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Platform based approach for automation of workflows in a system of systems

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Key Messages

- Emergence of workflow automation platforms its next natural evolutionary step after the emergence of SOA platforms.

- Difficulty on handling workflows in landscapes is that workflows evolve continuously.

- Platform-based approach for the automation of workflows can be used for transforming SOA-based system of systems to SOA + BPM-based system of systems.
Agenda

- Introduction
- Problem
- Solution variants
- Platform approach
- Results
- Further work
Introduction

- System of systems characteristics
  - Operational independence of its elements
  - Evolutionary development
  - Emergent behavior
  - Geographic distribution
- Directed system of systems
  - Central controller/steering body
  - Credit Suisse IT-Landscape is a directed system of systems
- SOA has been seen a main architectural style for handling complexity of system of systems
- But what about business processes? How do we automate business processes in system of systems?
Problem: Workflows in System of Systems are hidden

- In the past, mostly single applications were built:
  - Workflows in single applications were hidden in code
  - Workflow definition in single application was unknown

- Meanwhile, systems get larger, and landscapes transform to system of systems
  - Workflow implementation in system of systems are hidden
  - Cross application workflows are implemented randomly in invocation chains
  - Global workflow definitions are unknown
  - Flow state of the workflow is unknown
  - Data state of the workflow is unknown
Problem: Workflow Evolution

- Workflows evolve by
  - Degree of structure
  - Degree of automation

- Workflow type evolves
  - Case management workflow to human workflow
  - Human workflow to process orchestration workflow

- Approaches which focus on automation of single type inhibit overall evolution
Problem: End-to-End Workflow Automation

- End-to-end process
  - Process which starts with initial incoming request and ends with ultimate response i.e. no post processing steps

- End-to-end processes in a system of systems involve tens to hundreds of different applications
  - End-to-end processes integrate application sub-processes into one central defined process

- How to automate end-to-end processes?
Solution Variants for Workflow Automation

a) Each application selects (different) workflow automation approach
   – Each application integrates (different) workflow engine
   – End-to-end workflows are achieved by integration of processes from different workflow engines
   – Distributed workflow state

b) Same workflow engine is used by each application
   – Each application integrates (the same) workflow engine
   – End-to-end workflows are achieved by integration of processes from the same workflow engines
   – Distributed workflow state

c) One centralized workflow platform is defined which provides integrated environment for workflow automation
Our solution approach is not a best-of-breed for every requirement but One Fits All

- Create one platform for
  - Case Management
  - Human Workflow
  - Process Orchestration
Integrations on platform level
- Once-only and as much as possible
- Providing integrations as platform services

Integrations on process level
- Using platform services (configurative)
- Focus on business process related integrations

Software production line approach
Results, Load & Performance Tests

- **Service calls**
  - Approx. 100 Web service Tx per second*
  - Approx. 50 CORBA service Tx per second*

- **Macro-flows**
  - Persistent flows, after each activity the state is persisted
  - Max 46 test macro-flows per second*

- **Micro-flows**
  - Transient flows, in-memory
  - Max. 120 micro-flows per second*

* Setup: non-clustered, one engine and one database
Results, Global Deployment

* Singapore clients are currently hosted on HUB Zurich

- New York
- London
- Zurich
- Singapore*
Results, Applications

- Global view, applications per hub
  - Zurich (CH) – 19
  - Singapore (SG) – 1
  - London (GB) – 2
  - New York (USA) – 3

- Organizational unit view, applications per org unit
  - Investment Banking – 2
  - Private Wealth Management – 19
  - Technical Infrastructure Services – 4

- Ca one million workflow instances per month
Further Work

- **Workflow Platform**
  - Increase scalability to 800 macro-flows per second
  - Leverage Credit Suisse SOA
  - Transformation to software product line approach

- **Research**
  - Process automation in system of systems
  - Migration of «spagetti process landscapes» to BPM based landscapes
  - Workflow reference architectures
  - Flexibility in workflow applications
  - Workflow patterns for applications
  - Workflow benchmarking
Questions and Answers
Authors

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