Service Composition Strategies for Loosely Coupled Information Chains

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Executive Summary

Topic and Challenges

- Web Service composition across company boundaries
- Different strategies/architectures possible

Method and Approach

- Analysis of central, hybrid with hub support, and fully decentralized service orchestration architectures
- Evaluation and comparison on the basis of 8 criteria

Results

- Service Composition decentralization continuum
- Hybrid approach is most promising as it unifies the advantages of both centralized and decentralized solutions
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Automatization of Cross-Organizational Business Transactions

**Drivers and Benefits**
- Improvements of cost-performance ratio of IT
- Extending market reach
- Saving time
- Cutting costs
- Responding to customer demands more agilely

**Hurdles of Adoption**
- Different standards and standardization approaches prevent from a common understanding of business processes and data
- High costs and complexity of existing approaches

SOA aims at closing this gap
Orchestration vs. Choreography

**Orchestration**
- Represents the relation between one central service and different other ones called according to a pre-defined sequence
- Adequate to describe exchange patterns of one individual service
- Can be conducted with the help of languages such as BPEL
- Executable on respective engines

**Choreography**
- Bird‘s eye view
- Message exchange described from the perspective of an observer who is able to see all interaction of the participants of a choreography
- Languages, e.g. WS-CDL, BPSS
- Not executable, used for modelling and monitoring

**VS.**

Modelling the overall choreography and derive executable orchestrations
Example business process choreography
Centralized Service Orchestration

Stakeholder A
- Application
  - Adapter

Stakeholder B
- Application
  - Adapter

Stakeholder C
- Application
  - Adapter

Service Interface

Server
- BPEL Generator
- Collaborative Modeling
- Data & Process Templates
- User Registry
- BPEL Engine

**Pro**
- Efficient monitoring
- Fault handling
- Maintenance
- Less local complexity

**Con**
- Invocation policies (not all services might be called by one single hub)
- Lack of trust
- Single point of failure
Decentral Service Orchestration with Hub Support

Pro
- Msg exchange independent from server
- Overall choreography can still be used for monitoring and fault handling support

Con
- Fault handling more complex
- Users must be able to handle an execution engine
- Increased complexity
Decentral Orchestration without Hub

**Pro**
- Robustness against partial errors
- Higher scalability

**Con**
- Permanent synchronization of the local repositories
- Complicated fault handling
- Highest complexity on client side
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## Evaluation Summary

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<tr>
<th>Degree of centrality</th>
<th>Central orchestration</th>
<th>Decentral orchestration, hub supported</th>
<th>Decentral orchestration without hub support</th>
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<td>Functional scope</td>
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<td>Fault removal</td>
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<td>End-point complexity</td>
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SYSTEMATIC THOUGHT LEADERSHIP FOR INNOVATIVE BUSINESS

Executive Summary

Foundations and Related Work

The Service Composition Decentralization Continuum

Evaluation Summary

Conclusion and Outlook
Conclusion and Outlook

- **3 different strategies for service composition across company boundaries** where analyzed.

- **Comparison and evaluation** on the basis of 8 criteria.

- The **hybrid approach** is the most promising strategy within the service composition decentralization continuum.

- **Prototypical realization** in different research projects ongoing (EU funded project GENESIS, Swiss national funded project HERA).
Thank you for your attention!

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