Business Process Modeling and Service Oriented Architecture

Enabling IT to Deliver at the Speed of Business

Sponsored by IBM

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Penn State - Great Valley
Agenda

Introductions

- Understanding BPM and SOA
- Convergence: Where BPM meets SOA
- IBM’s SOA Lifecycle: Model - Assemble - Deploy - Manage
- Enterprise Transformation
  - Modeling your Business and your Technology
  - Getting started with Transformation

- Jonathan Brassington
  CEO & Partner
  LiquidHub

- Anthony Bakes
  Technology Manager
  LiquidHub

- Scott McLaren
  Websphere Sales Specialist
  IBM
## LiquidHub at a glance

<table>
<thead>
<tr>
<th>Overview</th>
<th>LiquidHub is a systems integrator and technology consultancy delivering Strategy, Applications, Data, and Infrastructure solutions within the context of Enterprise and Service Oriented Architectures.</th>
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<tbody>
<tr>
<td>Associates</td>
<td>300 associates worldwide</td>
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<tr>
<td>Locations</td>
<td>Philadelphia, Boston, and Hyderabad, India</td>
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<td>Industries Served</td>
<td>Life Sciences, Financial Services, Insurance, Retail and other industries</td>
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<td>Approach</td>
<td>Combining the planning and strategy of Enterprise Architecture and the principles of Service Oriented Architecture, our consultants work with clients to make most of existing IT system assets while providing a flexible technology architecture that will work long-term.</td>
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A little Buzzword Bingo

- **BPMN**
  - (Directory Services Markup Language)
  - (Model Driven Architecture)

- **SOA**
  - (Service Oriented Development of Applications)

- **MDA**
  - (Unified Modeling Language)
  - (Service Oriented Architecture)

- **SODA**
  - (Service Oriented Architecture)

- **BPEL**
  - (Business Process Execution Language)

- **UML**
  - (Business Process Management Notation)
  - (Business Process Management or Modeling)
A little Buzzword Bingo

**BPM** *(Business Process Management or Modeling)*

**DSML** *(Directory Services Markup Language)*

**SOA** *(Service Oriented Architecture)*

**BPEL** *(Business Process Execution Language)*

**SODA** *(Service Oriented Development of Applications)*

**BPMN** *(Business Process Management Notation)*

**MDA** *(Model Driven Architecture)*

**UML** *(Unified Modeling Language)*
Business-Oriented and Information Technology Concerns

- CEO concerns:
  - Increase Profits / Shareholder Value
    - Improve Customer Service
    - Enter New Markets
    - Enter New Geographies
    - Manage the Business in Real Time
    - Launch New Products
    - Shorten Time to Market
    - Ensure Financial Integrity
    - Ensure Regulatory Compliance
    - Leverage Inter-Firm Collaboration
    - Enable Business Combinations

- CIO concerns:
  - Enable the Business via Automation & Information:
    - Increase Functionality
    - Increase Agility
    - Improve System Scalability
    - Reduce Complexity
    - Extend value and reach of the Enterprise (e.g., to business partners)
    - Better align business processes with enterprise automation
  - Improve Financial Metrics:
    - Reduce Costs
    - Increase Return on Investment (ROI)
    - Maximize Current IT Asset Utilization
    - Better Predict Future IT Investment

The pressure for finding solutions to these problems is increasingly greater.
An Enterprise can be Viewed as a Collection of Processes
But, what about the capability to *Introduce* or *Change* processes?

The ability to implement new processes and change existing processes in a fast, cost-effective manner facilitates competitive advantage and is the essence of ‘agility.’
Business Process Management Definition

- A general term for the services and tools that support explicit process management including support for both human and application interaction.
- Business Process Management includes support for the key phases of the business process lifecycle: Process Definition, Execution, Monitoring & Administration, and Analysis & Optimization.
Key components of Business Process Management

- Process Design Modeler and Integrated Development Environment
- Process Repository
- Process Execution Engine
- Monitoring and Management
- Business Rules Engine
- Analytics, Optimization & Modeling

Source: Celent Analysis
Although there is no clear cut definition for the exact components required to constitute a Business Process Management Suite (BPMS), a typical BPMS includes all the tools necessary to effectively manage a business process through its life cycle.

Unlike Enterprise Architecture, Process Modeling, and Simulation tools that are used to create a new process, redesign/improve an existing process, or document an existing processes, the fundamental goal of a Business Process Management Suite is to automate and control processes as they are executed.
Key Standards for BPM

- Modeling Standards
  - BPMN (Business Process Modeling Notation)
    - Graphical flow charting language for modeling business processes
    - Developed by BPMI (Business Process Management Initiative)
  - UML (Unified Modeling Language)
    - Modeling language used to streamline the development of software
    - Commonly used for modeling business processes utilizing the activity diagram
    - Developed by the OMG (Object Management Group)
  - XMI (XML Metadata Interchange)
    - OMG standard that facilitates the seamless exportation of process models from one tool to another tool. This standard reduces an organization's dependency on the initial tool they select for modeling their business processes.

- Execution Language Standards
  - BPEL (Business Process Execution Language)
    - XML based standard language for executing business processes
    - Developed by OASIS (Organization for the Advancement of Structured Information Standards)
  - MDA (Model Driven Architecture)
    - OMG based standard used for translating UML based process model into BPEL
  - BPML (Business Process Modeling Language)
    - BPMI’s standard execution language that supports a direct mapping from BPMN
**Service-Oriented Architecture (SOA) is a multi-purpose buzzword**

A service-oriented architecture is a collection of services that communicate with each other. The services are self-contained and do not depend on the context or state of the other service. They work within a distributed systems architecture.  
*Source: DMReview.com*

**Is it an Enterprise Architecture?**

**Is it an Application Architecture?**

**Is it Software Architecture?**

**Is it an Approach?**

**Is it a Framework?**

**Is it a Reference Model?**

A service-oriented architecture is essentially a collection of services. These services communicate with each other. The communication can involve either simple data passing or it could involve two or more services coordinating some activity. Some means of connecting services to each other is needed.  
*Source: service-architecture.com*

Service-oriented architecture (SOA) is an evolution of distributed computing based on the request/reply design paradigm for synchronous and asynchronous applications.  
*Source: Javaworld.com*

Service-oriented architecture (SOA) is a design methodology aimed at maximizing the reuse of application-neutral services to increase IT adaptability and efficiency.  
*Source: http://dev2dev.bea.com/soa/

**SOA is an architectural style whose goal is to achieve loose coupling among interacting software agents. A service is a unit of work done by a service provider to achieve desired end results for a service consumer. Both provider and consumer are roles played by software agents on behalf of their owners.**  
*Source: XML.com*

**SOA refers to the re-engineering of IT systems and development that makes use of reusable chunks of software, aligned to business processes.**  
*Source: Diagonal Integrators*
SOA: Key Definitions

A Service

A repeatable business task – e.g., check customer credit; open new account

Service oriented Architecture (SOA)?

An IT architectural style that supports service orientation

Service orientation?

A way of integrating your business as linked services and the outcomes that they bring

Composite Application?

A set of related & integrated services that support a business process built on an SOA

Source: IBM
Fundamental SOA consists of services, descriptions & messages

1. Services Encapsulate Logic

2. Services Relate Through Service Descriptions

3. Services Communicate Through Messaging
The collective logic (or processes) that defines and drives the enterprise is an ever-evolving entity constantly changing in response to external & internal influences.

From an IT perspective, this enterprise logic can be divided into 2 important halves: business logic and application logic.

Services establish an abstraction layer wedged between traditional business & application layers.

Services are developed & deployed in proprietary environments, wherein they are individually responsible for the encapsulation of specific application logic.
Business Processes & Services

“Open account for customer”

Presentation – user interface

Get customer details

Locate account type

Add account to customer

Locate customer record

Check customer status

Lookup account type table

Retrieve account details

Create Customer Account record

Adapted from ANZ Banking Group Australia
# Comparing BPM to SOA

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<th><strong>SOA</strong></th>
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<td>- Business driven initiative</td>
<td>- A service centric viewpoint into the enterprise</td>
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<tr>
<td>- A process centric viewpoint into the enterprise</td>
<td>- Enables the independent construction of services while defining common characteristics for services:</td>
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<tr>
<td>- Higher-level abstraction for defining businesses processes where each process is a collection of tasks and each task represents functionality that may be represented by a service</td>
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<td>- Performs business process automation including orchestrating calls to the individual tasks that represent a business process</td>
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<td>- When automating processes that are dependant on legacy applications, provides application integration capabilities including the support for multiple platforms, languages, and communication standards</td>
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<td>- Doesn’t require SOA or services. However without SOA, leads to the creation of silo applications that don’t contribute to an overall flexible, agile enterprise that promotes reuse.</td>
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**SOA**

- Supports the execution of business processes by providing interfaces to services that can be mapped to tasks within a process while defining the interfaces within an enterprise context to support consistency and reuse.
BPM on SOA:

- BPM evolved from the workflow perspective while SOA evolved from the enterprise application integration (EAI) perspective. The two approaches are coming together as vendors begin to merge, acquire, and partner with each other.
- Services are becoming building blocks to model complex business processes. Services also become reusable and can be made into composite services aimed at different businesses within an organization.
- BPM is dependent on the underlying architecture, requiring integration between applications and automated business processes. SOA is the contemporary architecture. However, there is nothing inherent to BPM that requires SOA.
- BPM in general is the idea that we can model a business in terms of its processes and then represent them in a way that computers can understand and process. SOA has as its fundamental core the idea that business processes should be represented as services and then exposed as services so that different applications can consume and compose them in a loosely coupled manner. This means that as companies move to adopt SOA, they will necessarily implement BPM solutions as service-oriented versions, representing processes as services and BPM tools simply as service-oriented composition applications.
IBM on SOA
Business Centric SOA Starts with Your Most Critical Business Pain and Enables You to Build for Flexibility

- Deliver trusted information in business context to enable innovation
- Enable human and process interaction with consistent levels of service
- Achieve greater efficiency and effectiveness with business model innovation

“Forrester”

“Pick business processes with pain points that the business clearly recognizes — processes for which the business most clearly needs end-to-end visibility, control, insight, and flexibility”
And SOA Lifecycle Is The Key to Successful Projects

- Discover
- Construct & Test
- Compose

- Gather requirements
- Model & Simulate
- Design

- Sharing and reuse of services
- Establish decision rights
- Policies, measurement and control for SOA oversight

- Integrate people
- Integrate processes
- Integrate information

- Manage IT resources
- Manage services
- Monitor business metrics
Align Business and IT with SOA Governance

- Decision making rights, and measurements and controls across the lifecycle of services
- Mitigate business risk and maintain control of SOA projects
- Improve team effectiveness

“IBM's approach aligns with Gartner’s view of SOA governance, and we believe it is likely to be more effective than narrower approaches.”

Why IBM for SOA?

IBM understands service orientation and your business

- Expertise in aligning business and IT processes
  - SOA consultants, architects and IT specialists
  - Dozens of SOA-enabled business solutions
  - Unique intellectual property and methods

- Thriving ecosystem of partners (ISVs, SIs, Resellers)
  - 100+ partners in SOA community

- Extensive Industry experience and best practices
  - Over 1000 customers worldwide

- Unmatched breadth and depth of products
  - Over $1B/yr invested in SOA
  - IBM leads over 50 standards bodies
  - Over 300 SOA-related patents
Enterprise Transformation: Key Challenges for BPM on SOA
Enterprise Services Transformation

Your Current Enterprise Architecture
- 80% of your budget spent on maintenance
- Chaotic systems architecture
- Redundant systems
- Increasingly challenging systems integration

Enterprise Services Transformation Roadmap

The Agile Enterprise
- Visible, reusable services assets
- Reuse of legacy technologies
- Rapid development of new systems
- Easy integration of new software and systems

Creation of Reusable Enterprise Services

The Enterprise Services Transformation Roadmap provides a process for the controlled, stepwise evolution of an Enterprise Architecture to a Services Oriented Architecture with reusable services that work in a heterogeneous technology environment.
Enterprise Services Architecture Process Overview

ESA Planning
- Business Strategy
  - Goal Definition

ESA Framework
- Architecture Domain Reference Models

ESA Management
- Enterprise Architecture Program Management
  - Project Portfolio Management
  - Architecture Governance Board
  - Resource Management
  - Performance Management
- Enterprise Business Modeling
  - Business Architecture Domain Modeling
  - Business Process Models
  - Monitoring & Simulation
- Application Portfolio/Services Management
  - Services Domain Management
  - Application Architecture Design Patterns
  - Application Integration Coordination
- Enterprise Information/Data Management
  - Enterprise Data Domains
  - Enterprise Logical Data Model
  - Data Dictionary Management
- Technology Infrastructure Management
  - Technology Shared Services
  - Platform Selection and Management
  - Infrastructure Asset Management

Ongoing Development & Deployment
- Security Initiative
  - Security Strategy & Operations Guide
  - Security Monitoring Tool Implementation
  - Security Audit
- Directory Services & User Management Process
  - LDAP Infrastructure Upgrade
  - LDAP Schema Design & User Management Process
  - LDAP Schema Implementation & User Management Automation
  - Virus Scanning Infrastructure
    - E-mail & Calendar Upgrade

Ongoing Development & Deployment
- Summer Launch
- Choose Product
- University Launch
Business Domain Modeling

What are Business Domain Models?

BDMs start with a functional decomposition of an Enterprise’s Business Model. In subsequent activates, the BDM is further refined to describe core business entities and their inter-relationships. The BDM is a key input to Application and Data architectures.

How are Business Domain Models Created?

BDMs originate from the Enterprise Business Model. The first step is to use the business model to decompose the enterprise into business domains. Each domain is responsible for a core business competency, which typically includes strategy, control, and execution. Each domain is further decomposed using an iterative approach to define its detailed roles and responsibilities in performing core business processes.

How Do The Business Domain Models Relate To Applications?

The application architecture and information architecture of the ESA are derived from the BDM.

Domains are Business Competencies, defined as large business areas with characteristic skills and capabilities, for example, product development or supply chain.

A Business Component is a part of an enterprise that has the potential to operate autonomously, for example, as a separate company, or as part of another company (e.g, a Help Desk).
The Business Domain Model

Where are the core and non-core activities/ processes? What are the current business priorities?

How does my current application portfolio map to the business architecture? Where are my application redundancies?

How should teams be organized in the future to support the process?

What are the priorities for Reusable Application Services?

What are the gaps in our Solution portfolio? Where is the opportunity to improve and automate processes?

Which processes are internal vs. external via partners, suppliers etc?
### Detailed Business Domain Model: Financial Services/Investment Management Example

#### Partner & Supplier Interaction
- **Fund Accounting**
  - Cash Management
  - Manage Cash
  - Pricing
  - Price/Value Investments
  - Correct Pricing Error
- **Securities Accounting**
  - Conduct Securities Lending
  - Perform Clearing & Settlement
- **Analysis & Product Development**
  - Performance Analysis
  - Product/Service Success Analytics
  - R&D
  - Product Lifecycle
- **External Advisers**
- **Transactions Clearing-houses**

#### Record Keeping
- **Process Information Requests**
  - Generate Reports
  - Generate Statements
  - Generate Confirm/Notifications
- **Process Client Transactions**
  - Manage Assets
  - Manage Account Balance
  - Administer Installment Payment
  - Rebalance Assets
  - Calculate Benefits
  - Convert New Plan
  - Bill Fees
  - Process Credit/Margin
  - Calculate Annuity Payments
  - Administer Annuitization Payment
  - Manage Loans
  - Manage Trust Assets
  - Manage Trust Income & Disbursements
  - Process Corporate Actions
  - Withhold Taxes
  - Purge/Archive Records
  - Manage Client Payments
  - Prepare Excess Refund
  - Prepare Pass-Through Dividend
  - Manage Brokerage Orders

#### Advisory Services
- **Financial Planning**
  - Create Financial Plan
  - Manage Financial Plan

#### Account Management
- **Manage Accounts**
  - Setup/Maintain Person
  - Setup/Maintain Account
  - Setup/Maintain DC/DB Plan
  - Setup/Maintain Trust

- **Manage Information Requests**
  - Provide Information
  - Provide Personalized Performance Data

#### Investment Management
- **Investment Strategies Management**
  - Manage Portfolios
  - Replicate Indexes
  - Manage Order Routing and Execution
  - Monitor Performance

#### Management & Operations
- **Account**
  - Reconciliation
  - Reconcile Checks
  - Reconcile Client Accounts
  - Reconcile Transfer Agency Accounts
  - Reconcile Custody Bank Accounts
  - Reconcile Omnibus Accounts
- **Compliance**
  - Monitor Investment Compliance
  - Monitor Client Compliance
  - Audit Dividend & Capital Gain Disbursements
- **Client Control Reporting**
  - Process As-of Transactions
  - Provide Tax Services
- **Money Movement**
  - Move Money
- **Inventories Management**
  - Manage Literature Inventory
  - Fulfill Literature Requests
- **Financial Management**
  - Perform Corporate Budgeting
  - Provide Executive Information
  - Execute Monthly/Yearly Financials
  - Perform AP/AR
  - Issue Payroll
  - Track Assets
  - Prepare Compliance Reporting

#### Customer Relationship Management
- **Marketing**
  - Analyze/Understand Client
  - Perform Market Research/Analysis
  - Create/Modify Products/Services
  - Educate Client
  - Prepare Communications

#### Channels
- **Kiosk/POS**
- **Call Center/IVR**
- **Web**
- **Mobile**
- **Fax**
- **Paper**

#### Customer Segments
- **Retirement Client**
- **Brokerage Client**
- **Endowment Client**
- **Trust Client**
- **Defined Contribution Client**
- **Defined Benefit Client**
BPM & SOA Working Together

Source: BP Trends
Reference Chart
EA Domains and their impact on a “Services-Oriented” Solution Lifecycle

**EA Domains**

- **Architecture Program Management**
  - Solution Portfolio Mgmt.
  - Architecture Governance
  - Resource Management

- **Business Domain Modeling**
  - Business Domain Modeling
  - Business Process Modeling
  - Monitoring & Simulation

- **Services Domain Mgmt.**
  - Service Domain Modeling
  - Services Mgmt. & Governance
  - Solution Integration

- **Enterprise Data Mgmt.**
  - Master Data Model
  - Enterprise Data Dictionary
  - Data Integration
  - Data Warehousing/BI

- **Technology Shared Services**
  - Technology Shared Services
  - Technology Platforms
  - Infrastructure Services

**Solution Lifecycle**

- **Discover**
  - Project Charter & Solution Vision
  - Business Process Model
  - Requirements Specification

- **Design**
  - Solution Architecture (Conceptual)
  - Solution Design Specification
  - Data Model

- **Develop**
  - Solution Development & Orchestration

- **Deploy**
  - Solution Testing
  - Production Implementation and Support