The Future of Software Architecture for Large Scale Business Solutions

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Back to the Basics
Accenture Background

- Consulting, Systems Integration, Outsourcing
- 186,000 people in 49 countries
- Over 100,000 people in software development
- $23.4bn revenues
- $10bn SI revenues
Large Scale Business Solutions

- Serves 91 of the Global Fortune 100 & Governments in 43 countries
- Every 4 hours an Accenture system goes live
- Help process 50% of the world’s mail
- 1 in 5 of the world’s telephone numbers are billed by Accenture systems
- Issue 1/3 of the world’s passenger airline tickets
- Produce over 1 million lines of production code every business day
What’s the problem?
IT Productivity and Quality are Lagging

Despite advances in development tools and techniques, software initiatives have lagged behind in utilizing novel software engineering methods and techniques effectively to reduce the complexity of large-scale software.

IT cost overruns are still commonplace, and the cost to "keep the lights on" for fragile legacy applications typically consumes up to 60% IT budgets.
Key Conclusions

• **IT is not contributing as much as it could to earnings growth**

• **We don’t have an innovation problem, we have an adoption problem**

• **Conservative IT investing is like slow water skiing**

• **Corporate systems a long way from meeting consumer-based expectations**
Where is the money going today?

400 Global Organizations
100% of Budget

High Performers
100% of Budget

Low Performers
100% of Budget

- Running 29%
- Fixing 12%
- Enhancing 17%
- Integrating 9%
- Building 14%
- Testing 9%
- Deploying 10%

- Running 30%
- Fixing 5%
- Enhancing 17%
- Integrating 10%
- Building 18%
- Testing 10%
- Deploying 10%

- Running 32%
- Fixing 16%
- Enhancing 14%
- Integrating 7%
- Building 12%
- Testing 9%
- Deploying 10%
Where do CIO’s say they are going next?

Preferred Migration Option in Next 18 Months by Business Process

- On Demand Saas: 21% (Sales), 38% (Cust. Svc.), 60% (F&A), 49% (HR), 45% (Ops), 47% (SC), 29% (R&D)
- Enterprise Application Upgrade: 22% (Sales), 22% (Cust. Svc.), 21% (F&A), 18% (HR), 15% (Ops), 14% (SC), 35% (R&D)
- Custom SOA: 11% (Sales), 10% (Cust. Svc.), 15% (F&A), 18% (HR), 26% (Ops), 19% (SC), 16% (R&D)
- Industry Driven SOA: 6% (Sales), 5% (Cust. Svc.), 5% (F&A), 11% (HR), 3% (Ops), 4% (SC), 4% (R&D)
- BPO: 0% (Sales), 0% (Cust. Svc.), 0% (F&A), 0% (HR), 0% (Ops), 0% (SC), 0% (R&D)
What distinguishes the High Performers?

Ability to accelerate development cycle times

Performance ratings of objectives in improving delivery of applications development and maintenance

- Building systems that will be utilized
- Reducing risk of delays or overruns
- Accelerating cycle times
- Reducing risk of disruption to business
- Lower delivered cost

Overall vs. High Performance
So, What to Do About This?

Industrialisation Agenda: Attacking cost and time to market

- **Differentiation “on the outside”**
  - a clear view of what makes them unique – whether product, service, brand or business model – and have certainty the customers and market agree

- **Simplification “on the inside”**
  - simplicity in everything they do:
    - standardised products, processes & systems
    - identifying where they need scale and how to get it

- **Execution Mastery**
  - prioritize execution as a core capability:
    - managing the investments & risks of change programs
    - creating a culture to stick to the strategy operationally
Learning from Industrialization in Other Industries . . .

Evolution of Automobile Engineering:

- Original VW Beetle
- Original Fiat Panda
- Seat Marbella
- Seat Altea
- Skoda Octavia
- VW Touran
- Audi A3
- VW Golf V

Manufactured > Assembly > Platform

Number of Differentiated Cars:
- Early 70's
- Present

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Where Will We Focus To Get There?

- Enable Process-Driven Systems Integration
- Embrace Disruptive Technology Trends
- Evolve Architecture of Large Business Solutions
- Pursue Industrialization Agenda for Software
High Performance Business Agenda: Seeking Process-Driven Systems Integration

- Industry-wide Perspective
- Strategy and Economics of High Performers
- Operating Model
- Industry Specific Processes
- Industry Specific IT Frameworks and Technologies
- Industry Specific Offerings

Business Strategy, Operating Model

Business Process

Software Development & Integration
Linking Business Value to Software Implementation

**Application Architecture**
- Best Practice Application Architecture
- Industry Software Package Maps
- Industry IT Metrics
- Industry IT Best Practices

**Solution Design**
- Information & Data Models
- Component and Web Service Models
- Business Process to Automated Process Maps

**Solution Configuration**
- Linkage to SAP Solution Manager
- Connection to new SAP Galaxy
- Linkage to Oracle AIA
- Generation of Oracle BPEL

**Example Artifacts**
- Package selection
- Application Rationalization
- IT Cost Improvement
- Integration design

**Example Project Activities Supported**
- Process analysis in package implementation
- Gap analysis
- Implementation
- Testing

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Accenture Technology Vision: Major, Disruptive Wave of Technology Innovation

Data & Decisions

Influencers

Security  Sustainability  Millennials

Internet Computing

4C’s: Communication, Collaboration, Communities & Content

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Where Will We Focus?

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The Promise: Agility, Flexibility, Modularity
Evolution of Large Business Solutions
The rise of SOA, SaaS and Cloud

Potential Business Value for Clients
(indicative only, not in scale)
Interoperability, Services, Process Abstraction, Activity and Insight

**Standards-based (WS-*) Communication**
- HTTP/REST
- Web Services XML, SOAP, UDDI
- Standardized Communication between systems through widely accepted open standards.

**Services & ESB**
- Allows a network of disparate systems to interact as one unified enterprise system by resolving differences in system HW, SW, networks, and location. Lightweight and heavier (ESB) approaches need to co-exist.

**Process Abstraction (BPM)**
- Business processes and Rules abstracted separately in BPM patterns (BPEL) and Rules engine technologies.
- Human Workflow examples and business process Responses to complex events detected in Event Driven Architectures.

**BAM**
- Business Activity Monitoring
- Provides End-to-End process performance monitoring Real-time insight and control of business.
Separation of Concerns in Large Scale Solution

User Interface

Human Process
Business Process
Integration Process / Service Composition
Process Modeling
Human Process
Business Process
Integration Process / Service Composition

Service Oriented Architecture Infrastructure

UI Package
Custom
Service

Stateful

Stateless

Covered by standards (BPEL) Today

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Traditional industry responses to date

- Command and control
- Client centric, 1:1 approaches
- Quality programs and Capability Maturity (CMM)
- Labor Arbitrage / Offshoring
- Agile/light weight methods applied on limited basis

Necessary, but not Sufficient
Why do we keep doing this?

- Lexicon
- Foundation CASE Tools
  - IBM mainframe, DEC, Unix
  - Client/Server
- Eagle
  - Object-Oriented / Smalltalk
- Universal construction tools
  - Unix, C, Cobol, Sybase, Oracle
- J2EE
  - GRNDS for Java
  - Web and now SOA
- Microsoft Component / Entlib
  - Microsoft platform
    COM DNA then .NET
  - Client server then Web and now SOA

- Large scale projects and client commercial models
- Achieving predictable delivery
- To leverage scarce, expensive architecture building skills
- Productivity - to use a less experienced globalised cheaper workforce for application configuration and development
- Our primary methodology (ADM) is rooted in the same culture
- Common language and interchangeable skills goals to maintain flexibility in our workforce
Industrialization Focus: The “V” Model

V-Model of Software

Degree of Abstraction

Degree of Realization

Business Requirements

System Requirements

Functional Design

Technical Design

Coding

Intent

Reality

Acceptance Testing

System Testing

Integration Testing

Unit Testing

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No Silver Bullets, but Many Useful Approaches

- UML: a selective set of Models
- Use Cases: is a Model
- Design Patterns: expressed in DSL
- Model Driven Development (MDD)
- Transformation Rules: can generate Web service
- Transformation Engine: can generate WSDL
- Business Process Model: represented as BPEL
- Aspect-Oriented Programming: complimentary to Agile Development
- Business Process Orchestration: uses SOA
- Software Factories*: can generate Aspects

*Microsoft's Viewpoint
What Software Architecture Challenges Must be Addressed?

• Platform Competency
• Architectural Standards and Interoperability
• Data Architecture
• Infrastructure and Operations
• Application Rationalization
• IT Organization and Enterprise Architecture
• Methods and Tools
• Testing
• Security
• Training
Our Agenda: Strategic Industrialisation

- **Increased Automation**
  - All Lifecycle stages
  - Further rollout of existing proven capabilities

- **Standardized Platforms & Improved Asset Re-use**
  - Increased structure vs. bottom up re-use
  - Architecture assets

- **Quality and Continuous Improvement**
  - Methods, Metrics
  - Operational management
  - CMM, Six-Sigma, etc

- **Handling specialisation**
  - People
  - Approaches
Industrialize Across Technology Platforms
Industrialize Into Technology Implementations
Sample: Accenture Foundation Platform for Java

Java Reference Application
- “Gold Standard” illustration of AFP-J

Operations Enablement
- Prescriptive guides to facilitate integration with operations and monitoring tools

Java Build Accelerator (JBA)
- OSS development tools integrated into Eclipse
- Generation capabilities for “application scaffold” and “project scaffold”

Java Execution Framework (JEF)
- Run-time services
- Application shell and meta-model

Java Developer Enablement
- “micro methodology” extensions to ADM
- “How To” Guides and example documentation
Parting Thoughts: Industrialization of Software - Research Areas

- Platforms – Integration, Proscription, Standardization & Reuse
- Multiple Techniques – MetaData, Aspect, MDD, DSL, SOA & Agile
- Building the Right Talent – Process, Data, Semantics, Parallel
- Overcoming Cultural Issues – Reuse, Open Source, Inner Source, Agile vs Control
- Cracking Key Design Principles - Loose Coupling, Modularity, Abstraction, Multitenant, Distributed
- Longevity
- “Developer” vs “User”
- Things to Keep an Eye On – SaaS, PaaS, Cloud