SLA@SOI - Committed to Innovation

A complete framework for SLA management supporting the European Service Economy

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Innovation

SLA@SOI is the only project to create a comprehensive and holistic SLA management framework

• Supporting the full service stack
• From SLA-aware cloud infrastructure and service management
• Integrated business support
• Considering the whole service lifecycle from engineering to delivery

Delivering:
• An open-source framework
• Generic models and reference solutions
• Contributing to and supporting open standards
Innovation in Architecture

Service Provider’s Technical Perspective:

• **SLA management framework**
  ◦ Harmonizing perspectives of relevant stakeholders,
  ◦ 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

▶ Common semantics through harmonized foundation models
  ▶ SLA, Software, Service, Infrastructure
▶ Generic core elements
  ▶ Generic SLA Manager with abstract planning & provisioning module
  ▶ Generic Interfaces
▶ Domain-specific extensions
  ▶ Business, Software, Infrastructure, Clouds
Innovation in Core Technologies

Service Provider’s Technical Perspective:
Integrators can re-use and adapt from a set of core functions

- Unified SLA model
  - Foundation for SLA templates
- Common SLA and template registries
  - Semantic matching of templates
  - Template advertisements
- Support for SLA Translations
  - Syntax conversion, Term translation
- Foundations for SLA Negotiation
  - Protocol Engine
  - Interoperability supporting e.g. WS-Agreement and internal models (SLA model Java classes)
- Planning and optimization strategies for hierarchical SLAs
  - Combinatorial optimization algorithms developed for subcontracting
  - Infrastructure SLA planning and management
Service Provider’s Business Perspective:

- **Offering a Management suite for e-contracting**
  - Covers complete business lifecycle of a service provisioning/delivery.

- Business Terms identified from internal and external use cases
  - Common guarantee and service terms
- Offering an integrated business web tool to drive
  - Create products with business information: including promotions, policies, etc.
- Supporting product lifecycle management
  - E.g. product states
Infrastructure Provider’s Perspective

- **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.

- Demonstrating the SLA-enabling of arbitrary Infrastructure Providers
  - Supporting common virtualized infrastructure access in Clouds
  - Harmonizing interfaces to access heterogeneous infrastructure resources
    - Contributing and supporting OCCI – Open Cloud Computing Interface
  - Multi-layered, self-provisioned distributed infrastructure monitoring
    - Offering a generic monitoring infrastructure for different subsystems
Developer’s Perspective:

- **Engineering methods for predictable service-oriented systems**
  - Modeling techniques and prediction tools for SOA and SOI components

- **Software Performance and Reliability Prediction**
  - QoS Meta Model for software services
  - Service performance evaluation

- **Predictive capabilities for infrastructure provisioning services**
  - Resource Usage Prediction

- **Run-time SLA Violation Prediction**
  - Prediction integrated in monitoring architecture
  - Focus on aggregate SLA terms

- **Manageability Modeling and Design**
  - Meta-models for KPIs and adjustments
  - Tool support
Fully integrated and Open-Source!

Standard interfaces and protocols
- Support existing standards
- Propose and collaborate for new standards

Common integration approach
- Guidelines for adoption by developers
- Adoption of industry standard OSGi
  - allows flexible integration, configuration, and extension in different environments
- Code base with almost 90,000 Java lines of source code
- Complete documentation: 25,000 JavaDocs lines, 15,000 lines more of Java comments
- First open source distribution released 09/2010

► Providing all necessary foundations for transforming business by SLA-based services
  - Protocols, Algorithms, Implementations, Best Practice
Outreach and Scientific Impact

Content
• Web Site
• Technical Blog Posts
• Use case animations
• Technical Papers: 4
  ◦ Challenges in SLA Translation
  ◦ Dynamic setup of Monitoring Infrastructures for SLA Mgmt
  ◦ Using Cloud Standards for Interoperability of Cloud Frameworks
  ◦ Reference Architecture fir multi-level SLA Management

Events
• (co-)Organised 14 events including
  ◦ OGF24, OGF25, OGF26, OGF28, OGF30
  ◦ FESCA 2010
  ◦ NFPSLAM-SCO’09
  ◦ SLAs in Grids Workshop @ GRID 2009
  ◦ ICSOC Workshop 2009
• Presented 18 additional events
  ◦ SSAIE Summer School 2009, 2010
  ◦ Future Internet Assembly Madrid, Prague, Stockholm

Papers
• Published: 30
• Accepted awaiting: 21
• Submitted and under review: 11
• Includes
  ◦ QoSA 2010 (x2)
  ◦ CAiSE 2009
  ◦ ICE-B 2010
  ◦ ARES’09
  ◦ INGRID 09, INGRID 2010
  ◦ ICIW 2010
  ◦ ACM SAC 2010
  ◦ NFPSLAM 09 (x2)
  ◦ MASCOTS 2009
  ◦ CoreGrid 09
  ◦ Performance Eval Journal
  ◦ CloudComp 09
  ◦ QUASOSS
  ◦ ICSOC/ServiceWave 2009
  ◦ DEB 2009
  ◦ IEEE ICWS
Interested? What’s next?

Focus on some key innovations in more detail:

**The SLA@SOI SLA model**
- Keven Kearney, Engineering Ingegneria Informatica

**SLA Negotiation**
- Edwin Yaqub, TU Dortmund University

**SLA Monitoring**
- George Spanoudakis, City University London
Thank you!