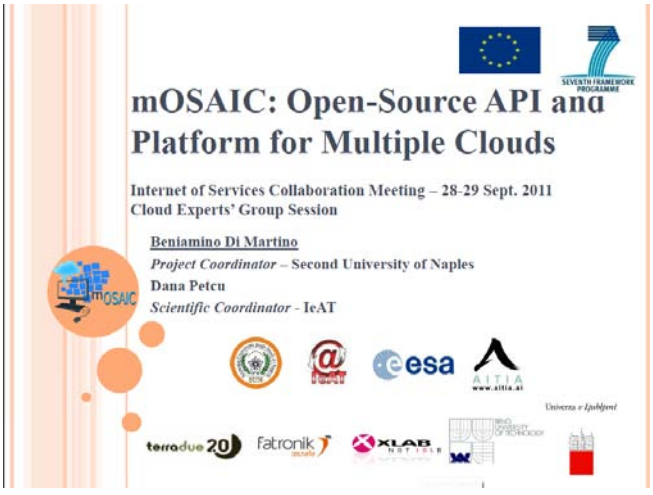
Major Outcomes

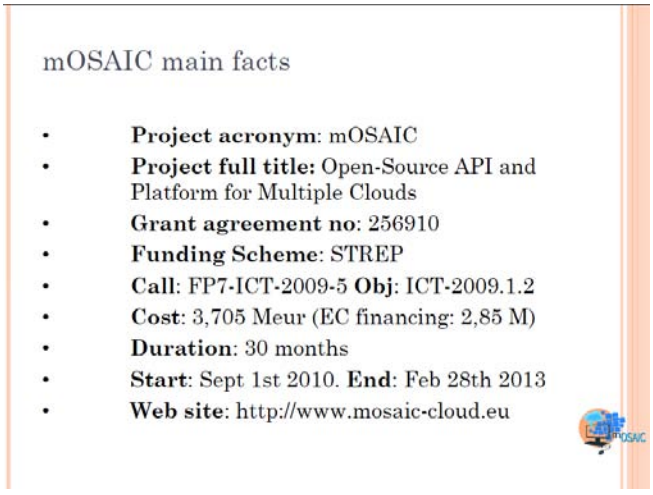
Beyond S-Cube





2. **MOSAIC** represented by Beniamino Di Martino





mOSAIC Partners

Second University of Naples – It (Prj Coordinator)

Institute IeAT – Ro

European Space Agency - Fr

AITIA - Hu

Tecnalia - Sp

Terradue - It

XLAB - Slo

University of Lubljiana - Slo

Brno University of Technology - Ck

The Cloud Computing Challenges

In literature main challenges are identified:

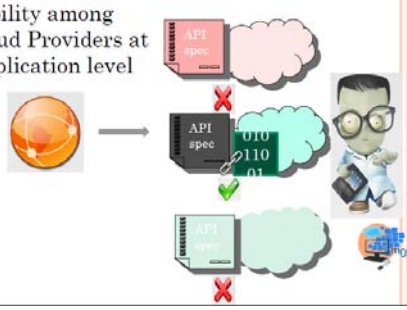
- data and application interoperability
- data and application portability
- governance and management,
- metering and monitoring,
- security.

mOSAIC will fully address the first two of these challenges, and partially address the next two ones.

Portability and Interoperability

Avoiding "Cloud Vendors Lock-in" and "Walled Gardens"

Allow Interoperability among Clouds and Cloud Providers at Service and Application level



How we develop a Cloud-based application?

High level

- Google App Engine
- Microsoft Azure Service Platform [or wait for Orleans]
- Manjrasoft Aneka
- Amazon Web Services

Low level

- APIs offered by IaaS Cloud service providers
  - to create and manage cloud resources, including compute, storage, and networking components
  - e.g. Amazon EC2, Eucalyptus, Oracle (Sun) Cloud, ElasticHosts, FlexiScale, GoGrid, Enomaly, OpenNebula, SliceHost, Nimbus, AppNexus, F5, Tashi, CohesiveFT, Mosso, Joyent .....
  - *So many! So different! This are the right APIs for the Cloud appls?*

Towards the usage of multiple Clouds

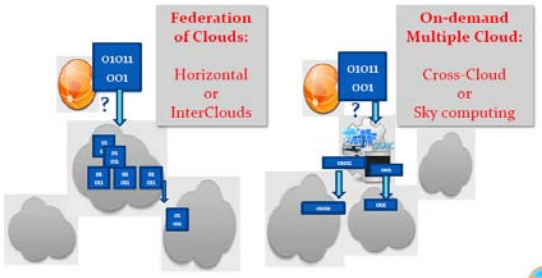
Portability

- At high level? *NO!*
- At low level? Ongoing task!
  - OCCI – January 2010
  - UniCluster, OpenStack, Jcloud, DeltaCloud ... from Spring 2010

Approaches:

- At IaaS level:
  - Migration of VMs between Cloud providers (e.g. Reservoir)
  - Agreements between Cloud providers
  - Communications between Clouds
- At PaaS level:
  - *Use services from different Clouds*

Federation of Clouds vs Using multiple Clouds



mOSAIC Approach

The mOSAIC project aims to develop an open-source platform that enables applications to negotiate Cloud services as requested by their users.

Using the Cloud ontology, applications will be able to specify their requirements and communicate them to the platform via the innovative API.

The platform will implement a multi-agent brokering mechanism that will search for services matching the applications' request, and possibly compose the requested service if no direct hit is found.

mOSAIC Key features and technologies

- Vendor agnostic API
- Open source PaaS
- Cloud resources and services brokering
- Cloud Agency
- SLA negotiations and monitoring
- Cloud Ontology
- Semantic Engine
- Component-based applications
- Multiple Clouds
- Long time running applications
- Event driven, asynchronous

mOSAIC goals

An API
- Cloud-based language- and platform-independent API
- Extends the existing language- or platform-dependent API capabilities with composite features based on *patterns*

A framework
- Semantic engine
  - Cloud ontology & Semantic representation of Cloud resources
  - Applications's needs in terms of SLAs and QoS requirements
- Cloud agency

An open-source platform
- a proof-of-the-concept prototype ready to be tested, exploited or extended by its users
- include instances of the APIs for two programming languages and application tools

Proofs of validity through the use cases and applications

mOSAIC goals

API at high level independent from the provider
- With implementation in high level languages

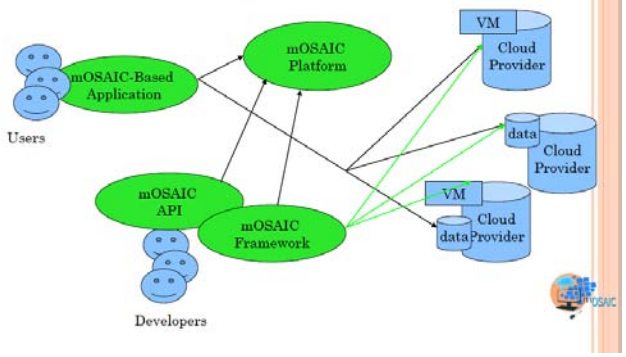
Common representations of resources
- Cloud taxonomy and ontology

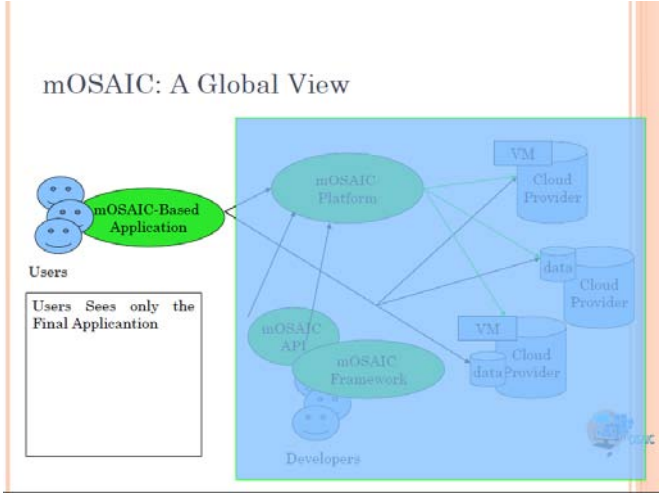
Powerful platform allowing dynamicity and
- Identification of appl's requirements in terms of resources
- (Re)Negotiation of the offers from different providers
- Monitoring and benchmarking
- Connectors to different services based on a common understanding

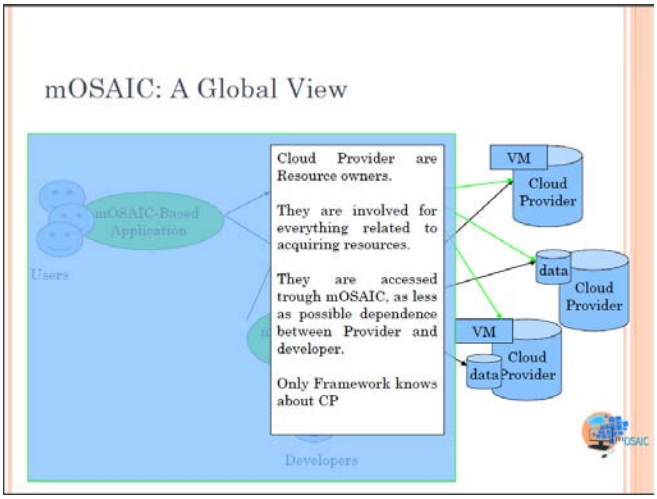
mOSAIC milestones

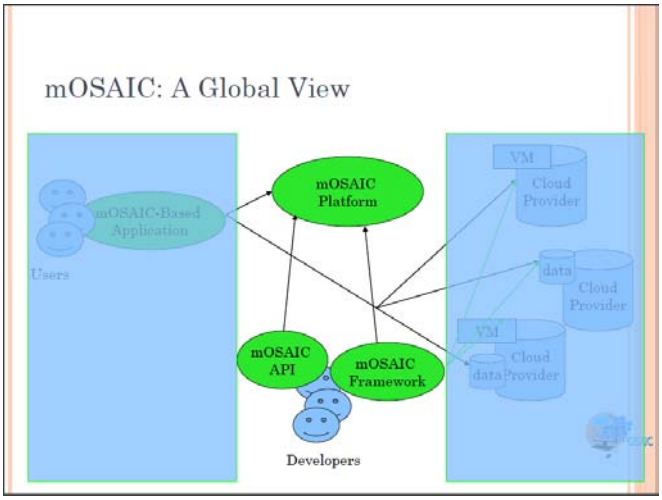
September 2011:	**1st implementation of API Cloud ontology**
September 2012:	**Platform available**
March 2013:	**Full software package**

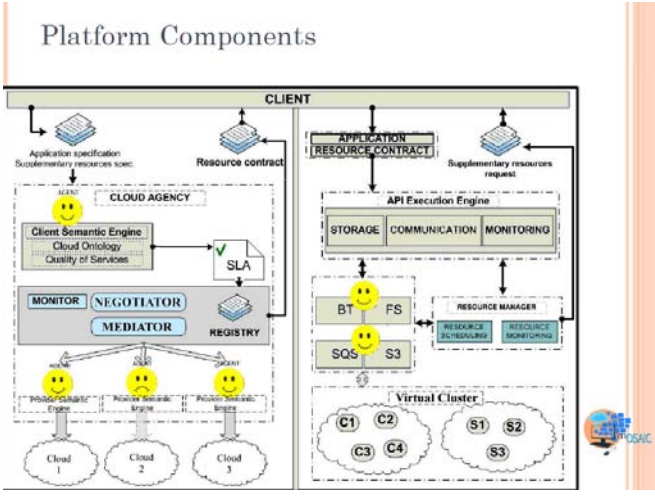
mOSAIC: A Global View











Current ongoing relevant tasks

- T1.2 → Cloud Ontology
- T1.3 → API design
  - APIs description
- T2.2 → API implementation
- T1.4 → Cloud agency
  - Agent protocols
  - Cloud request
- T1.5 → SLA agreement and Qos
  - Resource/services
  - Cloud Provider
  - Performance figures (QoS parameters)
- T2.3 → Semantic engine
  - Semantic query
  - Service discovery
  - Matchmaking
- **T2.5 → Provider Agent**
  - Resources
  - Services
  - Offer
- **T2.6 → Negotiator module**
- T3.1 → Cloud usage patterns
  - Patterns description
- T3.2 → Platform Use ca

Progress so far

Finalized deliverables (at Y1)

- API design
- API first prototype implementation - in Java
- Cloud Ontology
- Cloud Usage patterns

Work in progress

- Semantic Engine
- Cloud Agency
- SLA management and monitoring
- mOSAIC Applications development/porting

mOSAIC API

Concepts:

in public D1.3/Sept 2011 & papers

Implementations:

In Java, available at:

http://www.mosaic-cloud.eu -> <For Developers> box

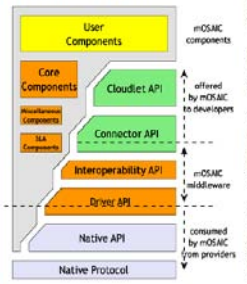
https://bitbucket.org/mosaic/

Guide in mosaic-api / mosaic-mvn / doc

In Python, in February 2012

mOSAIC API Architecture

mOSAIC API Layers



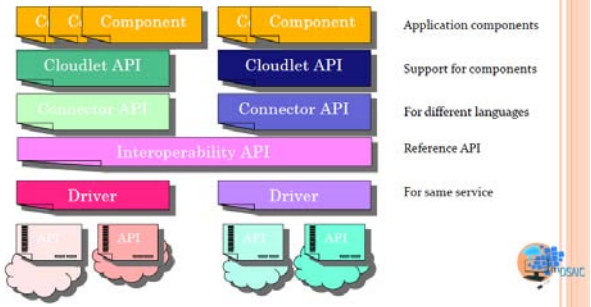
Lowest Layer: Native resource protocol (Web service, RPC, etc.), or a native resource API provided as a library by the vendor for a certain programming language. No uniformity.

Driver API: Wraps the native API, providing the first level of uniformity: all resources of the same type are exported with the same interface. Thus exchanging, for example, an Amazon S3 with a Riak key-value store is just a matter of configuration.

Connector API: depending on the programming language, provides abstractions for the cloud resources, suitable for the programming paradigm. This is where we provide the second kind of uniformity for the programming paradigms, as all the implementations of the connector API in object oriented programming languages will have similar class hierarchies, method signatures, or patterns.

Cloudlet API: Even thought the developer already can access cloud resources, he or she must restrict himself or herself to a cloud compliant programming methodology, which we provide (integrated with all the layers already mentioned) that we call Cloudlet, as similar with the existing Java Servlet technology that provides standard programming components in J2EE environments.

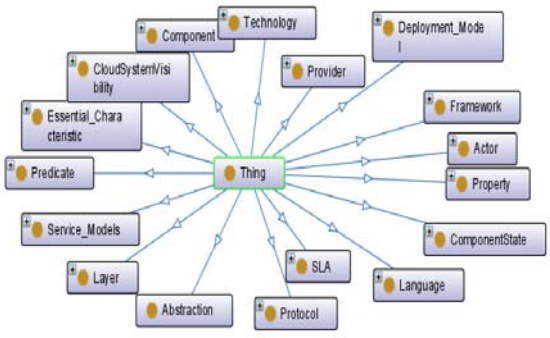
mOSAIC API's Layers



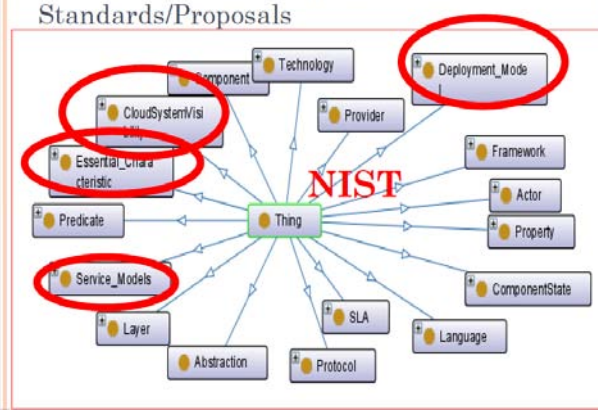
mOSAIC Cloud Ontology

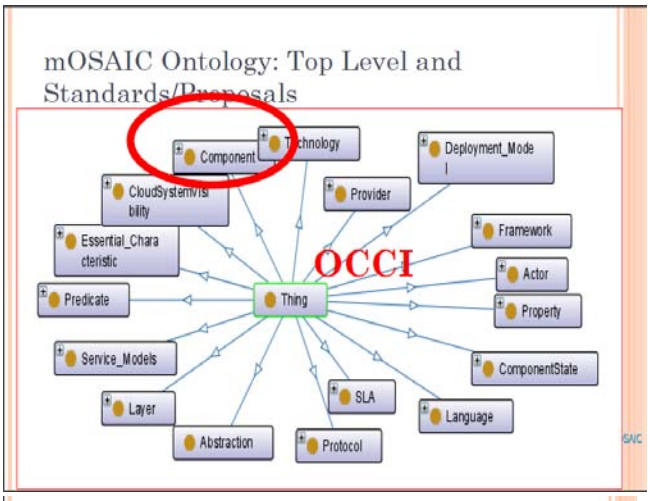
- Provides a unified description of
  - Cloud components
  - Interfaces
  - API
  - Requirements
    - SLA
  - …
- Enables
  - Reasoning
  - Semantics-based queries executions
    - Brokering
    - Discovery
    - Matchmaking
  - Cloud Services Composition

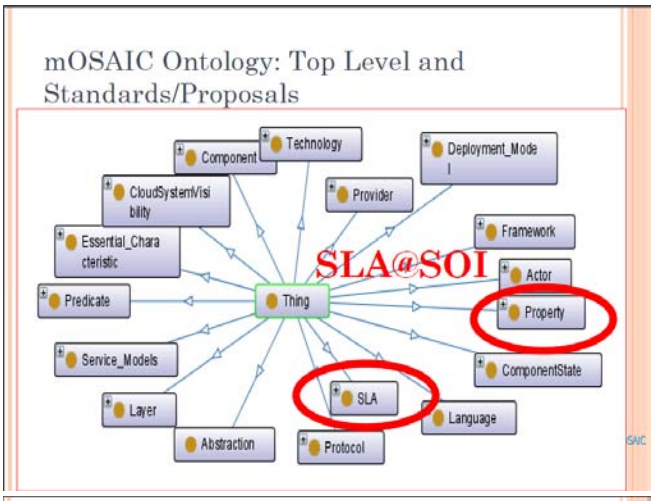
mOSAIC Ontology: Top Level

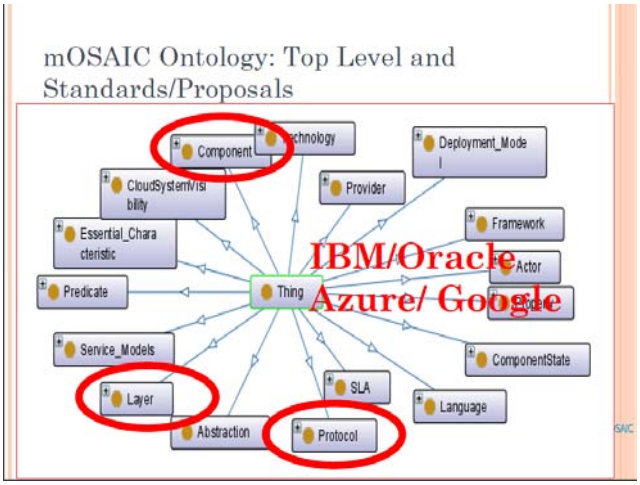


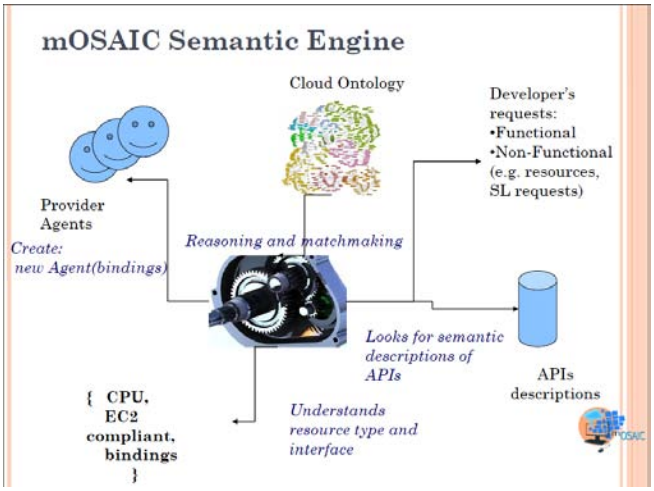
mOSAIC Ontology: Top Level and Standards/Proposals



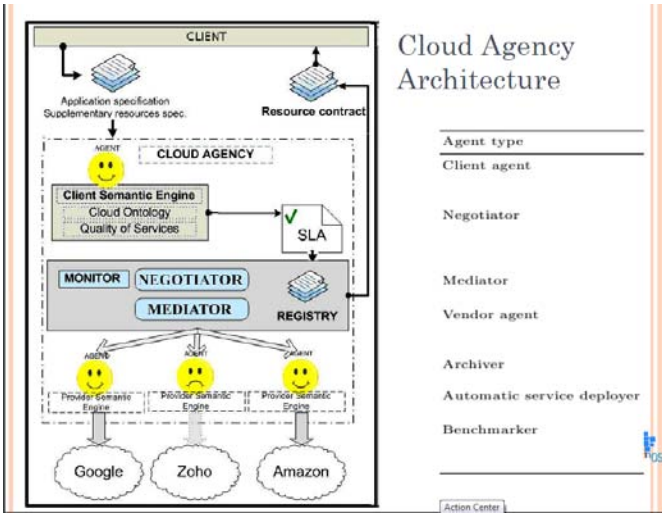

mOSAIC Ontology: Top Level and Standards/Proposals
Component
Technology
Deployment_Model
CloudSystemVisibility
Provider
Framework
Essential_Characteristic
OCCI
Actor
Predicate
Thing
Property
Service_Models
ComponentState
Layer
SLA
Language
Abstraction
Protocol

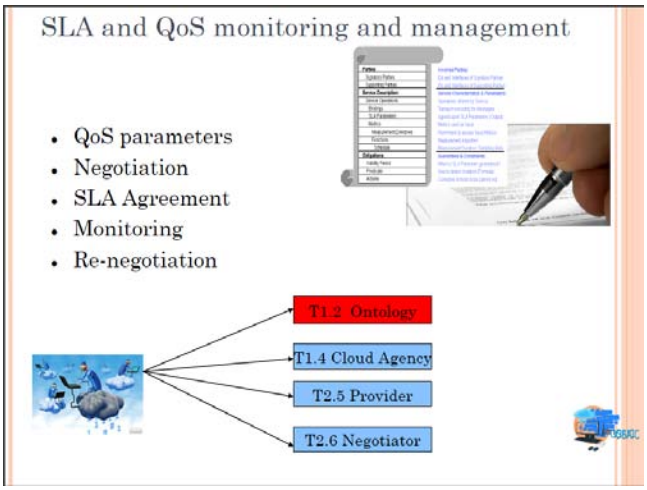

mOSAIC Ontology: Top Level and Standards/Proposals
Component
Technology
Deployment_Model
CloudSystemVisibility
Provider
Framework
Essential_Characteristic
SLA@SOI
Actor
Predicate
Thing
Property
Service_Models
ComponentState
Layer
SLA
Language
Abstraction
Protocol

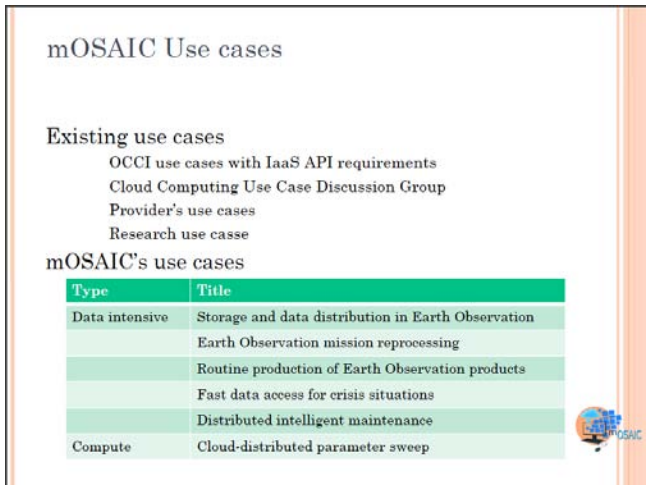

mOSAIC Ontology: Top Level and Standards/Proposals
Component
Technology
Deployment_Model
CloudSystemVisibility
Provider
Framework
Essential_Characteristic
IBM/Oracle
Azure/ Google
Actor
Predicate
Thing
Service_Models
ComponentState
Layer
SLA
Language
Abstraction
Protocol


mOSAIC Semantic Engine
Cloud Ontology
Developer's requests:
•Functional
•Non-Functional
(e.g. resources, SL requests)
Provider Agents
Create: new Agent(bindings)
Reasoning and matchmaking
Looks for semantic descriptions of APIs
APIs descriptions
{ CPU, EC2 compliant, bindings }
Understands resource type and interface

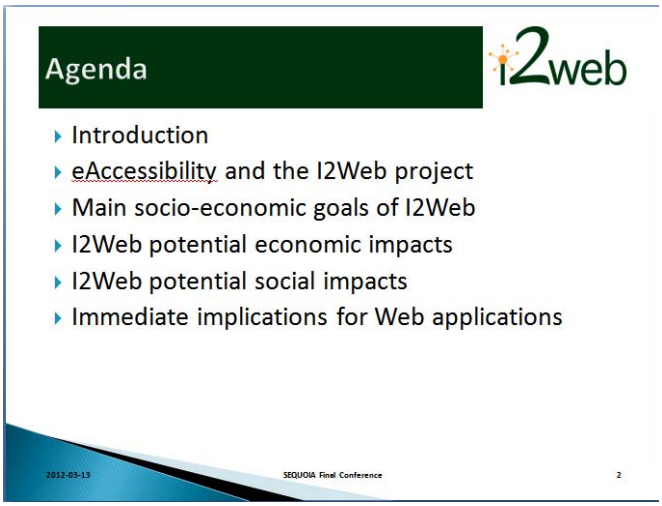

mOSAIC Cloud Agency
• The mOSAIC Cloud agency will be conceived according a service-oriented architecture, where agents will implement stateful, eventually mobile, services
• Negotiation, monitoring, dynamic benchmarking and reconfiguration of cloud resources are some mandatory services to be implemented
Why agents?


CLIENT
Application specification
Supplementary resources spec.
Resource contract
CLOUD AGENCY
Client Semantic Engine
Cloud Ontology
Quality of Services
SLA
MONITOR
NEGOTIATOR
MEDIATOR
REGISTRY
Google
Zoho
Amazon
Cloud Agency Architecture
Agent type
Client agent
Negotiator
Mediator
Vendor agent
Archiver
Automatic service deployer
Benchmarker





3. **I2WEB** presented by Carlos Velasco



Some facts …

- Society is ageing
  - Older people + people with disabilities will be 30% + 10% of population by 2025
- Internet Services are getting more interactive, participative and mainstream
  - Next Generation – mobile and multiple access devices
  - Media convergence, user-generated content, social networks
  - Further isolating these an other excluded groups
- Research and tools are required
  - To develop accessible Web Services and applications
  - To overcome this emerging & widening Digital Divide

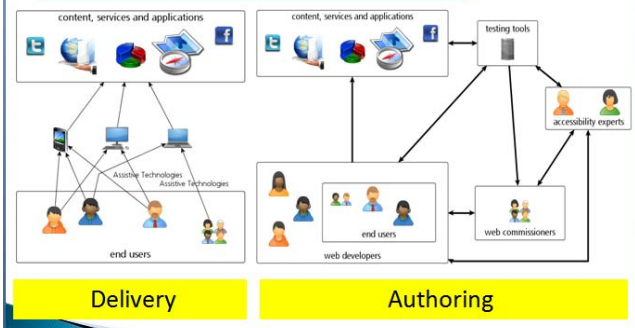
I2Web Vision

- Universal eAccessibility: Web Applications that are
  - fully inclusive & accessible to everyone, everywhere, every time on every device on which they wish to use them
- User-centric service creation
  - User Centered Design (UCD) and eAccessibility must be seamlessly integrated into all design processes

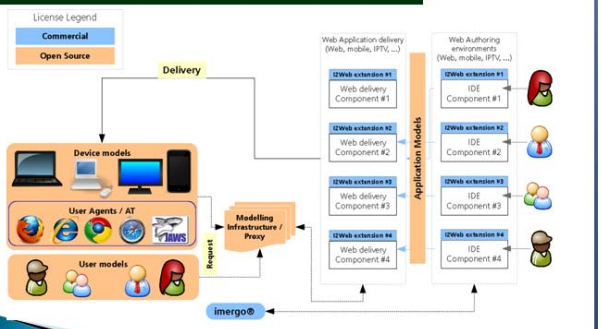
eAccessibility

- **eAccessibility** depends on 4 interdependent components
  - Content, Services and Applications
  - Testing Tools
  - Authoring Tools
  - Assistive Technologies (AT)
- To meet EU + National policies and regulations

I2Web approach and actors



I2Web Architecture



I2Web Consortium

1	Fraunhofer Society / Fraunhofer FIT	DE	Academia & Research
2	The National Microelectronics Applications Centre Ltd	IE	Commercial
3	University of York	UK	Academia & Research
4	Hewlett-Packard	IT	Commercial
5	Public-i Group Ltd	UK	Commercial
6	Polymedia SpA (KIT)	IT	Commercial
8	University of Ljubljana	SI	Academia & Research
9	National Council for the Blind of Ireland	IE	User Groups
10	Foundation for Assistive Technology	UK	User Groups

I2Web outputs

- Tools
  - Web Compliance tools incorporated into existing development environments and workflows for developers
  - Advanced verification tools for accessibility experts
  - User, device and application models
- Test, validate and demonstrate the developed frameworks & tools:
  - professionals
  - disabled & older people who contribute content to the web
  - non-disabled, non-professional people who contribute content to the web
- Ensure impact in standardisation/recommendation bodies

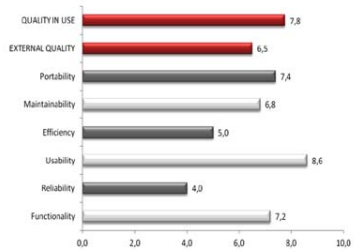
SEQUOIA socio-economic impact assessment of I2Web

- We found the initial SEQUOIA Socio Economic assessment & interview very helpful to focus our thinking
  - To clearly consider both our social & economic impact, which is very important in I2Web
  - This helped us develop our own Initial Exploitation Plan
- We plan to use the SEQUOIA "Self-Assessment How-To Guide" to repeat the exercise
  - To evolve our Exploitation Plan to its final version at the end of the project

Initial SEQUOIA assessment of the technical aspects of I2Web found

- … the most technological innovative aspects of the I2Web project are related to
  - the user, device and application models & Web Compliance tools
  - that we are developing for fully interactive multimedia Future Internet Services

Click to add title



Main socio-economic goals

- All citizens using Future Internet Services that are fully accessible to everyone, everywhere, every time and on every device on which they wish to use them
- Sustainable deployment of the I2Web Services, components & Compliance Tools by the project Partners & others, to ensure such eAccessibility across Europe
- Wide-spread adoption & sustainable evolution of the I2Web common Application, Device & User models, APIs, open infrastructure & methodology

I2Web economic impacts

- eAccessible validation prototype systems will be developed
  - in eBanking, eGovernment, Media Services
- Integrating accessibility into mainstream Web 2.0 development
  - developers can efficiently create interactive content & systems that work effectively for more people in more situations.
- Costs for accessibility can be justified as those for usability
  - Designing for accessibility will yield greater usability for all, not just for people with disabilities.
  - Est. 10% reduction thru compliance with regulatory & policies constraints.
- Project results will be input to relevant standardization bodies
- Initial Exploitation Plan
  - Partners' exploitation is estimated to result in up to 100 jobs over 3 years

Users who will directly benefit from the I2Web project

- End Users
  - Who participate in the co-design, co-creation & content of web 2.0 services
  - Older & disabled users, all citizens, all businesses
- Website Commissioners
  - who commission, own and manage websites & Web 2.0 applications
  - Need to know & monitor that they are accessible.
- Web Developers
  - Individuals, companies/SMEs who design & develop websites & Web 2.0 apps
  - need to understand & have tools to help them code for accessibility
- Accessibility Experts
  - who may well advise the previous two groups,
  - Need tools to test websites, applications & services for accessibility

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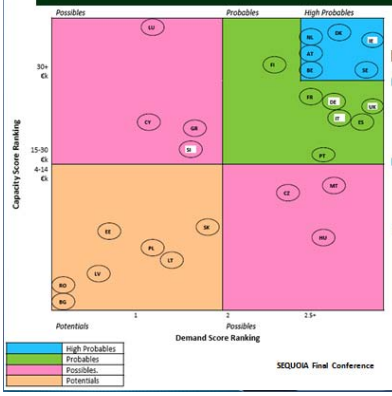
I2Web target markets analysis



Member States positioned by

- **Demand**
  - based on status & policy scores from 2007 MeAC report – Measuring Progress of eAccessibility in Europe
- **Capacity**
  - based on GDP per capita.
- **Cost-Benefit Analysis**
  - *eAccessibility Impacts Study* are developing an **eAccessibility Business Case Excel Tool**

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Customers for I2Web services

- Target Customers
  - Public & private organisations who commission & provide web services
  - National Agencies, NGOs & European Commission
  - Software & Web Service implementation companies (Large & SME)

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eAccessibility cost/benefits – eAccesibility impacts study

- Costs – extra costs for
  - Redesign
  - Design from scratch
  - Technical maintenance
  - Governance
- Benefits
  - Social responsibility & image
  - Compliance with legislation
  - External audience reach & sales
  - Productivity (internal IT application)
  - Efficiency gains from servicing/interacting online with customers/suppliers
  - More efficient recruitment process
  - Technical improvements (reduced site development & maintenance time; reduced server load)

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I2Web social impacts

- Significant & direct contribution to the eAccessibility of Future Internet Services for all users.
  - Including older & disabled users, who could otherwise be further marginalised by the increasing importance of such service in people's lives
  - Empowering more users to gain employment using such services
- Directly promoting policies such as
  - 2020 Digital Agenda for Europe (Pillar 6) – eAccessibility
  - European Social Agenda
  - UN Convention on the Rights of Persons with Disabilities
- Improving all Users experience of Web Applications

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Learning about Users & User Interaction

- **Web App developers must go to the users & see**
  - How users are using their Web Apps
  - What they actually want & need
- **When I2Web did** (63 users with various disabilities) **– we found**
  - Sophisticated **Strategies** that people with disabilities & older adults use in interactive applications on various devices.
  - We found over 100 distinct strategies being applied to use Web Apps on different platforms & applications.
- Overall interactions of users with application Web Apps are much **more complex, dynamic & adaptive than current standards assume.**

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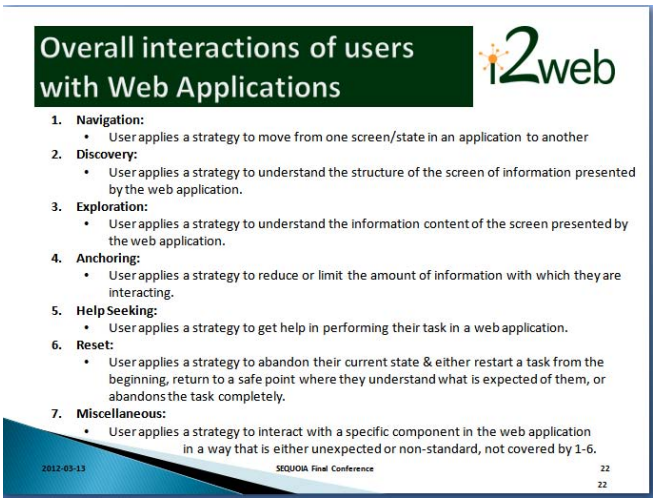
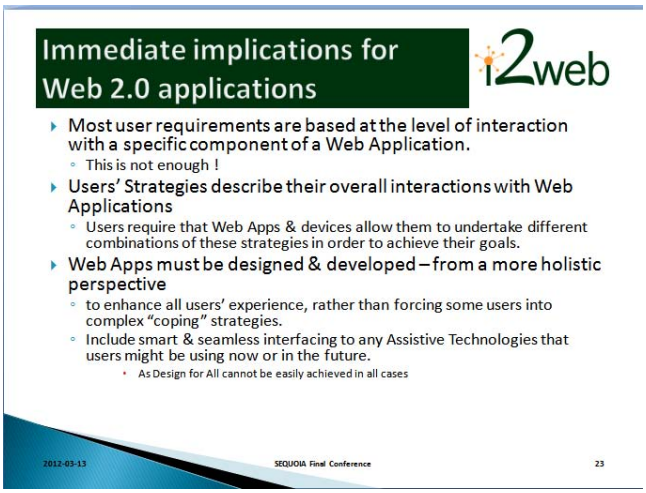
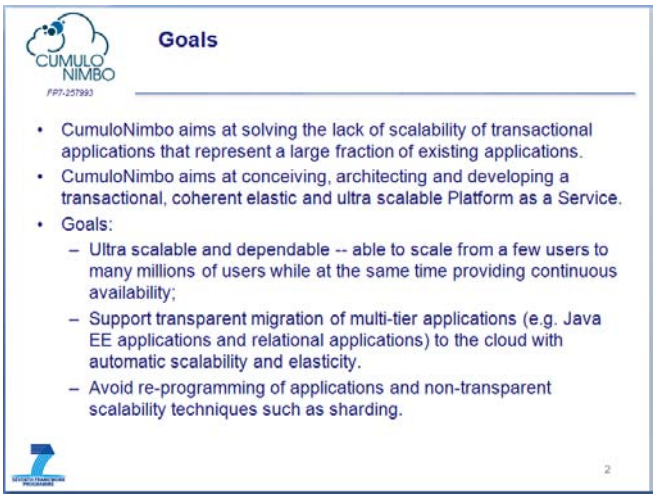
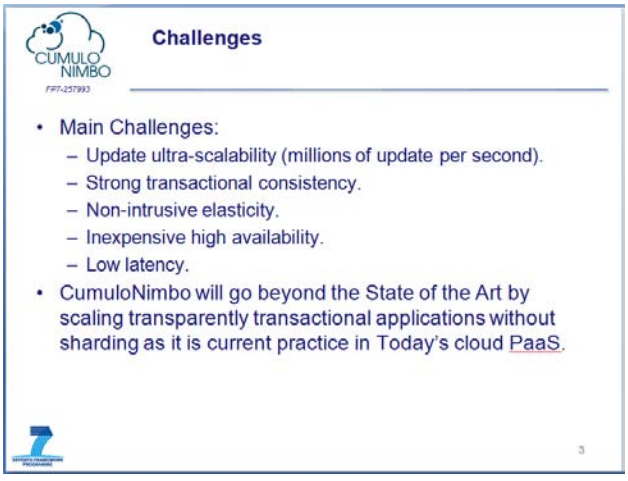
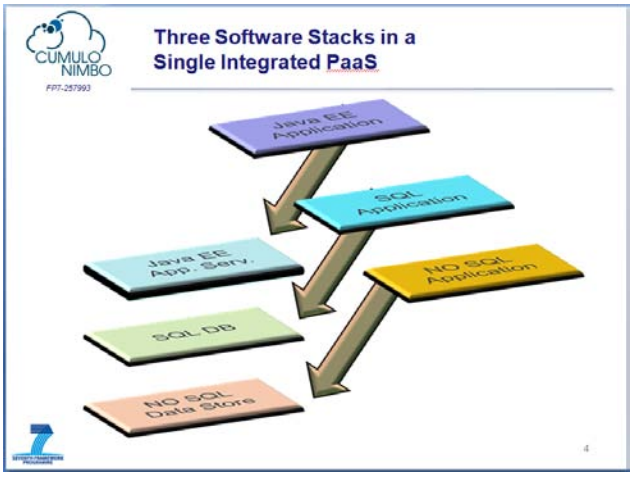




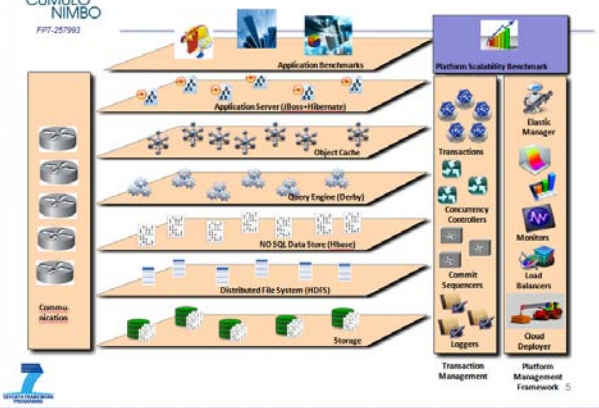
4. **CumuloNimbo** – represented by Ricardo Jimenez-Peris







Architecture



Architecture

- We exploit JBoss and Hibernate reflection to intercept:
  - Transactional processing → Becomes ultra-scalable.
  - Second level cache → Becomes distributed/elastic.
- No changes required in the application server.
- Approach applicable to any transactional application server either source code or with sufficient reflection capabilities.
- Support very large caches at both object and DB level enabling in-memory databases/application servers.

Date Footer 6

Main Breakthroughs: Ultra-Scalability

- Decomposition of transactional processing in different components scaled independently but in a composable manner.
  - Atomicity, consistency, isolation and durability attained separately.
  - No DB or transactional manager as a single component.
- The first bottleneck is in a component able to do millions of update transactions per second.
- Based on snapshot isolation.
  - Avoids read/write conflicts.
- Guarantees transactional coherence across application server, object cache and database.

Date Footer 7

Main Breakthroughs: Transparent Scalability

- No constraints on transactional processing and data.
- Fully transparent:
  - Syntactic transparency:
    - APIs do not change.
    - The application remains unchanged.
  - Semantic transparency:
    - The execution is equivalent to the one of a centralized environment (1-copy equivalence).

Date Footer 8

Main Breakthroughs: Fault Tolerance

- Replication is used for high availability and not for scaling.
  - Low cost data fault tolerance
    - Pushed down to the storage layer (distributed file system)
    - Outside the critical path.
  - Fault tolerance for other components with a simple approach
    - Configuration and vital data stored on a replicated data store (Zookeeper).
  - Fault tolerance of critical components:
    - Specialized replication that maximizes throughput and minimizes latency.

Date Footer 9

Main Breakthroughs: Elasticity

- Elasticity is controlled at each layer with customized elastic rules.
  - E.g., the object cache can provision nodes either due to lack of memory or CPU saturation.
- Elasticity is combined with dynamic load balancing to guarantee that provisioning is only triggered when needed.
- Non-intrusive reconfiguration:
  - Focusing on maintaining throughput close to the maximum one during reconfiguration.

Date Footer 10

Maximizing Industrial Impact

- Supporting current software stacks:
  - Java EE & relational SQL database.
- Remove obstacles to move to the cloud:
  - Syntactic and semantic transparency.
- Pave the way for the future:
  - Support for No-SQL data stores appl. and map-reduce jobs.
- Single platform for both OLTP and OLAP applications.

Date | Footer | 11

Social, Scientific and Exploitation Impacts

- Mass-media:
  - Presenting the results in national newspapers.
- Scientific:
  - Focusing on top conferences/journals (quality as opposed to quantity).
  - Using workshop publications to create awareness.
- Exploitaition:
  - Creation of a spin-off.

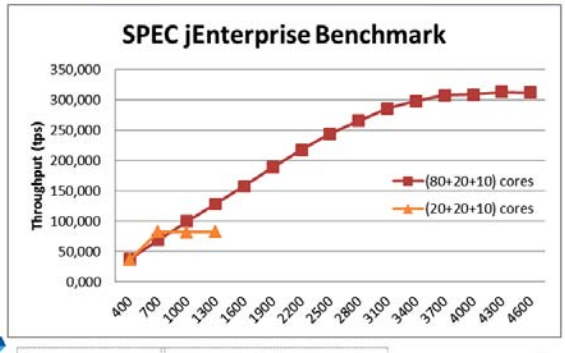
Date | Footer | 12

Progress and Achievements

- Almost 1.5 years of project.
- Patent filed with core of the inventions made.
- A running fully integrated prototype available with the main components:
  - Transactional manager,
  - Application server layer,
  - Distributed object cache,
  - SQL engine layer,
  - No-SQL data store layer.
- Real joint exploitation foreseen and already investors being sought.

13

Preliminary results



Date | Footer | 14

Experience/Feedback on the Self-Assessment Exercise

- The reflection caused by the self-assessment is interesting, in particular, for exploitation of results and presenting the work to potential investors.
- Quantified forecast of indicators is difficult, especially, indirect ones.
- Scientific impact can be more elaborated.
- It was a tough job to fill the survey in. It would be appreciated to make it slightly shorter ☺

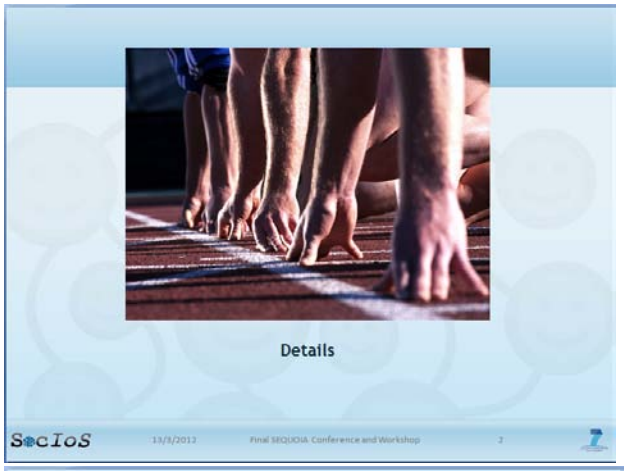
Date | Footer | 15

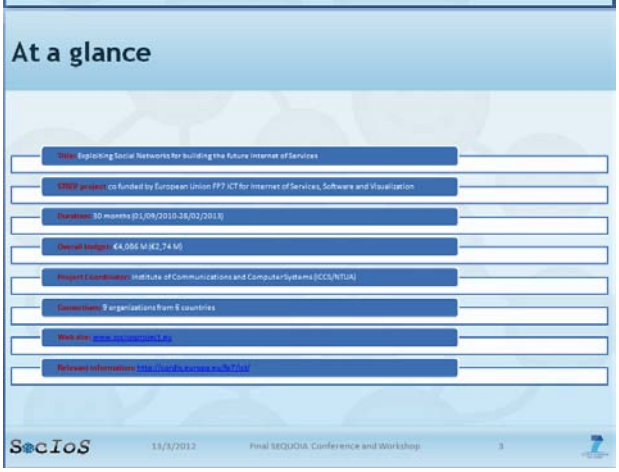
Project Consortium

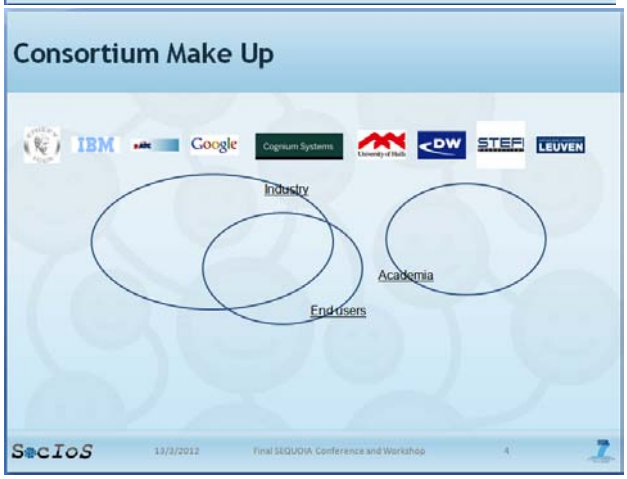
- Univ. Politécnica de Madrid (coord.)
- SAP
- FORTH
- Yahoo
- McGill Univ.
- Minho Univ.
- FlexiScale

Date | Footer | 16

SocioS, presented by Konstantinos Tserpes







Objectives

- Provide a service-oriented toolset that allows the building of business value applications leveraging the Social Networking Sites (SNS) "assets":
  - User Created Content
  - Social Dynamics (Social Graph)
- Aggregate, federate and expose data and functionality from the underlying SNSs as a service
- Attract developers by providing access to usable methods and tools to handle the toolset mentioned above
- Analyze the business models that the implementation of SocIoS will create or improve and build mechanisms to support them
- Analyze and tackle emerging legal and ethical issues
- Provide proof of concept solutions for the domain of journalism and TV commercial production

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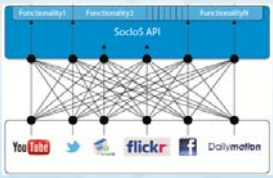
SNS Interoperability

- SocIoS Ontology
  - Identify conceptually common entities and functionalities
- SocIoS API
  - Build an API to invoke aggregated SNS API methods



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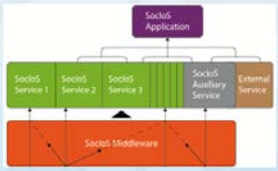
Service Engineering & Analytics

- Provide and host functionality not provided by the SocIoS API
- Combine the extra functionality with the SocIoS API methods
- Expose all functionality as a service
- Extra functionality services = Auxiliary Services
- External services
- Create applications by managing workflows



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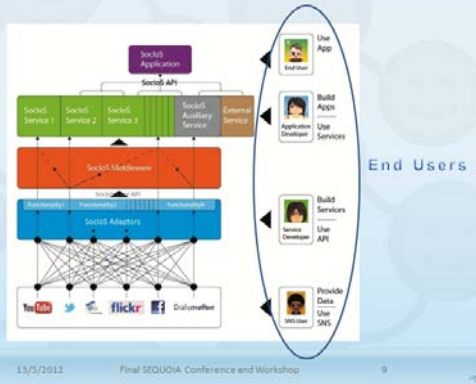
Complete Picture



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Components

- SocIoS API
- SocIoS Core Services
- SocIoS Auxiliary Services
  - Content Ranking
  - Recommendation services
  - Crowdsouring games
  - (reverse) Auction systems
  - Event detection
  - Sentiment analysis
  - …
- SocIoS Applications

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Applications
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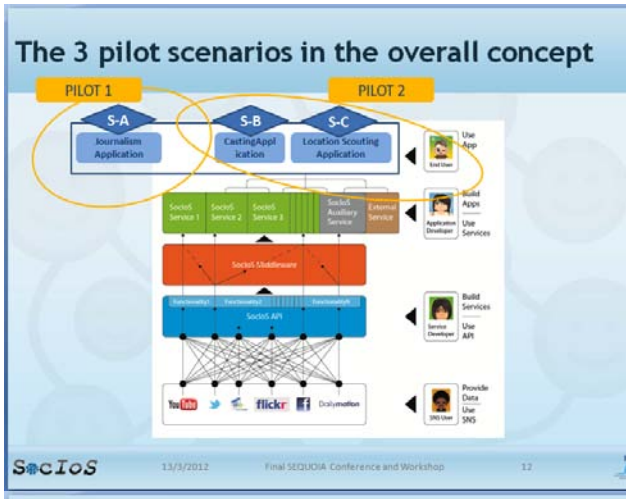
The 3 pilot scenarios in the overall concept
PILOT 1
PILOT 2
S-A
S-B
S-C
Journalism Application
CastingAppl ication
Location Scouting Application
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Scenario A "Journalism": Researching a multimedia online article with the help of SocIoS
Traditional journalistic research
Additional research with SocIoS
ARTS.21
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Scenario B TV Commercials Production: Researching casting with the help of SocIoS
Traditional Casting
The "SocIoS Way"
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Scenario C: Researching locations with the help of SocIoS
Traditional Location Scouting
The "SocIoS Way"
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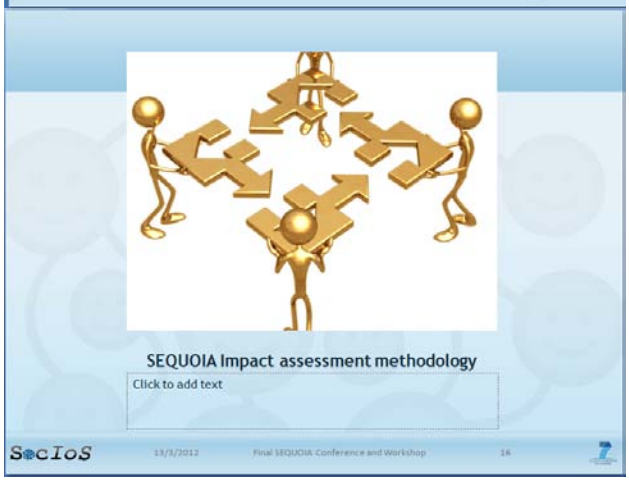
SEQUOIA Impact assessment methodology
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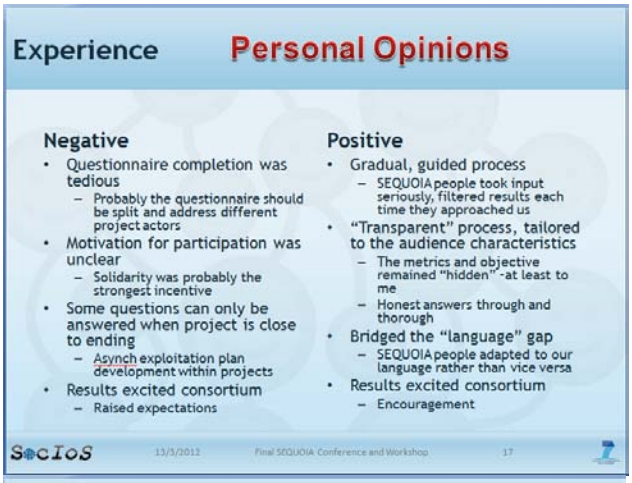
Experience
Personal Opinions
Negative
Questionnaire completion was tedious
Probably the questionnaire should be split and address different project actors
Motivation for participation was unclear
Solidarity was probably the strongest incentive
Some questions can only be answered when project is close to ending
Asynch exploitation plan development within projects
Results excited consortium
Raised expectations
Positive
Gradual, guided process
SEQUOIA people took input seriously, filtered results each time they approached us
"Transparent" process, tailored to the audience characteristics
The metrics and objective remained "hidden" -at least to me
Honest answers through and thorough
Bridged the "language" gap
SEQUOIA people adapted to our language rather than vice versa
Results excited consortium
Encouragement
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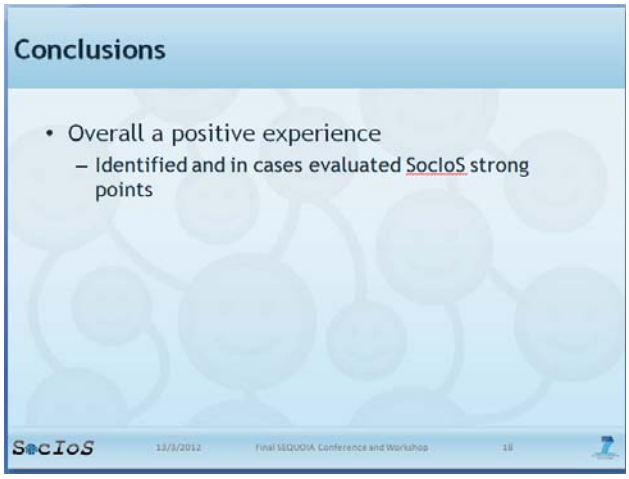
Conclusions
Overall a positive experience
Identified and in cases evaluated SocIoS strong points
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Thank you!
More Questions? Feel free to visit out web site or contact us directly:
SocIoS web site:
www.sociosproject.eu
Technical Manager
Konstantinos Tserpes (tserpes@mail.ntua.gr)
Dissemination Manager
Ilias Spais (ispais@atc.gr)
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Round Table

The conference closed with a round table and an open question & answer session.

Questions included:

Q: **Are there similar patterns and recommendations for Call 5 projects?**
A: Yes you must have a clear view of the context outside of the immediate consortium to broaden socio-economic impact.

Q: **Is there a way to assess beyond scientific impact?**
A: Projects would need to carry out ex-post assessments 5-10 years after the funded lifetime of the project.

Q: **Are IP issues a challenge?**
A: Projects often prefer non-copyright licences and do not even wish to have LGPL. They prefer APACHE-like code because it makes commercial exploitation easier.

Q: **Do projects have the right instruments for exploitation?**
A: Description of potential impacts needs to be better explained in proposals. The difference between project types, ie IP, NOE, Strep etc needs to be taken into account in setting achievable impacts.

Projects are insufficiently conceptualised to make the transition from idea to exploitation. Each of the actors in the value chain needs to be brought together in an ecosystem. Research projects require very different processes to classic value chains in companies.

The conference was closed by Dr Dini.

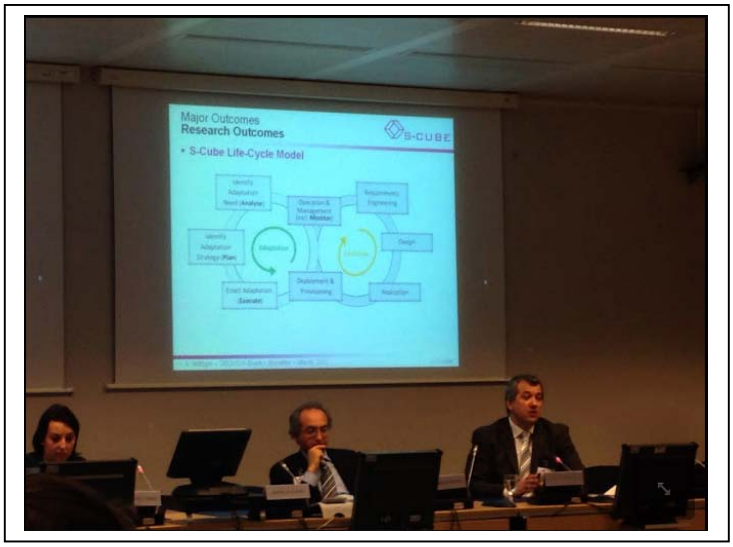
LIST OF PARTICIPANTS

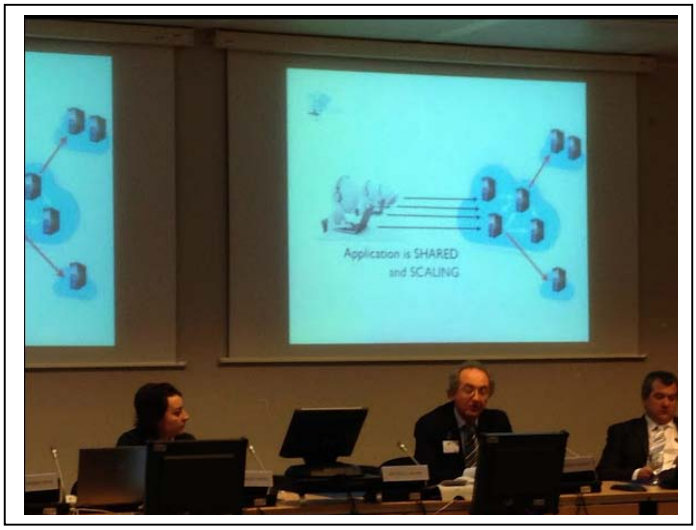
Registrations for the conference were online via the SEQUOIA website and invitations were sent to all of the Cal 1 and 5 project teams, the participants in the project's LinkedIn page, the mailing list for the NESSI platform and other potentially interested parties.

The following is the final list of participants:

Surname	Name	Organisation
Ahtes	James	Atos
Aznar	Mario	RTDI
Bellini	Francesco	Eurokleis s.r.l.
Bohlin	Erik	Chalmers University of Technology
Cascella	Roberto G.	INRIA
Cecchi	Maurizio	Telecom Italia
De Panfilis	Stefano	Engineering Ingegneria Informatica S.p.A.
Degadt	Wouter	IBBT-SMIT, VUB
Di Martino	Beniamino	Second University of Naples
Dini	Paolo	LSE
Domingue	John	The Open University
English	Anne	LSE
Field	Daniel	Atos
Jimenez-Peris	Ricardo	Universidad Politecnica de Madrid
Maggio	Martino	Engineering Ingegneria Informatica S.p.A.
Marasso	Lanfranco	Engineering Ingegneria Informatica S.p.A.
Metzger	Andreas	Paluno, U Duisburg-Essen
Missaglia	Marcello	missagliaeassociati srl
Molas-Gallart	Jordi	INGENIO (CSIC-UPV)
Naqvi	Syed	CETIC
Newton-Clare	Louise	LSE
O'Flaherty	John	MAC
Passani	Antonella	t6 ecosystems
Petitcolas	Fabien	Microsoft Europe
Pohl	Klaus	Paluno, U Duisburg-Essen
Tserpes	Konstantinos	ICCS/NTUA
Van Der Graaf	Shenja	LSE
Velasco	Carlos A.	Fraunhofer FIT
David	Callahan	European Commission
Zwegers	Arian	European Commission

SOME PHOTOS OF THE CONFERENCE:




Application is SHARED
and SCALING


Goals