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

09:00 – 09:15	Welcome and Introductions
09:15 – 10:30	Session 1 — Keynote: An Internet of Services - Visions *Carl Worms (Credit Suisse AG, Switzerland)*
10:30 – 11:00	Coffee Break
11:00 – 12:30	Session 2 — Agility and Quality in Service-Oriented Systems • Dependability-Driven Runtime Management of Service Oriented Architectures • Simulating Awareness in Global Software Engineering: A Comparative Analysis of Scrum and Agile Service Networks • Non-Functional Analysis of Service Choreographies • Local Model Learning for Asynchronous Services
12:30 – 14:00	Lunch

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

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]

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

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; well-defined 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
  - 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

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

Paper: Simulating Awareness in Global Software Engineering: A Comparative Analysis of Scrum and Agile Service Networks

Héctor Fernández (INRIA Rennes, France)

- 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

Paper: Local Model Learning for Asynchronous Services

Casandra Holotescu (Politehnica University of Timisoara, Romania)

- How to compose systems if we don't have behavioral models for all services?
- 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
  - 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

Case Study: Spicy Stonehenge: Proposing a SOA 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
- Source and instructions: http://git.io/stonehenge

Case Study: Open SOALab: Case Study Artifacts for SOA Research and Education

Thomas Reichherzer (University of West Florida, USA)

- Interested in providing a tested for SOA research as well as teaching resources for SOA-related 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)

Case Study: Constraint-Based Invocation of Stateful Web Services: The Beep Store

Sylvain Hallé (Université du Québec à Chicoutimi, Canada)

- 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

Case Study: Cloud in a Cloud for Cloud Education

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

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

A Monitoring Data Set for Evaluating QoS-Aware Service-Based Systems

Philipp Leitner (Vienna University of Technology, Austria

PESOS 2012

- 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
- 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

Case Study: Providing Lightweight and Adaptable Service Technology for Information and Communication (PLASTIC) in the Mobile eHealth

Luca Berardinelli (University of L'Aquila, Italy)

- PLASTIC: www.ist-plastic.org
- 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
- Models and transformations are in the repository

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

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: www.isa.us.es/ada.source/SLAnalyzer/

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

Paper: Exploring the Impact of Inaccuracy and 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
  - 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

Paper: Managing Multiple Applications in a Service Platform

Jacky Estublier (Universit Joseph Fourier, France)

- 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

Key Takeaways: Service Requirements 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