Service Oriented Architecture (SOA) Finale Trends and Directions

April 5, 2007
The Value of Re-usable Assets

The Example of Toyota

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>61% Reuse</th>
<th>43% Reuse</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Corolla CE</strong></td>
<td>US $13,870</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Camry LE</strong></td>
<td>US $19,295</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Scion xA</strong></td>
<td>US $13,845</td>
<td></td>
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</tbody>
</table>
The Challenge

“In 2005, 76% of I.T budgets were spent on maintenance, leaving only 24% for new investments.” Forrester Research*

- Complex processes & systems
- Complex applications & interfaces
- Difficult to adapt quickly
- Large portion of IT budget spent on maintenance, not on new value add investments
- Duplicate services and difficult to govern

* In 2005, 76% of I.T budgets were spent on maintenance, leaving only 24% for new investments.” Forrester Research*
The Vertical Silo Problem
Older Architectures Do Not Support Flexibility
Required by Current Business Environments

Monolithic Business Applications – built historically
- Must periodically synchronize on inventory information
- Pricing information into each inserted differently based on application structure
- No common customer database, inventory or flexibility in business processes
Where Are We Heading – Service Oriented Architecture
Component-based Architecture is Not Enough

- Services defined as units of business logic, but...
  - Flow of control – bound into service logic
  - Transformation of data formats bound into service logic
  - Tight coupling between services makes them fragile
**Service Oriented Architecture**

Moves IT Logic Out of Services

- Services defined as units of business logic separated from...
  - Flow of control and routing
  - Data transformation and protocol transformation
The basics: What is SOA?

... a service?

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

... service oriented architecture (SOA)?

An IT architectural style that supports integrating your business as linked services

"SOA impacts every aspect of IT and business."
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*

“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”

FORRESTER®
The SOA Lifecycle

Assemble
Assemble existing and new assets to execute and manage business processes

Model
Capture, simulate, analyze, and optimize business models to reduce risk and increase flexibility

Governance & Processes
Alignment of strategy and operations across business and IT in support of business objectives

Deploy
Deployment of models, policies and assemblies to realize business intent

Manage
Real-time visibility and analysis of business information for timely and coordinated action
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can you visualize how work gets done? Do you know what people do the most (you may be surprised)? Are people working effectively?</td>
<td>Is it easy to reach into, “to see”, and measure the business? In real-time? What can you do with those measurements?</td>
</tr>
<tr>
<td>Is the process fast enough from start to finish?</td>
<td>How do you decide what to change? How do you “business case” changes?</td>
</tr>
<tr>
<td>Is there too much manual work? too much paper? too many errors?</td>
<td>Is it easy to change how you work? Can you analyze changes before making them? Are changes a programming effort or a business analyst effort?</td>
</tr>
<tr>
<td>Need to ensure policies and business rules followed?</td>
<td>Is the connectivity infrastructure brittle? Hand-coded?</td>
</tr>
<tr>
<td>Is audit a concern?</td>
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</tbody>
</table>
SOA Reference Model

Business Management

People

Process

Information

Development Lifecycle

Connectivity

Partner Connections

New Services

Existing Applications

Model

Assemble

Deploy

Manage

Infrastructure Management
WebSphere Business Modeler

Benefits

& Business want to understand and change their operational processes quickly…
…but their processes are: misunderstood, inconsistent, hard-wired, or inflexible

Features

- Graphically Model Processes
- Simulate and Analyze
- Collaborate and Web Publish
- Export business and data models for use in IT deployment
- Import existing process pictures done in Visio as a starting point for true business modeling
WebSphere Integration Developer

Business want to understand and change their operational processes quickly…
…but their processes are: misunderstood, inconsistent, hard-wired, or inflexible

Business want to deploy automated processes fast
…but most do not have a way to do this

Features
- Development Tool for Process Server and ESB applications
- BPEL Without Coding
- Dynamic processes and assembly
- Business rules to determine the process flow
- Supports native human workflow

Benefits
- Training on a single, multipurpose platform materially improves productivity of staff and reduces education expense
- Reduce application development and maintenance costs by changing, adding or deleting business process rules rather than rewriting applications
Assembling The Components

If Approved then
- Send letter offering gold
If NOT Approved
- Send letter offering Credit counseling service

Adapting to business events
- Enable rapidly changing customer decision point
- Sell additional services based on customer profile
- Call Credit Rating service from an existing application
- Human intervention on suspect applications to prevent fraud
- Import EIS System
- Flexibly building business processes based on standards
**WebSphere Process Server**

**Benefits**
- **Reduce cost** to deploy function through simplicity, interoperability and component reuse

**Features**
- **A Single Process Server** built upon WebSphere Application Server
  - Integrated runtime for all SOA based process automation
  - Runtime engine for all the components defined in Assemble
  - SCA & CEI support
  - Supports compensation, fault handling, business objects, rich human interaction
- **Integrated ESB** for Range And Reach

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…but their processes are: misunderstood, inconsistent, hard-wired, or inflexible

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What is an Enterprise Service Bus (ESB)?

Flexible connectivity infrastructure for integrating applications and services to power your SOA

- Built on **MESSAGING**
- **ROUTING** messages between services
- **CONVERTING** transport protocols between requestor and service
- **TRANSFORMING** message format between requestor and service
- **HANDLING** business events from disparate sources

*Shape = Protocol
Color = Data type*
**Hudson’s Bay Company**

**Vision** Automate product information process by moving off paper-based system

**Challenge**
- Identified a requirement for a more stringent, policy driven (enforced) product return application.
- Required access to both current and historical sales and return transactions.
- Existing process for capturing store transactions could be anywhere from current to 2 ½ hours delayed.
- Identified that most fraudulent transactions occurred within ½ hour of the original sale transaction.

**Solution**
- Each store connects to WBI Message Broker via MQe for TLOG transfers. Data warehouse built with connections to mainframe and fraud detection application which is web service enabled back to the store.
- WBI Modeler used to model process and define artifacts.

**Value**
- Documented $1.6M in savings through the first 7 months
- We know it is more
- Environment has been further exploited to include debit and credit transactions both internally and externally with 3rd party organizations
- Process developed for capturing store transactions is being further exploited for enhanced inventory management

“This is really ‘COOL’ stuff. IBM as an implementation partner, stepped up and helped us deliver. They co-owned the process.”

Rob Armstrong, Manager Information Resource Management
**Messaging Fundamentals**

A single solution, with multi-platform APIs (JMS and MQI)
- Easy to use message centric interface
- Network independent
- Faster application development

**Assured message delivery**
- Once and Exactly Once, Transactional

**Loosely-coupled applications**
- Asynchronous messaging
- Pacing, Parallelism, Triggering

**Scalable & Robust**
- Publish\Subscribe or Point to Point
- Clustering, Large Messages

**Pervasive**
- Mobile, PDAs
- Supported on over 80 platforms

**PM4Data solution for ftp**
- Managed FTP over MQ
WebSphere ESB Appliances: DataPower

High-Speed XML Processor

- **Functionality** - Centralized wirespeed transformation, parsing, and schema validations
- **Performance** - Speed XML processing by orders of magnitudes, extensive SSL acceleration, XML Compression, XML Caching
- **Compliance** - Full support of XML, XSLT, XPath standards

Secure Enterprise Gateway

- **Appliance-Based** - “Drop-in” device helps secure multiple applications concurrently
- **Easy Integration** - Interoperates with and augments existing security systems

High-Speed XML-to-binary Transformer

- **Easy Integration** - No code changes, APIs, or extra complexity
- **Legacy Support** - Supports multiple wireline protocols, including WebSphere MQ and FTP
**IBM Delivers a World Class ESB Portfolio**

**ESB:**
- **WebSphere ESB** provides Web Services connectivity and data transformation

**Advanced ESB:**
- **WebSphere Message Broker** provides universal connectivity and data transformation

**SOA Appliances:**
- **WebSphere DataPower** provides simplified connectivity and wirespeed data transformation with enhanced security
SOA: Insurance Example BEFORE

Adding a new channel for Insurance Brokers to access internal systems was too costly and complex to introduce.

“Ripple” changes and unknown impact of changes had stalled project.

Projected Number of Interfaces = 132
Potential Number of Interfaces = n(n-1) = 380
Insurance Example AFTER

Benefit due to reduced labour: $1.7M USD
Capital costs: $350K USD
ROI after 24 months: 500%
Months to realize 100% ROI: 6
Deploying workflow to integrate processes

Projected Number of Interfaces = 132
Potential Number of Interfaces = n(n-1) = 380
WebSphere Services Registry & Repository

Businesses want a robust connectivity infrastructure…
…to simplify connectivity, support services orientation, reduce costs and risk

**Features**

- Publish and find services
- Publish and find services capabilities
- Publish and find service lifecycle stage
- Publish and find service interactions
- Publish and find service dependencies and redundancies

**Benefits**

- Reduce time to market via assembly of services
- Reduce cost via reuse
- Reduce risk by using hardened and understood services
- Improves consistent policy adoption, visibility, reliability

**Publish**
- Describe
- Populate
- Configure
- Classify
- Organize

**Find**
- Discover
- Search
- Retrieve

**Agility**
- Identify
- Notify
- Secure
- Access
- Runtime

**Manage**
- Policies
- Change
- Version
- Classify
- Analyze
- Promote

**Govern**
- Approve
- Retire
- Validate
- Conform
**WebSphere Business Monitor**

**Features**

- Scorecard view of Key Performance Indicators
- Track cost, time and resources
- Identify bottlenecks, balance workloads, reduce latencies in the *process, monitor trends*
- Set situational triggers and notifications and dynamically respond to these alerts
- Make process modifications based upon real-time data sent back to the Modeler for simulations
- Set programmed responses to events

**Benefits**

- Line of sight to business information in *real time*
- *Faster reaction* to changing business situations
- Optimize your business operations based on actual performance

**Businesses want a real time view of operations and the ability to intervene...**

...but there is typically no way to achieve this without a massive effort, yielding inflexible solutions
WebSphere Application Server

**Features**

- SOA enablement
- Simple, integrated development
- Secure and scalable deployment
- Flexible management and security infrastructure
- Standards leadership
- Proven experience
- Common and flexible deployment environment
- common tools platform

**Benefits**

- Increases the return on your existing investments while providing an on ramp to the entire IBM Software Group Portfolio:
  - Integrate application assets with the Web services based Services Oriented Architecture
  - Improve resource utilization with enterprise class quality of service
  - Experience enterprise integration with the industry’s broadest platform support that lets you bridge heterogeneous environments and reuse legacy assets

Businesses want a robust application integration platform…
…which manages complexity and provides a robust runtime engine
Application Server QoS
To Meet Your Tactical Application Needs

Customer Needs
Lower acquisition costs, rapidly develop & deploy departmental application, grow incrementally, low transaction volumes

QoS
Basic security & Web services, easy admin & deployment of single app, editors, J2EE model

Clustering & Load Balancing

WAS for z/OS
WebSphere Extended Deployment

WAS Network Deployment

WebSphere Application Server - Express

Visual tools included

Rational

Apache Geronimo

WAS Community Edition
The Model in Action

Business Innovation & Optimization Services

Interaction Services
- Portal

Process Services
- ESB facilitates communication between services

Information Services
- Federated Query

Development Services
- Partner Services
  - Community Manager

Business App Services
- App EJBs

Infrastructure Services

IT Service Management

IT impact on processes

Business dashboard
So what’s going on in the world?
**pressures: commoditization**

**Examples**

- When consumer electronics products stop working, owners are almost as likely to buy replacements (39%) as they are to get them repaired (44%)

- Nearly half (49%) of US and UK consumers have changed service providers in at least one industry during the past year due to poor service

- Airlines:

  ![Graph: Number of new airline entrants](image)

  *New market entrants create greater competition...*

  ![Graph: Real (inflation-adjusted) passenger yield](image)

  *...even as revenue per customer historically erodes*

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*Consumer Electronics Association; Accenture; Airline company Web sites; “Aviation Capacity” ATA; US Bureau of Labor Statistics*
innovation: why?

pressures: competition

Access to online information negatively affects brand loyalty as consumers switch brands at purchase...

...compounded by their willingness to purchase products from nontraditional providers.

American Interactive Consumer Survey, 2002, Dieringer Research Group. 4,000 survey respondents, all from U.S., combination of online and clicks and mortar shoppers; IBM Institute for Business Value
Example: Mobile Phones

- In addition to making and receiving calls, the most popular mobile phone activities among U.S. owners are using the calendar and address book (42%), downloading or playing games (33%), and downloading ringtones (32%).

- In fact, more than half (56%) of mobile phone subscribers rely on their phones’ nonphone features, such as camera, clock, calendar, messaging, music...and as substitute flashlights to see in dark places.

- And one in eight mobile phone users (12%) would pay $10 per month for unlimited TV access via their phones.
So what’s emerging and what should be watched?
While the number of transistors per square inch on integrated circuits doubles roughly every 18 months (Moore’s Law)...

...more storage can be purchased each year for the same price.
innovation: how?

**embedded intelligence**

- computing no longer just from computers
  - Already more than half of the world’s chip supply ends up in consumer-electronic gear.

- processing, visualization, simulation power
  - The chip in a musical birthday card has more computing power than the computers used on the first flight to the moon.

- “pervasive computing” actually becomes pervasive
  - In 2001, there were 60 million transistors produced for every man, woman and child on earth. In 2010, the amount of transistors per person will likely be 1 billion.
  - RFID costs are dropping as production volumes rise; when they reach 5¢ per tag (down from the current 25¢ per tag), many think they’ll become truly pervasive.
  - About 1.3 billion RFID tags were produced in 2005. This number is expected to rise to at least 30 billion by 2010.

Cell processors

Technology Collaboration Solutions

RFID solutions

...and more
interconnected people ... and things

a billion people

- By late 2006, China (currently #2) will surpass the United States (#1) in the number of broadband subscribers
- By early 2007, Slovenia (#20) will likely surpass the United States (#19) in the percentage of households with broadband connections

a trillion things

- Four leading types of “things” will increasingly account for the number of devices and objects connected to the Internet:
  - tagging things (radio frequency identification)
  - feeling things (sensors)
  - thinking things (smart technologies)
  - shrinking things (nanotechnology)
- 100% annual growth rate of number of object-to-object connections
- 49% annual growth rate of market value for object-to-object communications
- Estimated worldwide market value of object-to-object communications in 2010: $270 billion
supercomputing for everyone

faster, more powerful
- More than 70% of the world’s most powerful supercomputers were installed in 2005
- By 2010, supercomputers will be capable of 10 quadrillion calculations per second

more affordable
- On demand supercomputing today costs approximately 50¢ per hour for CPU time.
- Virtualization can result in an overall IT cost reduction of 15-30 percent, above and beyond what can be achieved through consolidation.

more ways to access
- Mainframes
- Grids
- On demand
- Aggregated servers

...and more
insight through integration

Instantaneous

55% Daily
17% Weekly
17% Monthly
11%

24% Weekly
44% Daily
29%

“How current does data need to be for analysis today in 2002?”

“How current will it need to be in 2006?”

[Source: Gartner]
innovation: how?

*insight through integration*

**storage**
- more information than ever before
  - E-mail volume:
    - 2000: 5.1 billion messages a day
    - 2005: 135.6 billion messages a day
  - The world’s largest commercial databases are now measured in the hundreds of terabytes.

**middleware**
- more information integrated more easily
  - 90% percent of Fortune 500/Europe 500 companies are planning to or are in the process of implementing an internal “shared services” – or global integration – strategy.

**autonomic systems**
- easier to analyze and better results
  - The Fire Program Analysis system looks at weather patterns and historical data, such as the location and intensity of forest fires, to predict and prepare five U.S. government agencies for the next season’s blazes.

**analytics**

**expertise**

**...and more**

ABC News; InformationWeek; Axon; Fire Program Analysis
The power of data

What if your car could self-diagnose, order parts and schedule a service appointment for you?

Pepper . . . and Salt

"Well, I see you still owe $7,382 on this one ... ."
Insurance on-demand

Black box in the car

Hi-tech check on where you drive will decide how much insurance you pay

By Sean Poulter

Consumer Affairs Correspondent

WITH insurance charges steadily rising, an aircraft-style ‘black box’ is being fitted to cars in an experiment to allow pay-as-you-drive schemes.

Insurers estimate motorists’ premiums will be based on where and how often they drive, with the in-car device capturing the details of their travel, speed and braking displayed in a report of driving condition

The information is then used to adjust the premium. The average claim is used to decide how much the driver will be charged. The technology allows the driver to be more careful, but for those who drive more carefully, it should mean cheaper premiums.

The system will avoid running on a network of the sort that covers the whole country. For the future, the technology could be applied to all the different

When the low instantaneous figure for a journey is less than the distance travelled, the system will be able to provide an accurate estimate of the position of the vehicle. The system is to be installed in a vehicle, which will be tested on the roads. The

Insurance companies are likely to refer to the new system, which works like a computer, that reads the details of travel, including the number of journeys taken and the distance driven. The system is to be installed in a vehicle, which will be tested on the roads. The

The system is to be installed in a vehicle, which will be tested on the roads. The information is then used to adjust the premium. The average claim is used to decide how much the driver will be charged. The technology allows the driver to be more careful, but for those who drive more carefully, it should mean cheaper premiums.

If you get lost... Online contact with a Norwest Union call centre who will advise location and possible directions to destination.

In case of accident: Call centre advised if car damage triggered. Will be able to assess severity of impact and send out assessment of the damage.
new forms of collaboration

between individuals
  • The “blogosphere” doubles in size every 5 months, adding 70,000 new blogs per day.
  • 50 million Americans -- 30% of U.S. Internet users -- visited blog sites in the first three months of 2005 alone.
  • 70% of Internet users use instant messaging, and nearly 4 in 10 send as many or more IMs as e-mails.

between, with and among companies, experts, communities, customers...
  • Over half the companies who emphasize collaboration out-perform their closest competitors in terms of operating margin.
  • By 2009, wikis are predicted to become mainstream collaboration tools in at least half of all companies.

more kinds of things to collaborate on
  • Procter & Gamble has set itself a goal of getting half its new product ideas from outside the company by 2010.
  • By 2010, 1 of 4 online music sales will be driven by recommendation technology, or “taste-sharing applications.”
Collaboration at Sea

Collaboration at Sea in the Low Bandwidth Multinational Naval Task Group Environment - Using Collaboration to facilitate tactical and strategic decisions.
virtual corporations

once hype, now reality

- Already, 41 percent of Global 2000 firms have deployed SOA (service-oriented architectures) — expected to rise to 62 percent in 2006.
- Worldwide spending on business process outsourcing is projected to grow 11 percent annually through 2008.

business broken into component pieces

- The average bank uses 60 to 90 defined business components every day in the course of business.
- The market for business information management software and expertise is considered to be currently valued at $36 billion, and could be worth $69 billion by 2009.

deeper integration with enterprise

- It’s predicted that, by 2008, 80 percent of development projects will be based on SOA.

Forrester; IDC; IBM “Building an Edge,” Vol 5, No. 8; Moore & Cabot Capital Markets/Dow Jones; Gartner/Wireless News
Thank you