Business Process Modeling
SOA Approach

Jyväskylä 10.5.2007
Kimmo Kaskikallio
IT Architect
SOA a huge opportunity for Universities

<table>
<thead>
<tr>
<th>Technology</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOA</td>
<td>1,148.4%</td>
</tr>
<tr>
<td>PHP</td>
<td>198.3%</td>
</tr>
<tr>
<td>Linux</td>
<td>120.8%</td>
</tr>
<tr>
<td>Web Services</td>
<td>99.5%</td>
</tr>
<tr>
<td>JavaScript</td>
<td>98.2%</td>
</tr>
<tr>
<td>C#</td>
<td>80.3%</td>
</tr>
<tr>
<td>SOAP</td>
<td>78.1%</td>
</tr>
<tr>
<td>XML</td>
<td>66.4%</td>
</tr>
</tbody>
</table>

*Growth of Required, Hot Tech Skills, Nationwide, 2004 – 2006*
### Service Oriented Architecture

**Different Things to Different People**

<table>
<thead>
<tr>
<th>Capabilities that a business wants to expose as a set of services to clients and partner organizations</th>
<th>Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>An <em>architectural style</em> that requires a service provider, requestor and a service description. It addresses characteristics such as loose coupling, reuse and simple and composite implementations</td>
<td>Architecture</td>
</tr>
<tr>
<td>A <em>programming model</em> complete with standards, tools, methods and technologies such as Web services</td>
<td>Implementation</td>
</tr>
<tr>
<td>A set of agreements among service requestors and service providers that specify the quality of service and identify key business and IT metrics</td>
<td>Operations</td>
</tr>
</tbody>
</table>
What is flexibility – It’s All About the Business

Change: Process Optimization
What’s stopping you?

- Lack of business process standards
- Architectural policy limited
- Point application buys to support redundant LOB needs
- Infrastructure built with no roadmap
Different Approach For Different Disciplines

Business Domain

IT Domain

Full Business view

Process to optimize

Creating IT flexibility
Interaction among services for higher business value
IBM delivers the full set of integrated BPM capabilities in a SOA

*Designed to Start Anywhere in the Cycle, Use Only What You Need*
Business Process Management Vision

- **Process Requirements**
- **Integration Developer**
- **Business Analyst**
- **Modeler**
- **Application Developer**
- **Staff**
- **Administrator**

- **Process Flows**
- **Interaction Glue**
- **Services**
- **Requirements Analysis and Modeling**
- **Process Models**

- **Business Process Runtime Infrastructure**
- **Monitoring and Analysis**
- **Process Improvement Feedback**
How to Build a Process Integration solution using BDD

Rational RequisitePro

- Create, Simulate & Analyze As-Is Business Model
- Create Observation Model with KPIs & export to Monitor
- Create, Simulate, Analyze and Optimize To-Be Business Model
- Create Financial Reports & ROI Estimates

WebSphere Business Modeler

- Choreograph services using BPEL, WSDL, etc.
- Configure Human Task Manager (including Ad-Hoc & Client)
- Assemble Solution (BPEL, Human Task Manager, Business Rules, etc.)

WebSphere Integration Developer

- Understand Risk, Project Costs, and ROI
- Identify and Manage Projects and Resources

Rational Portfolio Manager

- Business Analyst

CIO

- Integration Developer

Project Manager

Business Analyst

WebSphere Business Modeler

Rational Software Architect

Rational RequisitePro

Model Relational Database Schemas

Model & Implement Services, & expose as Web Services

Develop Portlets (App UI and Monitor)

Rational Functional & Performance Tester

Test

Tester

Rational Data Architect (4Q05)

- Data Architect

- RDB Mapping

- Model Relational Database Schemas

- Trace Requirements & Create System Use Case Realizations

- Create System Requirements

Rational Software Architect

- Java Developer

- Portal Developer

IBM Rational Team Unifying Platform

Run-time Statistics

Business Measures Model

Runtime

- WebSphere Process Server
- WebSphere Portal
- WebSphere Business Monitor

Deploy/Run

Monitor

Business Operations Analyst

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WebSphere Business Modeler Version 6 offerings

*WebSphere Business Modeler Basic*
- Process modeling
- Swimlane modeling
- Visio Import
- Eclipse integration
- Six Sigma Support
- Reporting
- Crystal Reports Integration
- Collaboration support
- Team support (CVS/ClearCase)
- Basic, Intermediate and Advanced Editing Modes

*WebSphere Business Modeler Advanced*
- Basic plus...
  - Performance simulation
  - Swimlane simulation
  - Business analysis (static/dynamic)
  - WebSphere Process Server support
  - WebSphere MQ Workflow support
  - WBI Server Foundation support
  - UML, XML, XSD support
  - Business Measures (Monitor) support

*WebSphere Business Modeler Collaboration Server*
- One-step process model Web publishing
- Web-browser-based Portal interface
- Access control at process, catalog or project level
- Feedback on specific artifacts or entire processes
- Attach documents and URLs

**Bundle:**
- WebSphere Business Modeler Collaboration Server
- 10 licenses of WebSphere Business Modeler Advanced
True Business Understanding Requires Multi-Dimensional Business Models

- **The Process Model**
  - The Graphical model provides the pictorial representation of the process model.

- **The Resource Model**
  - Allows you to define all of the different resource types and instances of those resources so that they can be associated to the model.

- **The Information Model**
  - Provides a view of data and how data is used within a business process.

- **The Organization Model**
  - Provides the definition and structure of all of the organization units and their associated resources.

- **The Analysis Model**
  - Definition of key process metrics and attributes are defined and then analyzed in both a static and dynamic manner.

- **The Collaboration Model**
  - Allows for both model time and deployment time collaboration on a process model.

- **The Business Measures (Observation) Model**
  - Definition of Key Performance Indicators and Metrics that represent the critical performance characteristics of how business performance is monitored.
Comprehensive Palette to model process complexity

Swimlane view provides different views of the same model

Objects with descriptive labels – Role label example

Color coded objects – color by Role example

Basic, Intermediate and Advanced modes show different levels of detail. Technology editing modes provide validation prior to transformation and export.

Metric Information available to view – Task duration example

Process editor - Free-Form Layout
The Information Model

- This data can be imported in from existing sources or upon export be used to help develop or enhance systems.

- Ability to associate critical information required for the process execution and to support the logic behind how the process behaves.

- Used in the analysis model for dynamic analysis of the process.

- Exportable so that it can be leveraged by both the runtimes and the application developers (UML Classes).

Templates can be used to inherit information that was modeled previously or that are reusable across business items.

Rules associated to business items can be evaluated during analysis.
The Resource Model

- Defines all role, individual, and bulk resources that are used within the business process and their associated costs

- Complex resource behaviors can be modeled in order to accurately reflect those behaviors in the analysis model
  - Qualifications and attributes associated to resources help determine the right resource to be used under a given set of circumstances
  - Use of timetable definitions help to accurately reflect any resource schedules

Scope definition helps identify specialized resource skill required to complete the steps in a business process.

Costs can be associated to resources and can be both per time unit and any one time start up costs.

Specifying availability characteristics assists in simulating real scenarios of resource constraints.
The Analysis Model

- Critical to understanding how a business process behaves

- Used to perform Return on Investment (ROI) analysis to determine the differences between the current and future states of the business process

- Simulations against the analysis model provides the most comprehensive way to identify complex behaviors of both simple and complex business processes
  - Robust simulation on the analysis model ensures that decisions made against the business process are based on the metrics that are validated by the business process Subject Matter Experts (SME’s)
Simulation animation

Queued work items show potential bottlenecks

Simulation real-time statistics

Simulation elapsed time

Simulation control panel
The Collaboration Model

- Project Tree view
- Model Elements view
- Outline view of the process
- Association of Comments and Responses with the process or specific elements of the process
- Attributes and associated documents and URL's view
- Graphical process view (SVG)
The Business Measures (Observation) Model

- Defines the contexts of what is monitored during the execution of the business process

- Key Performance Indicators (KPI’s) and Metrics are defined both at a business process and activity level of granularity

- Situation and situation outcomes can be defined in order to make KPI’s and metrics actionable
Icons are added automatically showing Triggers, Metrics, Timers, Counters and KPIs, etc. as they are added to the model.

Observation Model

Business Measures, KPIs and their Attributes
Demo

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Process Assembly

WebSphere Integration Developer
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Java Developer
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Portal Developer

IBM Rational Team Unifying Platform

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Platform Architecture

- Based upon IBM Rational Application Developer V6
  - **Note** – numerous features of RAD are not included in WID

- **Rational Software Development Platform**
  - Based on Eclipse 3.0
  - Contains the common components for Eclipse-based products
  - Installed once per system with the first product
Service Oriented Architecture programming model

Composition
- BPEL + Extensions
- SCA

Data
- Business Objects (SDO-based technology)

Invocation
- Service Component Architecture (SCA)
Goals of the new programming model

- J2EE is too difficult – SCA, SDO significantly simplify the programming model
- Strong isolation between business logic and the technical infrastructure code
- Dramatically reduced learning curve for “classical” application developers
- Provides a client programming model allowing client access to service components
- SCA is a service oriented component model for business services that publish or operate on business data
- SCA provides a single abstraction for service types that may already be expressed as
  - Session beans
  - Web Services
  - Java class
  - BPEL
  - etc…
Service Component: Overview

Component

Interface

Reference

Implementation

Implementation Types

Java
WSDL Port Type

Java
WSDL Port Type

Java
BPEL
State Machine
Business Rules
Human Task
Selector
Interface Maps
Programming Model

- Modules are contain “wired” Service Components
- Service Components use SDOs for data
- Solutions are a collections of Modules
WebSphere Integration Developer – Key Features

Assembly Diagram

- Business Processes
- Human Tasks
- Selectors
- Mapping Components
- Exports
- Imports
- Business State Machines
- Business Rules
- Resource Adaptors
- Web Services
- EJBs
- Java

Components Wired in Assembly Editor

- Used in Component Creation

J2EE Artifacts

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Component Assembly Editor
Composition - Business Process

- WS-BPEL compliant business process engine
- Simplified Process Editor
  - Optional
- Generic Business Process
  - Operations / Parameters
  - Service Implementation Details hidden
- Transactions / Compensation
Human Task Manager – Human Tasks

- **Invoke humans as services**
  - The ‘classical’ staff activity scenario

- **Allow humans to invoke services**
  - Any SCA component, e.g. a business process
  - Arbitrary Web services
  - Services performed by humans (ad-hoc)
Services implemented by People

1. ORIGINATING SERVICE
2. SERVICE REQUEST RECEIVED BY THE HTM
3. USER RECEIVES ALERT ABOUT NEW TASK
4. REQUEST USED TO CREATE NEW TASK AND USER ASSIGNED TO IT
5. USER ACCESSES TASK LIST AND SELECTS TO WORK ON TASK
6. TASK PAGE ASSOCIATED WITH TASK TYPE IS LAUNCHED
7. USER COMPLETES TASK USING TASK PAGE
8. TASK STATE IS UPDATED
9. SERVICE RESPONSE SENT BY THE HTM

ORIGINATING SERVICE

IBM Software Group

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Demo

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- Java Developer
- Portal Developer
- DBA
- Monitor

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**IBM Rational Team Unifying Platform**

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A Service Oriented Architecture is based on “components”, “services” and “processes”
Transition to formal models in RSA

- RSA will allow you to create models based on templates
  - UML 2.0 profile for software services
- The templates provide you with a recommended model structure, and UML profiles, appropriate to the type of model
- In example
  - A Use Case model – profile allows direct drag and drop of use cases from RequisitePro to RSA
  - An Analysis model – where you’ll find the Functional Areas
  - A Service Design Model – Rational recommended structure and profile for SOA – This is the Service Model Work Product
  - Enterprise IT model – May in practice be separated into Component Model and Operational model.
    - Contains the Services/Application matrix, expressed in model terms but may be extracted via a SoDA report
    - (An aside, not covered in this session: SoDA is a powerful tool for providing Word documents extracted from multiple Rational tools, which can be used to provide deliverables to customers who do not have the tools).
  - A “tourist’s guide” – the big picture of all the models
Ultimately, the goal of the Service-Oriented Modeling and Architecture method is to build an SOA.

At the heart of SOMA is the identification and specification of services.
Thank You

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IT Architect

email: kimmok@fi.ibm.com
Links

- **Best Practices for Using WebSphere Business Modeler and Monitor**

- **UML 2.0 Profile for Software Services**

- **SOMA introduction**

- **SOMA plugin**

- **IBM Academic Initiative**