Business Protocol Adaptors for Flexible Chain Management

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Agenda

• Overview
• Method
• Business Application
• Contribution
• Future Work
How to integrate Cross-organizational Information Systems in an efficient and effective way?
Gartner predictions (Jan. 2010)

• Through 2014, the act of composition will be a
  – stronger opportunity to deliver value from software than the act of development.

• By 2014, business process networks (BPNs) will
  – underpin 35% of new multi-enterprise integration projects.
From Composition to Process Network
Interacting Services

Company X
Fulfillment Service Provider
Public Process View

- RecDelivery Details
- RecProduct Order
- SendItem Shipment
Example of mismatch

Fifo queue: ProductOrder, DeliveryDetails

X cannot consume the messages from the queue in the expected order
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How to integrate them in an efficient and effective way?

Using Service Adaptation
Example of Adaptor

Company W
Fulfillment Service
Consumer
Public Process View

SendProduct Order

SendDelivery Details

RecItem Shipment

Minimal Protocol Adaptor
Public Process View

RecProduct Order

RecDelivery Details

SendDelivery Details

SendProduct Order

Company X
Fulfillment Service Provider
Public Process View

RecDelivery Details

RecProduct Order

SendItem Shipment

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Need for adaptation

• Collaboration of interacting services to reach a business goal
• Dynamic service outsourcing
  – Just-in-time selection of partners
• Services cannot collaborate if they are incompatible
  – They cannot be selected
Two kinds of mismatch

• **Interface mismatch**
  – Differences in the formats and specifications on the messages

• **Behavioral mismatch**
  – Two interacting services reach a deadlock if they wait for each other to exchange
Own way of working
Example of Adaptor

Efficient and automated method
Minimal Adaptor
Efficient at Design-time
- only messages needing adaptation
Efficient at Run-time
- less message overhead
Method Contribution
Efficient and Effective

- Efficient and automated approach
- **Minimal adaptor**
  - Less complex
  - Less message overhead
- Protocols containing
  - Sequence
  - Parallelism
  - Choices
  - Loops
- Protocols using synchronous and asynchronous communication
  - Most of services communicate asynchronously

Existing methods
- Not minimal
- All messages
- Only sequential processes
- Only Synchronous comm.
References

• Synchronous minimal adaptor

• Asynchronous minimal adaptor
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Business Chain cases

Produce to Stock
(forecast driven)

Produce to Order
(order driven)

Identifying the CODP

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Own way of working

Company W
- Fulfillment Service Consumer
- Public Process View
  - SendProduct Order
  - SendDelivery Details

Company X
- Fulfillment Service Provider
- Public Process View
- Private Process View
  - Receive Order
  - Set ItemList
  - Put Items
  - RecTx Info
  - Get Items

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Adaptation Cases

Letters $a, b, c, d$ represent adaptation places
Demand Chain $b, d$
Supply Chain $a, c$
Hybrid Demand/Supply Chain $b, c$

Responsibility to build an adaptor

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An adaptor could be generated with any existing method.

Example adaptor generated with Seguel et al. ICWS’10
Flexible configuration of an hybrid chain
Method Contribution
Effective and Efficient

• Using Service Adaptation
  – To resolve integration problems of Cross-org. IS among companies
  – To enable selection of partners

• Identifying adaptation responsibility of a partner

• Enabling Flexible Configuration business chains

• Using an efficient method for business protocol adaptation
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How to integrate Cross-organizational Information Systems in an efficient and effective way?
Contribution to the field

Information Systems
• Efficient and Effective Method
  – To Generate Business Protocol adaptors
  – To Integrate Cross-Organizational Inf. Sys.

Operations Management
• Efficient and Effective Method
  – To Enable Flexible Configuration of Business Chains
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Future Work

- Business case in De Lage Landen
- Architecture support
  - Reference Architecture and Prototype
- Implementing the Architecture prototype
  - Feasibility of solution with existing technology
  - Support breakthrough business model innovation in De Lage Landen
Thank you.