From Cloud for All to Cloud in Public Administrations

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Outline

- Introduction to Cloud

- Three main aspects an helicopter view:
  - Cloud Computing in Europe, what next
  - FI-WARE initiative
  - The PCP initiative

- Cloud Computing seen as an enabler for new Business
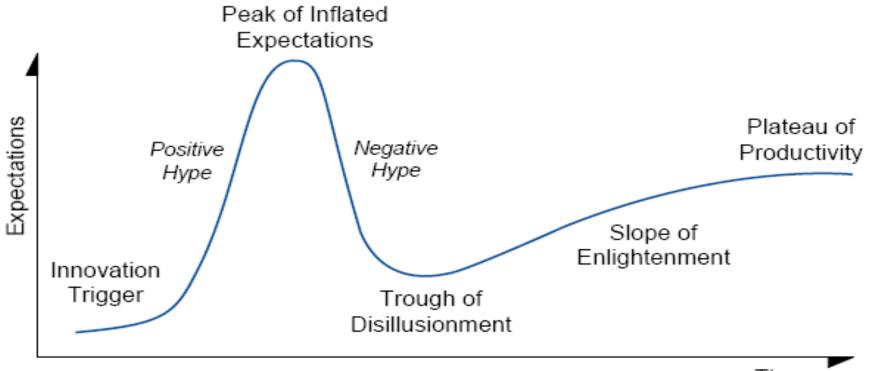
- What for The Future

- Conclusions

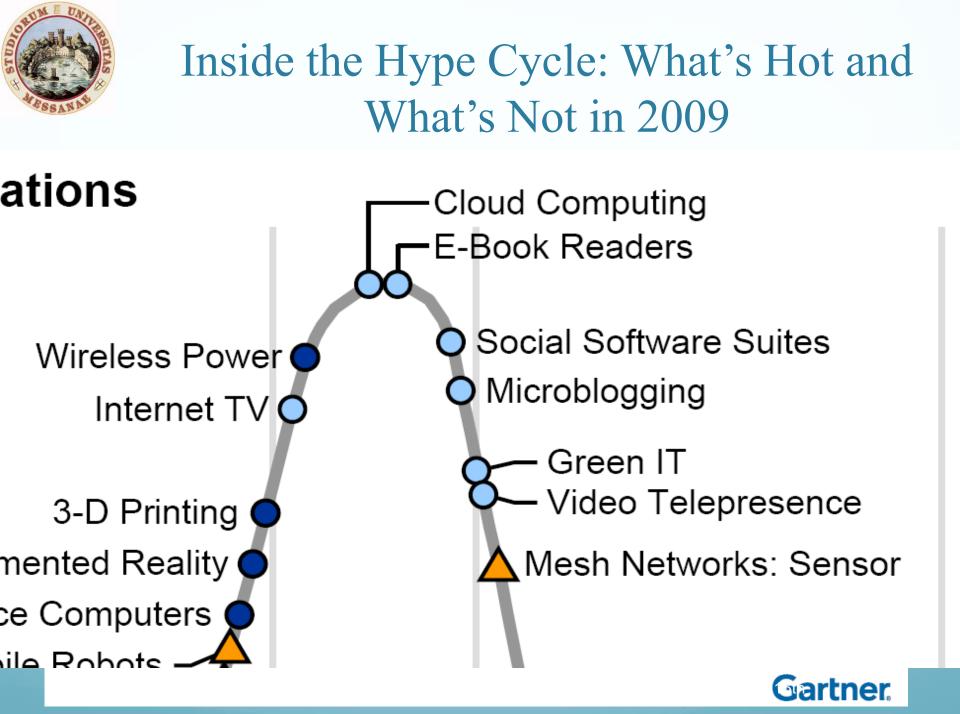# Simple graphical approach to get a better understanding: *Gartner hype cycle*

...so do the European Commission

We need Trust, Regulatory Certainty and Openness

The European Cloud Computing Strategy calls for the unleashing the potential of cloud computing in Europe calling for action in:

Cutting through the jungle of technical standards
Standardisation is a strong enabler for cloud computing, bringing confidence to both customers and investors.

Developing model 'safe and fair' contract terms and conditions: SLAs
Cloud customers need a clearer understanding of SLAs that apply to a particular cloud service and how they will be managed

A European Cloud Partnership to drive innovation and growth from the public sector
The ECP brings together industry and the public sector to establish a Digital Single Market for cloud computing in Europe, part of the European Cloud Strategy.

Key developments in the implementation of the EU Cloud Computing Strategy

- Identification of relevant standards (ETSI) for security, service level agreements(SLAs) and interoperability
- Objective catalogue of security certification schemes (ENISA)
- Commitments to adhere to Data Protection rules (Code of Conduct)
- European Cloud Partnership Vision Paper
- Common terminology and metrics for SLAs and contract terms

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1st FP7 call for software services and **cloud computing** was launched in 2007

Since then 97 projects have received funding under the areas of software engineering, Internet Services and cloud computing for a total of **€365 million**.

Cloud and software research
2014/2015 budget of **€125 million**

OBJECTIVES

❑ Explore cloud infrastructures and services & create tools and methods for software development

❑ Boost public sector productivity and innovation & competitiveness and promote growth and jobs throughout the Union

❑Maintain EU's leading position in research on cloud computing, software & services

❑Establish a trusted cloud for Europe

❑Build a single market for cloud computing

Accelerate the development and deployment of cloud computing & increase Europe's ability to design and deliver innovative Internet services

Success Stories & Business Value

Cloud4SOA provides tools to support Cloud-based application developers with multiplatform matchmaking, management, monitoring and migration by semantically interconnecting heterogeneous PaaS offerings across different providers that share the same technology.

Business Value

Launched Cloud Pier: An open source multi-cloud application manager for PaaS
User can contrast & compare different platforms for their application in a fragmented market of difficult-to-compare cloud solutions. www.opencloudpier.org

CumuloNimbo solved the issue of scalability of transactional cloud databases: now a cloud database can scale seamlessly to 100s or even 1000s of nodes in a fully transparent manner to the applications.

Business Value

A startup was created by UPM (P.Coord) to commercialize the core project results. Working with one of top-10 banks in the world. Full product package to be release www.cumulonimbo.eu

Mosaic Development of an open-source platform that enables application developers to select Cloud services according to their application needs.

Business Value

Provides SMEs with a vertical solution which includes multiple open tools or resources that can be exploitable by any company. www.mosaic-cloud.eu

VISIONCloud: Architect and implement an infrastructure for the reliable and effective delivery of data-intensive storage services, facilitating the convergence of ICT, media and telecommunications.

Business Value

Industrial partners engaged in exploitation plans, input from executives from IBM, TID, SAP www.visioncloud.eu

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A few EC projects in CC

A4Cloud - Accountability for Cloud and Other Future Internet Services

Cloud services allow enterprises to outsource non-core aspects of their business to third parties. The complexity of the service provision eco-system may not be visible to an individual or business end user. However, it should ideally be possible to hold each provider accountable for how it manages, uses, and passes on data and other related information.

ALIGNED - Aligned, Quality-centric Software and Data Engineering

I am the CIO charged with delivering big data applications. However, my software engineering teams and data engineering teams lack integrated processes and tools for developing systems where the data and software are evolving independently.

AppHub - The European Open Source Market Place

AppHub helps the market to seamlessly identify, position and implement the software outcomes of your projects.

AppHub provides the software produced by your project as cloud-ready packages that can be executed by a broad range of cloud service providers.

ARCADIA A Novel Reconfigurable By Design Highly Distributed Applications Development Paradigm Over Programmable Infrastructure

Given the inability of Highly-Distributed-Application-Developers to foresee the changes as well as the heterogeneity on the underlying infrastructure, it is considerable crucial the design and development of novel software paradigms that facilitate application developers to take advantage of the emerging programmability of the underlying infrastructure and therefore

ARTIST - Advanced software-based seRvice provisioning and migraTIon of legacy Software

ARTIST targets mainly software owners who need to modernize their applications and business model towards the cloud. ARTIST focuses on the modernization of applications based on three pillars that in most occasions cannot be tackled independently.

A few EC projects in CC

ASCETiC - Adapting Service lifeCycle towards EfficienT Clouds

The ASCETiC project focuses on issues of energy efficient computing, specifically on design, construction, deployment and operation of Cloud services.

BEACON - Enabling Federated Cloud Networking

The main users of the BEACON project are organisations that manage IT infrastructures and wish to introduce network virtualisation technologies into their IT infrastructure. The BEACON project aims to integrate network virtualisation and service function chaining into Cloud middleware.

BETaaS - Build the Environment for the Things as a Service

The BETaaS project is addressing developers communities in the field of IoT and M2M, Hardware vendors, Development Companies, M2M & IoT standardization groups and frameworks, Service Providers (SaaS, PaaS, BaaS, Mobile, Telcos and Utility Companies).

BIGFOOT - BigData Analytics of Digital Footprints

BigFoot addresses some of the most vital issues related to the deployment of large-scale data analytic technologies and innovative analytics-as-a-service business models:

Broker@Cloud - Enabling continuous quality assurance and optimization in future enterprise cloud service brokers

As the number of externally-sourced services in an enterprise cloud environment increases, it becomes increasingly more difficult to keep track of when and how services evolve over time.

CACTOS - Context-Aware Cloud Topology Optimisation and Simulation

A few EC projects in CC

CloudPier - an open source multi-cloud application manager for PaaS

I would like to use a cloud PaaS to develop new applications, this will increase the competitive edge for my business.
So, what's stopping me?
I find it hard to compare competitive offerings because they are very different.
Even if I find the right one, I am worried about vendor lock-in and high switching costs that could be a business risk.

CloudScale - Scalability Management for Cloud Computing

Cloud providers theoretically offer their customers unlimited resources for their applications on an on-demand basis. However, scalability is not only determined by the available resources, but also by how the control and data flow of the application or service is designed and implemented.

CloudSocket - Business and IT-Cloud Alignment using a Smart Socket

Startups, small and medium enterprises are typically very much focused on their core business. Hence, there are several business processes like customer relationship and campaigning, administrative issues on registration, part of IT services as well as part of after sales support that are necessary for the business success, but can only insufficiently be handled by those organisations.

CloudSpaces - Open Service Platform for the next generation of Personal Clouds

CloudSpaces aims to protect personal data of users and organisations stored and synchronized in Personal Clouds. Nowadays, Personal Clouds like Dropbox, Google Drive or Box among others have complete access to sensitive data.

CloudTeams - Collaborative Software Development Framework based on Trusted, Secure Cloud-based Pool of Users

CloudTeams will be a cloud-based platform which will transform software development for cloud services into a much easier, faster and targeted process. We'll engage with communities of users who will participate in the product life cycle to help software teams develop better solutions for customer problems.

CloudWATCH - A European cloud observatory supporting cloud policies, standard profiles and services

A few EC projects in CC

CloudWATCH2 - Think Cloud Services for Government, Business & Research

Cloud computing and big data are important enablers for productivity and better services. The challenge for Europe is to ensure it retains its leadership position in research and innovation on cloud software and services. This leadership not only depends on Europe's ability to innovate at the technological level, but also to demonstrate tangible business value.

CloudWave - Agile Service Engineering for the Future Internet

Cloud computing's initial success and impact in the IT sector is undeniable, but as its service offerings continue to evolve, both cloud infrastructure providers and application developers alike look towards a significant improvement in terms of performance, reliability and agility.

ClouT - Cloud of Things for empowering the citizen clout in smart cities

Let us outline four scenarios where users can benefit from the ClouT solution.

Scenario one

CoherentPaaS - Coherent and Rich PaaS with a Common Programming Model

I am the head of the IT department of a large enterprise. Just like many other companies, we are using a combination of data management solutions, such as SQL databases, NoSQL databases such as document data stores, graph databases, key-value data stores and complex event processing.

COMPOSE - Collaborative Open Market to Place Objects at your SErvice

COMPOSE addresses the complex challenges of developing an IoT application. COMPOSE provides a complete ecosystem for the developer, including the different stages of application development lifecycle, from design time through deployment and run-time within a secure cloud environment.

CUMULUS - Certification Infrastructures for Multi Layer Cloud Services

CUMULUS is addressing the need to create efficient and automated processes for certifying security properties of cloud services of all the different layers in the cloud stack, including infrastructure, platform and software services.

A few EC projects in CC

riscoss
RISCOSS - Managing Risk and Costs in Open Source Software Adoption

The RISCOSS project aims at proposing a tool supported methodology to evaluate the risks and costs intrinsic to the adoption of Open Source Software (OSS) in companies of different sizes, public administrations and OSS communities.

S|CASE
S-CASE - Scaffolding Scalable Software Services

Me and my friend are co-founders in a small mobile dev shop.

seaclouds
AGILITY AFTER DEPLOYMENT
Modeling Planning Controlling
SeaClouds - Seamless adaptive multi-cloud management of service-based applications

SeaClouds is a novel open source framework that performs Seamless Adaptive Multi-cloud Management of Service-based applications.

SERECA
SERECA - Secure Enclaves for REactive Cloud Applications

The Secure Enclaves for REactive Cloud Applications (SERECA) project targets two types of users/organizations: those wishing to move their mission-critical applications and their data to a Cloud infrastructure but do not trust the security of cloud-hosted applications and those who already use modern web applications hosted by cloud providers but the security soluti

SLA-Ready
SLA-Ready - Making Cloud SLAs readily usable in the EU private sector

2015: I am the CTO of a European SME. Using cloud services could be the answer to the rising complexity of software systems but …

I find some of the service descriptions and contractual terms complex and misleading.

I am not happy about typical "take-it-or-leave-it contracts".

slalom
SLALOM - Service Level Agreement - Legal and Open Model

SLALOM addresses top problems for potential adopters of Cloud services:

A few EC projects in CC

SPECS - Secure Provisioning of Cloud Services based on SLA Management

The use of the "as-a-service" approach, which delegates all kinds of resources to remote cloud service providers (CSPs) needs the adoption of new security methodologies which can introduce security mechanisms and controls in a modular way. This is the base notion behind SPECS security-as-a-service offering.

SSICLOPS - Scalable and Secure Infrastructures for Cloud Operations

The SSICLOPS project will focus on techniques for the management of federated private cloud infrastructures, in particular cloud networking techniques. Target customers include operators, service providers and other end user that require computing resources across clouds.

SUNFISH - SecUre iNFormatIon SHaring in federated heterogeneous private clouds

The overall problem that SUNFISH is trying to address is the lack of infrastructure and technology allowing Public Sector Players to federate their private clouds. To date, legislative barriers often make it difficult to use many commercial technological solutions.

SUPERCLOUD - User-centric management of security and dependability in clouds of clouds

Despite many business benefits, distributed clouds raise many security and dependability concerns due to an increase in complexity and a lack of interoperability between heterogeneous, often proprietary infrastructure technologies. Current provider-centric clouds are notably faced with three major security challenges:

SWITCH - Software Workbench for Interactive, Time Critical and Highly self-adaptive Cloud applications

Time critical applications often involve distributed components, and intensive data communication. For instance, applications which address disaster warning issues often include remotely deployed sensors, and many live event television broadcast scenarios require direction of multiple outdoor video sources.

Ongoing projects – European investment in improving the cloud

- **Federation** - Bring together multiple resource providers to jointly provide services. Typically require a common framework such as OpenStack.
- **XIFI, FELIX, ModaClouds, PaaSage and others**

- **Software Engineering** - Towards new software engineering methods that allow development of distributed and shared applications. First approaches generally model-driven.
- **PaaSage, POLCA, Artist, CoherentPaaS, Harness and others**

- **Automation & Adaptation** - Most projects aim to automate the deployment and configuration etc. – typically within their respective context
- **PaaSage, Midas, Celar, SeaClouds, CACTOS and many others**

- **Resource Matching** - Applications and services have specific requirements in terms of SLAs and behaviour. Configuring the available resources to meet these requirements.
- **CACTOS, Panacea, CloudScale and others**

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Gartner: Top 10 Strategic Technology Trends For 2014
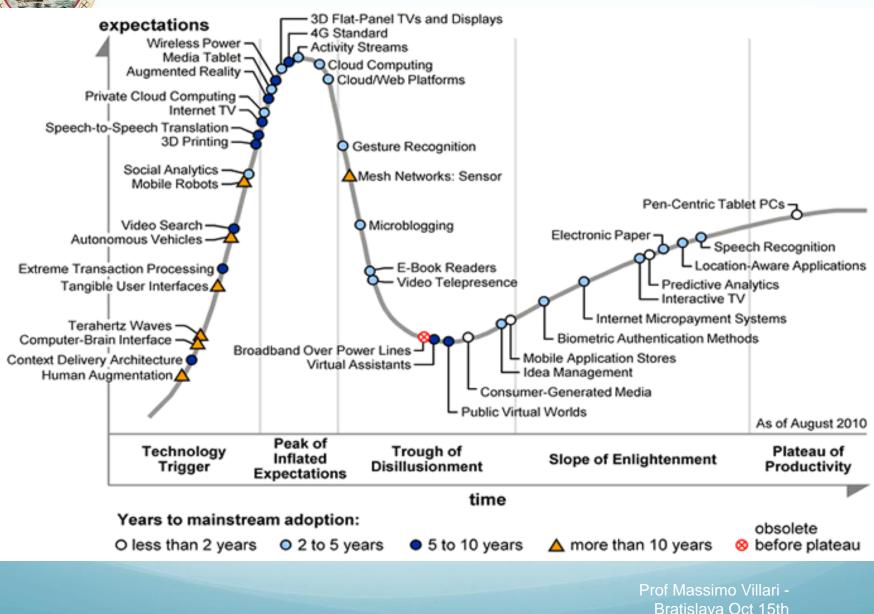
Gartner just concluded its Gartner Symposium/ITxpo 2013 in Orlando, gathering tens of thousands of IT executives. Among the most anticipated aspects of the gathering are the ruminations from the Gartner pontificators regarding IT trends. Among several trends shared were the Top 10 Strategic Technology Trends for 2014. Here is a summary of those trends:

Top Ten Strategic Technology Trends for 2014 :

- Mobile Device Diversity and Management
- Mobile Apps and Applications
- The Internet of Everything
- Hybrid Cloud and IT as Service Broker
- Cloud/Client Architecture
- The Era of Personal Cloud
- Software Defined Anything
- Web-Scale IT
- Smart Machines
- 3-D Printing

Hype Cycle: 2010

expectations

Wireless Power
Media Tablet
Augmented Reality
Private Cloud Computing
Internet TV
Speech-to-Speech Translation
3D Printing

Social Analytics
Mobile Robots

Video Search
Autonomous Vehicles

Extreme Transaction Processing
Tangible User Interfaces

Terahertz Waves
Computer-Brain Interface
Context Delivery Architecture
Human Augmentation

3D Flat-Panel TVs and Displays
4G Standard
Activity Streams
Cloud Computing
Cloud/Web Platforms

Gesture Recognition

Mesh Networks: Sensor

Pen-Centric Tablet PCs

Microblogging

Electronic Paper
Speech Recognition
Location-Aware Applications
Predictive Analytics
Interactive TV

E-Book Readers
Video Telepresence

Internet Micropayment Systems
Biometric Authentication Methods

Broadband Over Power Lines
Virtual Assistants

Mobile Application Stores
Idea Management

Consumer-Generated Media

Public Virtual Worlds

As of August 2010

| Technology Trigger | Peak of Inflated Expectations | Trough of Disillusionment | Slope of Enlightenment | Plateau of Productivity |

time

Years to mainstream adoption:

○ less than 2 years   ◯ 2 to 5 years   ● 5 to 10 years   △ more than 10 years   ⊗ obsolete before plateau

Why Cloud?

Photos uploaded to Flickr by Liz West. She is among a group of Flickr users upset by efforts to sell prints of images that were shared for free.

Why Cloud?

European official says new actions needed to "shock" digital world

In France: "Les Gafa"
Google, Apple, Facebook and Amazon

These Silicon Valley companies have hide revenue and global reach, but they pay little corporate

Hype Cycle: 2014

April 2010

Air travel disruption after the 2010 Eyjafjallajökull eruption

From Wikipedia, the free encyclopedia

In response to concerns that volcanic ash ejected during the 2010 eruptions of Eyjafjallajökull in Iceland would damage aircraft engines,[2] the controlled airspace of many European countries was closed to instrument flight rules traffic, resulting in the largest air-traffic shut-down since World War II.[3] The closures caused millions of passengers to be stranded not only in Europe, but across the world. With large parts of European airspace closed to air traffic,[4][5][6] many more countries were affected as flights to and from Europe were cancelled.

After an initial uninterrupted shutdown over much of northern Europe from 15 to 23 April, airspace was closed intermittently in different parts of Europe in the following weeks, as the path of the ash cloud was tracked. The ash cloud caused further disruptions to air travel operations in Republic of Ireland, Northern Ireland and Scotland on 4 and 5 May[7] and in Spain, Portugal, northern Italy, Austria and southern Germany on 9 May.[8] Irish and UK airspace closed again on 16 May and reopened on 17 May.[9]

The eruption occurred beneath glacial ice. The cold water from the melting ice chilled the lava quickly, causing it to fragment into very small particles of glass (silica) and ash, which were carried into the eruption plume. The extremely fine ash particles and the large volume of steam from the glacial meltwater sent an ash plume hazardous to aircraft rapidly high into the upper atmosphere.[10] The presence and location of the plume depended upon the state of the eruption and the winds. The large amount of glacial meltwater flowing into the eruption vent made this eruption so explosive that it injected its ash plume directly into the jet stream, which was unusually stable and south-easterly.[11] The ash was then carried over Europe into some of the busiest airspace in the world.

Composite map of the volcanic ash cloud spanning 14–25 April 2010, based on data by the London Volcanic Ash Advisory Centre's website[1] (Met Office, UK).

The International Air Transport Association (IATA) estimated that the airline industry worldwide would lose €148 million (US$200 million, GB£130 million) a day during the disruption.[12] IATA stated that the total loss for the airline industry was around US$1.7 billion (£1.1 billion, €1.3 billion).[13] The Airport Operators Association (AOA) estimated that airports lost £80 million over the six-and-a-half days.[14] Over 95,000 flights had been cancelled all across Europe during the six-day travel ban,[15] with later figures suggesting 107,000 flights cancelled during an 8 day period, accounting for 48% of total air traffic and roughly 10 million passengers.[16]

Future Internet: FI

"*A Digital Agenda for Europe*" *one of the key challenges facing Europe is to have a globally* competitive **Cloud infrastructure for the Internet of Services (IoSs2) interconnected with Things (IoTs)** distributed over remote areas.

IoTs will offer new possibilities for **sharing data**, information and services through the Internet, by introducing a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols.

Each Thing needs to interact with the environment in order to adapt its behaviour to the specific evolution of the system. The architectural organization of IoT components highlights the main functionalities necessary to develop new generation, high-value services that are sensing, for the interaction with the environment, storage, for collecting and saving data and information on system components, and computation, for processing data and offering advanced services.

Future Internet: FI

IoTs are currently applied in many applications fields, such as in buildings construction, cars traffic monitoring, environments analysis, medical care assistance, weather forecast, video surveillances, etc. IoTs offer new services for **making cities smarter. *They can improve the interaction of people and IT*** devices/services with surrounding environment, increase the Citizens' Quality of Life, reducing the wasting of the Earth's natural resources (Water, Petrol, Gas, etc.).

Recently Urban designers and infrastructure engineers believe that adding ***intelligence*** to utilities distribution, ***city structures*** and ***transportation systems*** will help to optimize resources availability, minimize energy usage, and provide accurate billing for domestic, public and business consumers.

ICT solutions can instrument urban areas to gather and combine information (energy, ***traffic and roads, mobility, waste, water, weather, events, activities, needs*** and opinions) continuously as well as on-demand. This will enable city environments to become much more efficient and to well adapt and support its inhabitants and visitor's needs. All these advantages are held down from technical issues.

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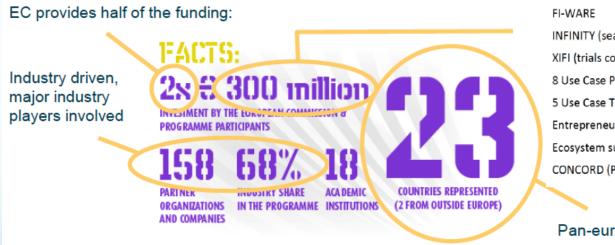
FUTURE INTERNET PUBLIC-PRIVATE PARTNERSHIP (FI-PPP)

The Future Internet Public-Private Partnership, short: FI-PPP, is a European programme for Internet-enabled innovation. The FI-PPP will accelerate the development and adoption of Future Internet technologies in Europe, advance the European market for smart infrastructures, and increase the effectiveness of business processes through the Internet.

FI-PPP: Phase I, II and III

EC provides half of the funding:

Industry driven, major industry players involved

FACTS:

2x ≈ 300 million
INVESTMENT BY THE EUROPEAN COMMISSION & PROGRAMME PARTICIPANTS

158 PARTNER ORGANIZATIONS AND COMPANIES

68% INDUSTRY SHARE IN THE PROGRAMME

18 ACADEMIC INSTITUTIONS

23 COUNTRIES REPRESENTED (2 FROM OUTSIDE EUROPE)

Pan-european dimension
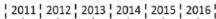
	2011	2012	2013	2014	2015	2016
FI-WARE	41 M€				23 M€	
INFINITY (searching of infrastructures)	3 M€					
XIFI (trials common facilities)			12,5 M€			
8 Use Case Proof of Concepts	40 M€					
5 Use Case Trials with real users			67,5 M€			
Entrepreneurs involvement					100 M€	
Ecosystem support					7 M€	
CONCORD (Program Facilitation)	6 M€					

- 1st phase
- 2nd phase
- 3rd phase

FI-PPP: Projects

FI-WARE: Phase I

CAPACITY BUILDING AND INFRASTRUCTURES

INFINITY: Phase I

Support Action will have a positive impact on the success of the FI-PPP programme.

XIFI: Phase II

Integrating Project aims to support advanced experiments on the FI-PPP core platform

USAGE AREAS AND USE CASE PROJECTS

The FI-PPP is covering a wide scope of usage areas through a set of use case projects that make use of the FI-PPP core platform in setting up trials of advanced Future-Internet-based services and applications. FI PPP phase 1 included 8 use case projects, and the ongoing phase 2 includes 5 use case trials, which will lead to SME-driven use case implementations in Phase3.

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FI-PPP Phase I and II: Use cases

TRANSPORT, LOGISTICS AND AGRI-FOOD

FINEST (Phase 1)

SmartAgriFood (Phase 1)

FIspace (Phase 2)

PERSONAL MOBILITY

Instant Mobility (Phase 1)

SOCIAL CONNECTED TV, MOBILE CITY SERVICES, AND VID

FI-CONTENT (Phase 1)

FI-CONTENT 2 (Phase 2)

FUTURE INTERNET PPP

FI-PPP Phase I and II: Use cases

SMART ENERGY

FINSENY (Phase 1)

FINESCE (Phase 2)

MANUFACTURING

FITMAN (Phase 2)

E-HEALTH

FI-STAR (Phase 2)

SMART CITIES AND PUBLIC SECURITY

SafeCity (Phase 1)

OUTSMART (Phase 1)

First of all, let me stress that FI-WARE is an open platform that comes from Europe. It does not belong to a single company, to a single country. It is European

In 2011 we looked at several trends: computing capabilities and data growing as we've never seen before, the emergence of cloud computing, the internet of things… trends that are defining the Future of Internet.

All of this is built in FI-WARE (…) an open technological infrastructure with 60 modules, called Generic Enablers, based on the most innovative technologies there are to date (…)

*We then had large scale trials across multiple domains - health, energy, agrifood, multimedia… and after verifying the potential of the technology we are now expanding it, making it accessible, for free**, to thousands of startups and web entrepreneurs that can generate the innovation ecosystems we need***

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Jesus Villasante, from the European Commission

The EC is making a strong bet on FI-WARE

- Neelie Kroes launched FI-WARE LAB at Campus Party Europe in London
  - "FIWARE is one way we are levelling a playing field: a project to make innovative technologies available for all."
  - "Smart cities are a great example … They create platforms, and use them, making open data and applications available – to citizens, to developers, to innovators, to come up with yet more ideas … and this is where initiatives like the FIWARE LAB come in. Led by industry, this is a major investment in generic technology."

- She also made a reference to FI-WARE LAB at the launch of the EIP on Smart Cities and Communities
  - "Just earlier this week I launched the Future Internet lab … That's something that you can turn into real results, real jobs, and real innovation. **European platforms helping European innovation in European cities**."

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Home page di FiWare

FI-WARE Partners

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FI-WARE Accelerators

New applications and services
New companies
New markets

#SmartCities   #eHealth   #Social &learning

#Manufacturing &Logisticts   #Media &Content

#Transport   #Agrifood   #Energy &Environment

16 FIWARE Accelerators
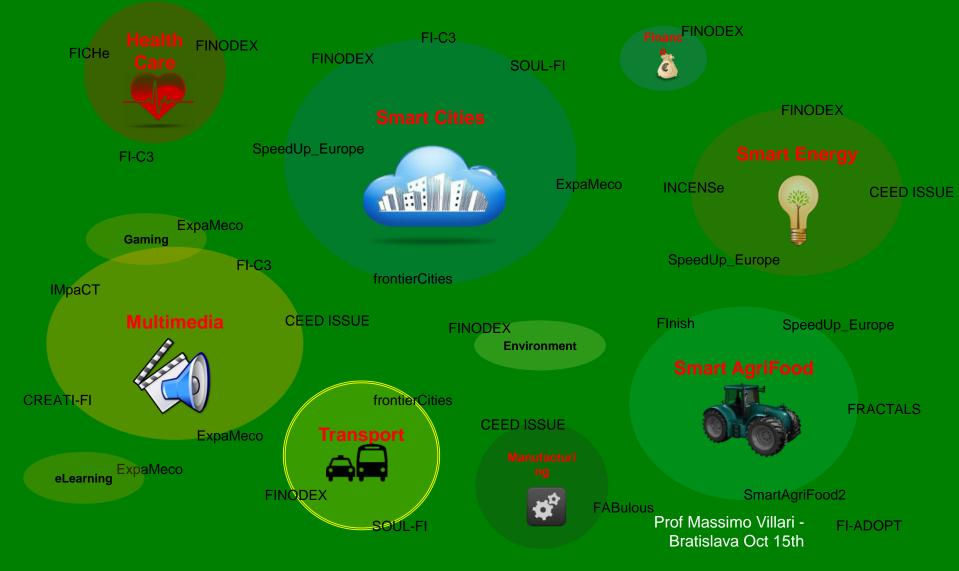
16 Different acceleration and financing programs

We want to reach YOU!

We want to select YOU(the best)!

We want YOU to be

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Sectors covered by the accelerators

FICHe

Health Care

FINODEX

FI-C3

FI-C3

FINODEX

FINODEX

Smart Cities

SpeedUp_Europe

frontierCities

SOUL-FI

ExpaMeco

Finance

FINODEX

FINODEX

Smart Energy

INCENSe

CEED ISSUE

SpeedUp_Europe

ExpaMeco

Gaming

FI-C3

IMpaCT

Multimedia

CEED ISSUE

CREATI-FI

ExpaMeco

eLearning

ExpaMeco

FINODEX

Environment

Transport

frontierCities

FINODEX

SOUL-FI

CEED ISSUE

Manufacturing

FABulous

FInish

SpeedUp_Europe

Smart AgriFood

FRACTALS

SmartAgriFood2

FI-ADOPT

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The Accelerator at a Glance

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Nr. of Sub-grantees...up

FrontierCities - European Cities driving the Future Internet" (FrontierCities) is a proposal presented to the FI-PPP Phase 3 CP-CSA Call.

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Numbe

frontierCities
EUROPEAN CITIES DRIVING THE FUTURE INTERNET

May
14
2014

"SMART CITIES ARE OF STRATEGIC INTEREST FOR ALL OF US" – FI-WARE FOR SMART CITIES

Blog, Conference
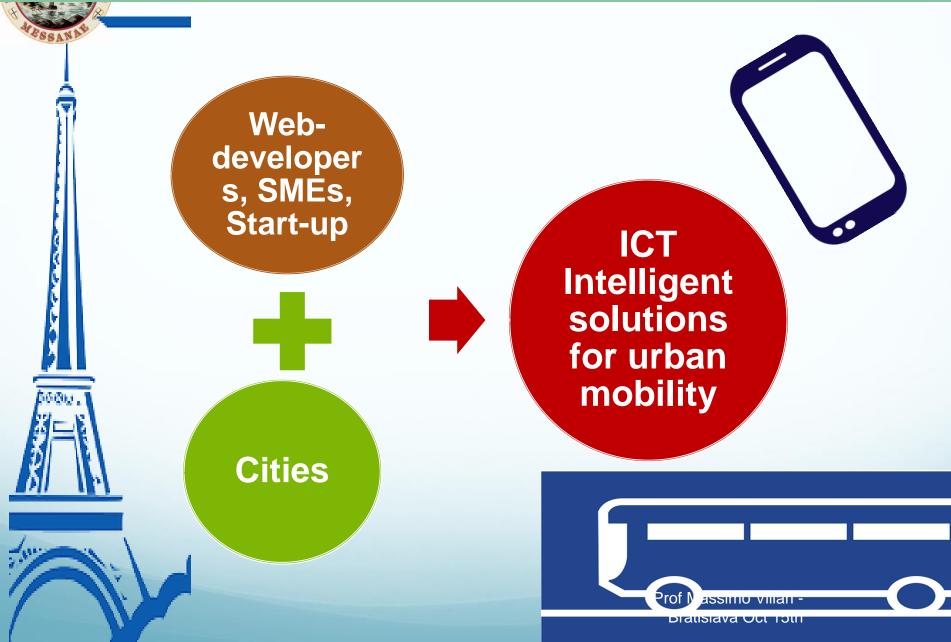
The strategic interest of Smart Cities was the main theme of the seminar *Future Internet Opportunities in Smart City Environments*, held at the auditorium of the Spanish **Secretary of State for Telecommunications and Information Society**, in Madrid. Several speakers discussed the opportunities that Future Internet platforms (such as FI-WARE and its open ecosystem, **FI-Lab**) could bring to Spanish cities in order to provide better services for its citizens.
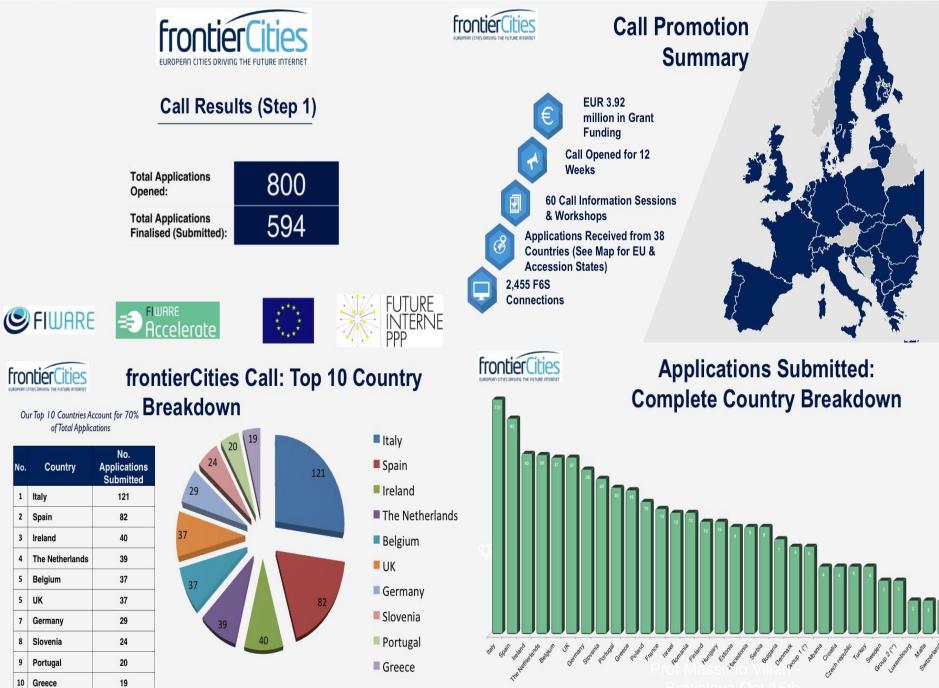
Representatives from several cities in Spain (A Coruña, Valencia, Rivas-Vaciamadrid and Seville) spoke about their efforts and chosen solutions to build Smart City services in areas such as traffic, e-government, energy efficiency, public lighting or emergency management. They also reflected on the importance of **Open Data** and difficulties they had come accross, such as the lack of legal frameworks and the hard choice of deciding what platform adapts best to their local and regional needs.

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EUROPEAN CITIES DRIVING THE FUTURE INTERNET

Web-developers, SMEs, Start-up

+

Cities

ICT Intelligent solutions for urban mobility

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frontierCities:
THE First In EUROPE

- First year EC Review

- The most valuable Accelerator among the 16th

- Selected as a: BEST PRACTICE

- Heterogeneous Consortium from
  - ICT point of View
  - Commercial point of View
  - Administrative point of View

frontierCities:
THE First In EUROPE

- **The reviewers wish to first of all say BRAVO to this project team. The enthusiasm, passion, ambition and incredible efforts have led to an exceptional and amazing result so far. The seniority of the team has probably contributed greatly, combined with the clear focus on creating a sustainable FIWARE community rather than reaching the project KPIs as such…..**

- **The team again shows great talent to leverage the 'helicopter' view in the researching of the market, to gain a better understanding of the actual city needs, enabling them to effectively match demand and supply in a most effective way in the near future. It will enable the companies and the project team to approach the cities with projects that meet their needs, in a language they understand.**

- **We can only encourage that the team will keep up this great effort and will publish findings and share best practices as soon as possible.**

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The WELL-KNOWN Drawback in FI-WARE

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FIWARE should(will ?) BE

FI-PPP:

Public

Private

Partnership

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SHORPY

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EUROPEAN CITIES DRIVING THE FUTURE INTERNET

TELEFONICA, ORANGE, ENGINEERING AND ATOS JOIN FORCES TO PUSH COMMON STANDARDS FOR SMART CITIES BASED ON THE FIWARE PLATFORM

FIWARE

Telefónica, Orange, Engineering and Atos have decided to join forces and announce that they will take the initiative towards creation of the **FIWARE Open Source Community** to foster and support the evolution of **standards for Smart Cities** and their spread worldwide. It is expected that the FIWARE Open Source Community will be fully operational at the end of Q2-2015.

With the enormous growth in the number of smartphones, daily life has become digital but in cities remains very similar to how it looked like 15 or 20 years ago. The **integration of Internet of Things, Cloud and BigData technologies**, together with the support of Open Data policies, will create the conditions for a new period of intense transformation of cities into smart cities. For Bruno Fabre, Executive Vice-President of Telcos, Media & Utilities in Atos, "the Smart City market has proven to be a slow process. The combination of open-source solutions and a new approach for business models will unlock this new opportunity for the Third Digital Revolution".

However, the concept of "Smart City" is also under (r)evolution, since it will not just be focused on providing more efficient services, but transforming cities into digital platforms enabling the development of innovative citizen services open to all, bringing the fuel for a new economical boost, fostering growth and the creation of new jobs. The four companies strongly believe that FIWARE will be instrumental in materializing this vision. "FIWARE does not just support a more efficient management of municipal services. **It brings open standards enabling to transform cities into engines of growth**", explains Marieta Rivero, Chief Deputy Commercial Officer at Telefónica. "Using FIWARE, Smart Cities can deliver the platform, combining Open Data and the APIs based on which new innovative applications can be created", she explained.

The Evolution of Cities

The digital evolution of cities is a multifaceted process with a clear focus on the citizen," says **Mário Campolargo***, Director of Net Futures for the European Commission's DG CONNECT. "We need to be prepared to take a holistic approach towards smart cities, involving IT technologies but also sociologists and architects for all-encompassing solutions.*

The Evolution of FI-WARE

CONNECTED
SMART CITIES
NETWORK

Open & Agile Smart Cities

15
MAR 2015

☐ by Martin Brynskov | ☐ posted in: Connected Smart Cities News, Strategic Initiatives | ☐ 0

Cities from seven countries boost open standards for smart cities

Thirty-one cities from seven countries in Europe and Latin America launch the "Open & Agile Smart Cities" initiative to accelerate adoption of common standards and principles for global smart city development.

UPDATE: Read the Frequently Asked Questions, with information about the 2nd wave (deadline June 5).

(See linked documents at the bottom)
(Programmable Web published an OASC interview with more details about the motivation and outlook)

Hannover, 16.03.2015 – CeBIT is the natural place for one of the most important announcements this year about smart city development in Europe. The **Open & Agile Smart Cities (OASC)** initiative, signed by 31 cities from Finland, Denmark, Belgium, Portugal, Italy, Spain and Brazil, aims to kickstart the use of a shared set of wide-spread, open standards and principles, enabling the development of smart city applications and solutions to reach many cities at once, by making systems interoperable between cities, and within a city.

The commitment marks a milestone in the development of smart cities, boosting the digital transformation of cities into engines of growth and citizen satisfaction through co-creation.

The Evolution of FI-WARE

Open & Agile Smart Cities: OASC

- Approach: The adoption of a driven-by-implementation approach is the cornerstone of the OASC initiative.

- API: Within the OASC initiative, the FIWARE NGSI API is adopted as a first open license standard API targeted to provide the basic artifact for portability and interoperability of smart city solutions.

The Evolution of FI-WARE

Open & Agile Smart Cities: OASC

- Data model: The FIWARE NGSI API is agnostic to data models, therefore full portability and interoperability is achieved through the definition of standard city data models. Following the driven-by-implementation approach of the OASC, a first set of data models are adopted based on results of the CitySDK project.

- Platform: Last but not least, the OASC initiative goes for the adoption of an open,flexible and easily-distributable open data/API publication platform which any organisation can set up at a low cost if it is not already being used. Specifically, CKAN will serve as the base standard platform for publication of static file datasets NGSI API query resources.

EC
PCP

Prof Massimo Villari
Bratislava Oct 15th

How does PCP work?

- PCP involves different suppliers competing through different phases of development. The risks and benefits are shared between the procurers and the suppliers under market conditions.

- For PCPs, risk-benefit sharing under market conditions is when procurers share the benefits and risks related to the IPRs resulting from the research and development (R&D) with suppliers at market price.

- Competitive development in phases is the competitive approach used in PCP by procurers to buy the R&D from several competing R&D providers in parallel, and then compare and identify the best value for money solutions available to address the PCP challenges. R&D is split into phases (solution design, prototyping, original development and validation/testing of the first products) with the number of competing R&D providers being reduced after each evaluation phase.

- Separation from the deployment of commercial volumes of end-products is the complementarity of PCP that focuses on the R&D phase before commercialisation.

EU co-financed projects in the ICT domain that are implementing joint trans-national PCPs

- CHARM - Consortium of road management authorities that conducts a PCP to improve traffic throughput, road safety, CO2 footprint and reduce the costs of traffic management by moving to an open modular architecture for Traffic Management Centres equipped with advanced traffic management, traffic prediction and cooperative systems.

- PRACE 3IP – Consortium of research infrastructure centers that conducts a PCP that focuses on increasing the energy efficiency of high performance computing.

- SILVER - Consortium of local and regional authorities that conducts a PCP to identify robotics solutions that enable care givers to reach 10% more independently living elderly persons by 2020.

- SMART@FIRE – Consortium of fire brigades and interior ministries that aims to conduct a PCP focused on ICT solutions for smart personal protective equipment for fire fighters and first responders.

- DECIPHER – Consortium of public health providers that aims to conduct a PCP focused on innovating cross-border mobile healthcare that benefits patients and healthcare organisations through the use of electronic patient records as key enabling technology.

- V-CON – Consortium of national road authorities that aims to conduct a PCP to improve their efficiency and effectiveness by improving data exchange in the sector through virtual modelling of road infrastructure.

EU co-financed projects in the ICT domain that are implementing joint trans-national PCPs

- C4E – Cloud for Europe addresses the objectives of the European Cloud Partnership program. The consortium of public authorities aims to give a clear view on the public sector requirements and usage scenarios for Cloud Computing in Europe, by removing the obstacles for Cloud adoption and harmonising the requirements from different public organisations. The PCP will focus on services that are identified as missing or need to be adopted for Governments use.

- IMAILE – Consortium of universities and cities that aims to conduct a PCP focused on e-learning solutions, meaning new technologies and services which address the challenge of providing the next generation of Personal Learning Environments (PLE) for primary and secondary schools.

- ENIGMA – Consortium of cities that aims to conduct a PCP focused on innovative solutions to bring radical improvements to cities' urban safety and energy efficiency, using next generation ICT applications in the context of innovative public lighting systems as part of the city infrastructure.

- THALEA – Consortium of hospitals that aims to conduct a PCP focused on developing a highly interoperable telemedicine-platform that detects increased risk ICU-patients.

- PREFORMA – Consortium of memory institutions that plans a PCP to address the challenge of increasing transfers of electronic documents and other media content for long term digital preservation. The focus is to establish a long-term sustainable ecosystem, a reference implementation of the most common file format standards for the assessment and correction of the collections to be archived.
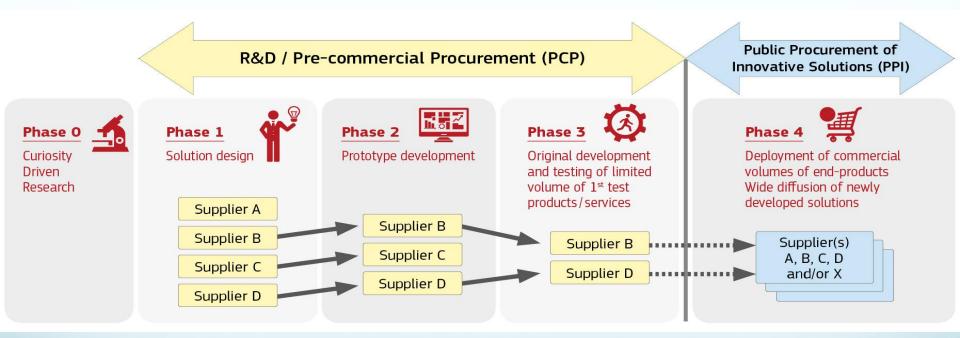
Policy context

Under Horizon 2020, the EU increases support for groups of public procurers who work together on innovation procurement through two different approaches:

- Pre-Commercial Procurement (PCP): The procurement of R&D services, involving risk-benefit sharing under market conditions and competitive development in phases. PCP offers a way for public procurers to share risks and benefits of procuring R&D and to address challenges of public interest for which no satisfactory technological solution is available on the market yet. The procurement of R&D services is clearly separated from the deployment of commercial volumes of end-products.

- Public Procurement of Innovative Solutions (PPI): The procurement in which public procurers act as launching customers of innovative goods or services which are not yet available on a large-scale basis and may require conformance testing. This is applicable when contracting authorities/entities, possibly in cooperation with additional private buyers, act as a lead customer for the procurement of existing "innovative" solutions (not the R&D services to develop them) that are not yet available on large scale commercial basis due to a lack of market commitment to deploy.

PCP and PPI

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Final
Step

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Why Cloud Computing?
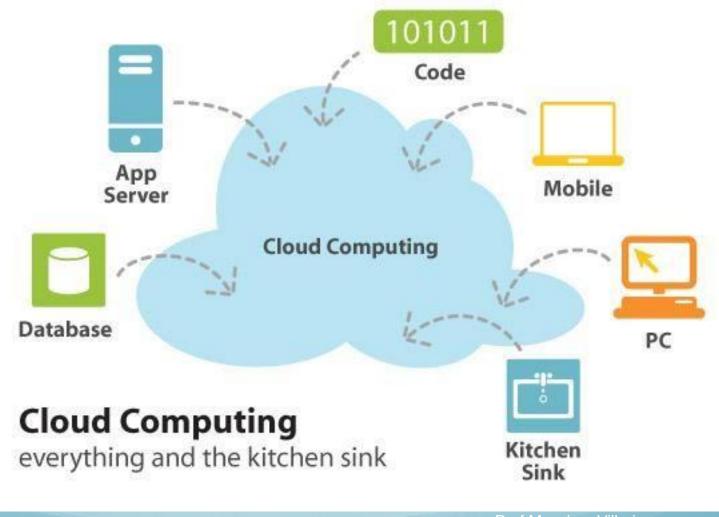
back in 1961, computing pioneer Prof. John McCarthy predicted that "computation may someday be organized as a public utility"
BUT………
As "Could computing" seems to be "anything anywhere", shouldn't we focus more on "Cloud business" instead?
"Technology vendors will deliver cloud infrastructure, but those details must be linked for us all, or 'the cloud' will just be nothing more than a buzz-word… We can't spend all of our time arguing about how to implement the cloud and almost no time talking about whether our business can fit the cloud model."
Daryl Plummer, Gartner Group Vice President, Gartner Fellow
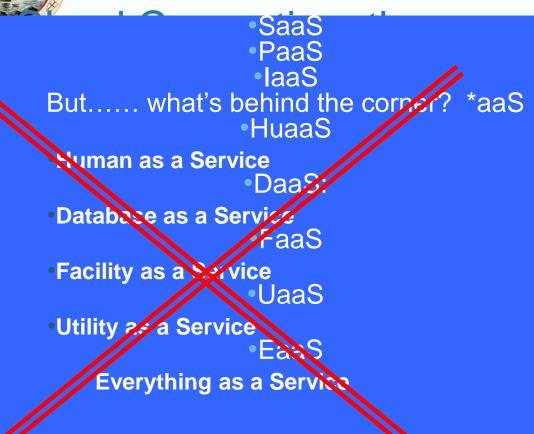
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What is Cloud Computing?

Cloud Computing: the meaning of classification

- SaaS
- PaaS
- IaaS

But…… what's behind the corner? *aaS

- HuaaS

- **Human as a Service**

- DaaS:

- **Database as a Service**

- FaaS

- **Facility as a Service**

- UaaS

- **Utility as a Service**

- EaaS

  Everything as a Service

Cloud @ UniME

Università degli Studi di Messina

RESERVOIR

VISION Cloud

FIWARE Accelerate
frontiérCities

CloudWave

SEVENTH FRAMEWORK PROGRAMME

Completed Projects

Running Projects

BEACON

HORIZON 2020

Prof. Massimo Villari

Resources and Services <u>Virtualization</u> without Barriers (RESERVOIR) :

- Provisioning Services as Utilities Advanced
- End-to-End Support for Service-Oriented
- Computing Service and Resource
- **Migration without boundaries**
- **Federated Heterogeneous Infrastructure and Management**

Storage Cloud Challenges: VISION Cloud EU Project

- Raise the Abstraction Level of Storage
- Content-<u>Centric</u> Storage Access Data
- **Mobility and Federation Computational**
- Storage Advanced Capabilities for Cloud-based Storage

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Execution Analytics

- Effective monitoring of infrastructure
- Effective monitoring of applications
- Event filtering, consolidation
- Complex event processing

Coordinated Adaptation

- Machine Learning techniques
- Modeling adaptation scenarios

Feedback Driven Design

- Insights to aid developers
- Test plan evolution through analytics

Enabling Federated Cloud Networking

BEACON will deliver an homogeneous <u>virtualization</u> layer, on top of heterogeneous underlying physical networks, computing and storage infrastructures, providing <u>enablement</u> for automated federation of applications across different clouds and <u>datacenters</u>.

The BEACON project is fully committed to open source software, the research and development activities of the consortium will be based on existing open source projects. Cloud networking aspects will be based on <u>OpenDayLight</u>, a collaborative project under The Linux Foundation, and specifically we will leverage and extend the <u>OpenDOVE</u> project with new rich <u>intercloud</u> <u>APIs</u> to provision <u>cross</u>-site virtual networks overlays

Funded by
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European Cloud Partnership /ECP/

frontierCities
EUROPEAN CITIES DRIVING THE FUTURE INTERNET

European Commission

"Unleashing the Potential of Cloud Computing in Europe"
September 2012

The Cloud computing strategy

The European Commission's strategy 'Unleashing the potential of cloud computing in Europe'

Adopted on 27/9/2012. Its aim is to speed up the cloud uptake across Europe

Cloud strategy's key actions

Cutting through the jungle of standards

Development of model safe and fair contract terms

A European Cloud Partnership to drive innovation and growth for the public sector.

DG CONNECT working groups for the implementation of the strategy

ETSI: Cloud Standards Coordination — Launched on 4/12/2012

The Cloud Select Industry Group on Service Level Agreements — Launched on 21/02/2013

The Cloud Select Industry Group on Certification Schemes — Launched on 10/04/2013

The Cloud Selected Industry Group on Code of Conduct — Launched on 21/02/2013

Research: The Cloud Expert Group — Now completed

• Steering Board — Launched on 19/11/2012

The European Cloud Partnership

• Cloud for Europe Initiative

Public Launch 14-15/11/2013

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Funded by the European Union

Consortium at a glance

- Liberologico – Italy

- Interway –Slovakia

- YMENS– Romania

- University of Messina - Italy
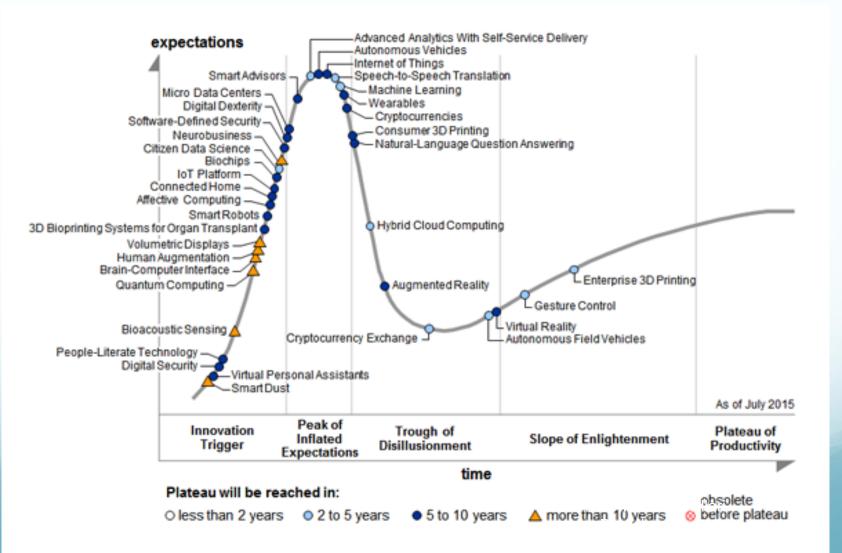
What for the Future

Nexus of Forces

The journey to digital business continues as the key theme of Gartner, Inc.'s "Hype Cycle for Emerging Technologies, 2015." New to the Hype Cycle this year is the emergence of technologies that support what Gartner defines as digital humanism — the notion that people are the central focus in the manifestation of digital businesses and digital workplaces.

AND WORKFLOWS

Gartner's 2015 Hype Cycle for Emerging Technologies Identifies the Computing Innovations That Organizations Should Monitor

2015 Hype Cycle Special Report Illustrates the Market Excitement, Maturity and Benefit of More Than 2,000 Technologies

The journey to digital business continues as the key theme of Gartner, Inc.'s "Hype Cycle for Emerging Technologies, 2015." New to the Hype Cycle this year is the emergence of technologies that support what Gartner defines as digital humanism — the notion that people are the central focus in the manifestation of digital businesses and digital workplaces.

The Hype Cycle for Emerging Technologies report is the longest-running annual Hype Cycle, providing a cross-industry perspective on the technologies and trends that business strategists, chief innovation officers, R&D leaders, entrepreneurs, global market developers and emerging-technology teams should consider in developing emerging-technology portfolios.

"The Hype Cycle for Emerging Technologies is the broadest aggregate Gartner Hype Cycle, featuring technologies that are the focus of attention because of particularly high levels of interest, and those that Gartner believes have the potential for significant impact," said Betsy Burton, vice president and distinguished analyst at Gartner. "This year, we encourage CIOs and other IT leaders to dedicate time and energy focused on innovation, rather than just incremental business advancement, while also gaining inspiration by scanning beyond the bounds of their industry."

Major changes in the 2015 Hype Cycle for Emerging Technologies (see Figure 1) include the placement of autonomous vehicles, which have shifted from pre-peak to peak of the Hype Cycle. While autonomous vehicles are still embryonic, this movement still represents a significant advancement, with all major automotive companies putting autonomous vehicles on their near-term roadmaps. Similarly, the growing momentum (from post-trigger to pre-peak) in connected-home solutions has introduced entirely new solutions and platforms enabled by new technology providers and existing manufacturers.

Digital Marketing (Stage 4): The digital marketing stage sees the emergence of the Nexus of Forces (mobile, social, cloud and information). Enterprises in this stage focus on new and more sophisticated ways to reach consumers, who are more willing to participate in marketing efforts to gain greater social connection, or product and service value. Enterprises that are seeking to reach this stage should consider the following technologies on the Hype Cycle: *Gesture Control, Hybrid Cloud Computing, Internet of Things (IoT), Machine Learning, People-Literate Technology, Speech-to-Speech Translation.*

Digital Business (Stage 5): Digital business is the first post-nexus stage on the roadmap and focuses on the convergence of people, business and things. The IoT and the concept of blurring the physical and virtual worlds are strong concepts in this stage. Physical assets become digitalized and become equal actors in the business value chain alongside already-digital entities, such as systems and apps. Enterprises seeking to go past the Nexus of Forces technologies to become a digital business should look to these additional technologies: *3D Bioprinting for Life Science R&D, 3D Bioprinting Systems for Organ Transplant, Human Augmentation, Affective Computing, Augmented Reality, Bioacoustics Sensing, Biochips, Brain-Computer Interface, Citizen Data Science, Connected Home, Cryptocurrencies, Cryptocurrency Exchange, Digital Dexterity, Digital Security, Enterprise 3D Printing, Smart Robots, Smart Advisors, Gesture Control, IoT, IoT Platform, Machine Learning, Micro Data Centers, Natural-Language Question Answering, Neurobusiness, People-Literate Technology, Quantum Computing, Software-Defined Security, Speech-to-Speech Translation, Virtual Reality, Volumetric and Holographic Displays, and Wearables.*

Autonomous (Stage 6): Autonomous represents the final post-nexus stage. This stage is defined by an enterprise's ability to leverage technologies that provide humanlike or human-replacing capabilities. Using autonomous vehicles to move people or products and using cognitive systems to recommend a potential structure for an answer to an email, write texts or answer customer questions are all examples that mark the autonomous stage. Enterprises seeking to reach this stage to gain competitiveness should consider these technologies on the Hype Cycle: *Autonomous Vehicles, Bioacoustic Sensing, Biochips, Brain-Computer Interface, Digital Dexterity, Human Augmentation, Machine Learning, Neurobusiness, People-Literate Technology, Quantum Computing, Smart Advisors, Smart Dust, Smart Robots, Virtual Personal Assistants, Virtual Reality, and Volumetric and Holographic Displays.*

"Although we have categorized each of the technologies on the Hype Cycle into one of the digital business stages, enterprises should not limit themselves to these technology groupings," said Ms. Burton. "Many early adopters have embraced quite advanced technologies, for example, autonomous vehicles or smart advisors, while they continue to improve nexus-related areas, such as mobile apps."

Additional information is available in Gartner's "Hype Cycle for Emerging Technologies, 2015." This report is part of Gartner's Hype Cycle Special Report for 2015. This Special Report provides strategists and planners with an assessment of the market hype, maturity, business benefit and future direction of more than 2,000

EUROPEAN COMMISSION

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European Commission - Press release

Commission invests €16 billion in funding for research and innovation over next two years

Brussels, 13 October 2015

The European Commission will boost competitiveness by investing almost €16 billion in research and innovation in the next two years under Horizon 2020, the EU's research and innovation funding scheme.

The European Commission will invest almost €16 billion in research and innovation in the next two years under Horizon 2020, the EU's research and innovation funding scheme, following a new Work Programme for 2016-17 adopted today.

The new funding opportunities offered by the Work Programme are directly aligned with the policy priorities of the Commission of President Jean-Claude Juncker and will substantially contribute to the Jobs, Growth and Investment Package, the Digital Single Market, Energy Union and Climate change policy, Internal Market with stronger industry and making Europe a stronger global actor.

Carlos Moedas, Commissioner for Research, Science and Innovation said: *"Research and innovation are the engines of Europe's progress and vital to addressing today's new pressing challenges like immigration, climate change, clean energy and healthy societies. Over the next two years, €16 billion from Horizon 2020 will support Europe's top scientific efforts, making the difference to citizens' lives."*

In line with Commissioner Moedas' strategic priorities, Horizon 2020 will be open to innovation, open to science, and open to the world. The new Work Programme 2016-17 offers funding opportunities through a range of calls for proposals, public procurements and other actions like the Horizon Prizes, together covering nearly 600 topics. The programme's structure is a reflection of the overall flexibility of Horizon 2020 which focuses on the EU's long-term priorities and the most pressing societal challenges while allowing it to swiftly address emerging problems such as outbreaks of diseases.
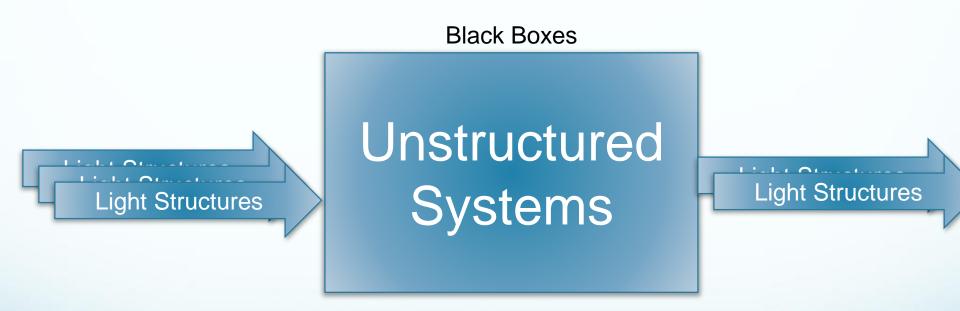
The programme will support a range of cross-cutting initiatives: the modernisation of Europe's manufacturing industry (€1 billion); technologies and standards for automatic driving (over €100 million); the Internet of Things (€139 million) to address digitalisation of EU industries; Industry 2020 in the Circular Economy (€670 million) to develop strong and sustainable economies; and Smart and Sustainable Cities (€232 million) to better integrate environmental, transport, energy and digital networks in EU's urban environments.

In addition, at least €8 million in funding will be available for research on security of EU's external borders to help identify and prevent human trafficking and smuggling; €27 million for the new technologies to help prevent crime and terrorism as well as €15 million for research into the origin and impact of migration flows in Europe. The new Work Programme will also build on successes in health research, such as the Ebola-related breakthrough discoveries already supported by Horizon 2020, by investing €5 million to respond to the critical outbreak of the damaging olive-tree pest *Xylella fastidiosa*.

The new Work Programme is also set on improving the impact of Horizon 2020 funding. First, it will ensure more money is available for innovative companies thanks to new leveraging opportunities supported by the European Fund for Strategic Investments (EFSI), in addition to over €740 million dedicated to support research and innovation activities in nearly 2000 small and medium enterprises (SMEs). More will also be done to improve synergies with other EU funding programmes, as stressed by President Juncker in his State of the Union speech, as well as support researchers in their applications with clearer guidance and impact criteria.
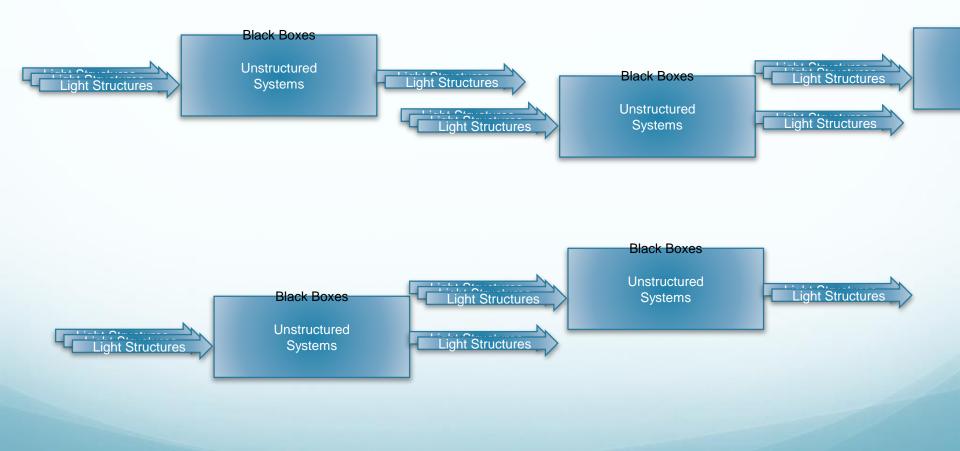
Dynamic Workflows

Black Boxes

Unstructured Systems

Light Structures

Light Structures

Light Structures

Composition of Workflows

Dynamic Workflows

Black Boxes

Unstructured
Systems
(appear to be)

Big Data
NoSQL
TAG Based Clouds
Taxonomy Based Systems
APIs: WebService Restful Based
….

myVision

It is widely and well recognized that Cloud Computing has changed our perception of IT technology. More and more people around the world are now touched by the cloud.

We are now entering the era of Clouds of Humans and Minds. Europe is strongly involved in this change and in the near Future this will impact positively on innovation and growth in Europe.

Prof Massimo Villari -
Bratislava Oct 15th

Conclusions

- Introduction to Cloud

- Three main aspects an helicopter view:
  - Cloud Computing in Europe, what next
  - FI-WARE initiative
  - The PCP initiative

- Cloud Computing seen as an enabler for new Business

- What for The Future

Conclusions

- Looking at:
  - How cloud is progressing in Europe
  - How the PCP is working and what are its outcomes
  - How to get infos from FI-WARE: Accelerators and OASCs

Last Thought …

Life *is too short to make it complex … enjoy it and take easy*

(CIT. Massimo Villari)

Thank you …and ..Ciao D..

Prof. Massimo Villari
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Oct 15th, 2015 in *Interway* Bratislava

Prof Massimo Villari -
Bratislava Oct 15th