



The NEXOF-RA project

**ETSI - Grids, Clouds & Service Infrastructures
Workshop**

2-3 December 2009

Sophia Antipolis



- **NEXOF – The NESSI Open Service Framework**
 - Motivation
 - Main concepts
- **The NEXOF-RA Project**
 - NEXOF-RA Why
 - NEXOF-RA What
- **Trend in Cloud Computing**

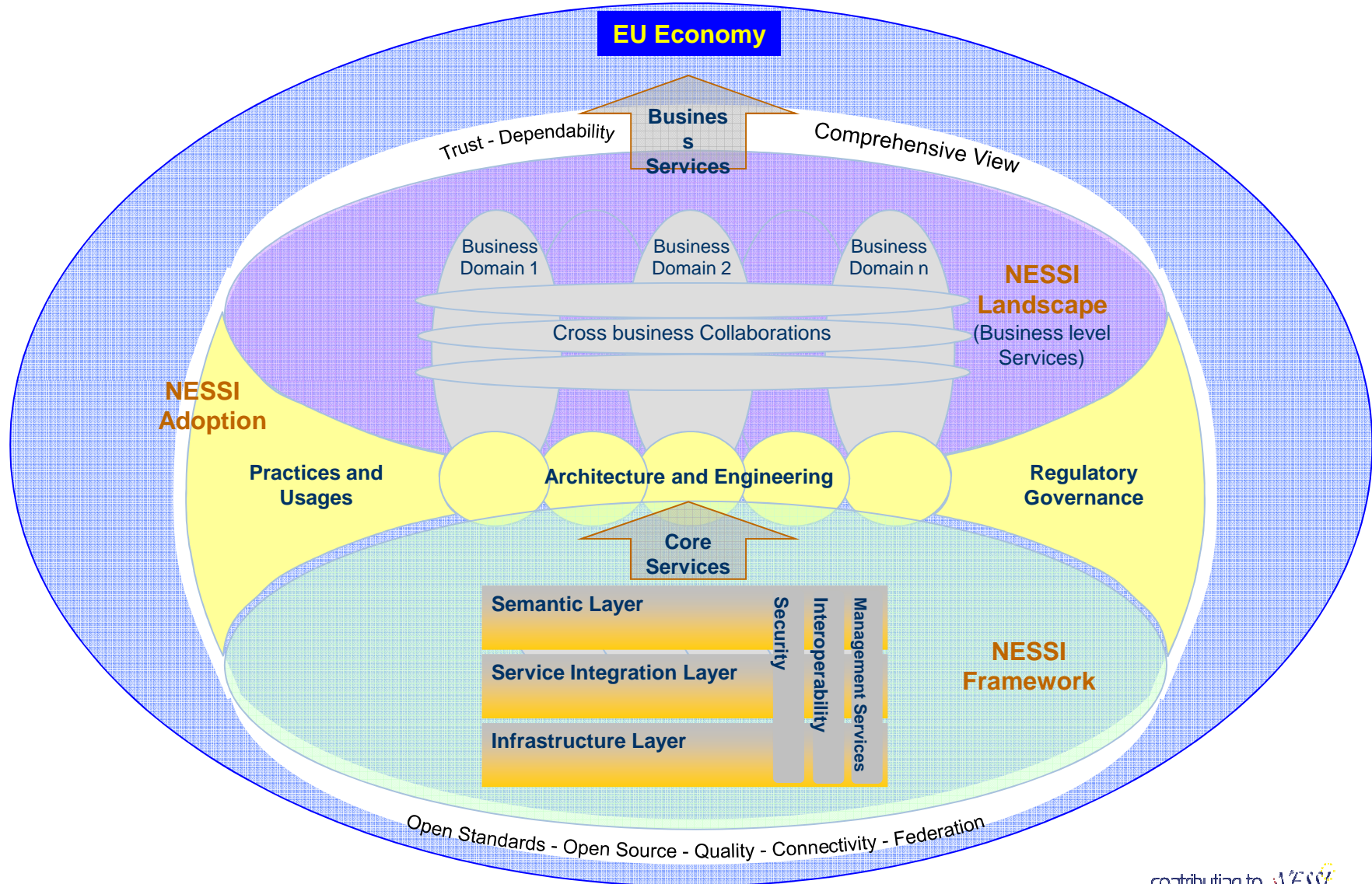
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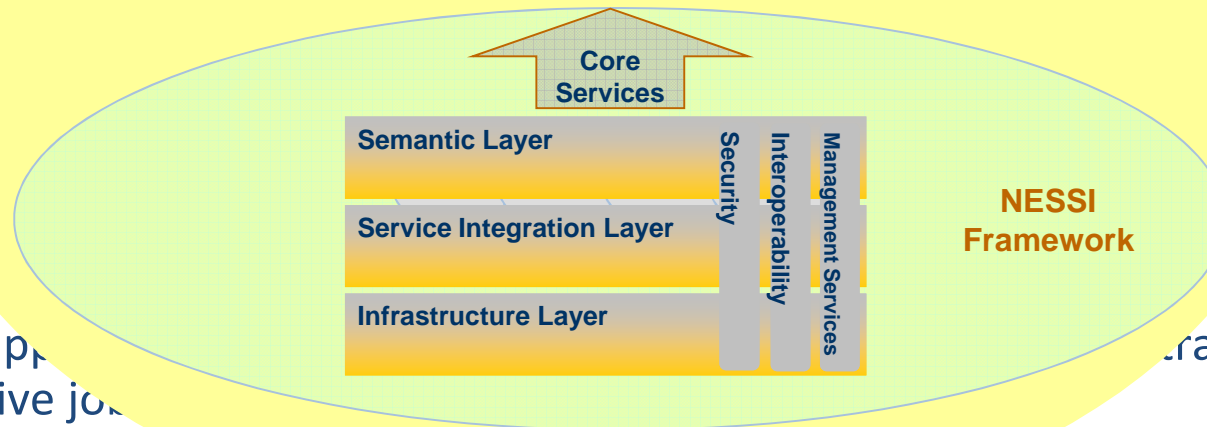
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The NESSI Open Framework is an integrated, consistent and coherent set of technologies and associated methods and tools intended to

- Provide European Infrastructure with efficient services and software infrastructure and quality
- Master core utilities oriented
- Establish speed to
- Develop open source
- Fostering societal applications, and competitive jobs

implementing the



NESSI Open Service Framework

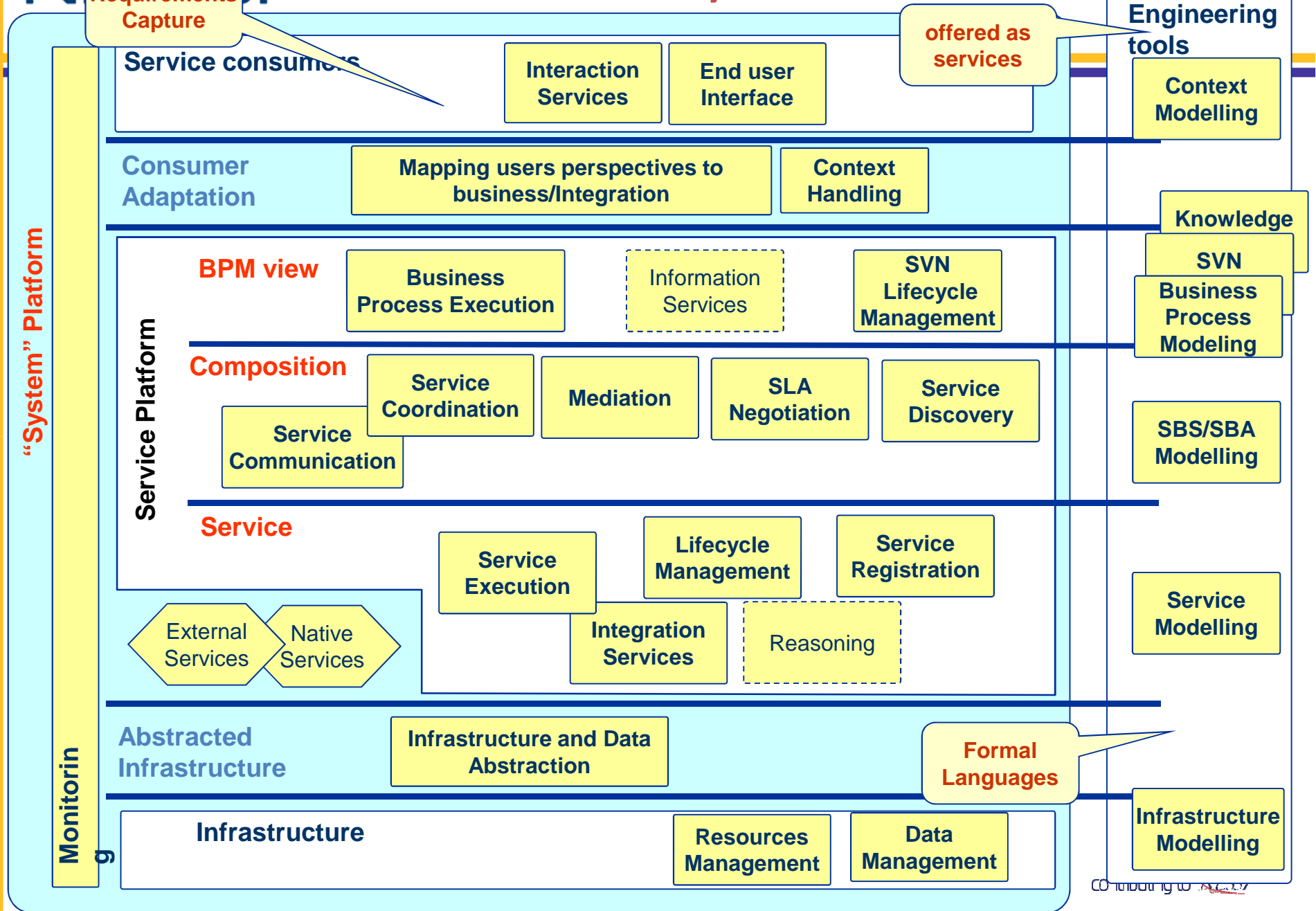
- Open Reference Model
 - Concept and Principles
- Open Reference Architecture
 - Standards
- Open Reference Implementation
- Conformance Test Suite

“The Independence Principle”

Size

Domain

Technology



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Why: Project motivation

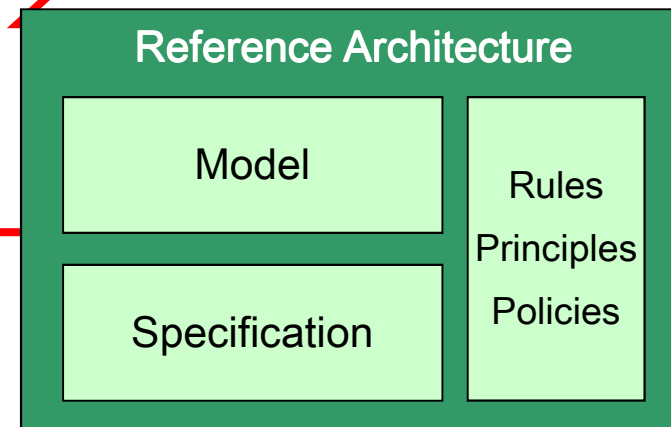
- “Deliver a **coherent** and **consistent** open service framework, ranging from the infrastructure up to the interfaces with the end users, **leveraging research** (“**value add**”) in the area of service-based systems to consolidate and trigger innovation in service-oriented economies”
- NEXOF-RA is a **step** in the process of building and creating the conditions for the adoption of the whole of Open Service Framework
- The aim is that the RA will be built through **consensus** within the NESSI Community, validated by the NSPs and widely adopted to support the European Service Economy

NESSI Open Service Framework

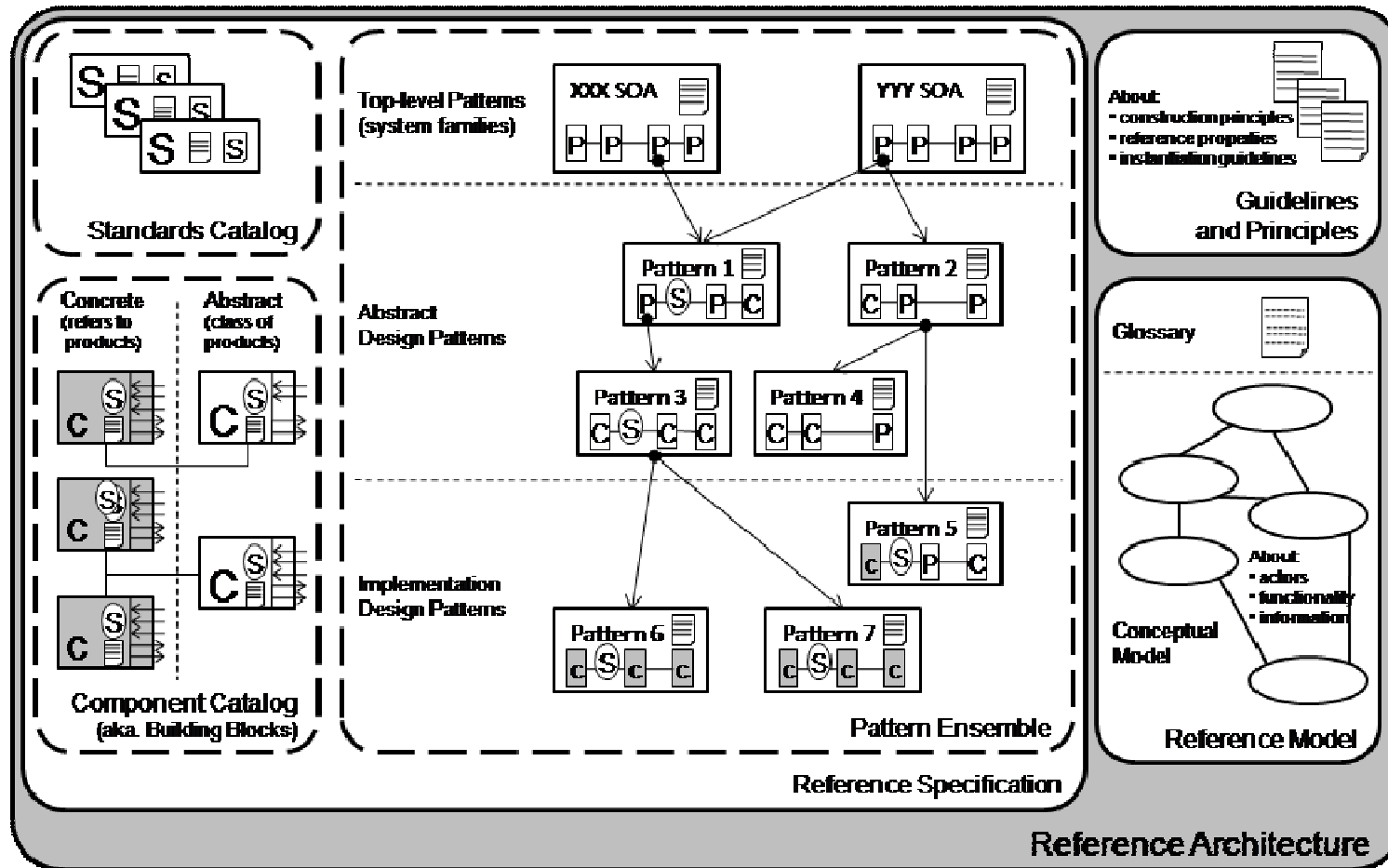
- Open Reference Model
→ Concept and Principles
- Open Reference Architecture
→ **Standards**
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NEXOF-RA

- Proof-of-concept
- NEXOF Roadmap

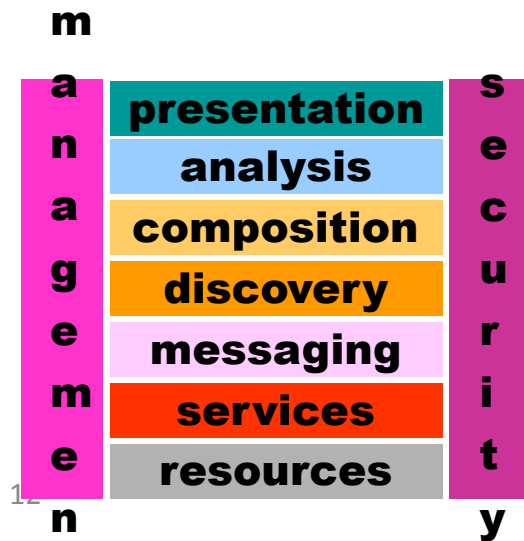


The NEXOF Reference Architecture Structure



- The NEXOF Reference Model (v1.0)

- From 9 concerns to 125 functionalities
- 100 of which from external sources (standards, NSPs, ITs)



Federated Processing & Decommissioning	Context-Aware Resource Discovery	Resource Publication	Resource Deployment	Resource Sharing	Workspace Design and Personalisation	User-Oriented Resource Authoring Tool	Manage Security
Federated (Re)Configuration	Model-Based Engineering Tools and Formalisms	Service Front-End Rendering	Query Contextual Information	Subscription to Contextual Information	Connection to Context Providers	Automatic Resource Transcoding	Security Policy Configuration
SLA Description	Content Adaptation and Personalization	Application Adaptation and Personalization	Service Front-End Persistence	Domain Model Management	Domain Model and User Interface Binding	Interaction Management	Security Implementation
SLA Translation	Monitor User Behaviour and Knowledge Extraction						IService Security
SLA Negotiation							IAuthentication
SLA Compliance Monitoring	Search based on Requirements	Provides Searching Ranking and Selection Algorithms	return ranked results to consumers	Manage Publication Events	Manage Versions, Authoring	Search based on Behavioral Constraints	INon-Repudiation
Setup Monitoring Rules	Organizes Service Descriptions	Browse Catalogue Content	Manage Catalogue Federations	Search based on Structural Constraints	Provides API Interfaces for Service Querying, Storage and Retrieval	Manage User Subscriptions	IMessage Security
Resource Usage Monitoring	Manage Content Replication schemas between catalogues	Provides a Service Discovery Engine	Select Best Candidates	Store, Modify, Delete, Move, Relative, etc Service Descriptions	Manage Content Access Policies	Manages the Creation of Search Queries	IPrivacy
QoS Metrics Monitoring	Provides a Service Discovery Engine at Runtime	Manage User Accounts, Roles, Groups	Provides a Service Discovery UI	Assistance for the Specification of Search Criteria	Manage Service Descriptions		IEncryption
Produce Accounting and Billing Information of Resource & Service Usage	Enhance Message	Manage Message Metadata	Route Message	Transform Message	Select Endpoint	Validate	IStamping
Self-provisioning	Send Message	Configure Service Mapping					ISignature
Self-configuration							IProcess Security
Self-optimization	Standard IDE Functions (edit, compile)	Legacy Migration Tools	Service Versioning Support	Service Adaptation	Stateful Service Support	Service Policy Support	Monitor Security
Self-healing	Code Analysis (style, metrics, performance)	Testing Tools	Service Testing	Analysis	Transactional Support	Message Pattern Support	ISecurity Monitoring
	Specification to Code Generation	Service Interface Specification	Service Packaging	Management Information	Stop	Management and Monitoring	ISecurity Monitoring Notification
	Code to Specification Generation	QoS Specification	Resume	Update Publishing	Communication Support	Deploy/Undeploy	Collect Data
	MDA Zoos	Policy Specification	Update Version	Execute Service Component Instance	Manage computational Resources	Management specification	Analytics
	Legacy Wrapping Tools						IAuthorization
	Provision Virtual Resource Set	Add Resource to Resource Set	Suspend Resource Set	Delete Resource Set	Monitor Resources		IPolicy, Translation
	Reserve Capacity	Release Reserved Capacity	Remove Resource from Resource Set	Resume Resource Set	Pay per Use		

03/12/2009

NESSI Strategic Projects



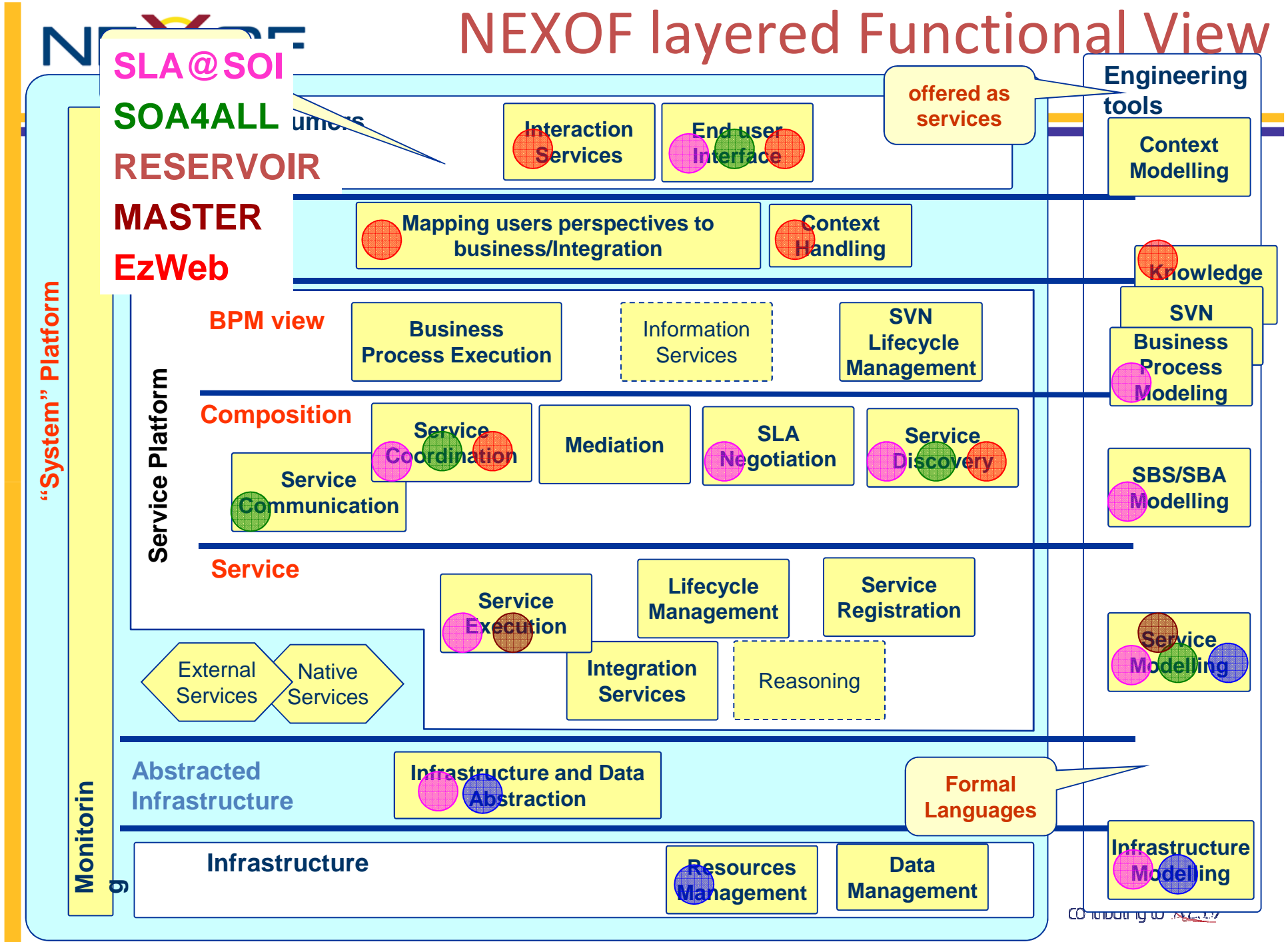
Invitations to contribute



NESSI Compliant Projects



NEXOF layered Functional View



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- Cloud normalization & standardization
 - (Migration,) Interoperability, Portability and Openness in the cloud (a step forward for cloud computing) to provide solutions for the challenges:
 - **Interoperability between different cloud vendor platforms** and on-premise platforms (Client / Service Consumer does not want to care where the service is hosted)
 - **portability** (Service provider does not want to update the business logic every time he changes the service runtime (e.g. a cloud service runtime))
 - **Services to use all the features** (e.g. storage, DB) provided by the cloud without having to worry about vendor lock-in
 - providing open protocols that enable participation, i.e. extending well-established open royalty-free protocols (such as XMPP in terms of message delivery, Open Social in terms of social networks)
 - Flexible service deployment using cloud providers
 - Allow use of hybrid and/or multiple clouds for the deployment of a service
 - QoS (service availability, bandwidth-related access quality)

- ❑ “Security” in the Cloud
 - ❑ T”S”PR -Security in the cloud: (on the fly) access control in the cloud (from user-centric to (application) behavior centric (behavior tracking, (adaptive) profiling, mining, ..., under the constraints of privacy protection
 - ❑ behavior-based Security policy
 - ❑ Data confidentiality (how confidentiality requirement of each piece of data in the service could be supported by a cloud provider? e.g. do they have the proper DB structure required by the service?)
 - ❑ Compliance in the Cloud (Business and/or Regulatory)
 - ❑ Enhanced control in a cloud (e.g. resources (data, physical machines, ...) – “need to know”
 - ❑ Self-managing and self-healing clouds (high availability, fault tolerance, ...)

- ❑ Cloud adoption and usage
 - ❑ Service Market place applied to the Cloud
 - ❑ Plug and Cloud everything
 - ❑ Virtualization and management beyond computation; e.g. storage and networks
 - ❑ Virtual Sandboxing (vs. Virtual Machine)

- **NEXOF-RA** aims at **standardise** the way services are built, offered and consumed. There is the need for a Reference Service Architecture
- The **Reference Architecture** should be defined in order to allow any business domain, size and technologies
- Implementing a **Reference Architecture** is not a single shot
- Implementing a **Reference Architecture** requires a large community with contributions from many sources.

www.nexof-ra.eu