

# MESOA 2010 Summary

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# SOA Research Agenda

- Presented evolution of the research agenda and the introduction of “Runtime Monitoring of Service-Oriented System Evolution” as a new topic under Maintenance and Evolution
- Attendees were encouraged to work on “leaves” of the research agenda
- Discussion Points
  - What is the relationship between service orientation and cloud?
    - Cloud resources are infrastructure/platforms that have a service layer to access those resources
    - Can you even think about cloud without services?
  - Monitoring should be a cross-cutting concern



# Using Simulation Models to Evolve Business Processes

Marin Litoiu (York University, Canada)

- Propose a feedback evolution loop based on simulation
  - Key is creating a simulation model that matches the real system in order to create trust in results of what-if scenario analyses
  - Business metrics are defined in the Modeling phase at the service and business process level and are then mapped to the simulation model
  - The simulation model is used for what-if scenario analyses of changes in business processes
- Created a tool based on IBM products plus a custom module for estimation, decision-making and integration
- Future work includes validation at a larger scale, runtime optimization, implementation of an optimization algorithm, prediction of future states and KPIs
- Discussion
  - Challenges of using KPIs that are not time-related



# Requirements-Driven Framework for Root Cause Analysis in SOA Environments

Hamzeh Zawawy (University of Waterloo, Canada)

- The goal of RCA is to discover an incident's first or true cause
- The basis of their approach is the use of goal models for RCA in which the problem of diagnosing software systems is transformed into a satisfiability problem
- Generic log data is annotated with goal model information that can be queried to see if goals have been met (alternate approach to instrumenting all systems)
- Problems include the lack of standards for log data, large log data size and logging components that fail when errors are injected as part of testing
- Discussion
  - Using IR techniques, DSLs or metamodels to deal with lack of standards for log data
  - Automation of the creation of the goal model — lots of work at the business process layer but might need patterns to deal with the infrastructure layer



# SOA Integration as an Alternative to Migration: The Role of Data Type Conversion

Harry Sneed (ANECON GmbH, Austria)

- Position is that data should be stored in ASCII format to avoid the ASCII-to-binary conversion that takes place when the service implementation is called from the web service stubs
  - Runtime data casting is avoided — less errors due to incompatibilities between data types
- Migration process would add a step for data type conversion in the legacy code
- Problems
  - Requires conversion at the database level — would need to write a script to do so
  - Requires conversion to binary when data is used in computations — potential performance problem



# Perspectives on SOA Control Science

Hausi Müller (University of Victoria, Canada)

- Position is that we are looking at SOA too much in a static way — too much focus on design time
  - Interesting fact is that 1/3 of the research agenda presented in a US Air Force report on Technology Horizons focuses on adaptive systems
- Control science focuses on the runtime validation and verification of systems after they adapt at runtime due to certain conditions — challenge is that the state space is much larger than in static environments
- The fundamental assumption of dynamical software systems is that execution environment will now be known a priori at design time— only partially known
  - An approach for dealing with this assumption is to move some development activities from design time to runtime in which a system has to reason about its environment and state and runtime
- Because service-oriented systems are dynamic, there is need for governance and adaptation in service-oriented systems



# Characterizing Policies That Govern Service-Oriented Systems

Hausi Müller (University of Victoria, Canada)

- Conducted work on categorizing policies according to the service life cycle
- Value of this work is the understanding of all policies, especially runtime policies
- Discussion
  - Provides insight on KPIs and aspects that can be managed in a system



# Context-Driven Adaptive Monitoring for Supporting SOA Governance

Norha Milena Villegas (University of Victoria, Canada)

- SOA governance needs to manage context information to ensure the execution and evolution of service-oriented systems — policies are defined at design-time but managed at runtime
- Position is that service monitoring infrastructures need to be adaptive as well because context changes over time
- Proposing dynamic monitoring for SOA governance as a feature-based model to represent context and monitoring requirements for SOA governance plus an adaptive control-based reference architecture to implement dynamic context monitoring infrastructures
- Context-aware governance feedback loops
  - An external loop to control governance objectives
  - An internal loop to monitor context
  - Interact to adjust control governance objectives in reaction to changes on context
- Discussion
  - What differentiates this approach from others is the adaptation of the monitoring strategy as opposed to just the managed system





# A Dynamic Framework for Quality Web Service Discovery

Hausi Müller (University of Victoria, Canada)

- The focus is on incorporating quality attributes into matchmaking algorithms for dynamic service discovery
- Approach combines static discovery with dynamic selection
  - Requires a the definition of a representation for dynamic service attributes
  - Uses these dynamic attributes as a secondary criterion for service selection
  - Adds service consumer context to identify selection criteria automatically
- Discussion
  - Very domain-specific — will require the creation of ontologies or data models to represent context
  - Potential security and privacy concerns due to context propagation



# Research Topics from the Perspective of SOA Evolution

Kostas Kontogiannis (National Technical University of Athens, Greece)

- Top Research Areas (in no particular order)
  - Service versioning—diversity and complexity
  - Property tracing—from design time to runtime
  - Smart service infrastructures
  - Logging, monitoring and diagnostics
  - Data access, data handling and data validation services
  - Tools for supporting the SOA life cycle



# Challenges for Maintenance and Evolution of Service-Oriented Systems at Credit Suisse

Carl Worms (Credit Suisse, Switzerland)

- More than 1200 services at the moment
- Mostly CORBA-based but migrating to Web Services
- Challenges
  1. Complexity due mainly to size (~ 6,700 applications)
  2. Finding the proper IT architecture governance and structure
  3. Anticipating the future in 5-10 years — from monolithic to loosely-coupled components/sub-domains
  4. Managing multiple integration infrastructures
  5. Making SOA scale for more than 1,000 services (created an in-house Interface Management System — IFMS)
  6. Adapting SE life cycle models for SOA (created the CS Interface Engineering Process)
  7. Testing and versioning of interfaces (established processes and created a separate testing group)
  8. From regional to global services



# Next Steps

- Presentations will be placed on the MESOA web site in PDF format
  - Unless you say no, I will assume it is OK to do so
- Papers and Workshop Summary will be published by the SEI as post-proceedings
  - Papers will be edited by SEI technical editors
  - I will send them to you for approval
  - I will also send you at some point a copyright form that you need to sign and return
- Again, we encourage all of you to work on “leaves” of the agenda
  - We can participate as co-researchers, reviewers or just “cheerleaders”
  - We can publish the work as an SEI report — high visibility in the software engineering community



# MESOCA 2011

## Williamsburg, VA USA

### September 26, 2011



- Maintenance and Evolution of Service-Oriented and Cloud-Based Systems
- Will run as an ICSM co-located event instead of a workshop
- Will run in parallel with SCAM and not WSE to avoid conflicts (like the ones we had today)
- Main advantage is that papers will be part of the IEEE Digital Library

**WE EXPECT ALL OF YOU TO BE THERE !!!**  
**BRING YOUR FRIENDS !!!**



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