Business Process Modeling and SOA
9-23-2008
Class Notes

SOA Life Cycle (The IBM SOA Foundation)
  • Model
    o Business analysis and design (requirements, processes, goals, key performance indicator)
    o IT analysis and design (service identification and specification)
  • Assemble
    o Service implementation and building composite applications
  • Deploy
    o Application deployment and runtimes
  • Manage
    o Maintenance of the operating environment
    o Service performance monitoring
    o Service policy enforcement

Business Process Modeling (BPM) or Business Process Management
  • Also called Business Process Management
  • About the design and execution of business process
  • BPM is about modeling a business process, using standard graphical and XML representations, as a flow of activities
    o A process performs actions over some interval of time in order to achieve, or to progress to, some objective.
      ▪ Examples
        • Login process: log-in with credential data, log-in rules and validation
        • E-commerce: shopping cart, purchased items, buyer info, validation
        • Supply chain process
          o Suppliers
          o Customers
    o A business process is step-by-step activities with specific inputs and outputs that provide resolution to some business problem and/or business objectives
    o Modeling a business process model
      ▪ Analysts - Discussions/interviews with owners of business process requirements (Tools: spread sheets, PowerPoint, etc)
        • Roles
        • Tasks
        • Sequence of information and data
        • Resources
• Requirements
  § Existing business process models? For analysis?
  • Data catalogs
  • Business items
  • Business item templates
  • Business item instances
  § Capture business process elements or items: normal business operations and standard business procedures
  • Sub-processes
  • Components
  • Services
  • Input data
  • Output data
  § Model roles and resources
  § Capture alternatives and exceptions
  § Model services
  § Model policies
  § Model key performance indicators
• BPM is closely aligned with the notation of SOA
  o A business process == a service
  o A business is a service, one intended to be called by other systems, and these calls drive its execution.
• Contemporary BPM processes are built to interact as services with other systems, or even to orchestrate or choreograph other systems, including the businesses of other companies
• Standards
  o BPEL
  o BPEL4WS
  o BPMN

**Business**
- Business Alignment
- Business Componentization
- Business Modeling:
  o Introduces concepts, deliverables, roles
  o Describe and organize
    • Business strategy
    • Business vision
    • Business objectives
    • Business goals
    • Business vocabulary
    • Business architecture
    • Business analysis and design
Business Process

- Consists of a sequence of activities that produces a valuable result.
- Has related business items (data) that flow through it, including those used as the process’ input and output.

Business Process Optimization (primary business strategy)

- Cost reduction

Business Activities and Tasks

- Are the elements that, when connected, make up business processes.
- Business activities:
  - Duration
  - Cost
  - Revenue
  - Resource
  - Input
  - Output
- The elements used to decompose business processes.

Modeling Approach

- Users and User Interactions (Use Cases?) - Who are the users of the system and what are they trying to do?
- Real-world Services - What are the “real world” (problem domain) services and the associations among them?
- Service for each Use Case (Robustness Analysis) - What services are needed for each use case?
- Service Interaction (Sequence and Collaboration Diagrams) - How do the services collaborating within each use case interact?
- Real-Time Control Issues (State Chart Diagrams) - How will we handle real-time control issues?
- How to Build or Assemble - How are we really going to build this system on a nuts-and-bolts level?

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      - Tasks
      - Sequence of information and data
• Resources
• Requirements

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- Capture business process elements or items: normal business operations and standard business procedures
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  • Output data

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- Capture alternatives and exceptions
- Model services
- Model policies
- Model key performance indicators

Problem Statement
Cutit’s immediate priority is to streamline their internal supply chain process. The order process in particular needs to be supported by planned services so that orders and back orders can be fulfilled as soon as possible.

Model Business Items => Service Candidate Identification
- Business items are used in the business operations
- Examples of Business Operations
  ◦ Receive, track Orders from customers and back orders
  ◦ Manufacture Chain Blade (use specific materials <= predefined formulas)
  ◦ Assembly chains (=> add => products => Inventory)
  ◦ Prepare purchase Orders of Saws and Kits from different manufacturers to complement product line; Materials Orders
  ◦ Inventory stock level issue => Notifications
  ◦ Conduct a periodic Patent Sweep to search for recently issued patents with similarities to Cutit’s planned chain designs
- Examples of Business items:
  ◦ Order documents
  ◦ Customer information
  ◦ Bills of materials
  ◦ Work products
- Service Candidates
  ◦ Entity Services
    ▪ Order
    ▪ Inventory
    ▪ Chain
• Saw
• Kit
• Material
• Formula
  o Utility Services
    • Notifications
    • Patent Sweep

• Internal Supply Chain Processes
  o Initial set of services (service candidates) to support the internal supply chain processes
    • Keeping track of orders and back orders
    • Chain manufacturing
    • Tracking required manufacturing materials
    • An inventory management of manufactured and purchased products

Service identification techniques include
• Business services
• The decomposition of business processes into activities and tasks from which existing or to-be-developed services (and their operations) are identified.

Modeling Business Processes
• Documenting business process with visual aids and metadata
• Modeling and simulating “as-is” and “to-be” (future) business processes will allow for the identification of costs, delays, or areas for automation
• Human tasks as part of the execution of a process
  o Travel approval, Loan approval, waiting for approval etc
  o Notify the system of their decisions
  o Collaboration with colleague
• BPEL (Business Process Execution Language) for Web services
  o IBM, Microsoft, and others
  o OASIS Standard

Business Process Management
• Looks at the full life cycle of business processes to improve their efficiency, flexibility and control
• Is about
  o Modeling, simulating, optimizing, deploying, running, managing and monitoring business process

Supply Chain Process Improvement
• Flow of materials
• Information
• Services
- Monitoring and control of this flow
  - Raw materials
  - Procurement
  - Production
  - Inventory management
  - Order processing
  - Warehousing
  - Transportation
  - Distribution

References: http://www.logistics-consultants.co.uk/example_supply_chain_process.htm#

**SOA Service**
- Discoverable resource
- Executes a repeatable tasks
- Described by an externalized service specification

Must Consider
- Business requirements and needs
- Specification: self-contained and described in terms of
  - Interface, Operations, Semantics, Dynamic behavior, Policies, Quality of service
- Reusability: Corse and/or granularity design decisions
- Service Agreements: between consumers and producers
- Hosting and Discoverability: service metadata, registries and repositories
• Aggregation

Functional Layers (Top to bottom)
• Consumers
• Business Process
• Services
• Service Components
• Operational Systems

Non-Functional Layers (Left to right)
• Integration: capability to mediate, route, transport service requests to proper service provider
• Quality of Service
• Information Architecture: capability to support data, metadata, and business intelligence
• Governance: capability to support business operational life cycle management in SOA

References