SOA / ESB Case Studies

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SOA on your terms and our expertise
## Customer examples of levels of adoption

<table>
<thead>
<tr>
<th>Stages of Adoption</th>
<th>Web Services Role</th>
<th>Client Examples</th>
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<tr>
<td><strong>4</strong> On Demand Business Transformation</td>
<td>- Broad transformation of existing business models or the deployment of new business models</td>
<td>BEKINS</td>
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<td></td>
<td>- Enables standards-based connection of entire value network</td>
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<td></td>
<td>- Services, products, partners, and process flows may vary with market conditions and services available</td>
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<td><strong>3</strong> Enterprise Wide Transformation</td>
<td>- An architected implementation enabling business functions throughout an enterprise</td>
<td>AVIS, Charles Schwab, USDA, Miami Dade</td>
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<td></td>
<td>- Enables a publishing and consumption of services -- through self-description and dynamic combination -- within a Service Oriented Architecture</td>
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<td><strong>2</strong> Service Oriented Integration of Business Functions</td>
<td>- Integrating services across multiple applications inside and outside the enterprise for a business objective</td>
<td>Boeing, Avnet, Visa, BlueCross, CIBC</td>
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<td>- Integrates partners, divisions or channels with WS for basic transactions</td>
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<td>- Integrates a private network of partners or divisions</td>
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<tr>
<td><strong>1</strong> Implementing Individual Web Services</td>
<td>- Creating services from tasks contained in existing or new applications</td>
<td>JPMorgan, PNC, BlueCross, CIBC</td>
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<td></td>
<td>- Exposing existing functionality as web services, unlocking value from current infrastructure</td>
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Customer IT Background – Banking – Financial sector

- IT environment is very diverse, including many different hardware and software platforms
  - iSeries (AS/400)
    - Lots of homegrown RPG
  - Mainframe
    - Lots of homegrown Cobol
  - Windows
    - Leveraging WebSphere for web applications
  - Solaris
    - Various packaged apps
  - MQ
    - Enterprise-wide messaging
  - Packaged applications
    - PeopleSoft, SAP, others

- Increasingly hard to manage, change
  - Lots of dependencies between modules
  - No master data
    - Lots of batch data replication
Executive Summary from earlier customer workshop

Our Findings:

- The business requirements for customer centricity, and flexibility and responsiveness in addressing new requirements drives the need to better integrate the channels available today and drive an infrastructure modernization that allows for better data aggregation and infrastructure transparency for the existing application portfolio
  - SOA provides an agile and resilient approach for coordinating, and then consolidating disparate business systems (order processing, CRM, SCM) across the board in support of the vision to provide a global set of business systems
  - An Enterprise Service Bus provides the architecture foundation of the integration system that supports the SOA

- The need for efficiency at a global scale can be greatly facilitated by the establishment of SOA based architectural and standards governance for
  - Development and deployment of custom (in house) software packages
  - Integration of packaged software applications to address specific business needs
Executive Summary from earlier workshop

Our Recommendations

- Start building out the common SOA/ESB infrastructure by integrating existing and new Web Services to address critical business need

- Consider use of SOA and ESB technology to drive legacy transformation
  - “Gradual legacy code retirement”
  - Phased Data Model modernization
  - Enterprise wide Architectural and Standards Guidance including criteria for infrastructure and application package selection
  - Process Discipline and Best Practices

- Use SOA Strategy and Planning Engagement to scope and initiate projects
  - Process Map of Delivery Business
  - Transformation Roadmap – which business processes/functions in which stage
High Level Systems Views – Current

- Numerous Applications and databases, spread across various systems
  - Partial application portfolio migration from AS/400 to S/390
  - Partial application portfolio migration from green screens to Web
  - Mix of realtime messages and batch synchronization, aggregation
Leveraging SOA

Shift focus from Application and Data view to Process View for Flexible Business
Common (XML Document) message model for process integration
Shift focus to event driven process integration for Improved Customer Experience
Portal enabled Workflow Processes for Staff Integration as needed
Use SOA models (process, function, data, message) as one of the criteria in infrastructure and application package selection as well as partner integration

JSPs & Portlets:
e.g. OrderProcess, AccountHistory

Business Process Services
e.g. Order Processing, Customer Account Setup, Catalog Services, Payment Services

Business Function Services:
e.g. ShoppingCartAdd, ComputeTax, CheckInventory

Enterprise JavaBeans:
e.g. Customers, Orders, Catalogs, SKUs

Database & Transaction Systems:
e.g. ADDRESS, ORDER tables
e.g., DB/400 call, CICS call

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Top-down versus Bottom-up

- **Top-down** starts with a look at the business and its processes
  - Component Business Model (CBM) is IBM’s way of identifying the core components of a business
  - Service-Oriented Modeling and Architecture (SOMA) defines the steps of developing and building an SOA
    - Identify services
    - Specify services
    - Realize services
  - Focus on enterprise and business
    - Bridging gap between business and IT!

- **Bottom-up** looks at infrastructure
  - Few selected (Web) services
  - Establish an ESB
  - Refactor existing applications to invoke services
Enterprise Service Bus Project

- The ESB project fits the description of a bottom-up project:
  - Establish an Enterprise Service Bus
  - Develop two Web services
  - Adjust existing application code to call services

- It will feed into current and future business process modeling and optimization efforts
  - ESB serves as the SOA ‘backbone’
  - Additional services can be deployed with little overhead
  - Allows further stepwise migration of existing applications

- A top-down discussion is happening in parallel
  - Not a focus of this talk
Architecture – the “Big Picture”

Business Context Diagram

WWW

Business

Call Center

Enterprise Integration Layer (ESB)

Information Systems

Suppliers

Warehouse
Adding more details

To-be Component Diagram - EIL + 3

WWW

JMILL (Win2k Java)

CDAP (AS400 RPG/Cobol)

Enterprise Integration Layer (MQ)

Protocol Transformation/Data Transformation/Service Virtualization

Delivery Date Collection Service

Address Service

Tax Service

AOPS (AS400 RPG/Cobol)

COS/Routing (390 Mainframe)

Warehouse (390 Mainframe)

ODStar

Conceptual ESB

EIL (ESB)

On Ramp

Off Ramp

Protocol Transformation

Data Transformation

Service Virtualization

Service
Architecture Decisions

- Use WebSphere 6 “Service Integration Bus (SIBus)” for ESB deployment
  - Supports multiple protocols for service invocation
  - Supports link into MQ
  - Well-defined programming model for message mediation

- Use MQ for connectivity into existing apps
  - Already deployed throughout customer IT environment
  - Easy to use from RPG and Cobol
  - Fixed-length messages

- Deploy on WAS cluster with failover
  - Two physical machines
  - Windows 2000
WebSphere Live for SOA

Topology: High Availability With Load Balancing

- 2 App Server instances per machine for message processing
  - Horizontal and vertical scaling
  - Total of 4 server processes
  - All configured with all destinations, mediations, and services
  - Load balanced between destination/mediation and services

- 1 additional instance per machine acting as MQ ‘proxy’
  - Only one active at any given time
  - The other one in “hot standby” for failover
  - Part of a separate cluster
  - Required because of MQLink-WMQ limitations

- Can be scaled up by adding additional machine(s)
ESB Solution Topology

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ESB Solution – HA Overview

Summary

- We deployed a first instance of ESB based on WebSphere Application Server 6 SIBus
  - 2 Web services
  - Connectivity to legacy applications via MQ

- Special focus on
  - Formal modeling where possible/reasonable
    - Rational Software Architect
  - Non-functional requirements
    - Performance
    - High availability

- Project completed successfully
  - On time and on budget

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In production today

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Another case story – SOA on user interface
Banking – Financial service

- iSeries application (legacy) for core banking
  - No standardized interface to connect
  - “not normal” investment into development of MQ interface

- Existing Java application for loan offering and customer credibility checking
  - Initial data for loan account opening in this application
  - Forms are printed
  - Printed forms are retyped into core banking application (whole process – 5-6 hours)

- Consolidation for different channel support
Existing environment

- Java application for loan offerings at retailer office

Wrapped into Portlet (to be used inside of Websphere Portal)
Existing environment (continue..)

- iSeries – ICBS application (5250) (LOAN Account opening)

Loan approval scenario of 5250 screens wrapped into web service + HATS Portlet (to be used inside of Websphere Portal)
Proposed Environment (continue ....)

- Solution
Results

- 3 minutes for approval and opening for loans in core banking solution
- SOA – on user interface platform
- ESB platform established
- Jump-start into SOA
Q & A