Benchmarking Workflow Management Systems

University of Stuttgart
Universitätsstr. 38
70569 Stuttgart
Germany

University of Lugano
Switzerland

Mariglianna Skouradaki, Dieter H. Roller, Frank Leymann
Institute of Architecture of Application Systems
{skouradaki, dieter.h.roller, leymann}@iaas.uni-stuttgart.de

Vincenzo Ferme, Cesare Pautasso
Faculty of Informatics
University of Lugano
Switzerland
{firstname.lastname@usi.ch}

Phone +49-711-685 88477
Fax +49-711-685 88472
Motivation

Application Tools

Workflow Management System

User
Motivation

*the row of appearance and company selection are random*
Agenda

- Background
- Problem definition
- Project status
- Open challenges
- Conclusions & open discussion
Background: Workflow Management Systems

1. Process Models

2. Workflow Engine

3. Instance Database

4. Application Server

5. Web Services

6. Users & IT tools
Problem Statement

- SOA Benchmarking is very broadly scoped
- Testing frameworks on Workflow Engines:
  - Simple, artificial control flows as workload
  - Performance measurements are reduced to response time
  - Testing frameworks are tightly coupled to particular Workflow Engines
  - Workload characterization limited to basic request/response interaction patterns
- Seminal work did not consider Web Service composition scenarios
BenchFlow Phases

- Scenario Collection
- Workload Characterization
- Workload Generation
- Benchmark Generation
- Test Client Construction
- Benchmark Execution
Process Models – Scenario Collection

Models (Non-Executable Files)
- .pnml: 2177; 26%
- .bpmn2: 3168; 38%
- .bpmn: 608; 7%
- .yawl: 427; 5%
- .bpel: 21; 0%
- .EPC: 1960; 24%

- IBM Industry Models
- BPM Academic Initiative
- Research Projects

Total: 8363
Process Models Analysis

A

B

Analyze and characterize the discovered parts
Choose the Engines

- Process Engine Survey (22 engines)
  http://en.wikipedia.org/wiki/List_of_BPMN_2.0_engines

- Lack of documentation delays our decisions on:
  - Which engines are testable?
  - Which elements of the BPMN 2.0 set are actually supported?

- Approaches:
  - Contacting the vendors
  - Plan compliance tests
More Open Challenges

- Automate the Generation of Realistic Workload
- Benchmarking Long Running Processes
- System Internal Load Optimization
- Performance Impact of Workflow Language Features
Benchmark Setup

- WFMS on different physical machines connected through the same local network
- Need of a flexible deployable mechanism
- The used workload are 3 process models derived from the first micro-analysis on our collection
- Throughput will be the first calculated metric
Conclusion – Call for Action

- Industry Process Collection (8421 models, 3168 BPMN2)
- Process Metrics Analysis (130 metrics)
- Process Synthesis Methods (clustering, fragments)
- Process Engine Survey (22 engines)
  
  http://en.wikipedia.org/wiki/List_of_BPMN_2.0_engines

- Feedback on the followed process?
- Ideas in tackling the open challenges?

skourama@iaas.uni-stuttgart.de

http://www.iaas.uni-stuttgart.de/forschung/projects/benchflowE.php
http://design.inf.usi.ch/research/projects/benchflow