SLA@SOI – An Overview
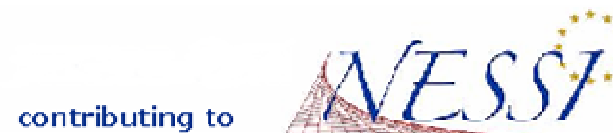
Empowering the Service Economy with SLA-aware Infrastructures

SASO-Biz workshop October 21, 2008
Joe Butler
Intel

contributing to

SLA@SOI Fact sheet

13 Partners

- 7 countries: Austria, Germany, Ireland, Italy, Slovenia, Spain, United Kingdom
- 6 industrial, 1 SME, 4 academic, 2 research centres

Duration

- June 2008 – May 2011

Budget

- 15.2 M€

Info

- http://www.sla-at-soi.eu

Motivation & Goals

Expected Results

(Industrial) Use Cases

Collaboration Spaces

contributing to

Vision

- A business-ready service-oriented infrastructure empowering the service economy in a flexible and dependable way.

Business-readiness requires

- predictability & dependability ➜ prerequisite for acceptance & uptake of (new) services
- holistic SLA management ➜ transparent IT management
- automated negotiation ➜ dynamic, scalable service consumption

Impact on the knowledge economy

- decreased time to market for new services
- increased productivity and competitiveness
- lower entry barriers, especially for SMEs

Technical Motivation

Service Consumer
- dynamic demand for complex business solutions at low costs

Flexible usage Business Services

Software Provider
- SOAs provide un-precedented flexibility

Engineering of predictable services

Service Provider
- service economy requires dependable services

Automated SLA negotiation and management

Infrastructure Provider
- virtualization technologies allow for adaptive SOIs

SLA enforcement via adaptive infrastructures

Vision of SLA@SOI

A business-ready service-oriented infrastructure empowering the service economy in a flexible and dependable way

contributing to NESSI

Research Topic Areas

SLA@SOI

Business Management (provider – consumer)
- specification & negotiation
- business & legal assessment
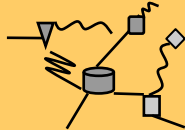- arbitration & penalty management

Predictable systems engineering

- engineering
- modelling
- analysis

Service-enabled Business Logic

- for complex layered architectures
- for different application types

Applications / Processes
Business logic
Middleware

Service/SW management (provider)

- landscape modelling
- discovery
- monitoring
- steering
- provisioning

SLA foundations

- negotiation
- brokering
- translation
- planning
- monitoring
- adjustment

Infrastructure Management
- harmonized virtualization technologies
- adaptive, SLA-aware management
- monitoring support

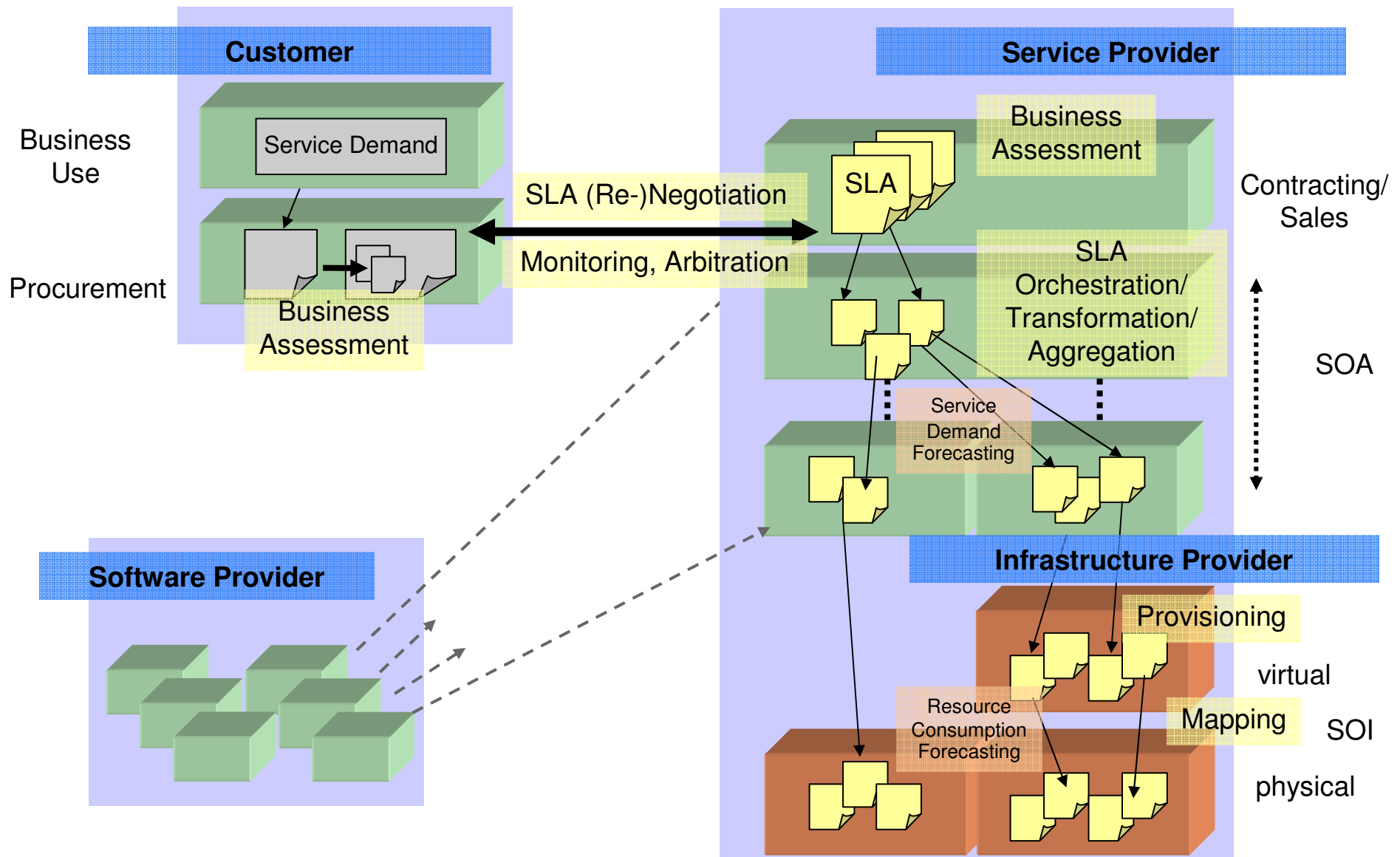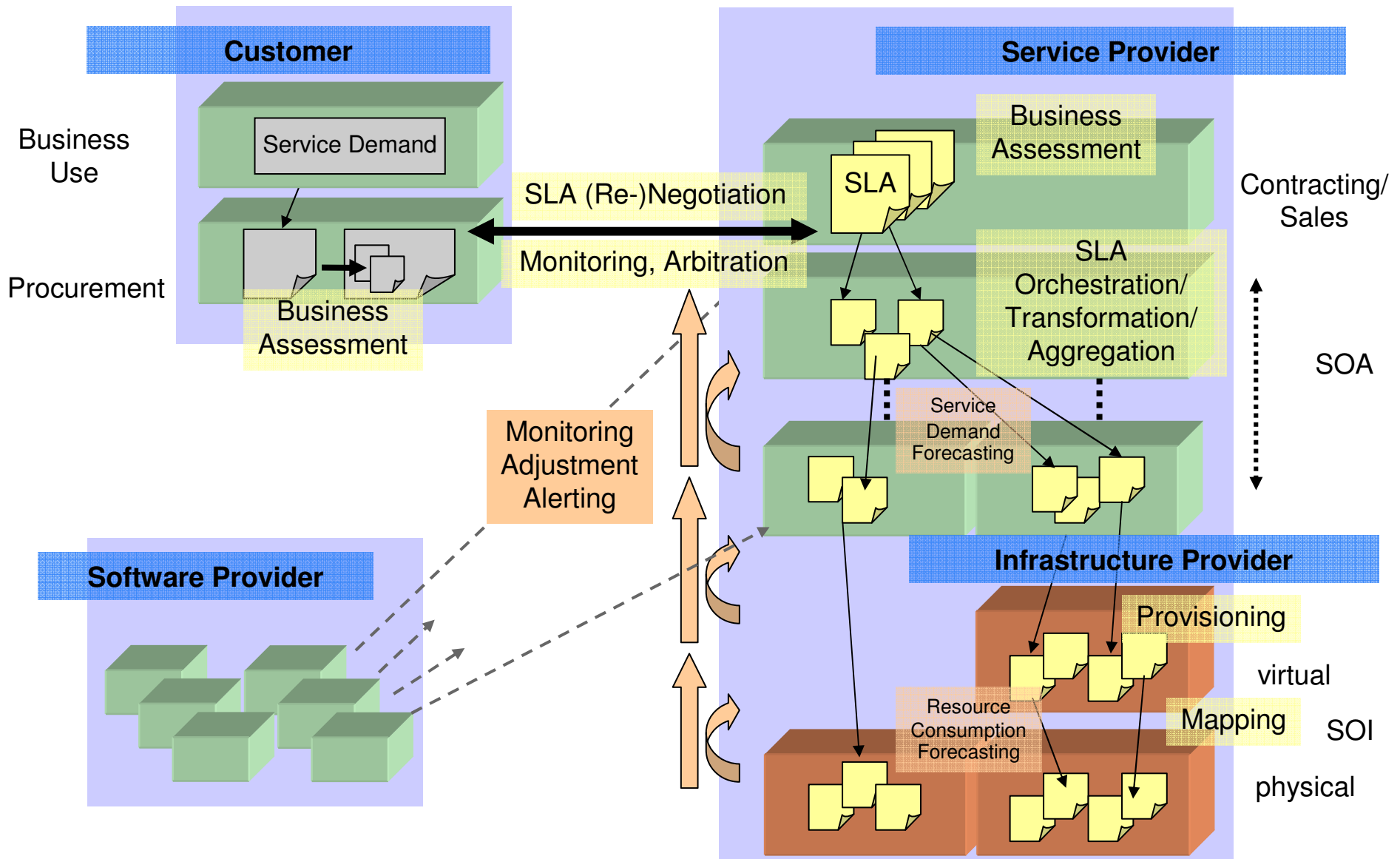# Envisioned Interaction

Envisioned Interaction
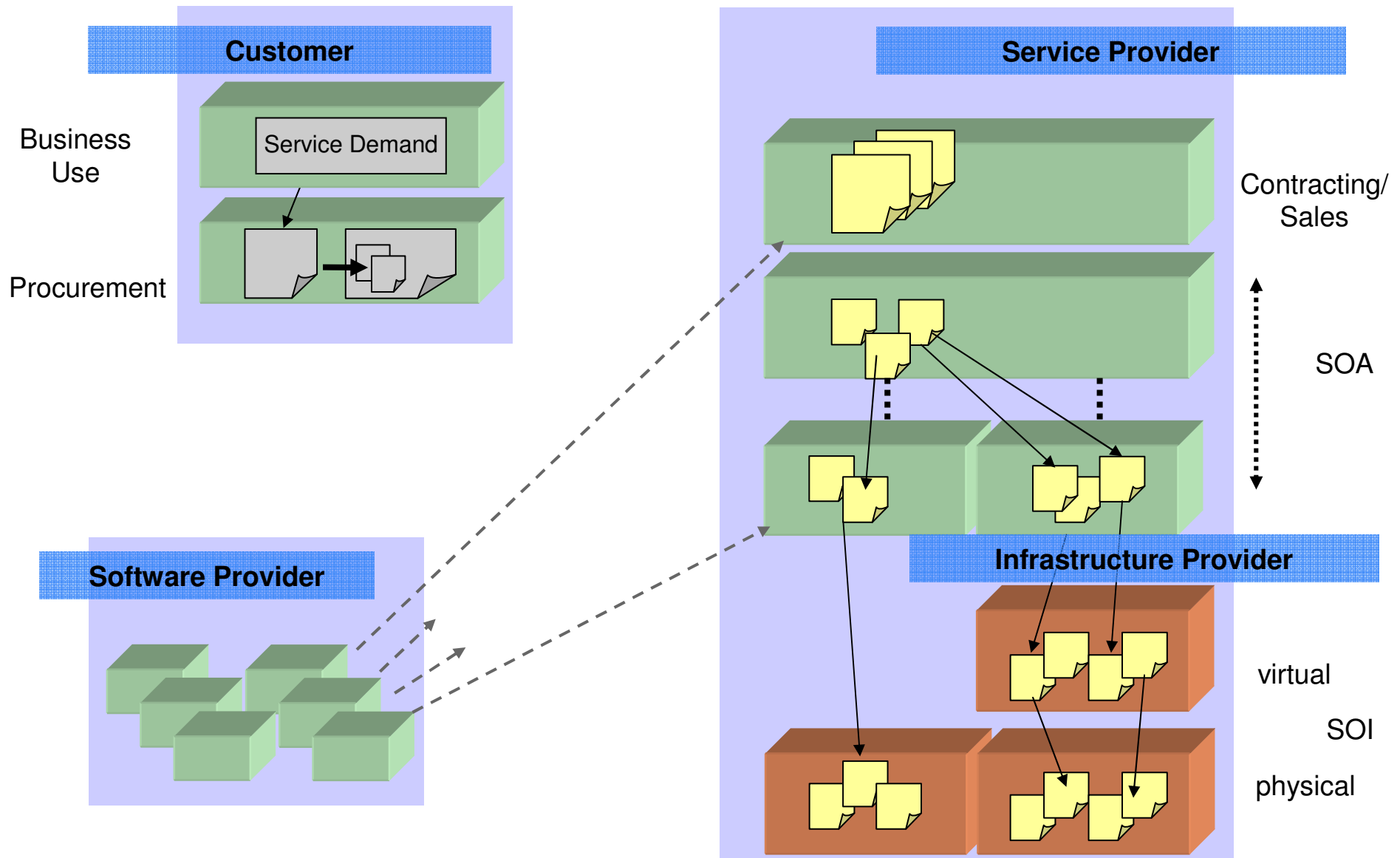
Envisioned Interaction

Project innovation

Main innovations

- **SLA management framework**
  - harmonizing perspectives of relevant stakeholders (software/service/infrastructure provider and customer)
  - standards for SLA specification and negotiation & systematic multi-layer SLA management (planning, optimization, and provisioning), monitoring and accounting
  - ➢ guaranteed QoS in a dynamic and end-to-end fashion via consistent SLA handling across IT stack

- **adaptive SLA-aware infrastructures**
  - standardized interfaces for adaptive infrastructures with harmonized access to different virtualization technologies.
  - advanced technologies for SLA enforcement on infrastructure level
  - ➢ efficient resource usage w/ reliable SLA enforcement at infrastructure level

- **engineering methods for predictable service-oriented systems**
  - modelling techniques and prediction tools for SOA and SOI components

- **business management suite for e-contracting**
  - covers complete business lifecycle of a service provisioning/delivery

Motivation & Goals

Expected Results

(Industrial) Use Cases

Collaboration Spaces

Main project results

Open Source

SLA
Core Architecture

Reference
Implementation

NESSI
Open Framework

Standardization

Reference demonstrator

ERP Hosting	Enterprise IT	Serv. Aggreg.	eGoverment	Financial Grids
➢ ERP as a service ➢ business value chains	➢ dynamic comprehension of service stack provisioning and business value	➢ user segmenta-tion and predictive analysis ➢ public SLAs	➢ agreements driven by social aspects (not market logics)	➢ innovative financial products ➢ spatial-aware SLAs

➔ **Industrial Evaluation Report: "How to run an SLA-driven business"**

Information Society
Technologies

SEVENTH FRAMEWORK
PROGRAMME

contributing to

NESSI

Scientific results (from action line A)

- at least 95% of research results are public

- SLA management framework (report + prototype)

    - including all results from action line A (architecture, SLA foundation, business/ service/infrastructure mgmt., predictable systems engineering)

    - contains architecture, methodologies, meta-models, tools, services, protocols, interfaces, integrated technical framework

➤ allows scientific community to precisely see scientific approach, developed solutions and technical evaluation results

➤ allows industrial community (software/ service/ infrastructure providers and service customers) to leverage prototype components

➤ basis for standardization activities

➤ designed for integration with NESSI open framework

Impact-related results (from action line B)

- Reference demonstrator (report, prototype)
  - demo scenario available as open source
  - allows scientific community to compare results and to do subsequent research (replay and modification of SLA-experiments)
  - allows industrial stakeholders to get hands-on experience
- Industrial use cases
  - will be made largely public
  - allows industrial stakeholders to get detailed insight
- Scientific/Technical Evaluation Report
  - precise description and assessment of scientific/technical results
  - community (IT managers & researchers) is able to understand the technical conditions under which the SLA framework can be used and receive guidance for implementing SLA projects
- Industrial Evaluation Report
  - precise description and assessment on the applicability of project results to different industrial setups (based on use cases and external requirements)
  - includes description & evaluation results from industrial use cases
  - CIOs can assess applicability of results for their organization

Major contributions to NEXOF, i.e.

- the **NESSI reference model** and the **NESSI architecture**

- a complete SLA management infrastructure for service-oriented utility infrastructure. This includes in particular:

  - an **e-contracting platform** between service consumers and providers

  - a **framework for mapping, planning and coordination** within multiple levels in an organizational/IT structure

  - **access and provisioning layer** for SLA-aware infrastructure

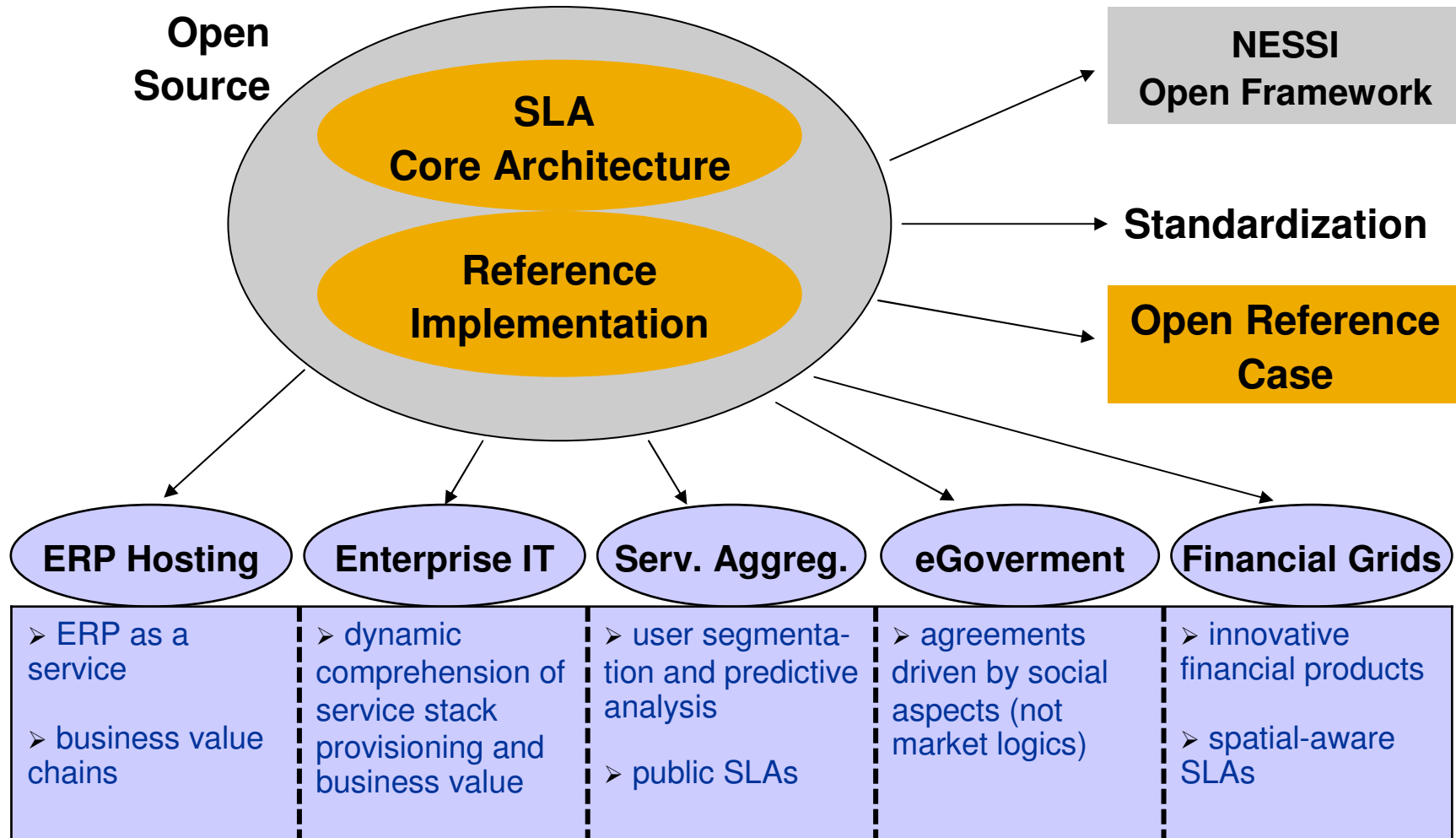|	
Service Consumers	The project will provide standardized models, protocols and methods for SLA contracting procedures between service providers and consumers
BPM view	Methods and tooling for analysis of business processes and service user behavior (independently from the functional service aspects)
Composition	Standardized models, methodologies and frameworks for holistic SLA management
Services	Standardized models, methodologies and frameworks for holistic SLA management
Infrastructure	Standardized interfaces for a service-oriented infrastructure including implementations of selected components

contributing to

Motivation & Goals

Expected Results

(Industrial) Use Cases

Collaboration Spaces

contributing to

A use-case driven project

Open Source

SLA Core Architecture

Reference Implementation

NESSI Open Framework

Standardization

Open Reference Case

ERP Hosting	Enterprise IT	Serv. Aggreg.	eGoverment	Financial Grids
➤ ERP as a service ➤ business value chains	➤ dynamic comprehension of service stack provisioning and business value	➤ user segmentation and predictive analysis ➤ public SLAs	➤ agreements driven by social aspects (not market logics)	➤ innovative financial products ➤ spatial-aware SLAs

➔ Industrial Evaluation Report: "How to run an SLA-driven business"

Information Society Technologies

SEVENTH FRAMEWORK PROGRAMME

contributing to NESSI
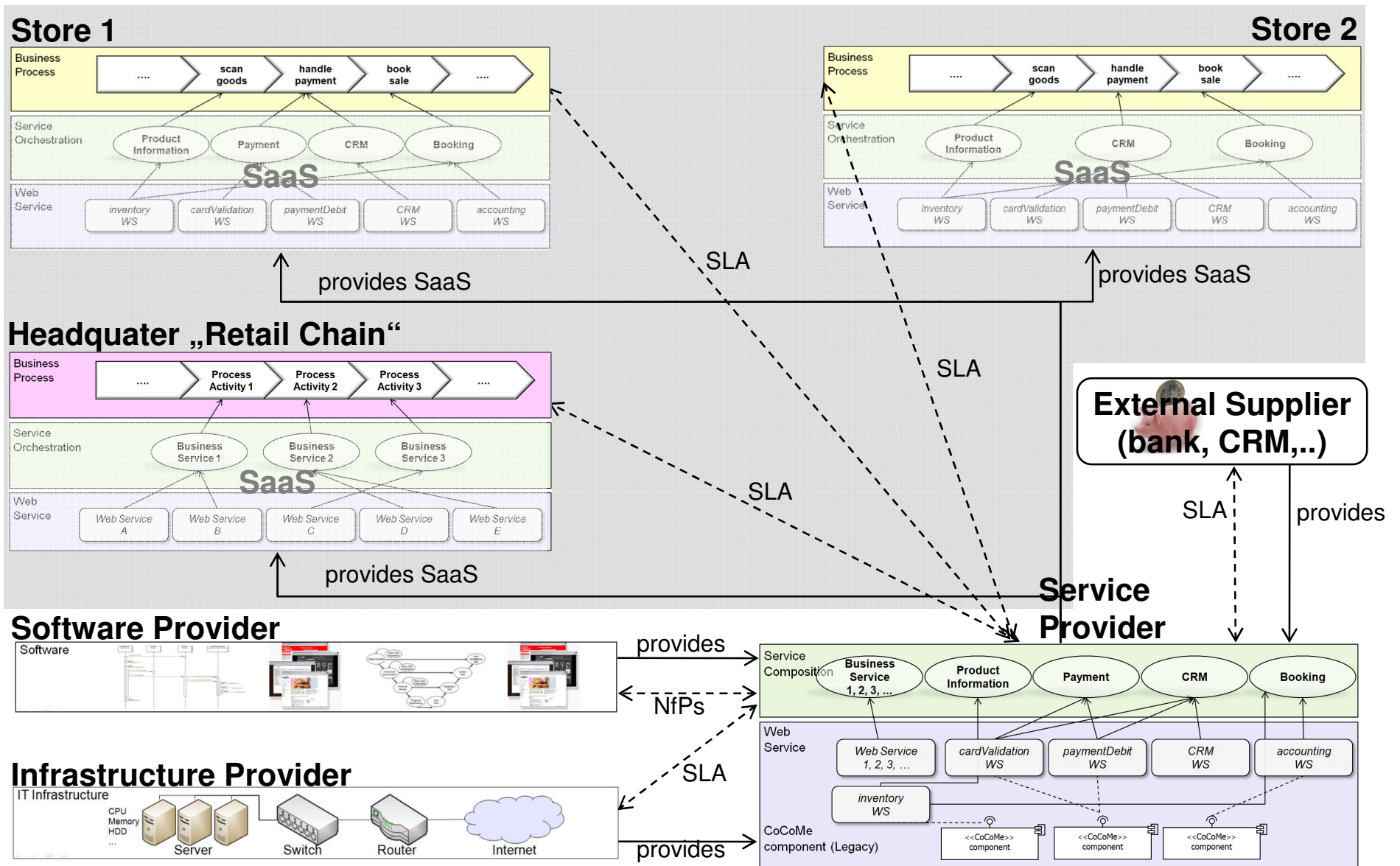
Open Reference Case

Idea

- a reference demo application (as open source)

- a reference SLA management demo scenario (as open source)

➢ allows scientific community to compare results and to do subsequent research (replay and modification of SLA-experiments)

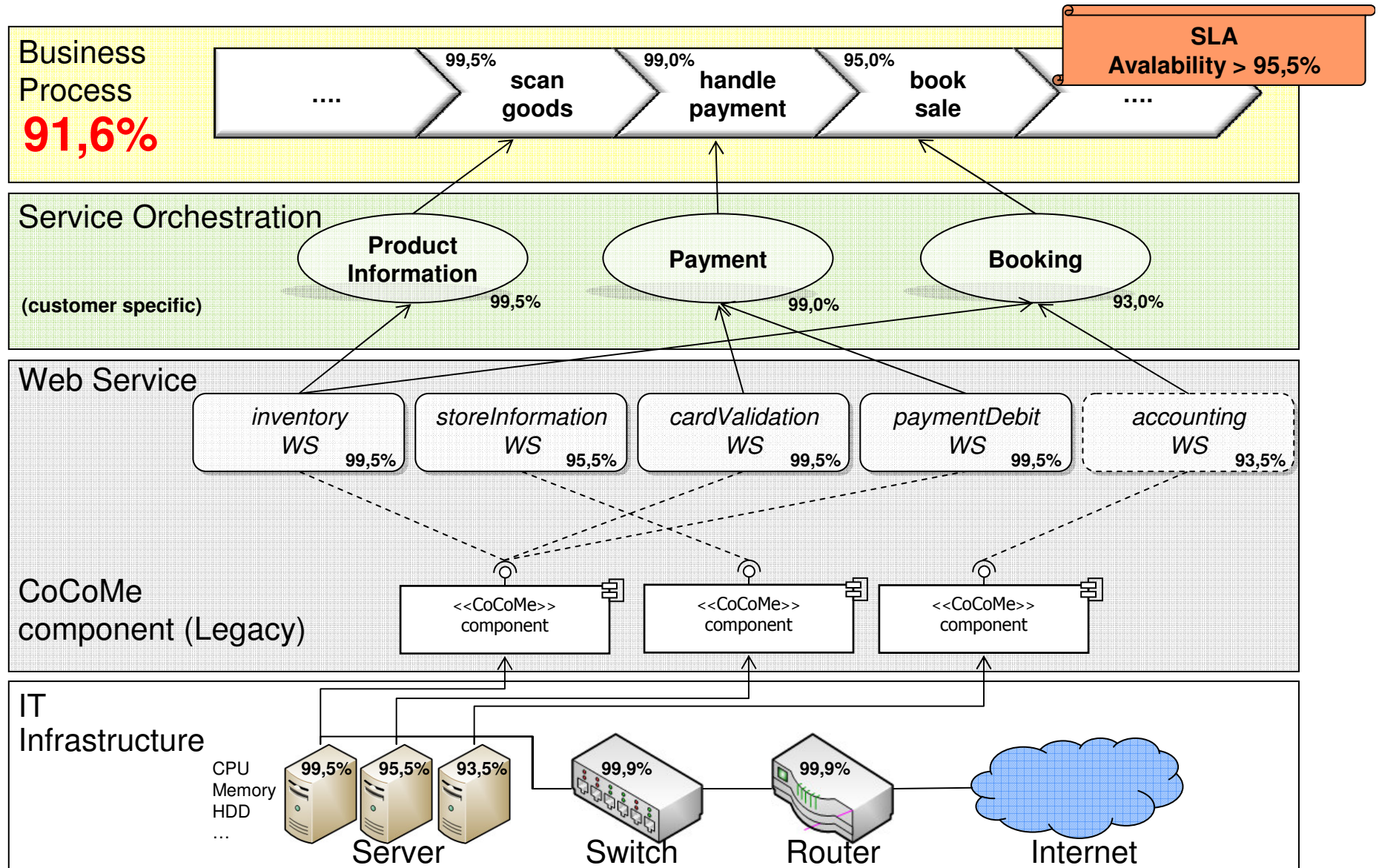➢ allows industrial stakeholders to get hands-on experience

Features of the ORC

- an existing Java-based application

- precise specification & modelling available

- addresses management of retail chains (w/ core enterprise and several stores)

- different service selection and deployment options

contributing to

Open Reference Case – Scenario

Open Reference Case – Scenario

SLA@SOI

Business Process

91,6%

99,5%	99,0%	95,0%

.... → scan goods → handle payment → book sale → ....

SLA Avalability > 95,5%

Service Orchestration

(customer specific)

- Product Information   99,5%
- Payment   99,0%
- Booking   93,0%

Web Service

inventory WS 99,5%	*storeInformation WS* 95,5%	*cardValidation WS* 99,5%	*paymentDebit WS* 99,5%	*accounting WS* 93,5%

CoCoMe component (Legacy)

<<CoCoMe>> component	<<CoCoMe>> component	<<CoCoMe>> component

IT Infrastructure

CPU Memory HDD ...

99,5% 95,5% 93,5%   99,9%   99,9%

Server   Switch   Router   Internet

Information Society Technologies

SEVENTH FRAMEWORK PROGRAMME

contributing to NESSI

Industrial Use Case: ERP Hosting

Partner & roles
- SAP: software & service provider
- Intel: infrastructure provider

Business context
- business applications (ERP, SCM, CRM, …)
- hosted in a Software-as-a-Service model

Technical service/SLA features
- Service types: A2A/B2B Web Services, UI services, business processes
- SLAs on performance, availability & security

Challenges
- complexity in terms of number of services, components, configurations & usage variants
- process flow partly implemented in a constraint model (no explicit flow information)
- underspecified environment: various parameters unknown at design time

contributing to

Partner & roles

- Intel: lead, use cases and infrastructure provider
- XLAB: specification, design & implementation contributions
- SAP: ERP process knowledge, monitoring capabilities
- UDO: design & implementation contributions

Business context

- SLA-aware dynamic provisioning of Enterprise IT Suite
- Supporting continuously evolving role and priorities of Enterprise IT
- CMF, ECF, Scalability + TCO

Technical service/SLA features

- Demonstrate tuned adaptation to provision competing demands appropriately
- SLAs potentially describing relative priority, response times & temporal variation
- Realistic infrastructure, services & workload simulation

Challenges

- Efficiently reconciling and dynamically provisioning a technology capability or investment relative to a specified process with business level metrics

Partner & roles

- eTel (lead)
- TID, FBK, Intel (contributors)

- Logistical Fulfillment
  - For a product's technical fulfillment various SLAs have to be fulfilled in aggregate across the heterogeneous technical landscape
- Tripleplay (or Quadplay) services (implemented)
  - (quadplay exists but not sold as such)
    - Television
    - Phone
    - IP
    - Add on services
  - SLA for services
    - multiple instances
      - DSL (8Mbits for 1 setup box)
- Carrier routing
  - VOIP/trunking arbitrage of minutes between carriers
    - spot markets created for

contributing to

Industrial Use Case: E-Government

Partner & roles
- ENG: WP Lead., Design & Implementation Lead.
- FBK: Requirement Specification Lead, Design & Implementation Contr.
- GPI: Evaluation Lead., Platform Provider, Design & Implementation Contr.
- CITY, INTEL: requirement specification

Business context
- Social and Health assistance to elderly people: home meal delivering
- Government (Governance, Social Care Body), Citizens, Health Care Structures
- Integrated management of Citizen needs, Structures activities, Governance of costs, quality and performances.

Technical service/SLA features
- G2G: SLAs on key performance indexes, norms, regulations, accounting
- G2C: SLAs on quality, privacy issues
- G2B: quality, security, accounting
- SOA platform provided by GPI in compliance to SPCoop (Italian standard for G2G).

Challenges
- Human Based Services (e.g. meal delivery) and integration with automatic services and monitoring.
- No one big centralized workflow, but related/synchronized processes.
- Relationships between G2G, G2C and G2B SLAs (related to different processes) and automatic derivation.
- Probably each SLA will contain both business and technical constraints.
- The Service Provider selection is possibly operated by a Request for BID (the consumer provides a SLA Template that the provider must instantiate and agree to).

Industrial Use Case : Financial Grid

Partner & roles
- BeSC: Grid and Computational Finance provider
- XLAB: Implementation
- Intel: infrastructure provider

Business context
- Financial applications (Risk Management, Implied Volatility, Back testing)
- Competitive and volatile sector with demand for Risk analysis on ever larger data sets increasing by order of magnitude
- Solutions to be deployed as a highly available and scalable online services

Technical service/SLA features
- Service types: B2B Web Services, UI services, Infrastructure Services
- Online services – dynamic composition and deployment of spatially aware services
- SLAs on availability, location, compliance, system architecture, networking capability
- Vendor and architecture neutral services

Challenges
- complexity in terms of dynamic service composition, auto deployment and un-deployment
- Service Discovery and selection based on
  - location, networking bandwidth and non functional metadata e.g. legal and jurisdiction issues
- Service Assurance in such a complex and dynamic environment
- Highly regulated and compliance aware sector (MiFID - EU FSA, CRD, SarbOx, Basel2)

Motivation & Goals

Expected Results

(Industrial) Use Cases

Collaboration Spaces

contributing to

Collaboration spaces

NEXOF-RA
- early input delivered to RFP roadmap

SSAI Concertation WG on "SLAs and QoS"
- co-lead by SLA@SOI (Tariq Ellahi)

SSAI Concertation WG on "Standardization"
- co-lead by SLA@SOI (Philip Wieder)

SSAI Concertation WG on "Virtualization"
- participation since Sept 08 (Joe Butler)

Future Internet
- participation in "Management & Governance"

contributing to

Thank you!