



Encounter LATP-ETPs

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NESSI is an H2020 ETP



First established in FP7,
NESSI is recognised by
the EC as an H2020 ETP

“... the Commission's Horizon 2020 proposal for an integrated research and innovation framework programme recognises the role of European Technology Platforms (ETPs) as part of the external advice and societal engagement needed to implement Horizon 2020.”

“... networks such as ETPs are important because markets, while being powerful drivers of innovation, often do not function perfectly when it comes to generating ideas in an environment with a high degree of uncertainty and a need for coordination ...”

COMMISSION STAFF WORKING DOCUMENT “STRATEGY FOR EUROPEAN TECHNOLOGY PLATFORMS: ETP 2020”
(SWD(2013) 272 final)

What is NESSI?

- ▶ The European Technology Platform dedicated to Software, Services and Data

Mission

- ▶ Provide **thought leadership in Europe** on the convergence of the networks of data, things and services
- ▶ **Drive convergence and transformation** by strengthening and advancing the software and service-based economies in Europe
- ▶ **Stimulate the creation of ecosystems** around software, services, and data
- ▶ **Provide visionary, comprehensive input** to the European Commission, thereby shaping the European research and innovation agenda

NESSI Vision

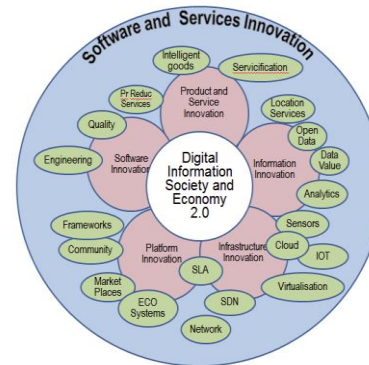
NESSI is the European Technology Platform for the new Digital Information Society and Economy 2.0, powered by software, services and data

The Challenge

- ▶ To promote the importance of Software and Services eco-system and innovations for Europe's competitiveness

Current Focus Areas

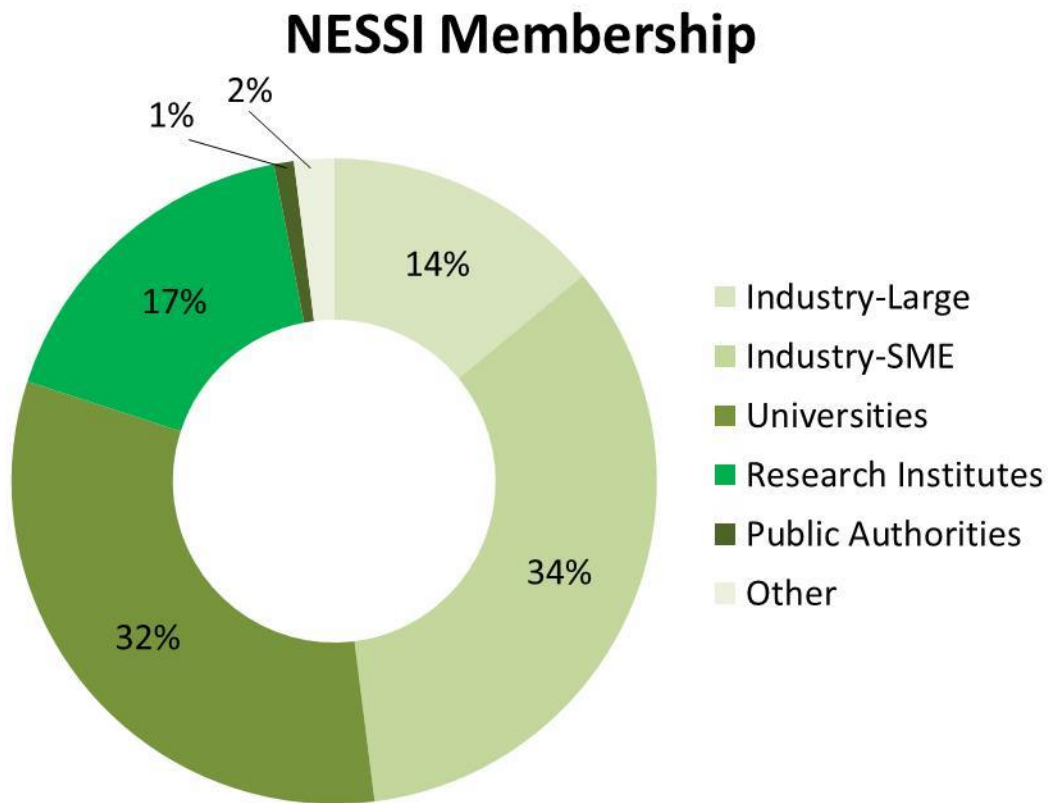
- ▶ Big Data
- ▶ Cloud Computing
- ▶ Cyber Physical Systems
- ▶ Everything as a Service
 - ▶ All underpinned by Software Engineering



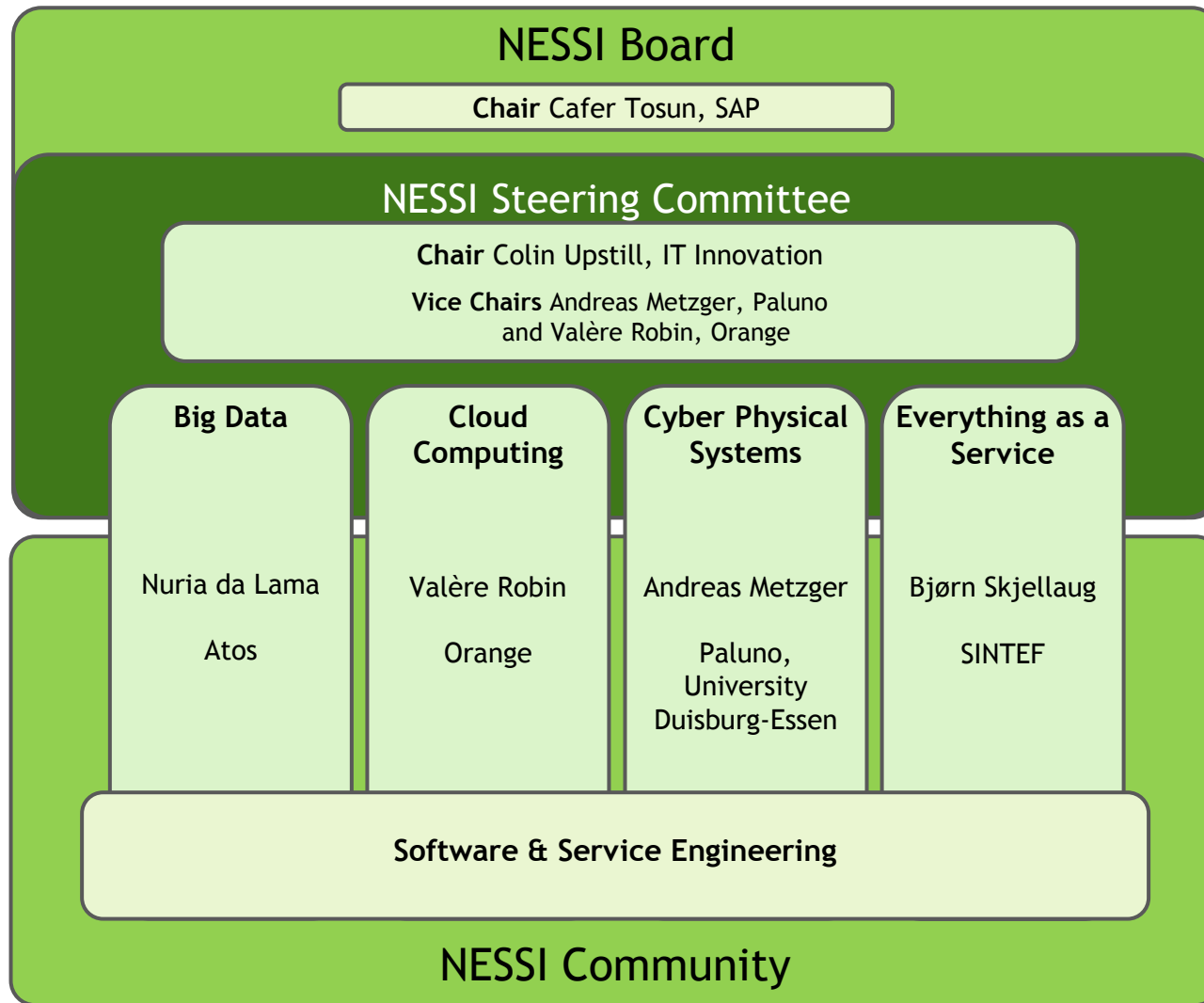
NESSI Partners



NESSI has >450 Members



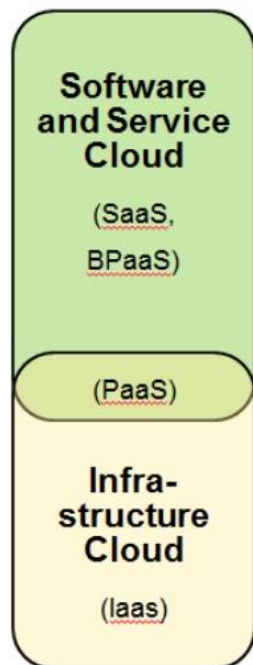
NESSI Structure and Focus Areas



Big Data

- ▶ In 2014 NESSI initiated the Big Data Value cPPP in the H2020 ICT LEIT Programme
 - ▶ NESSI Partners led the proposal to the EC that there should be such a cPPP
 - ▶ NESSI Partners led the creation of the initial SRIA
 - ▶ NESSI Partners led the foundation of the Big Data Value Association (BDVA), the “Private” part of the PPP
- ▶ Data (including Big data) continues to be a significant part of NESSI’s mission as the ETP for software, services and data

NESSI Cloud White Paper



Product & Service Innovation

“Innovate with Cloud”

Applications provided as services (efficiently assembled from PaaS services), *offering transformational benefits and capabilities to businesses, public bodies, citizens (e.g., the “next” facebook)*

Engineering & Governance Innovation

“Agile design & operation”

Techniques and tools to exploit cloud opportunities *to more dynamically and responsively build, operate and manage interoperable cloud-scale applications (à la “DevOps in the Cloud”)*

“Transforming ICT”

Scalable computing, IoT & networking resources offered as services, *thus eliminating need for infrastructure (pre-)invest by application providers*

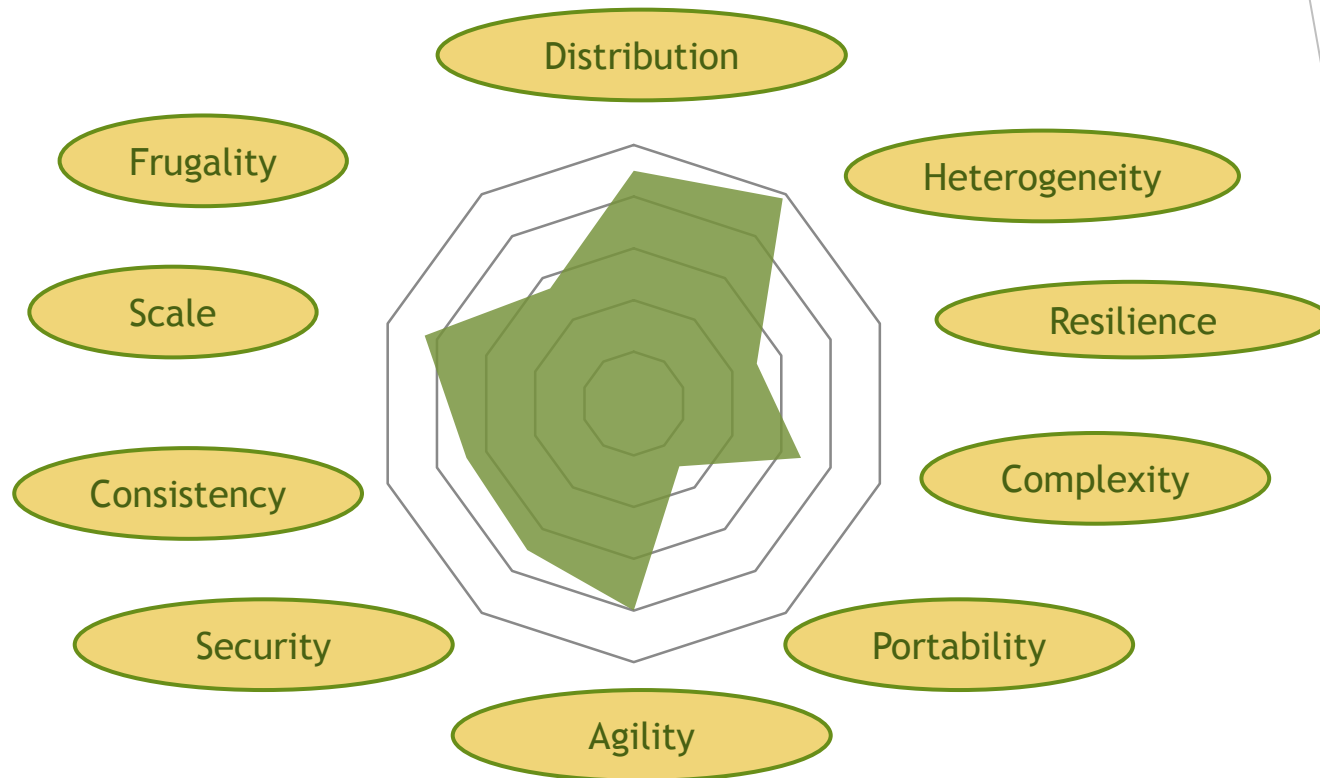
“Adaptive Cloud Infrastructures”

Application-aware mechanisms *to build resilient, sustainable infrastructures for service deployment and operation (e.g., adaptation of cloud depending on usage setting of application)*

Cloud Computing Evolution

- ▶ Distributed clouds (large scale, interconnected, federated)
- ▶ Business critical clouds (for enterprises of all sizes, for administrations)
- ▶ Sustainable clouds (environment, regulations, actors)
- ▶ Clouds reaching the edges (network, devices, IoT, CPS)
- ▶ Clouds for services ecosystems (PaaS, API, market places)
- ▶ Core technology + tools + standards

Engineering Tradeoffs for Clouds



Research should enlarge the solutions' domain, providing transparencies for service developers and users

Impact of Research Challenges

	Sustainability of business and society	Economic efficiency	Time to market and agility	Digitalization of economy	Ecological impact	Trust and acceptance	Services and ecosystems development
Federated cloud networking	+++		+			++	+
Automated service discovery and composition		++	+++	++			+++
Cloud security	++			++		+++	+
Integration of the cloud and networks, IoT, CPS, mobile devices		+++		+++	++		++
Cloud for mission critical large scale systems	+++	++	+	+	+	++	+
New programming models leveraging cloud infrastructures		+	+++	++			+++
Evolution of cloud architectures	+				+++	+	

Cloud Consultation Workshop - 4 November 2014

Models

Languages

Components

Tools

Architectures

Processes

Innovation Challenges

- ▶ Standards and recommendations
 - ▶ elements of trust (on interfaces, on data and processes)
 - ▶ involving technology providers, services providers, users
- ▶ Migration
 - ▶ leveraging clouds for business in all sectors
 - ▶ tools and certification
- ▶ Education
 - ▶ not only in ICT
- ▶ Impacts on organisations and society
 - ▶ towards resilience and agility

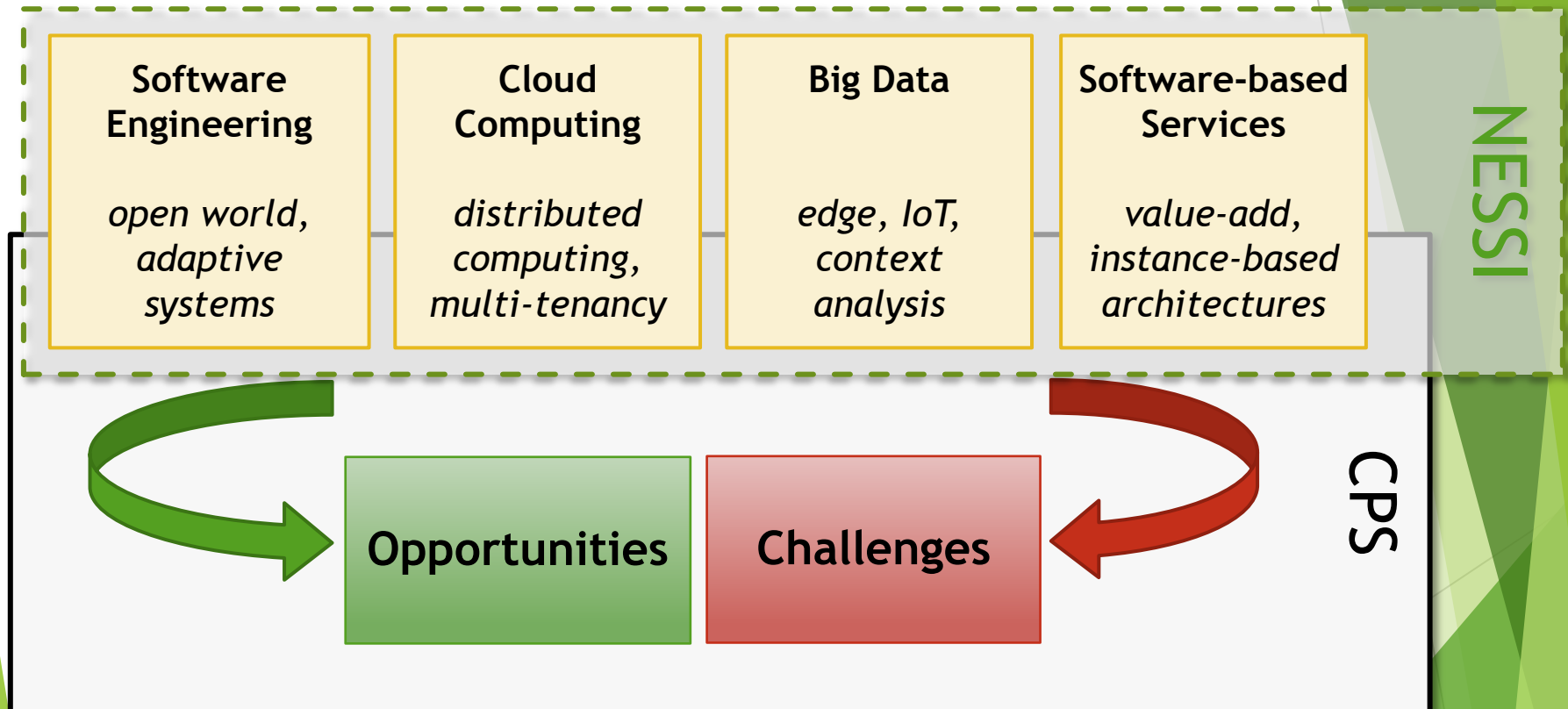
Markets

Products

Standards

Actors

Cyber Physical Systems



Software Engineering for CPS

- ▶ H-CPS: Human/Operator-in-the-loop CPS
- ▶ C-CPS: Crowds-in-the-loop ****NEW****
- ▶ Software Innovation ****NEW****
- ▶ Powerful abstractions for modelling and understanding open-world CPS
- ▶ Middleware and platforms for dynamic federation of CPS
- ▶ Quality assurance of CPS in the presence of dynamic federation and adaptation

Cloud for CPS

- ▶ Scalability, elasticity and availability of Compute Resources
- ▶ Infrastructure cost reduction
- ▶ Real-time data collection, analysis, and actuation
- ▶ Multi-tenancy in CPS infrastructures
- ▶ Dependable and predictable cloud Service Level Commitments for CPS
- ▶ Cloud Services and Platforms for CPS construction and deployment ****NEW****

CPS and Big Data

- ▶ Leveraging Big Data analytics for better CPS adaptation
- ▶ Greater customization and smartification in the products and services
- ▶ Assuring CPS assets stay online (predictive maintenance, ...)
** NEW **
- ▶ Handling massive data production
- ▶ Distributed data storage and processing
- ▶ Monetizing Big Data stemming from CPS

Software-based Services Creating Value with CPS

- ▶ Instance-based architecture for a “true” Business Network of Things
- ▶ “Software-defined” Industries
- ▶ Service architecture for software-based services for CPS

Everything as a Service

The ICT world is changing

- **Service markets/ecosystems:** Availability of better services/components that should be used in the application
- **Individualization:** Customers increasingly strive for individualized / on-demand solutions and services; while “traditionally” systems were designed for a multitude of end-users belonging to the same class and thus following the same or similar processes (in fact current systems although can be parameterized they implement the same process - aka business process), new systems should easily implement individualized processes as each end user might him/herself in different context of use from other end users
- **Big Data:** Big Data is a fact. Big Data materializes, from a technological point of view, that context changes enormously in very short time frames
- **Failures / Violations:** Due to the distributed nature and decentralized ownership and control of FI applications, SLA violations of used services, or even discontinuation of such services, may have significant impact on quality
- **Business models:** Business ecosystems and technology foster emergence of ever new business models and opportunities

Everything as a Service

New Needs and Trends in Research

- ▶ Dynamic world of services (micro-services?) interacting
- ▶ 'Flat' distributed architecture, less partitions and layers
- ▶ Impact all sectors (including tertiary sector, products)
- ▶ Cyberworld is not here yet
- ▶ Service as the connection unit
- ▶ Programmable world / software universe
- ▶ Smart services: autonomous and active agents
- ▶ Universal service bus
- ▶ Communities of services, crowd based services
- ▶ Ad hoc aggregation of services, possibly temporarily
- ▶ Use of unreliable micro services to build something consistent and usable
- ▶ Links with the Programming subject

Coming Soon

- ▶ NESSI Sessions at ICT 2015, Lisboa, 21 Oct
 - ▶ Cyber Physical Big Data Systems: Coming Together of Game-Changing Trends (jointly with ARTEMIS-IA and BDVA)
 - ▶ <https://ec.europa.eu/digital-agenda/events/cf/ict2015/item-display.cfm?id=15659>
 - ▶ Software Encapsulates the World: Everything as a Service (XaaS) by 2025
 - ▶ <https://ec.europa.eu/digital-agenda/events/cf/ict2015/item-display.cfm?id=15731>
- ▶ NESSI White Papers
 - ▶ Cyber Physical Systems
 - ▶ [http://www.nessi-europe.eu/?Page=position papers](http://www.nessi-europe.eu/?Page=position%20papers)
 - ▶ Security and Privacy
 - ▶ to be published late 2015
- ▶ Questionnaire regarding H2020 Experiences
 - ▶ To be launched late 2015

Available Now!

More Information

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