Interorganizational Business Process Management

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Overview

- Chapter 1: The Basics
  - Intra- and Inter-organizational processes
- Chapter 2: The Concepts
  - Framework, ingredients (CF, Tx, QoS, Dyn)
- Chapter 3: The Technologies
  - SOC, extension, architecture
- Chapter 4: Further On
  - Project, developments, conclusion

Chapter 1
The Basics

- Intra-Organizational BPM
- Inter-Organizational BPM

Intra-Organizational Business Process Management

The Bare Basics

Workflow Management

- WFM = Information Logistics
- Getting
  - the right information (documents)
  - at the right time
  - to the right person
- Emphasis
  - on structure of work processes (workflows)
  - not on contents of work activities (biz functions)
- WFM ~ BPM
Workflow Management Aspects

- Routing of information/documents
- Allocation of tasks to actors
- Scheduling of tasks in time
- Scheduling of scarce resources
- Monitoring flow of work
- Handling exceptional situations
- Providing management information

Example WF: GTI

WFM Concepts (Summarized)

Intra-Organizational Business Process Management

Specifying Processes

Process specification techniques

- data flow based ?
- token based ?
- event based ?
- document based ?
- communication based ?
The 'perfect' choice

- Choice depends on
  - nature of business process
  - level of detail
  - intended audience
- Combination of techniques for
  - different abstraction levels
  - different aspects
- Consistency with BPMS environment
  - ‘independent’ modeling tools
  - BPMS-specific tools and details
Inter-Organizational Business Process Management

The Background

Intra-organizational BPM uses automated support for business process management within organization boundaries.

Inter-organizational BPM (IBPM) uses automated support for business processes management across organization boundaries – e.g. for eBusiness.

Both forms can be coupled or integrated to get complete process support in virtual organizations.

Increasing Relevance of IBPM

- Concentration on core business competence
  - Dynamic business process outsourcing
  - Asymmetric (business level client/server)
  - Horizontal and vertical markets
  - E.g. financial and logistics markets (XF)
- Combination of highly specialized functions
  - Dynamic cooperative business networks
  - Symmetric (peer-to-peer business level)
  - Usually vertical markets
  - E.g. automotive and construction markets (XW)

Supporting IBPM

- Efficiency
  - Setup of integration
  - Enactment of integrated process
- Effectiveness
  - Functional complete
  - Interoperable in market
- Flexibility
  - Adapted to dynamic market
  - Fit for evolving requirements

Example IBP

An interorganizational business process is a business process enacted by two or more autonomous organizations, of which at least one organization exposes the explicit control flow structure of a non-trivial process to the other organization(s).
**IBPM Concepts**

- **organizational model**
- **process model**
- **information model**

**agent**

**activity**

uses

**info element**

**organizational model**

**process model**

**information model**

**IBPM Aspects (1)**

- **Distribution**
  - distributed process definition
  - distributed process enactment
- **Heterogeneity**
  - different process/data standards
  - different software/hardware platforms
- **Autonomy**
  - local decisions w.r.t. workflow enactment

**IBPM Aspects (2)**

- **Encapsulation (abstraction)**
  - hiding of private details (competition)
  - hiding of uninteresting details (service)
- **Standardization**
  - process structures
  - data structures
  - interaction protocols
  - abstraction for right level
  - bilateral or market segments

**Chapter 2**

**The Concepts**

- Three-Layer Framework
- IO Control Flow
- IO Tx and QoS
- Dynamism

**Three-Level Framework**

- **External Process**
  - project
  - Conceptual Process
  - Internal Process
  - Process Initiator

- **Conceptual Process**
  - map
  - Conceptual Process
  - Internal Process

- **Internal Process**
  - map
  - Conceptual Process
  - Internal Process
  - Process Responder

**XO Control Flow**

*Ingredient Number 1*
Control flow interface levels

- **Black box**
  - Initiator sees no details of responder

- **Glass box**
  - Initiator sees details of responder

- **Half-open box**
  - Initiator can control details of responder

- **Open box**
  - Initiator is controlled by responder

XO Tx and QoS

*Ingredients Number 2 and 3*
### Transactional processes

- Three-level model $\Rightarrow$ multi-level Tx model
  - E.g. WIDE Tx model, XTC BTF
- Long-running, multi-phase processes $\Rightarrow$ multi-phase Tx model
  - E.g. XTC BTF
- Business process structure and semantics $\Rightarrow$ flexible Tx semantics
  - E.g. atomicity criteria, XTC ATC

### QoS Agreements

- QoS dimensions:
  - Execution times
  - Reaction/wait times
  - Availability of resources
  - Quality/precision of results
- Electronic contracting
  - Contract structure
  - Contract specification language
  - Organizational and legal embedding

### Dynamism

**Ingredient Number 4**

A dynamic interorganizational business process is an interorganizational business process that is formed dynamically by the (automatic) integration of the subprocesses of the involved organizations. Here dynamically means that during process enactment, collaborator organizations are found by searching business process market places and the subprocesses are integrated with the running processes.
Chapter 3
The Technologies

- CrossFlow Technology
- SOC Technology
- BPWS Model
- Architecture Blueprint

CrossFlow Technology

An Early Prototype
CrossFlow Architecture (Phase 2: Setup)

CrossFlow Architecture (Phase 2: Setup)

CrossFlow Architecture (Phase 3: WFMS)

CrossFlow Architecture (Phase 4: Completed)

**SOC Technology**

*What is Out There?*

- **Communication:**
  - HTTP, SOAP
- **Service specufication:**
  - WSDL
- **Control flow specification (orchestration):**
  - BPEL
- **Coordination, Transaction & QoS**
  - WS-C, WS-T & WS-A
- **Brokering (dynamism):**
  - UDDI
Web Services Stack

- WS-Security
- WS-Agreement
- UDDI
- SOAP
- WSDL
- BPEL
- WS-T
- WS-C
- HTTP
- XML

SOC Technology

- Platform:
  - HTTP, SOAP, WSDL
- Control flow:
  - BPEL
- Transaction:
  - WS-C, WS-T
- Quality of Service:
  - WS-A (+ WSDL, JSDL, WSLA)
- Dynamism (brokering):
  - UDDI, OWL-S

BPWS

An Approach to SOC4DIBPM

BP-WS-B Architecture

BP-WS-G Architecture
Brokering aspects

- Name-based
  - Très, très simple
- Attribute-based
  - Predefined attributes (matching space)
  - Name (of course), QoS, Tx
- Semantics-based
  - Meaning of services (OWL-S)
- Structure-based
  - Process matching

An Architecture Blueprint

*Getting More Practical (at least a bit)*
Three-Level Framework Revisited

- External Process
  - Project
    - Conceptual Process
      - Map
        - Internal Process
          - Process Initiator
          - Process Responder

Integration Architecture

- PS
- EPS
- DIBPM
- Process Designer
- CS
- Converter
- MS
- Mapper
- IS
- IPS
- WFM

DIBPM Module Architecture

- Broker
- Collaborator
- PBI
- BP-WSI
- TX
- EP
- QoS
- DIBPM
- Contractor
- EPS

Chapter 4
Further On

- Example Project: CrossWork
- Current Developments
- Conclusions

An Example Project in DIBPM

CrossWork

An Example Project in DIBPM
Automotive supply pyramid (2)

1st Tier Suppliers

2nd Tier Suppliers

The start

NoAE

OEM

Design/Production

Prod. Spec.

XW

CrossWork Abstracted Architecture

What

Who

How

With

CrossWork Architecture (1)

Goal Decomp.

Team Format.

WF Compos.

Global Enactm.

Local Enactm.

Legacy Integrat.
Current Developments and Conclusion

Let's be Brief and Clear
(D)IBPM essential for efficient process management in (dynamic) e-business

Necessary concepts currently being developed – based on WFM – but not yet standardized

Standard technology currently based on Service Oriented Computing

Other technology may be embedded, e.g., agent technology, semantic technology

Link to legacy information systems important but difficult (interfaces, wrappers)

Process specification and management not nearly as well standardized as data management