Service-Oriented Business Integration: Will we be Dynamic?

Paul Grefen
School of Industrial Engineering
• **Service-orientation is supposed**
  • to support business integration of autonomous parties by
    − well-described published services
    − encapsulation of service implementation
    − composition of services
  • to foster agility, i.e., support dynamism in business collaboration by
    − loose coupling of services
    − service brokering (by third parties)
    − explicit attention to non-functional characteristics
Dynamism

- Dynamism implies change
- Two major questions w.r.t. change:
  - How often?
  - How much?
- Result in two dimension to chart dynamism:
  - Frequency of change
  - Intensity of change
The dynamism space

- intensity
  - everything
  - some things
  - nothing

- frequency
  - never
  - sometimes
  - always

SOC as an Enabler
The exploration in this presentation

- Explore the dynamism space w.r.t. service-oriented business integration
- Focus on business process structure aspect
- In a decent order
  - First the frequency dimension
  - Next the intensity dimension
  - Then combined
- Starting with a research view
- Then moving to business practice
Egham, UK, January 13, 2010

• Gartner Reveals Five Business Process Management Predictions for 2010 and Beyond:
  • By 2013, dynamic BPM will be an imperative for companies seeking process efficiencies in increasingly chaotic environments.
  • By 2014, business process networks (BPNs) will underpin 35 per cent of new multi-enterprise integration projects.
Service-Oriented Business Integration:
The Frequency Dimension

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Where innovation starts
The dynamism space

Intensity

Frequency

everything

some things

nothing

never

sometimes

always
The dynamism space: temporal flexibility

- frequency
- intensity
- never
- sometimes
- always
- nothing
- some things
- everything
Collaboration is long-lasting (or even permanent) without pre-determined end date
Collaborations are changed periodically, but not on the basis of individual orders
Collaborations are determined and created for each individual order
Collaborations are changed during the execution of an individual order
Frequency dimension: four classes (2)

- Ultra-dynamic
- Dynamic
- Semi-dynamic
- Static

(Client) Order

1  10  100  1000  10,000
Example static frequency
Example ultra-dynamic frequency
Service-Oriented Business Integration:
The Intensity Dimension
The dynamism space

- **intensity**
  - everything
  - some things
  - nothing

- **frequency**
  - never
  - sometimes
  - always
The dynamism space: structural flexibility

**Intensity**: nothing, some things, everything

**Frequency**: never, sometimes, always
The intensity dimension: five classes

- Static
- Substitution
- Interlinking
- Assembly
- Construction

**Fixed distributed process structure**

- Plug-in remote prefabs (bilateral)
- Link distributed prefabs (multilateral)
- Glue distributed prefabs together (multilateral)
- Greenfield distributed process design
Substitution
Interlinking
Assembly
Construction
Service-Oriented Business Integration:
The Dimensions in Our Research
The dynamism space

- **Intensity**
  - nothing
  - some things
  - everything

- **Frequency**
  - never
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  - always
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The dynamism space

- Static
- SemiDyn
- Dynamic
- UltraDyn
CrossFlow: Dynamic Service Outsourcing

Dynamic Virtual Enterprise

**SOC ‘avant la lettre’**
Service specification in e-contracts
Service brokering & contracting
Dynamic generation of execution infrastructure
Support for non-functional aspects (LoC, QoS)

Monitoring and Control

Service Consumer

Service Provider
CrossFlow in the dynamism space

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CrossWork: Instant Virtual Enterprise

**Integrating MAS build-time with SOC run-time**

- Semi-automated formation of goals and teams
- Semi-automated formation of processes
- Automated mapping onto SOC infrastructure
- Two-layer process enactment using BP-WS
CrossWork in the dynamism space

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Integrating transactional processes and services
Business-level Tx-QoS specification
Mapping onto abstracted transaction models
Enactment using transactional process modules
## XTC in the dynamism space

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ASCI: Generating Protocol Adapters

**Linking incompatible statefull services**
Analysis of process incompatibilities
Determination of message sets to ‘repair’
Automatic construction of minimal adapter
## ASCI in the dynamism space

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CrossFlow

CrossWork

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Service-Oriented Business Integration: The Dimensions in Practice
Automotive: CrossWork

1\textsuperscript{st} Tier Suppliers

2\textsuperscript{nd} Tier Suppliers
Healthcare: Teleradiology

International market!
Financial: Asset-Based Financing

Lease Provider

Asset Provider

Asset Provider

Asset Provider

Lease Taker

Lease Taker

Lease Taker

Finance Provider

Asset Manuf.
Logistics: Linking harbours and logistics

Port Community Services

- WP3
  - B2G
  - B2B
  - B2H
  - G2G

Logistics Service Portal

- WP4
  - B2B JV producten
  - B2G services derden
  - Specifiek klant product
  - B2B Product derden

Generieke Infrastructuur & Services

- WP2


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## The dynamism space: present & future (?)

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- **B2C (?)**
Practical requirements to business integration

- Process integration
  - Process structures (as discussed)
  - Process semantics
- Data integration
  - Data structures
  - Data semantics
- Business-level integration
  - Business goals (the ‘why’)
  - Trust (the ‘with whom’)
    - Hard without a pre-existing context (dynamic case)
  - Often ignored in research
  - Or treated in isolation
Service-Oriented Business Integration:

Advancing Things: Our To-Do List
Looking back on 12 years of SOC

- Lots of research results
  - Papers
  - Prototypes (software, languages, protocols, etc.)
  - Case studies (often sand box)
- Not so much consolidation in the field
  - We have lots of standards (WSDL, BPEL, etc)
  - But do we have a framework like RDBMS?
- Not so much impact on practice yet
  - The interest is there (and growing)
  - The understanding sometimes needs growing
As researchers, we tend to super-specialize in specific fields of services – focusing on one aspect or element.

- Often too little aware of other aspects or related fields – hence missing links or reinventing the wheel.
- An observation: conferences and journals these days seem to dislike overviews, surveys and frameworks.

Real breakthroughs require an amalgamation of aspects and elements, however.
Balance technology push and requirements pull

- Service technology research is to a large extent technology-push driven – often we don’t really understand what practice needs
- Industry to a large extent relies on what they know (or what the big vendors/advisors tell them) – they don’t really understand what is available (and what it can do)
- So there is a bit of a gap:
  - We talk about frameworks for ontology-based semantic process matching algorithms for service interoperability
  - Industry talks about screen scraping techniques for data interoperability (last week indeed !)
Service-Oriented Business Integration:

A Few Final Words

Pictures
A bit busy in SOC Avenue …
A bit of a gap …