Achieving Business Agility through SOA and BPM

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Introducing OMG

• One of the most successful forums for creating open integration standards in the computer industry
  - Platforms: CORBA, UML, many related specifications
  - Domains: Finance, Telecoms, Healthcare etc.

• An industrial consortium with vendor and user members
  - Implementation must be available from OMG member

• Interfaces freely available to all
  - Visit http://www.omg.org

• Decisions taken by members
# Worldwide Membership

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Building (in)flexible business systems (1)

- In the past, creating business IT systems has been like filling a mould (project requirements, schedule) with amorphous concrete (code)
Building (in)flexible business systems (2)

- When you’ve finished, you have this big, rigid, monolithic thing that has one very specific purpose.

There are no identifiable parts that could be re-used for something else.

It's hard to change the shape.

If you try, it breaks.
Adapting to changing business needs

- IT development usually a series of catastrophic discontinuities ...

- Instead of evolving function in response to evolving requirements
Maintenance & evolution is expensive

- More than **50% of staff time spent on maintenance**
  Leintz & Swanson 1981 survey of 487 organisations

- Recent maintenance & evolution cost estimates even higher
  - 60-70%  (Huff, 1990)
  - > 90%   (Moad, 1990)
  - 75%     (Eastwood, 1993)
  - > 90%   (Erlikh, 2000)

- **US annual software maintenance costs > $70bn**
  Edelstein 1993, Sutherland 1995
Flexibility through modular structure

- Improve agility of enterprise IT systems by mirroring structure of enterprise itself
  - Taking orders
  - Shipping products
  - Reporting accounts
  - Forecasting sales

- Each function becomes a “service”
  - Modularity -> flexibility
  - New business processes use existing services
Link Services Bilaterally?

Order taking

Product shipment

Account reporting

Production planning

Sales forecasting
Enterprise Service Bus

Order taking

Production planning

Product shipment

Account reporting

Sales forecasting
Services are ...

- Modular: each service represents a self-contained business function, does not reveal implementation, can be re-used
- Composable: may be used as part of a new business function without unexpected side-effects
- Precisely-described: public meta-data describes what each service provides, what it requires, its expected outcomes
- Coarse-grained: Each implements a major business process primitive
SOA pedigree

- SOA’s pedigree goes back to 1970s
  - 1982 book on academic SOA system

- OMG CORBA used to implement SOA within enterprise from 1990s
  - Efficient, tightly-coupled systems

- Web services used for SOA across enterprise boundaries from 2000
  - Same principles, loose coupling
Can SOA help you?

- Using services is a necessary, but not a sufficient condition for flexible business architecture
  - How to put the “Architecture” into SOA?
  - Avoid creating JABOWS (“Just A Bunch Of Web Services”)

- Your organisation must have mature, repeatable business processes

- You must be able to accurately capture those processes, so they can be supported and automated

- Unless you know how your organisation really works, and can capture that information precisely, SOA can’t help you
BPM and SOA

- SOA: building business systems from independent services
  - Each performs specific, well-defined business function
  - “Orchestrated” in different ways to implement processes
  - But ... how orchestration code designed sometimes vague

- Identifying processes often harder than SOA implementation
  - Delaware Electric Coop: 55% project effort identifying & modelling processes, 20% coding, 25% testing & deploying

- BPM helps analyse business needs, design SOA solutions
  - “BPM is SOA's killer application, SOA is BPM's enabling infrastructure” – Ismael Ghalimi
Business Process Maturity Model (BPMM)

- Failed enterprise applications part of IT folklore
- Some of these failures can be blamed on technology issues ...
- ... but more are rooted in the state of the organization into which the application is being deployed
- Problems manifest themselves as weaknesses in the business processes that are the target of an enterprise application
- BPMM aims to measure and help improve organizational readiness for technology deployment
What is BPMM?

- Guidance on appraising the maturity of business processes
  - How repeatable? How risky?

- Metrics for fidelity with which Business Processes are implemented

- Determine whether organic growth or acquisitions have resulted in multiple ways of performing similar tasks

- Can suppliers deliver outsourced services?

- Guidance implementing business process foundations needed for organizational agility & lower costs
BPMM levels

1 Initial: processes performed in inconsistent, sometimes ad-hoc ways, with results that are difficult to predict

2 Managed: work within local workgroups is performed in a repeatable way (but other groups may use other procedures)

3 Standardized: common, standard processes created from organisation’s best practices used across organisation

4 Predictable: process performance measured to control variation; outcomes predictable from intermediate states

5 Innovating: organisations identify gaps between current capability & objective, implement changes to address them
Capturing business processes

• **Precise Business Process Modelling**
  - Models service orchestration
  - Captures composition of SOA primitives into business processes

• Defines primitives’ behaviour, allows definition, capture & automation of orchestration

• Precise, visual, usable by “The Business”
Business Process Modelling Notation

- Financial Institution: Authorise credit card
- Distribution: Pack goods, Ship goods
- Sales: Authorise payment, Process order
Putting the “Architecture” into SOA

• Architecting business processes that orchestrate SOA services requires:
  - Capturing processes in a form understandable by business
  - Accessible meta-data describing SOA services & interfaces
  - Generating workflow orchestration code from both these

• Business Process Modelling Notation becoming de facto standard for creating & sharing business process designs
  - Exports standard Business Process Execution Language (BPEL) to drive process automation engines
Model-Driven Architecture

- Standards-based framework for manipulating & storing precise, business-level models that generate working systems
  - The bridge between technology-independent business models and SOA-based deployment strategy

- Build computation-independent model in business language(s)
- Store models in common, standards-based model repository
- Exchange models with business partners
- Transform into code, database schemas, deployment scripts ...
- Invest in models as the long-lived intellectual assets, not code
Analysts say ....

• Gartner:
  “Organizations implementing SOAs should pay close attention to the MDA standards and consider acquiring tools that automate models and rules.”
  “By reinforcing the business-level focus and coupling MDA’s with SOA concepts, you end up with a system that is inherently more flexible and adaptable.”

• Forrester:
  “Forrester expects model-driven development (MDD) to play a key role in the future of software development; it is a promising technique for helping application development managers address growing business complexity and demand.”
  “MDA is the most important standards framework for MDD.”
MDA Study - Österreichische Bundesbahnen

• Austrian Railways: one of Europe’s largest transport providers
  - 49,000 staff and 8,000 trains per day (average)
  - Requires 200-300 manual schedule alterations per day

• Netz division handles track management and planning
  - 12,000 staff manage 5,672 km of track in 15,000 segments
  - Requirement: per-usage billing for actual use of network
"Leistungsdaten Zugfahrt" (LDZ) application

- Billing logic for actual use of OBB network, based on:
  - Train weight
  - Km travelled
  - Delays incurred

- LDZ exchanges train data with 13 operational (legacy) systems
  - Legacy systems provide train data services
  - Orchestrated by new application for new billing process
  - Approx. 50 individual records/train → 400,000 records/day

- Detailed, itemised, monthly invoices issued to customers
  - 1st to fulfill EU’s fine grain rail billing requirements
LDZ implementation

- Model-driven, Service-based
  - ArcStyler/MDA turns UML models into 4 tier infrastructure
  - 400,000 EJBs represent every train, signal & station
  - Integrates 13 legacy services

- Initial preparation phase – 2 months, 3 people
- Development by 15 people in 4 Teams
- 1st running test case (no error checking) after 3 months (12/01)
- Pilot running mid-May 2002, ready for deployment July 2002
OCEB - OMG Certified Expert in BPM

• Five vendor-neutral exams & Certifications
  - Fundamental level (available now)
  - Business & Technical Intermediate (in beta test)
  - Business & Technical Advanced (in beta test)

• Jointly developed with UML Technology Institute in Japan, available internationally

• Exams written by 25 BPM experts

• Testing provided by Pearson Vue test centres
Summary

• SOA provides architectural basis for flexible business systems
  - Industry (including OMG) has 15+ years’ SOA experience
  - ... but implementation platforms change routinely
  - ... so we need platform-independent SOA designs

• Business modelling helps design business-needs-driven apps
  - BPMM measures organizational readiness for automation
  - BPMN de facto standard for capturing business processes

• MDA provides tools for writing & maintaining flexible apps.
  - Links business needs & BPMN process models to SOA deployment strategy
For further Information

- OMG: http://www.omg.org
- MDA: http://www.omg.org/mda
- Email: andrew@omg.org

Thank You