Flexible Support of Inter-Organizational Business Processes Using Web Services

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Overview

• Scenario
• Flexibility in Interorganizational Business Processes
• Direct and indirect enactment
• Cross-cutting functionality in business processes
• Solution Architecture
  • Aspect-oriented schema representation
  • Composite Applications
Scenario

Order entry

Check for mechanical correctness

Check for control system correctness

Representation office

Control systems company

Mechanical engineering company

Rating agency

Query rating system

Common process

Check credibility

Calculate delivery date

Confirm order

Query logistics system

Logistics provider

Sub-process

Service
Flexibility in Inter-Organizational Business Processes

- Metamodell evolution
- Model evolution
- Instance evolution
- Scalability
- Asynchronous service evolution

(Business)-Process Metamodel
(Business)-Process Model
Instance
Services

Service extensibility and integration
New Service
Modified Service

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Further requirements

- Knowledge encapsulation
- Enactment autonomy
- Service autarchy
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Direct and indirect enactment of business processes

Direct enactment

Indirect enactment
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Fulfillment of requirements

Process-oriented requirements
- Direct enactment
- Indirect enactment
- BPM evolution
- Schema evolution
- Instance evolution
- Service extensibility and integration
- Asynchronous service evolution
- Service autarch

Service-oriented requirements
- Scalability
- Enactment autonomy
- Knowledge encapsulation
- Web Services
Strategy

• Use indirect enactment and make schema representation more adaptable
  • We have to appropriately split up the schema representation
  • The schema representation must be configurable

• Objects, Components, ?
Cross-Cutting Functionality obstructs Flexibility

Control flow

Information flow

Organisational structures
Aspects in Inter-Organizational Business Processes

Perspectives

Functional
- Task
  - Activity implementation
- Input
- Output
- Activities

Operational
- Control Flow
  - Timing
  - Exception Handling

Behavioural
- Data Types
  - Data Flow

Informational
- Roles
  - Agreements

Organizational

Causal, historical and transactional perspective not shown
Solution architecture

Step 1

Business Process Specification

Order management system

Calculate order value

Order Value > 5000 Euro

Extended check

Rating system (external)

Credibility Ok?

Order confirmation

Order rejection

Accounting department

Step 2

Aspect-element-oriented schema representation

Composite application

Step 2

UDDI
Aspect Element Oriented Schema Representation

- Operational aspect
- Informational aspect
- Organisational aspect
- Control aspect

Temporal connection

Calculate order value

Order Value > 5000 Euro

Extended check

Rating system (external)

Standard check

Credibility Ok?

Accounting department

Order management system

Client/server connection

Temporal connection

Continue order processing

Reject order

Operational aspect

Order management system
Creation of Composite Applications

1. (Informal) Requirements of the customer
   - Requirements Elicitation and Analysis
   - Component retrieval
   - Gap Analysis
   - Selection

2. Component creation
   - Component repository

(1) Requirement elicitation and analysis
(2) Component selection

Composite Service Process
- Adaptation
- Composition
- Component
- Component
- Component
- Component
Composite Applications
Execution of Composite Applications

1. Initiation Phase
2. Specialization Phase
3. Execution Phase
4. Evaluation Phase

(Next) Initiation Phase
Summary

• Flexibility in Inter-organizational Business Processes

• Indirect enactment of an aspect-element-oriented schema representation allows both evolution and scalability

• Implementation: composite application built from web services
Perspectives in Inter-Organizational Business Processes

- Perspectives
  - Functional
    - Task
    - Input
    - Output
    - Activities
  - Operational
    - Activity implementation
  - Behavioural
    - Control Flow
    - Timing
    - Exception Handling
  - Informational
    - Data Types
    - Data Flow
  - Organizational
    - Roles
    - Agreements

Causal, historical and transactional perspective not shown
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