NETWORKED EUROPEAN
SOFTWARE & SERVICES
INITIATIVE

NESSI: delivering building blocks for the Internet of Services

ICSEA 2009, Oporto 21.09.2009.

Aljosa Pasic, Atos Origin

Agenda

- The story of NESSI
- Future Internet (of services)
- Building blocks for IoS
- Closer look at security for IoS
- Conclusions

The story of NESSI

- The context - European Technology Platform

- Strategic?

Today, NESSI partners represent 1.7 Million strong workforce and 490 B€ in revenues

- Link?

NESSI has presented an initial Strategic Research Agenda that represents a global investment of 2.5 B€

NESSI's governance

NESSI partners

Coordinating

Board

Steering Committee

Committees

NESSI Office

NESSI members

Actively Contributing
⇒to NEXOF
⇒to the SRA

Working Group

Research Projects

Staying Aware

Newsletters

Events

Mailings

NESSI's constituency

NESSI

NESSI partners

Coordinating

NESSI members

Actively Contributing
⇒to NEXOF
⇒to the SRA

400 members

12 working groups

6 NESSI Strategic Projects

5 NESSI Compliant Projects

Staying Aware

ETP – European Technology Platform

JTI – Joint Technology Initiative

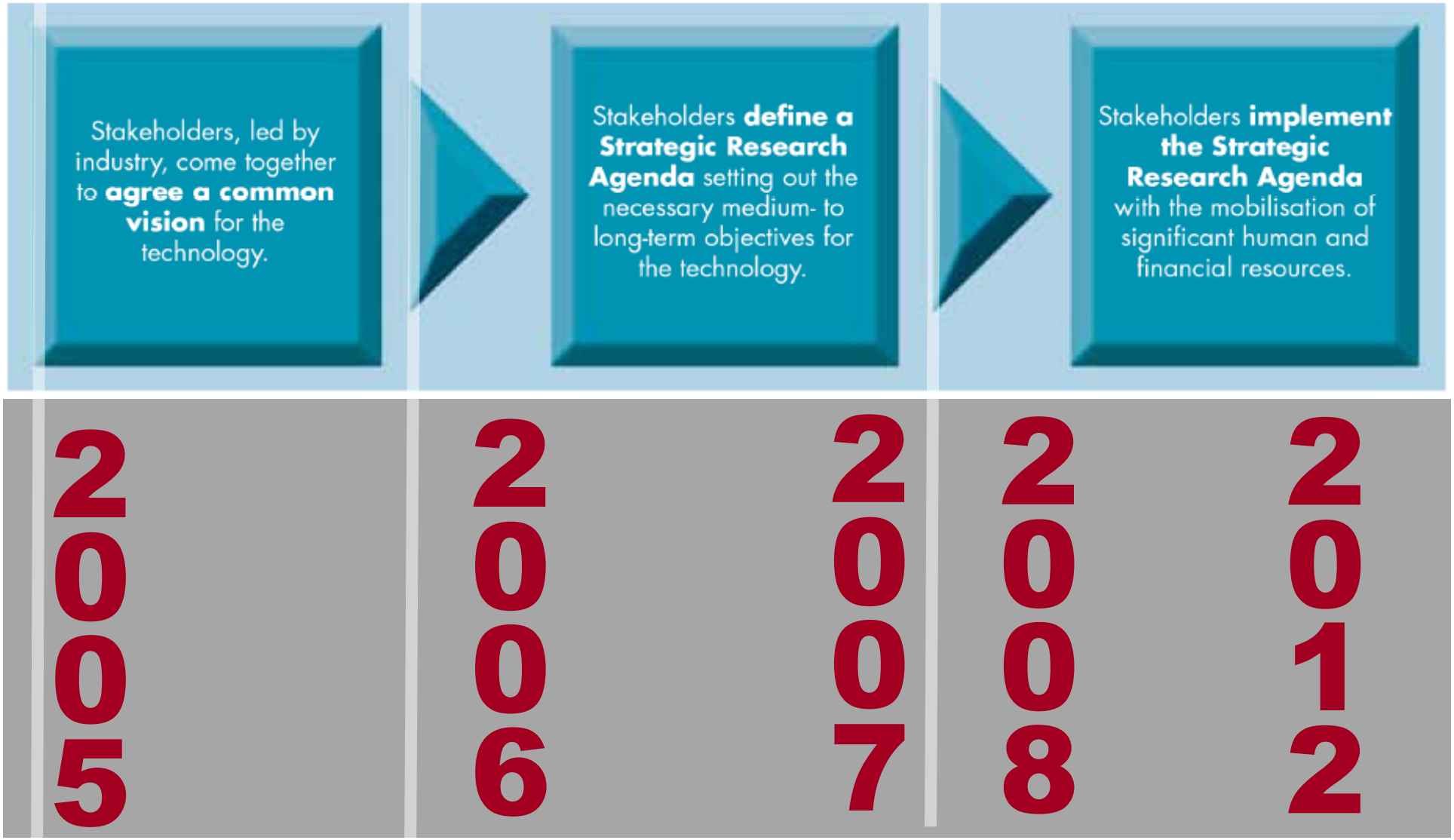
Over 30 ETPs – 6 JTIs

- Innovative Medicines Initiative (IMI)
- Embedded Computing Systems (ARTEMIS)
- Aeronautics and Air Transport (Clean Sky)
- Nanoelectronics Technologies 2020 (ENIAC)
- Fuel Cells and Hydrogen (FCH)
- Global Monitoring for Environment and Security (GMES)

ETPs http://cordis.europa.eu/technology-platforms/home_en.html

JTI http://cordis.europa.eu/fp7/jtis/

NESSI at a glance



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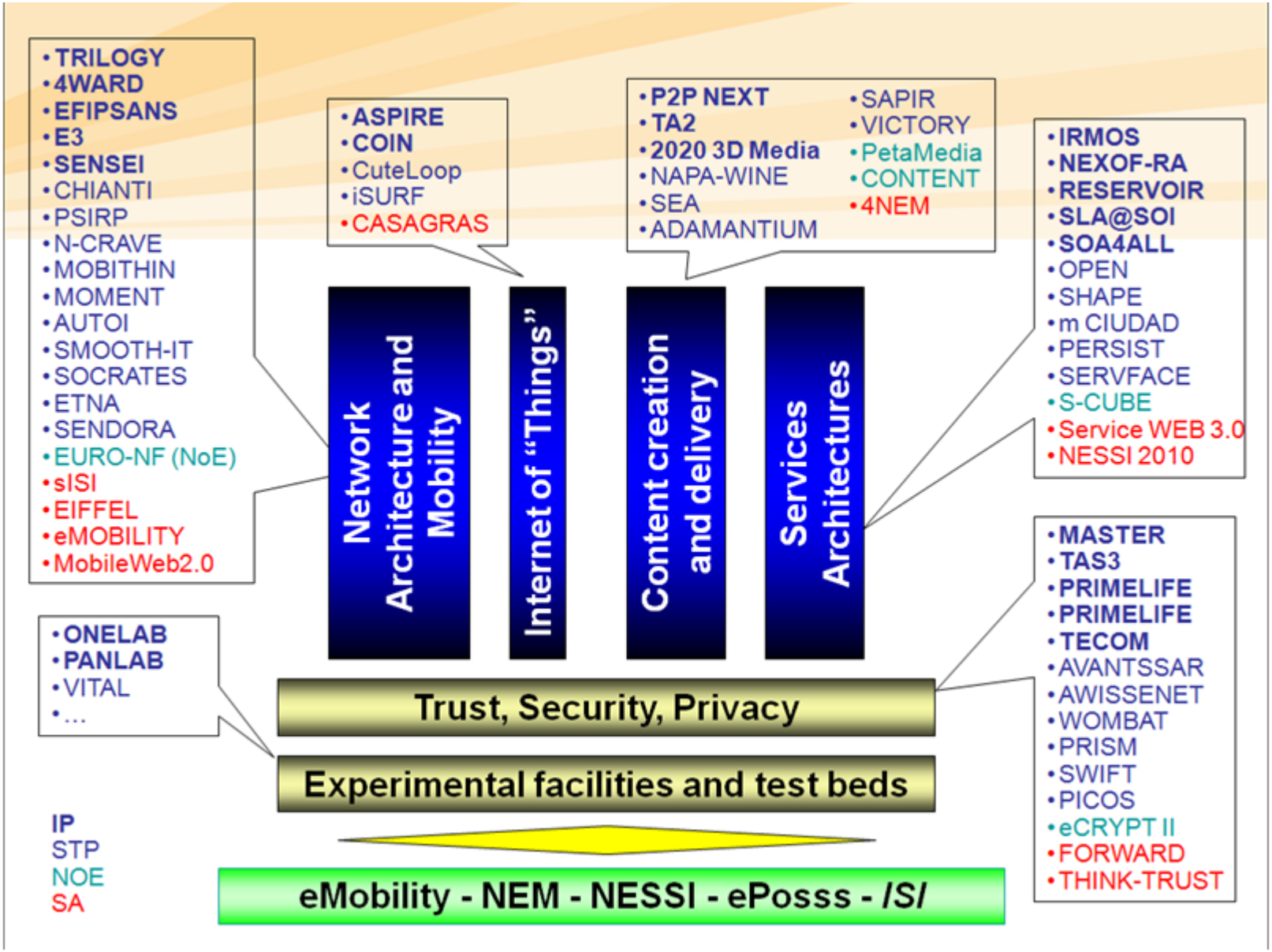
NESSI in Future Internet

Tomorrow the Internet will be strategic because of "services"

Future Internet Assembly



European Commission

Launched in April 2008

The BLED Declaration:

Towards a European approach to the Future Internet

Current Internet: Success & Challenges

With over a billion users world-wide, the curre
communications infrastructure and service platfo
and European society in general. However, today's
bear little resemblance to current and foreseen usa
and current utilisation are now beginning to hamp
in the realms of technology, business, society
development ofthe Internet is to sustain the netw

Future Internet: Vital to continued econ

In the future, even more users, objects, services ar
through the Future Internet which will underpin a
mies.It is therefore time to strengthen and focus
Europe's competitiveness in the global marketplac

A significant change is required and the actors, researchers, industrialists, SMEs assert the urgent necessity to redesign the Internet, taking a broad multidisciplinary approach, to meet Europe's societal and commercial ambitions.

This declaration is endorsed by the following European Technology Platforms and European Research Projects*:

eMobility, NEM, NESSI, ISI and EPOSS

2020 3D Media	CHORUS	FAST	N-CRAVE	SAPIR	SOCRATES
4NEM	COIN	FORWARD	NESSI 2010	S-CUBE	SWIFT
4WARD	CONTENT	INTERSECTION	OPEN	SEA	TA2
ADAMANTIUM	CuteLoop	IRMOS	P2P NEXT	SENDORA	TAS3
AGAVE	DICONET	iSURF	PanLab / PII	SENSEI	TECOM
ASPIRE	E3	m CIUDAD	PERSIST	SERVFACE	THINK-TRUST
AUTOI	eCRYPT II	MASTER	PetaMedia	Service WEB 3.0	VICTORY
AVANTSSAR	EFIPSANS	MobileWeb2.0	PICOS	SHAPE	WOMBAT
AWISSENET	EIFFEL	MOBITHIN	PRIMELIFE	sISI	
CASAGRAS	eMOBILITY	MOMENT	PRISM	SMOOTH-IT	
CHIANTI	EURO-NF	NAPA-WINE	RESERVOIR	SOA4ALL	

*Accession to this declaration is open to existing and future EU Projects that wish to actively contribute

European Commission

Future Internet Assembly

Conferences

- April 2008 — Slovenia (launch)
- December 2008 — Spain
- May 2009 — Czech Republic
- November 2009 — Sweden

Active through Working Groups

European Commission Future Internet Web site

http://ec.europa.eu/information_society/activities/foi/index_en.htm

Future Internet Web site

www.future-internet.eu

European Commission

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The tools of NESSI

- The first “tool” of an ETP is its Strategic Research Agenda
  - ✓ Moving from vision to definition
  - ✓ Frame the context
  - ✓ Refine the Technological scope

NESSI Open Service Framework

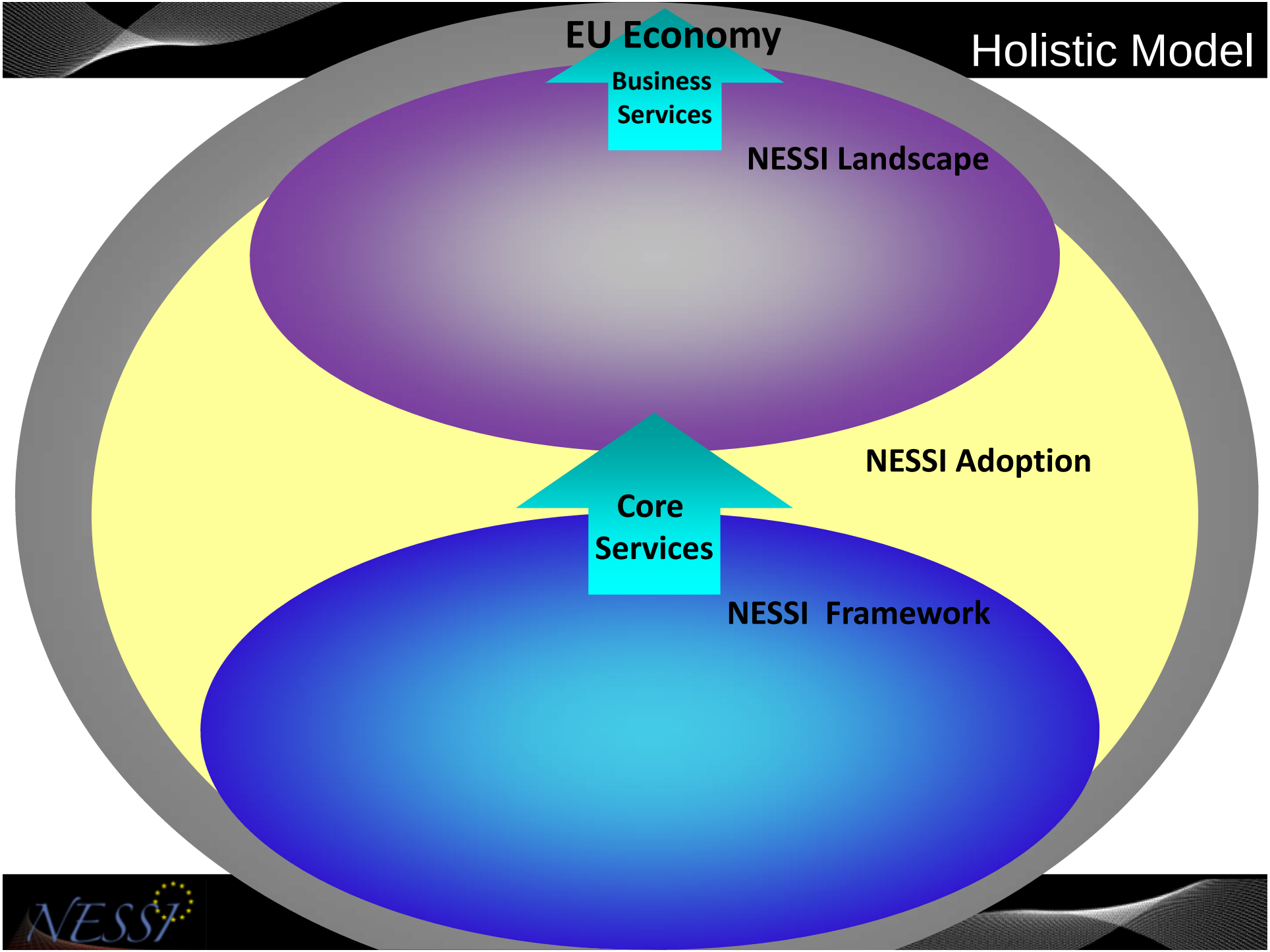
The tools of NESSI

- The first “tool” of an ETP is its Strategic Research Agenda
  - Moving from vision to definition
  - Frame the context
  - Refine the Technological scope

2008 2012

- Enhance definition of NEXOF – the NESSI Open Service Framework
- Build it “together”

Holistic Model



Holistic Model

EU Economy

Business Services

NESSI Landscape

Practices & Usages

Architecture & Engineering

NESSI Adoption

Regulatory Governance

Core Services

NESSI Framework

Define and implement

NEXOF

NESSI Open Service Framework

NESSI

Contributing to NEXOF – a world-wide process

NESSI Strategic Projects

Contributing key components to NEXOF

NEXOF
NESSI Open Service Framework

Invitations to Contribute

- **Open to all**
- **Participative selection process**

NESSI CompliantProjects

Compliant to NEXOF
or
Contributing to NEXOF

Contributing to NEXOF – a world-wide process

NESSI Strategic Projects

EzWeb

SOA4All

MASTER
Managing Assurance, Security and Trust for sERvices

RESERVOIR

NEXOF
reference architecture

SLA@SOI

NEXOF
NESSI Open Service Framework

Invitations to Contribute

NESSI CompliantProjects

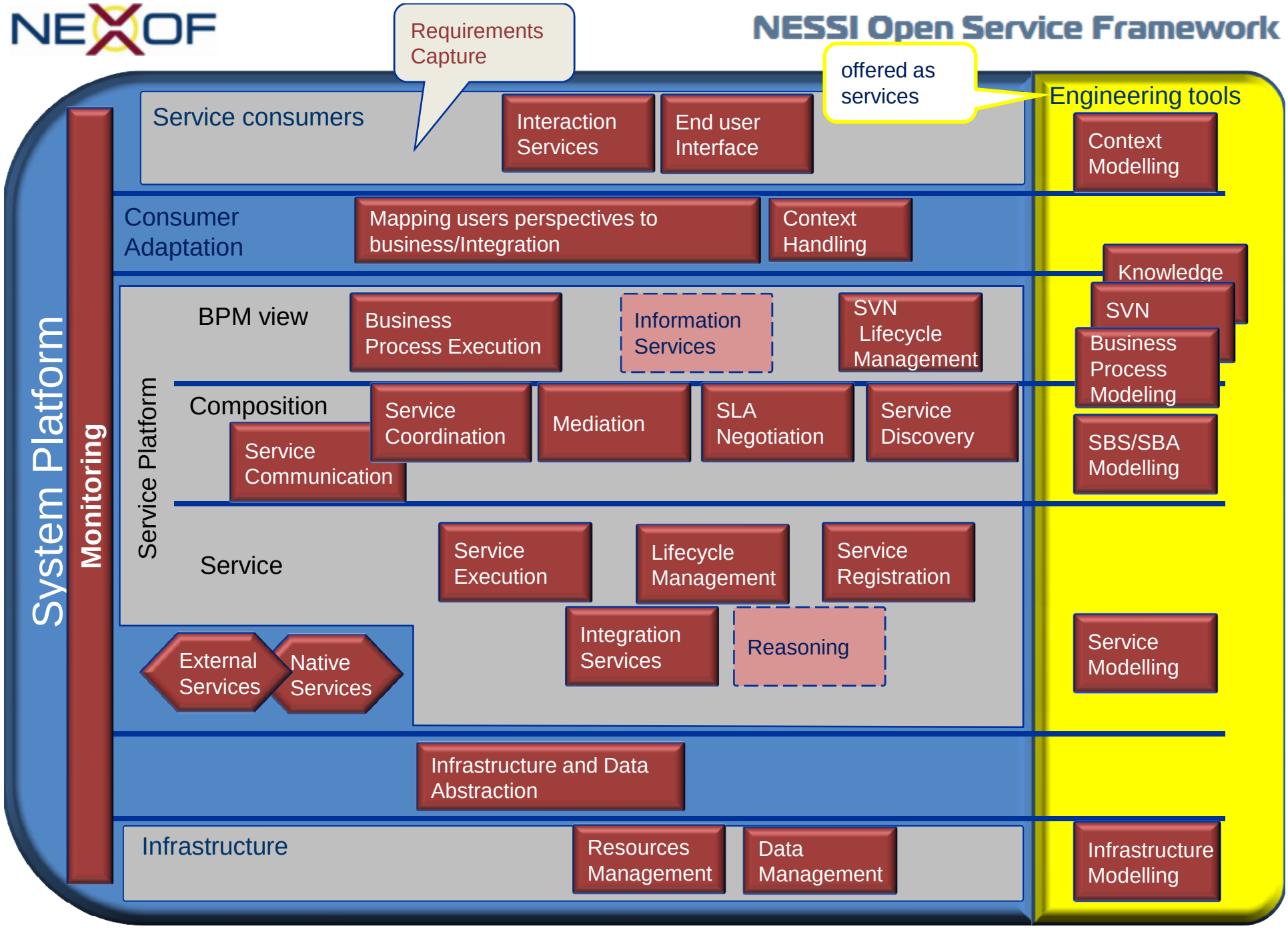
PrimeLife

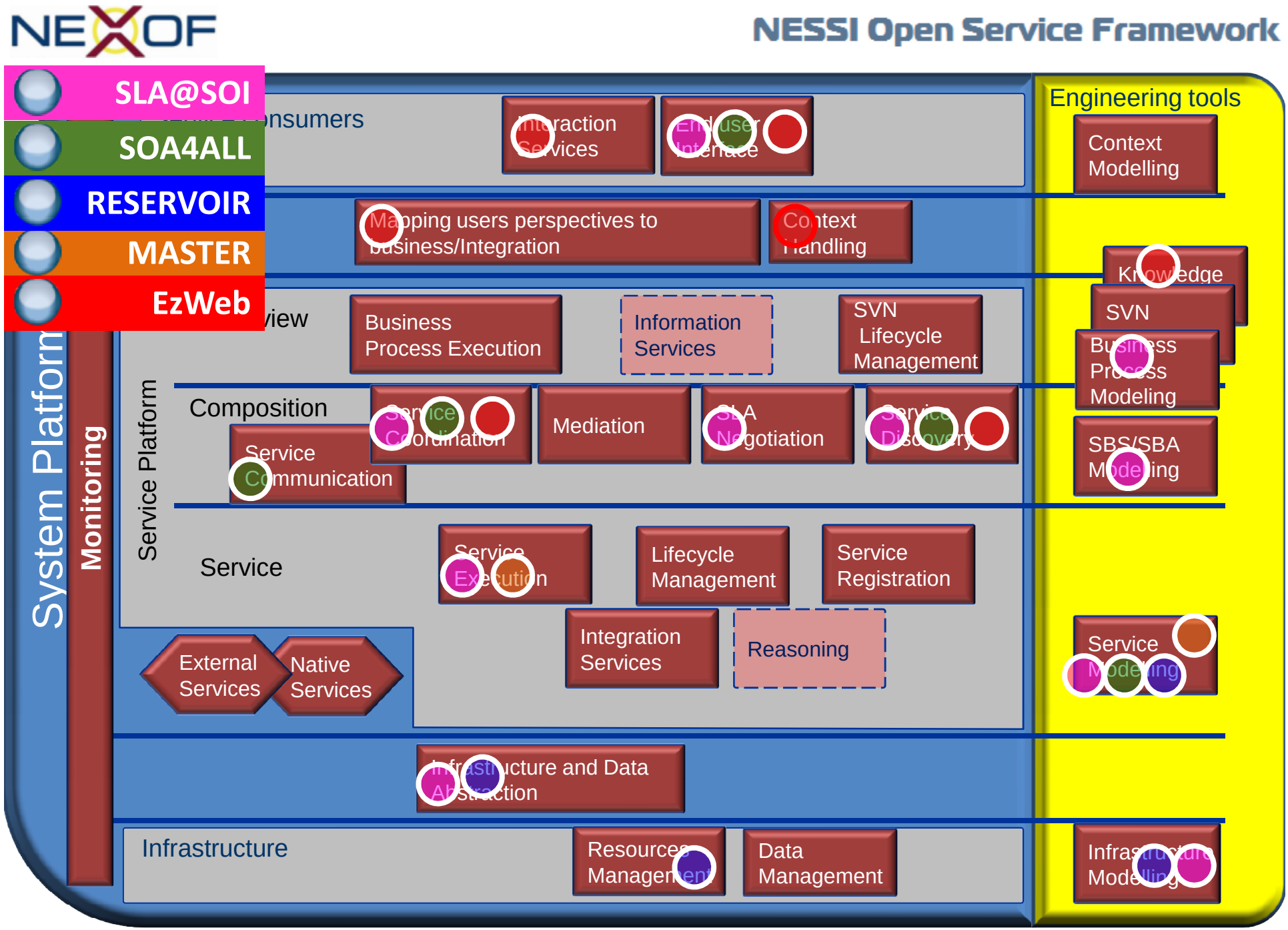
FAST

TAS³

COMPAS

mymobileweb


NEXOF
NESSI Open Service Framework
Requirements Capture
offered as services
Engineering tools
System Platform
Monitoring
Service consumers
Interaction Services
End user Interface
Context Modelling
Consumer Adaptation
Mapping users perspectives to business/Integration
Context Handling
Knowledge
SVN
Business Process Modeling
SBS/SBA Modelling
Service Platform
BPM view
Business Process Execution
Information Services
SVN Lifecycle Management
Composition
Service Coordination
Mediation
SLA Negotiation
Service Discovery
Service Communication
Service
Service Execution
Lifecycle Management
Service Registration
Integration Services
Reasoning
External Services
Native Services
Service Modelling
Infrastructure and Data Abstraction
Infrastructure
Resources Management
Data Management
Infrastructure Modelling


NEXOF
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Infrastructure Modelling

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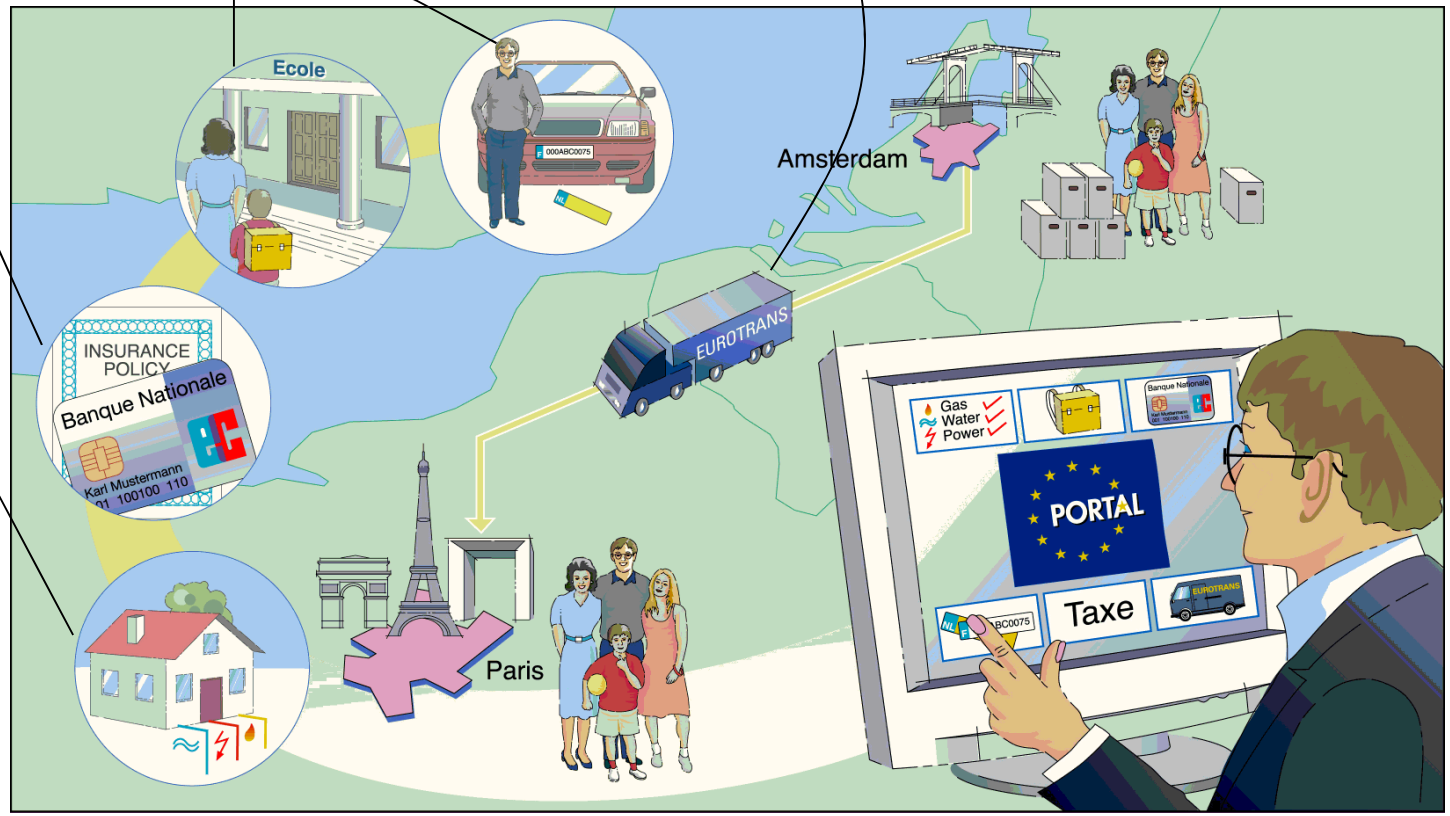
Service Oriented World

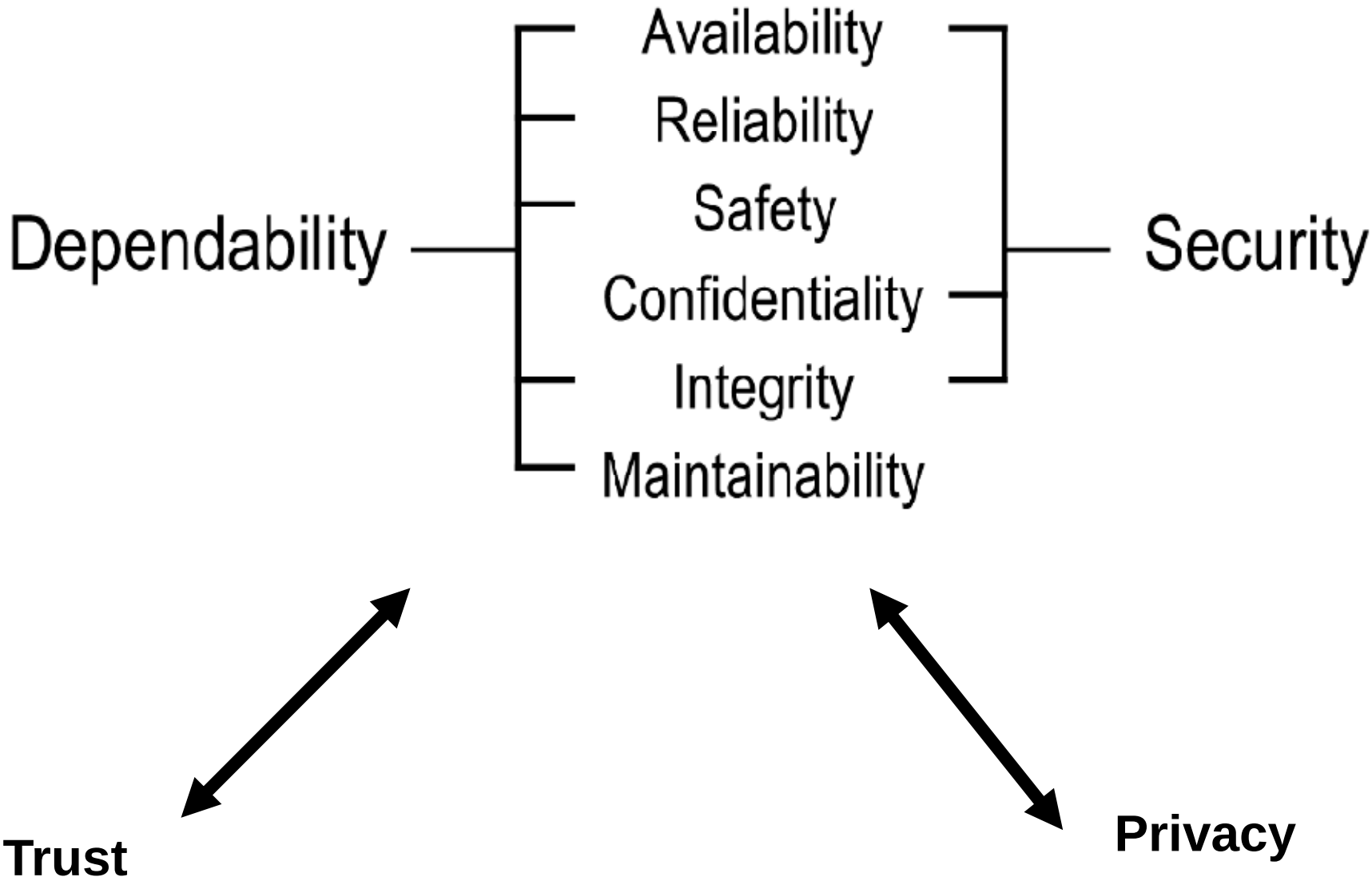
Applications will need to utilise shared and co-owned services out of different domains of control that require to obey separate security policies and ask for diverse security and dependability qualities



Challenges

- "A trustworthy Internet with services that you trust"
- The technical base that makes the Internet a safer place
- Address long-term research and industry vision on trust, security and dependability in software and services

What is TSD (&P) anyway?



Coming problems

- For industry: Demand for Secure software is much higher than available security expertise
- For research/technology: New complex scenarios (e.g. ambient intelligence) introduce security issues not addressed by conventional engineering processes
- For market consultants: Security properties difficult to measure and it is also difficult to evaluate their “compositional effects”
- For users: Security segmentation and market definitions are blurring: “service infrastructure” covers network infrastructure, perimeter, desktop, server and application security
- For auditors and lawyers: Who is accountable and liable for what?
- For society: Trust becomes a “key enabler” for service provision and use
- For everyone: How much should we spend on security?

Some Research Topics

- Security Technologies “Embedded” in Services
  - Services at the component level of the Service-Oriented Architecture
- Specialised Security Services and Properties
  - Access control architecture and its implementation
- System-wide Security Characteristics
  - Holistic implementation of the secure service eco-system. Dependability and Availability.
- Human/Societal/Technical Trust elements
  - The human & machine perception of System Trustworthiness. Privacy, digital rights…
- Governmental and Societal Context
  - Policy, Regulation, Certification, Awareness, Security Stakeholders Mapping…

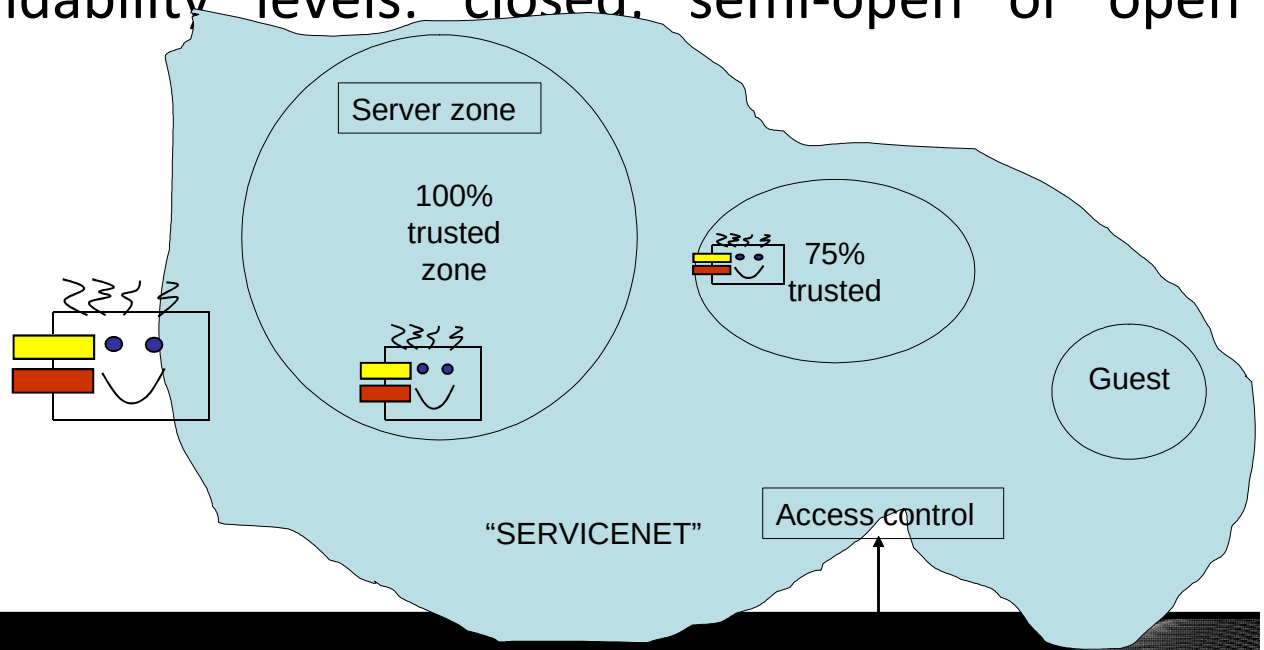
TSD “grey” context boundaries

If computing sky is getting “cloudy”…TSD will depend on “weather conditions”…

Infrastructure view: Expanding boundary (include remote access PC) and/or Contracting boundary (exclude outsourcing staff PC, external B2B server…)

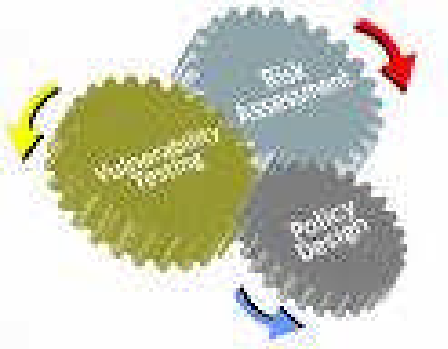
Trust view: “trust zones” where a level of trust can be established and security controls can be enforced

E2E Security or Dependability levels: closed, semi-open or open “servicenets” ?



Security Dimensions in Service Infrastructures

Secure Services



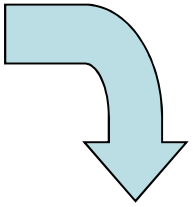
Security as a service

Securing Services

What should it be?

- **Dynamic**
- **Adaptable**
- **Composable**
- **Measurable**
- **Predictive**
- **Scalable**
- **Persuasive**
- **Open**
- **Trustworthy**
- **Interoperable**

- *In TSD engineering and modelling*
- *In TSD control and management*
- *In TSD level assurance*



Approaches, properties and research challenges

…which brings many trade-off issues…

Availability

Data integrity

Privacy

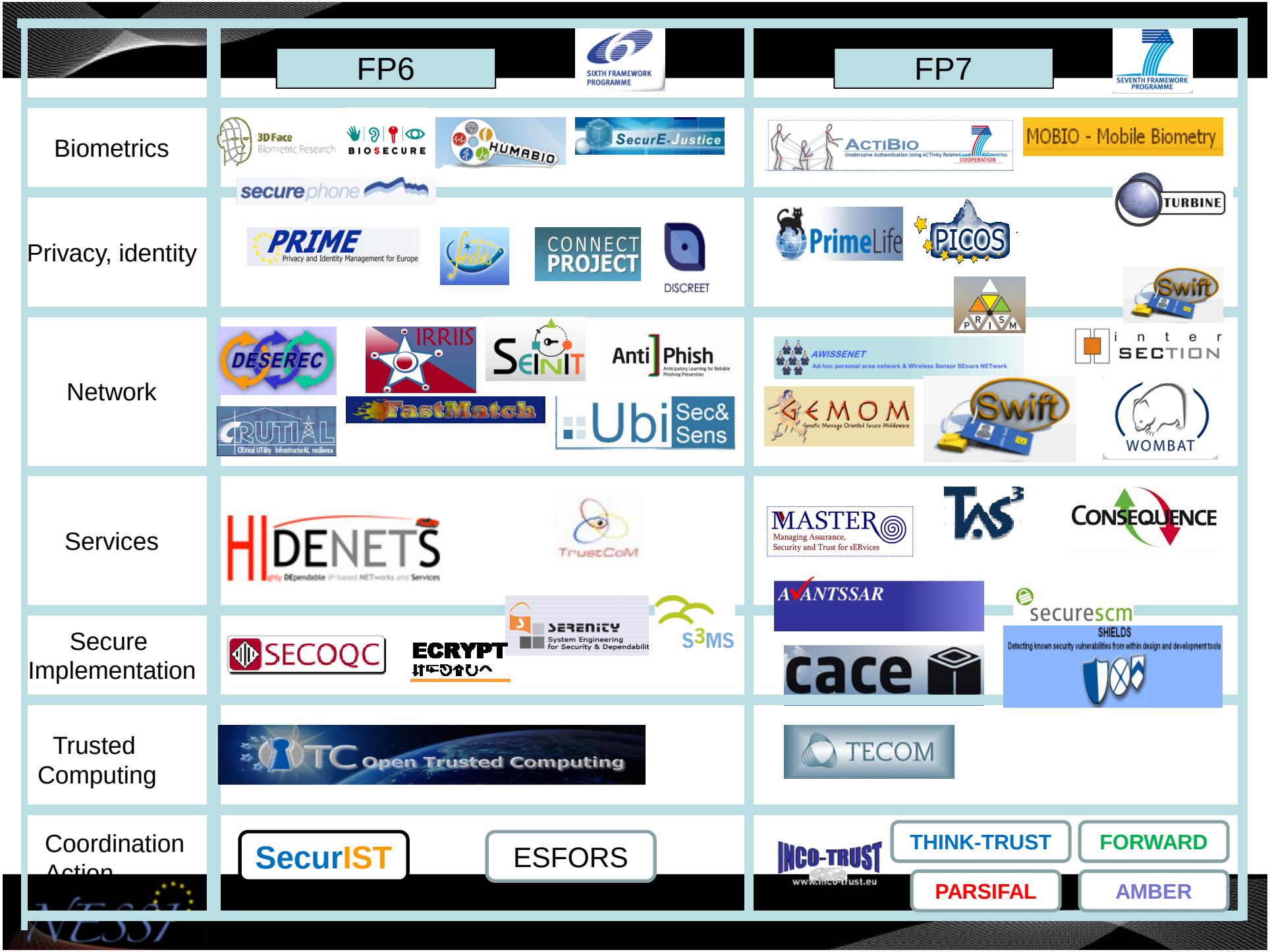
Accountability

Scalability

Assurance

Metrics for Trust, Security & Dependability

a) b) c)


FP6
SIXTH FRAMEWORK PROGRAMME
FP7
SEVENTH FRAMEWORK PROGRAMME
Biometrics
3D Face Biometric Research
BIOSECURE
HUMABIO
SecurE-Justice
ACTIBIO
Unobtrusive Authentication Using ACTivity Related and Biometrics
COOPERATION
MOBIO - Mobile Biometry
securephone
Privacy, identity
PRIME
Privacy and Identity Management for Europe
fidis
CONNECT PROJECT
DISCREET
PrimeLife
PICOS
TURBINE
Swift
PRISM
Network
DESEREC
IRRIIS
SEINIT
Anti Phish
Anticipatory Learning for Reliable Phishing Prevention
AWISSENET
Ad-hoc personal area network & Wireless Sensor SEcure NETwork
inter SECTION
GEMOM
Generic Message Oriented Secure Middleware
Swift
WOMBAT
CRUTIAL
CRitical UTility InfrastructurAL resilience
FastMatch
Ubi Sec&Sens
Services
HIDENETS
highly DEpendable IP-based NETworks and Services
TrustCoM
MASTER
Managing Assurance, Security and Trust for sERvices
TAS3
CONSEQUENCE
Secure Implementation
SECOQC
ECRYPT
SERENITY
System Engineering for Security & Dependability
S3MS
AVANTSSAR
securescm
SHIELDS
Detecting known security vulnerabilities from within design and development tools
cace
Trusted Computing
TC Open Trusted Computing
TECOM
Coordination Action
SecurIST
ESFORS
INCO-TRUST
www.inco-trust.eu
THINK-TRUST
FORWARD
PARSIFAL
AMBER

More on trust and trustworthiness…

In a service-centric Internet:

- Use and adoption of services depends highly on TRUST and TRUSTWORTHINESS
- The trust model relies on complete requirements that include business, technical, legal, regulatory, and societal requirements

MASTER
Managing and Auditing Security and Trust for sERvices

TAS3

PrimeLife

We need more than technology : an example

- Risk management failure; **a trader (Jerome Kerviel) was able to turn off the monitoring controls which should have alerted the organization to a magnitude of risk which put the organization in danger.**
- Governance failure; **when the French Banking Commission detected Kerviel's activity and warned Societe Generale (SocGen) that its risk management regime was not working properly, SocGen management apparently failed to take effective action to fix the problem. Identifying in time both failures and who in the organization is responsible for addressing each failure is a lesson learnt for other companies which might face in the future similar problems.**

MASTER approach: align and manage

- GRC tool structure should have “roundtrip” processes. Management at all levels should have effective tools for understanding the information and reports it receives, including the ability to “drill down” into information to see the details provided by staff at all levels.
- Compliance Management solution, such as MASTER can help implement roundtrip processes.
- Different interfaces for different people.

Relationship between MASTER and few other NSP

- SLA@SOI
  - Management of SLA across service composition
  - Discovery of service based on SLA parameters
  - SLA modelling. This includes the accounting and billing properties
- SOA4ALL
  - Discovery based on semantic descriptions
  - Semantic description of services (e.g. SA WSDL, WSMO Lite, MicroWSMO)
  - Framework for context information (acquire, adapt etc)
- NEXOF
  - Reference model, architecture and implementation

Key building block for FI: Identity

- **STORK is a large scale pilot in the ICT-PSP (ICT Policy Support Programme), under the CIP (Competitiveness and Innovation Programme), and co-funded by EU. It aims at implementing an EU wide interoperable system for recognition of eID and authentication that will enable businesses, citizens and government employees to use their national electronic identities in any Member State. It will also pilot transborder eGovernment identity services and learn from practice on how to roll out such services, and to experience what benefits and challenges an EU wide interoperability system for recognition of eID will bring.**
- **The STORK interoperable solution for electronic identity (eID) is based on a distributed architecture that will pave the way towards full integration of EU e-services while taking into account specifications and infrastructures currently existing in EU Member States. The solution provided is intended to be robust, transparent, safe to use and scalable, and should be implemented in such a way that it is sustainable beyond the life of the pilot.**

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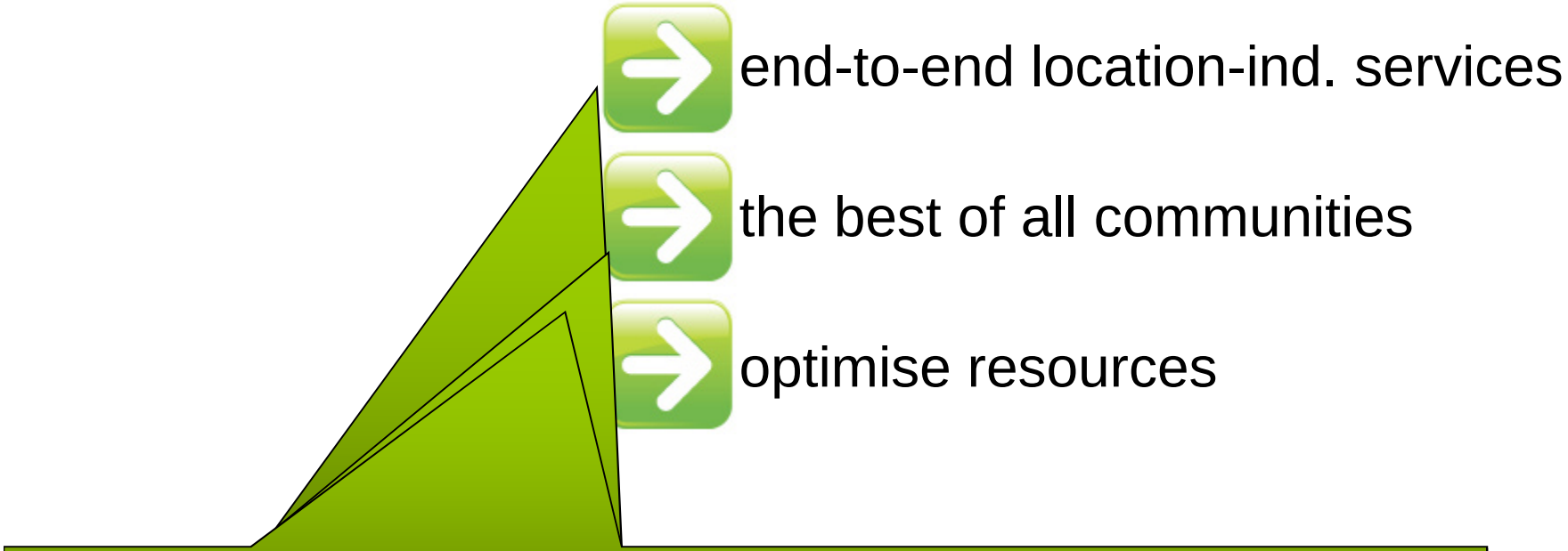
The importance of the global collaboration

- Future Internet – an ***opportunity*** for collaboration
- Similar initiatives exist in several countries

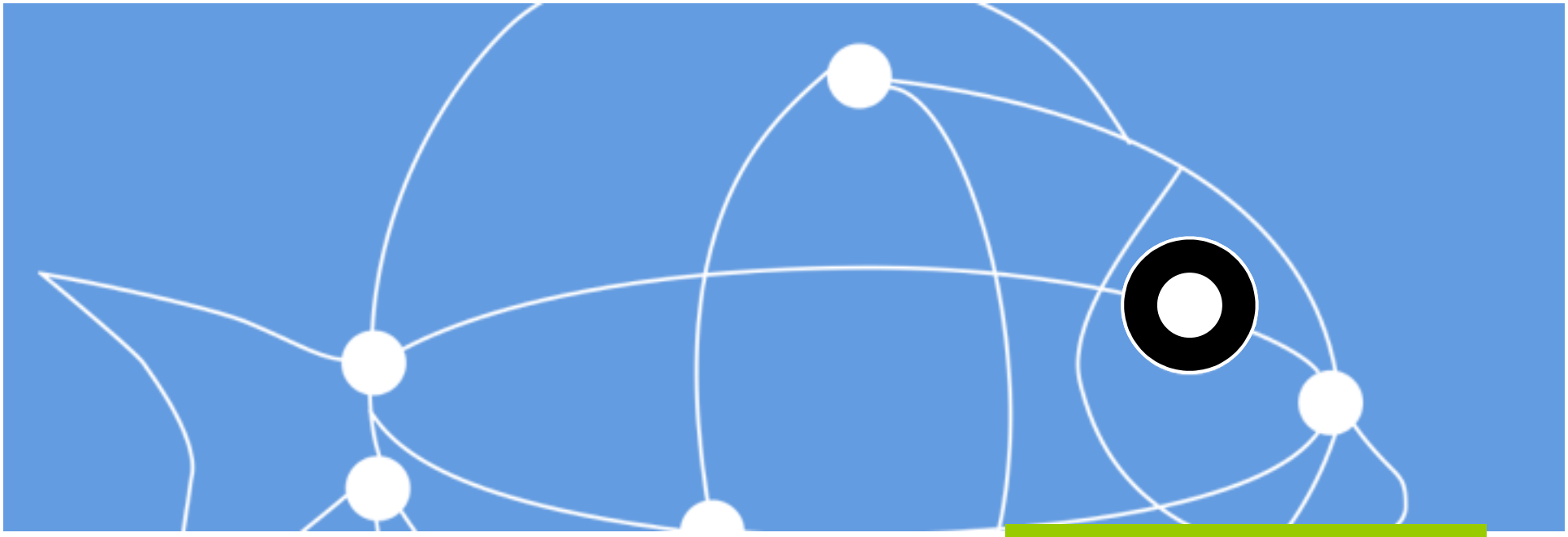


✓Validate the best competitive applications and usage scenarios worldwide
✓Avoid reinventing the wheel

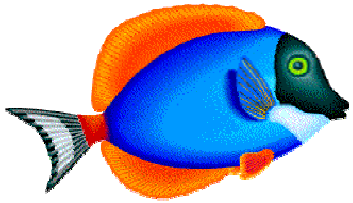
NESSI

Conclusions

- We need to invest in research GLOBALLY in order to ensure continued trust by users as society increases its dependency on software services
- Software security engineering, in its road to maturity, could & should use lessons learned from the software engineering and from the system security, but also other disciplines and research communities



Thank you



FACING TECHNOLOGICAL CHALLENGES TOGETHER

Aljosa Pasic (Atos Origin)

aljosa.pasic@atosorigin.com