



PESOS 2012 SUMMARY

4th International Workshop on Principles for Engineering Service-Oriented Systems

Organizers

Patricia Lago (VU University Amsterdam, Netherlands) Grace A. Lewis (CMU Software Engineering Institute, USA) Andreas Metzger (PALUNO, University of Duisburg-Essen, Germany) Vladimir Tosic (NICTA, Australia)

ICSE 2012 Zurich, Switzerland June 4, 2012

Agenda 1



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Agenda 2

14:00 – 15:30	 Session 3 — The Quest for Case Studies Spicy Stonehenge: Proposing a SOA Case Study Open SOALab: Case Study Artifacts for SOA Research and Education Constraint-Based Invocation of Stateful Web Services: The Beep Store Cloud in a Cloud for Cloud A Car Logistics Scenario for Context-Aware Adaptive Service-Based Systems A Monitoring Data Set for Evaluating QoS-Aware Service-Based Systems Providing Lightweight and Adaptable Service Technology for Information and Communication (PLASTIC) in the Mobile eHealth Case Study
15:30 – 16:00	Coffee Break

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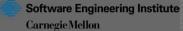
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Agenda 3

16:00 – 17:15	 Session 4 — Governance and Monitoring of Service-Oriented Systems SALMonADA: A Platform for Monitoring and Explaining Violations of WS-Agreement-Compliant Documents PRadapt: A Framework for Dynamic Monitoring of Adaptable Service- Based Systems Exploring the Impact of Inaccuracy and Imprecision of QoS Assumptions on Proactive Constraint-Based QoS Prediction for Service Orchestrations Managing Multiple Applications in a Service Platform
17:15 – 17:30	Closing Remarks





Keynote: An Internet of Services – Visions 1 2012 Carl Worms (Credit Suisse AG, Switzerland)

- Main SOA Ingredients @ Credit Suisse
 - Decomposition into coarse-grained components services expose a business view — not coupled to database design
 - Credit Suisse eXchange Bus (CSXB)
 - Mandatory to use enterprise information bus for integration
 - Central Service Repository (Interface Management System — IFMS)
 - 1,100 services available

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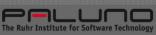
- Service catalog, design tool, governance enforcer, lifecycle management, code generator
- SOA Governance
 - Quality assurance process enforces policies IFMS policies are just a subset

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Keynote: An Internet of Services – Visions 2

• Future of IT at Credit Suisse

- 5 years
 - Mastering of technical debt complete analysis of the cost of rework understand the cost of immature development processes
 - Industrialization of solution delivery: flexibility of development procedures; tools for development, test efficiency and quality assurance
 - New types of business requirements: security and risk tolerance in global distributed environments, business intelligence for big data and analytics
- 10 years The Cloud
 - Fully-automated data centers with completely standardized HW components
 - Strict quality criteria for software: limited size and complexity; welldefined runtime features; 100% tested and error-free; standardized interfaces; decoupled architecture on all classical layers (UI, business logic, data)
 - Software will be generated from sophisticated models to be independent from cloud providers



Keynote: An Internet of Services – Visions ₃

Next steps for Internet of Services

Globalization of SOA

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- Migration of 2'600 CORBA service operations to web services
- Consolidation of data flows between front and back offices
- Adoption (and improvement) of financial industry standards, e.g., SWIFT

 Global management of the ever-growing software portfolio

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Paper: Dependability-Driven Runtime Management of Service Oriented Architectures Johann Bourcier (IRISA – University of Rennes, France)

- Context is home automation for the elderly high adaptability and dependability requirements
- Research problem: how to maintain service dependability in an evolving and non trustable world
- Dependability means that every service meeting its QoS
- Work presents an autonomic approach based on dependability objectives — rule-based system determines triggers for system reconfiguration based on dependability values produced by a system monitoring component
- Service dependability is determined using a voting-based approach — aggregation algorithm for consumer evaluations/votes (between 0 and 1) for each QoS parameter

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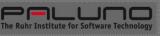
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Paper: Simulating Awareness in Global Software Engineering: A Comparative Analysis of Scrum and Agile Service Networks Héctor Fernández (INRIA Rennes, France)

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- Agile service networks are networks of service-oriented applications (nodes) that collaborate on a common task (edges)
- Research question: Can ASNs help maintain awareness in GSE (lack of awareness is a problem in Scrum)
- Research compared awareness "propagation" for Scrum and ASN — built two prototypes
 - For ASN, awareness was implemented using a coordination model in which coordination information is associated with each node (valuable data exchanges)
 - For Scrum it was done via scrum masters in a hierarchical structure
 - Measured time it took to propagate bug information
- Results show that ASNs are much more effective



Paper: Non-Functional Analysis of Service Choreographies Cesare Bartolini (ISTI-CNR, Italy)

- Q4BPNM is used to express non-functional properties in choreographies in BPMN specifications — performance, security and dependability
 - Properties are extracted from SLAs
 - Model transformation from KlaperSuite to models that can be analyzed using Markov chains, queuing theory, etc,
- Questions can be asked against these BPMN specifications
- Future work
 - Derive implicit constraints from explicit ones
 - Visual improvements single view of specification and properties
 - Integrate KlaperSuite into a BPMN-compliant tool
 - Map choreography annotations to individual tasks
 - Identify liability for contractual breaches
 - Adaptive analysis





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Paper: Local Model Learning for Asynchronous Services

Casandra Holotescu (Politehnica University of Timisoara, Romania)

- It is the service of the service
- Most active learning techniques use the L* algorithm works well for synchronous but not asynchronous communication because on non-determinism
 - If ended prematurely, L* might not return safe approximate models
- Goal is to build a property-enforcing adapter property expressed as a FSM
- BASYL: Black-box asynchronous learning

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- Runtime behavior exploration is done against properties
- Studies show that BASYL can obtain models precise enough for controller synthesis, although some execution scenarios might be missing

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Case Study: Spicy Stonehenge: Proposing a SOA 2012 Case Study Tiago Espinha (TU Delft, Netherlands)

- SOA research lacks standard tools to compare and validate research results
- Spicy Stonehenge is based on Apache Stonehenge and implements a simulation of a stock market
- Built on top of Turmeric SOA (open-source, used by eBay) — leverages its monitoring features

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Source and instructions: http://git.io/stonehenge

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Case Study: Open SOALab: Case Study Artifacts for SOA Research and Education Thomas Reichherzer (University of West Florida, USA) PESOS 2012

- Interested in providing a tested for SOA research as well as teaching resources for SOArelated courses
- Students and faculty build and add new SOA components to the Open SOALab repository. They can then be used in class projects and/or research activities
- Systems: currency exchange (PHP and SOAP), hotel reservation (invokes currency exchange), web auto parts (BPEL, Java, Amazon cloud services)

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Case Study: Constraint-Based Invocation of Stateful Web Services: The Beep Store Sylvain Hallé (Université du Québec à Chicoutimi, Canada) PESOS 2012

- Tutorial application for CD store (shopping cart + payment)
- Built to analyze correctness properties of client-service interactions (e.g., data type constraints, message sequence constraints (temporal and data), data-aware sequential constraints
- Applications: runtime monitoring, model checking, trace validation
- Service is a single stand-alone PHP file where each contract violation is clearly marked

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Case Study: Cloud in a Cloud for Cloud Education ²⁰¹² Nobukazu Yoshioka (National Institute of Informatics, Japan)

- edubase Cloud cloud infrastructure built by GRACE (Center for Global Research in Advanced Software Science and Engineering) for academia
- Includes a client monitoring console (similar to the one provided by Amazon EC2)
- Used in in a cloud course since this year in which students build their own cloud on top of edubase

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Case Study: A Car Logistics Scenario for Context-Aware Adaptive Service-Based Systems Annapaola Marconi (FBK-IRST, Italy)

- Context is management and operation of a car delivery process from the port to the dealer
- Created a modeling framework for contextaware business processes and services

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- <u>http://www.astroproject.org/downloads/artifacts.</u>
 <u>zip</u>
- Tested for runtime context-aware composition of services and automatic adaptation of contextaware business processes

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A Monitoring Data Set for Evaluating QoS-Aware Service-Based Systems Philipp Leitner (Vienna University of Technology, Austria

- Case study from the manufacturing domain
- Instrumented end-to-end business processes with steps implemented as services: QoS data, process-specific data and low-level instance data
- Microsoft .NET on top of VRESCo

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 Repository artifacts include a data set with monitoring results (~10000 executions) that can be used for comparing algorithms for predciting SLOs, find factors that influence SLOs, m ine the impact of different adaptations are applied to the process

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Case Study: Providing Lightweight and Adaptable Service PESOS Technology for Information and Communication (PLASTIC) 2012 in the Mobile eHealth Luca Berardinelli (University of L'Aquila, Italy)

PLASTIC: <u>www.ist-plastic.org</u>

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- Define context as PDA device context (e.g., high/low power) and network context (e.g., bandwidth)
- Use of combination of tools for MDE challenge is that tools do not integrate well

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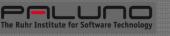
Models and transformations are in the repository

Paper: SALMonADA: A Platform for Monitoring and Explaining Violations of WS-Agreement-Compliant Documents

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Carlos Müller (Universidad de Sevilla, Spain)

- QoS specification using WS-Agreement
 - Had to develop a WS-Agreement-compliant specification language because WS-Agreement provide a standard structure but not a standard language (e.g. no single standard for expressing SLOs) — Monitoring management document
- Monitoring
 - Passive monitoring (obtain QoS of service composition) using SALMon
- Detecting and explaining violations
 - CSPs (constraint satisfaction problems) to express SLAs
 - Extended SALMon to include an analyzer determines if CSPs can be satisfied
 - Violations are explained in natural text if a solution cannot be found
- SALmonADA as a Service: <u>www.isa.us.es/ada.source/SLAnalyzer/</u>



Paper: PRadapt: A Framework for Dynamic Monitoring of Adaptable Service-Based Systems Ricardo Contreras (City University, UK)

- Existing monitoring approaches assume monitoring rules are pre-defined and known in advance (at design time) — not viable in dynamic and adaptive environments
- The main components of the Pradapt framework are a rule adaptor and an execution engine
- Adaptation is based on adaptable pervasive flows (AFPs) — automatically derived at runtime, taking into consideration the current system composition and environment

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Paper: Exploring the Impact of Inaccuracy and PESOS Imprecision of QoS Assumptions on Proactive Constraint-Based QoS Prediction for Service Orchestrations Dragan Ivanovic (Technical University of Madrid (UPM), Spain)

- Constrained-based QoS prediction (based on CSPs) can be used at runtime at any point during system execution
 - Formulate a CSP that models QoS for an orchestration instance at the point of prediction
 - Solve the CSP against the given SLO

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- Problem is that it is not always accurate because it is done at design time
- Paper studies the effect of inaccuracy in SLO predictions
- Study shows that introducing inaccuracy does not significantly worsen indicators in most cases

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Paper: Managing Multiple Applications in a Service Platform

Jacky Estublier (Universit Joseph Fourier, France)

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- In OGSi, composite services are not a platform concept — against information hiding
- Provider visibility should be controlled
- Built a layer on top of OSGi to promote information hiding and service composition

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Key Takeaways: Service Requirements 2012 for the Internet of Services

- Documentation Metadata to enable discovery, selection, monitoring and behavior prediction
- Quality requires more modeling, simulation and testing — translate into more governance
- Adaptability integration with runtime monitoring and management infrastructures

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