Enterprise Architecture and Business-IT Alignment

Professor Hong-Mei Chen
Department of Information Technology Management
Shidler College of Business
University of Hawaii at Manoa

http://hmchen.shidler.hawaii.edu, hmchen@hawaii.edu

Outline
Enterprise Architecture and Business-IT Alignment

- Recap from EA intro: drivers for EA
- Alignment Problems
- Current Approaches
- EA as the key for integrating 3 different Disciplines: BITAM-SOA Framework
- Features of BITAM-SOA framework
- SOA impacts => Analyzing SOA (by Dr. Kazman)
Recap from yesterday:
Primary Driver for EA

Why alignment?

Note: There are relationships among these drivers: Business-IT Alignment may mediate other drivers.
IT people are from Mars...

Business people think they should stay there.

Nine Signs
(Ross, Weil, Roberson, 2006)

1. One customer question elicits different answers
2. New regulations require major effort
3. Business agility is difficult and growth initiatives aren’t profitable
4. IT is consistently a bottleneck
5. Different business processes and systems complete the same activities
6. Information necessary for making decisions is not available
7. Employees move data from one system to another
8. Senior Management dreads discussing IT Agenda items
9. Management doesn’t know whether it gets good value from IT
Business-IT Alignment

“aligning information systems capabilities with business goals” – the base for organizational agility and competitive advantage

- Top 10 list of concerns for 2 decades
- Number one concern of CIOs over the last 5 years
- Rapid change in business and technical environment
  - Changing Customers’ expectations
  - Service Economy: lower entry barriers
  - IT organization and sourcing change: SaaS, service grid (Globus), etc.

Business-IT alignment approaches

(Chen2007)

- via Architecture
  - Software Architecture:
    - BITAM (Chen, Kazman, & Garg, 2005),
    - CBAM (Clements, Kazman, & Klein, 2002),
    - ATAM (Bass, Clements & Kazman, 2003), etc.
  - Enterprise Architecture:
    - The Zachman framework (Zachman 1987), TOGAF (the Open Group 2002), OMG's MDA (2003), DoDAF (2003), FEAF, etc.

- via Governance
  - Business Performance Management:
    - Balanced Scorecard (Kaplan & Norton 1996),
    - Strategic mapping (Kaplan, Norton 2004), etc.
  - IT Governance: COBIT, IT Service Management: ITIL, etc.

- via Communication
  - SAM (Henderson and Venkatraman, 1993), Social dimension (Reich & Benbasat 2000), alignment maturity (Luftman 2000), etc.
1) Business Model layer: drivers, strategies, revenue streams, investments, constraints, regulations, policy

2) Business Architecture layer: applications, business processes, workflow, data flow, organization, skills

3) IT Architecture layer: hardware, software, networks, components, interfaces, platforms, standards

3-Layer BITAM Architecture

Service-Oriented Business-IT Alignment Method (BITAM-SOA) Framework

Comparative Analysis of Business-IT Alignment Approaches

<table>
<thead>
<tr>
<th>Via Architecture</th>
<th>Via Governance</th>
<th>Via Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Models/ methods</td>
<td>BITAM (ATAM, CBAM)</td>
<td>Enterprise Architecture: ITIL, COBIT, strategy map</td>
</tr>
<tr>
<td>2. Perspective</td>
<td>Architectural strategy/ evaluation/analysis design; IT investment/ cost-benefit tradeoff</td>
<td>Value delivery; Resource Control; Performance measurement; Strategic planning; requirement</td>
</tr>
<tr>
<td>3. Stimuli</td>
<td>Change/scenario</td>
<td>Change/Policy</td>
</tr>
<tr>
<td>4. Level Focused</td>
<td>1, 3 layer</td>
<td>1-3 layer</td>
</tr>
<tr>
<td>5. Who (leadership)</td>
<td>CIO; Architects</td>
<td>Architect</td>
</tr>
<tr>
<td>6. When to align/realign</td>
<td>Misalignment or new change occurs</td>
<td>New Process/applications</td>
</tr>
<tr>
<td>7. What to align</td>
<td>Elements in layers 1,3</td>
<td>N/A</td>
</tr>
<tr>
<td>8. How to align</td>
<td>12 step method including mapping from different levels</td>
<td>N/A</td>
</tr>
<tr>
<td>9. Techniques</td>
<td>Architectural analysis</td>
<td>Modeling</td>
</tr>
<tr>
<td>10. Key Critical Success Factors</td>
<td>Architectural Adaptivity; Misalignment detection; Misalignment prevention</td>
<td>Enterprise modeling; Integration of workflow management application portfolio management</td>
</tr>
<tr>
<td>11. Repeatability</td>
<td>Yes: 12 step method</td>
<td>N/A</td>
</tr>
</tbody>
</table>

[Chen2007]
Instantiating the BITAM-SOA Model for Service Engineering

1. Business Model layer: drivers, strategies, revenue streams, investments, constraints, regulations, policy

2. Business Architecture layer: applications, business processes, workflow, data flow, organization, skills

3. IT Architecture layer: hardware, software, networks, components, interfaces, platforms, standards

[Chen2007]
Features of the BITAM-SOA framework

- Holistic, integrated:
  - bridge separation of concerns of three approaches
  - Integrate concepts in each approach
- Layered approach: abstraction and mapping
- Explicit modeling of Social Dimension
- Focus on value proposition to customers
- Expand software architecture analysis methodology for enterprise architecture development
- Centers at service-oriented enterprise architecture
- Metadata approach:
  - enterprise service bus (ESB), configuration, business rules & policy, workflow, roles, application portfolio, architecture evolution, etc.
- Top-down and Bottom up value engineering (alignment perspectives)
- Rooted in strategic management: Resource-based View theory

BITAM-SOA Layered Approach: Abstraction & Mapping

- Different EA frameworks have different definitions of terminology “business architecture” and “business models”
- BITAM framework: separate strategic component from Business Architecture layer to place in the Business model layer;
- Business Architecture in the BITAM-SOA framework refers to the operating model of the business: information architecture, process architecture, application architecture, workflow, data architecture
- BITAM abstraction mechanisms: for mapping concepts from different approaches in one framework
Strategic Alignment Model
Henderson & Venkatraman (1993): 4-corner model

BITAM Layers:
Three Layers of a Business System
(Chen, Kazman, Garg 2005)

1. **Business Model layer**: drivers, strategies, revenue streams, investments, constraints, regulations, policy

2. **Business Architecture layer**: applications, business processes, workflow, data flow, organization, skills

3. **IT Architecture layer**: hardware, software, networks, components, interfaces, platforms, standards

- 3-layer model (vs. SAM 4 corner) reflects the practice that business strategy planning encompasses IT strategy planning.
- Any change in any of the three layers may cause misalignment
Explicit Modeling of the Social Dimension

Communication Problem: Hidden Costs

- Social Dimension of a complex socio-technical system
- Costumer interaction: “high touch”
- Workflow: human decision-making
- Architectural competence: Human capital, Culture, teamwork
- IT: Don’t forget people → BPR lesson
Business-IT Alignment: 
Social Dimension (Reich & Benbasat 2000)

- The most important factor for business-IT alignment in the social dimension is for CEO to communicate directly with the CIO
- Culture change

Focus on Value Proposition to Customers
Value Proposition

1. **Value** is measured by the amount the customer is ready to pay for
2. Value proposition generates revenue streams
3. Value configuration implements value proposition

Value Configuration

(Stabell 1998)

- Set of interdependent activities:
  - that add value
  - for the customers
  - to the company products or services
**Generic Value Chain**

Porter, 1980

How a business generates value in the traditional way:

- **Support Activities**
  - Firm Infrastructure
  - Human Resource Management
  - Technology Development
  - Procurement

- **Primary Activities**
  - Inbound Logistics
  - Operations
  - Outbound Logistics
  - Marketing & Sales
  - Service

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**Resource-Based View (RBV)**

- Firm's resources are more important than industry structure in getting and keeping competitive advantage.
  - Resources include the firm's financial, physical, human, intangible, and organizational assets used to develop, manufacture, and deliver products or services to its customers.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Industrial organization</th>
<th>Resource-based view</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitive advantage</td>
<td>Positioning in industry</td>
<td>Possessing unique organizational assets or capabilities</td>
</tr>
<tr>
<td>Determinants of probability</td>
<td>Characteristics of industry; firm's position within industry</td>
<td>Type, amount, and nature of firm's resources</td>
</tr>
<tr>
<td>Force of analysis</td>
<td>External</td>
<td>Internal</td>
</tr>
<tr>
<td>Major concern</td>
<td>Competition</td>
<td>Competences - resources</td>
</tr>
<tr>
<td>Strategic choices</td>
<td>Choosing attractive industry; appropriate position</td>
<td>Developing unique resources and capabilities</td>
</tr>
</tbody>
</table>

[Source: 1980](http://www.aip.org/.../Resource%20%20view)
Rooted in Strategic Management: Resource-Based View (RBV)

Value Creation: RBV

- A firm’s resources and capabilities are valuable if, and only if, they reduce a firm’s costs or increase its revenues compared to what would have been the case if the firm did not possess those resources (Barney, 1997).
- Recent extension to RBV, the dynamic capabilities approach (Teece, Pisano, and Shuen, 1997), explores how valuable resource positions are built and acquired over time.
- Dynamic capabilities are rooted in a firm’s managerial and organizational processes, such as those aimed at coordination, integration, reconfiguration, or transformation or learning.
- Firms can create value by combining heterogeneous resources that are economically valuable, difficult to imitate or imperfectly mobile across firms (Barney 1991, Peteraf 1993, Zhu 2004).
- Although the individual components that go into the IT infrastructure are commodity-like, integrating these components to develop a coherent infrastructure tailored to a firm’s strategic context is a competitive advantage.
Top-down and Bottom-up Alignment Perspectives: (Chen, Kazman, Garg 2005)

1. **Business Model layer**: drivers, strategies, revenue streams, investments, constraints, regulations, policy

2. **Business Architecture layer**: applications, business processes, workflow, data flow, organization, skills

3. **IT Architecture layer**: hardware, software, networks, components, interfaces, platforms, standards

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**Why Governance?**

- Inability of Organizations to Execute Their Strategy
- Reliance on Financial Measures
- Corporate Accounting Scandals
  - Enron – once the seventh largest company in the U.S. – 63.4 billion dollar bankruptcy
  - WorldCom – 107 billion dollar bankruptcy
  - Tyco, Global Crossing, Adelphia and dozens of others
- Emerging IT governance models: concerns about IT investment & IT organizational Effectiveness
Two Different Schools Integrated into the BITAM-SOA Framework

Business Model layer:
drivers, strategies, revenue streams, investments, constraints, regulations, policy

Business Architecture layer:
applications, business processes, workflow, data flow, organization, skills

IT Architecture layer:
hardware, software, networks, components, interfaces, platforms, standards

3-Layer BITAM Architecture

Application Portfolio
Business Processes
IT Infrastructure
SOA SOA SOA
Service-Oriented Enterprise Architecture
Cost
Benefits
External infrastructure services
Stakeholder Perspective
Financial Perspective
Activity Perspective BPM
Resource Perspective
External business services
External application services
Value Proposition
Customers
Social Dimension Technical Dimension
Service Innovation
Service-Oriented Business-IT Alignment Method (BITAM-SOA) Framework

Business Performance Management (BPM)

- Measurement-based management
- To understand how people, processes, infrastructure and assets act together across an enterprise to affect business performance
- Results-based planning and management
- Increased use of information technology
- Increased sharing of data for benchmarking
**Balanced Scorecard: Four Perspectives**  
(Kaplan & Norton)

**Financial**
- Measures performance against expectations
- "To succeed financially, how should we appeal to our shareholders?"

**Customer**
- Measures the economic impact of actions taken
- "To achieve our vision, how should we appeal to our customers?"

**Internal Business Processes**
- Measures employees skills, procedures, methods...
- "To satisfy our shareholders and customers, what business processes must we excel at?"

**Learning and Growth**
- Measures effectiveness, ability to adapt
- "To achieve our vision, how will we sustain our ability to change and improve?"

BITAM-SOA perspectives

- Stakeholder perspective: include more than customers’ perspective
- Learning and growth perspective is captured in Social Dimension
- Internal business process perspective is included in the activity perspective to reflect BAM (business activity modeling) and Business Process Management (BPM) development trend and strategic network with external system processes
- Resource perspective is modeled for the infrastructure layer

Strategy Map
ITSM: ITIL

- ITIL - the Information Technology Infrastructure Library
- Developed in the late 1980's, the IT Infrastructure Library (ITIL) has become the worldwide de facto standard in service management.
  - Starting as a guide for UK Government, the framework has proved to be useful to organizations in all sectors through its adoption by many service management companies as the basis for consulting, education and software tools support.
- The IT Infrastructure Library documents industry best practice guidance.
  - It has proved its value from the very beginning. Initially, the Central Computer and Telecommunications Agency (CCTA) collected information on how various organizations addressed Service Management, analyzed this and filtered those issues that would prove useful to CCTA and its Customers in UK Central Government.
- Being a framework, ITIL describes the contours of organizing Service Management.

IT Governance: COBIT

Control Objectives for Information and related Technology (COBIT®).

- To aid organizations in successfully linking business and IT goals to meet today's business challenges
- an IT governance framework and supporting tool set that allows managers to bridge the gap between control requirements, technical issues and business risks.
- COBIT enables clear policy development and good practice for IT control throughout organizations.
- COBIT was first published by ITGI (IT Governance Institute®) in April 1996. ITGI's latest update—COBIT® 4.1—emphasizes regulatory compliance, helps organizations to increase the value attained from IT, highlights links between business and IT goals, and simplifies implementation of the COBIT framework.
BITAM-SOA Framework Centers on a Service-oriented Enterprise Architecture

* more detailed about EA in the next section

1) Business Model layer: drivers, strategies, revenue streams, investments, constraints, regulations, policy

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3) IT Architecture layer: hardware, software, networks, components, interfaces, platforms, standards

3-Layer BITAM Architecture

Application Portfolio Business Processes IT Infrastructure

SOA SOA SOA

Service-Oriented Enterprise Architecture

Cost Benefits

External infrastructure services

Stakeholder Perspective

Financial Perspective

Activity Perspective BPM + IT Service Management

Resource Perspective

External business services

External application services

Value Proposition

Customers

Social Dimension

Technical Dimension

Service Innovation

Service-Oriented Business-IT Alignment Method (BITAM-SOA) Framework

IS SOA Old Wine in a New Bottle??

- SOA is an architectural style where systems consist of service users and service providers
- A service is a self-contained, distributed component with a published interface that stresses interoperability, is discoverable and dynamically bound.
- Promises:
  - Interoperability, flexibility, cost-effectiveness (operations support solutions through interoperability, reusability and composability between loosely coupled services), innovation power.
SOA: All the Rage!

Is and is NOT beyond Web Services
- Embraced as an enterprise architectural strategy
- Supported by standards (ws-*) & XML- and the global status of organizations such as W3C, UNCEFACT, UDDI, OMG and OASIS
- Strong DOD, commercial push
- 70% of Fortune 500 companies have already implemented some form of SOA.
- IDC expects spending on SOA-related software to reach nearly $15 billion by 2009.

SOA Standards – Current and Emerging
Converging BPM & SOA Differences

<table>
<thead>
<tr>
<th>BPM</th>
<th>SOA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business-driven</td>
<td>IT-driven</td>
</tr>
<tr>
<td>Top-down process approach</td>
<td>Bottom-up architectural approach</td>
</tr>
<tr>
<td>Reuses process model</td>
<td>Reuses service implementation</td>
</tr>
<tr>
<td>Project-oriented</td>
<td>Enterprise infrastructure-oriented</td>
</tr>
<tr>
<td>Success measured by business metrics and Key Performance Indicators (KPIs)</td>
<td>Success measured by architectural metrics, logical consistency, ease of integration, and cost of change.</td>
</tr>
</tbody>
</table>

1. In a recent report, Forrester Research wrote that BPM and SOA markets are becoming one and converging to the point that the "integration suite" market category is obsolete and is being replaced by the emerging "Integration-Centric Business Process Management Suite".

2. Recently, Gartner analysts have predicted that, beginning in 2007, BPM will become the driver for SOA implementation. The analysts observed that the technology for the BPM-SOA convergence might not fully mature until 2010, but urged business to immediately adopt "process architecture" if they wish to become leaders in this trend.

The claim:

There has been no enabling technology for Business-IT alignment until SOA.
SOA Impacts Alignment Approaches

- Alignment via architecture:
  - Offers enterprise perspective; level of service granularity; architectural agility via recomposition

- Alignment via governance:
  - Allows standard enforcement & performance measures; removing redundancy; streamlining operations; repository-based, centralize IT resource management; ease implementation based on service concepts

- Alignment via communications
  - Service as a binding concept
  - Business people understand “service” as co-production of value → social dimension cannot be forget

Thesis

The claim: “There has been no enabling technology for Business-IT alignment until SOA”

We agree but argue that SOA alone does not guarantee business-IT alignment; in fact, SOA implementation requires alignment...

Therefore ➔ An integrated framework
Implications

- While advocating enterprise architecture as the core instrument for alignment, the BITAM-SOA framework suggests a multi-disciplinary holistic approach to Business-IT alignment.
- The framework impacts practice by explicitly engaging managerial attention on all three approaches for Business-IT alignment with a SOA paradigm.
- It encourages a CIO to play the important role of the business innovation leader, instead just being a resource steward.
- The "alignment" is never the final goal/state. Architectural and organizational agility is crucial. Management must be vigilant about change and disciplined about the realignment process.

Concluding Remarks

- Enterprise Architecture program should integrate the strength of other alignment methods.
- The BITAM-SOA framework contributes to integrating managerial, socio-technical system perspectives in a single framework and facilitating synergy among distinct research disciplines that has been lacking until now.
- The BITAM-SOA framework also provides a blueprint as to how different business-IT alignment methods can be orchestrated together to devise cross-disciplinary alignment methods. (see work in progress for service engineering)
Questions? Comments?
Strategic Enterprise Architecture Management

Professor Hong-Mei Chen
Department of Information Technology Management
University of Hawaii at Manoa

http://hmchen.shidler.hawaii.edu, hmchen@hawaii.edu

MANAGING ENTERPRISE ARCHITECTURE:
STRATEGIES & EXPERIENCES
Jyväskylä, Finland

Outline
Strategic Enterprise Architecture Management

- EA Management overview related to BITAM-SOA
- Leadership agenda
- EA Scorecards: Objectives & Measures
  - Value proposition and delivery
  - IT Portfolio Management
- EA development
  - EA products quality management
- EA governance
  - EA as process (for standard governance)
  - EA as a consultant service - service quality management
- Architectural competency
Leadership Agenda (1)

- Vision
  - Connect EA with company strategy
  - EA as a strategic management tool
    - standardization, integration, agility for change
  - EA as unique capabilities, not one time project investment
    - EA development = capability development
  - EA is a strategy

- Top-down approach is the key for long term success (see reference slide)
  - remember lessons from ERP??
# Top-down vs. Bottom-up

<table>
<thead>
<tr>
<th>Issue</th>
<th>Top-down approach</th>
<th>Bottom-up approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity</td>
<td>Complexity is reduced as scope is limited and problems are approached in priority sequence. Scope and complexity build gradually.</td>
<td></td>
</tr>
<tr>
<td>Initial investment</td>
<td>The formal methodology requires training to get started. Many organizations initially depend heavily on external expertise.</td>
<td>The small EA team can begin by coordinating internal SMEs borrowed for the program. The initial technology-only approach falls into IT's sweet spot.</td>
</tr>
<tr>
<td>Impact and value</td>
<td>Early wins are unlikely in the first year of the effort. • Over time, the EA program can be perceived as being nothing more than a paper tiger. • Little historical evidence to date for value in business process inventories.</td>
<td>• The program has significant impact quickly. • Early successes build the much-needed credibility for the more politically complex efforts that follow. • Some areas much in need of improvement must wait for attention due to the step-wise approach.</td>
</tr>
<tr>
<td>Governance issues</td>
<td>The data collection process delays the introduction of governance.</td>
<td>Early cost savings help justify new governance processes, which are introduced early. • Governance is introduced as a policing process, making architects the bad guys in the eyes of the business and development organizations.</td>
</tr>
<tr>
<td>Scope issues</td>
<td>Broad scope is explicitly established at the outset. • The initial data collection activity enables a consensus regarding the current state, which is critical to effective planning.</td>
<td>The typical infrastructure origin hampers efforts to expand scope.</td>
</tr>
<tr>
<td>Cultural buy-in</td>
<td>Business issues are emphasized at the outset, thus improving business buy-in.</td>
<td>Initial technology focus appears insensitive to business issues.</td>
</tr>
</tbody>
</table>

Forrester Research, March 2004

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## Leadership Agenda (2): Action Plan

- **Communicating Vision:**
  - Make EA relevant to company strategies and goals
  - Scorecards ready
- **Get people in place:** EA function organization and design
  - Define roles and hire skilled architects
  - People empowerment: give authority
- **Commit Resources (longer-term) to build the foundation**
- **Incentives:** reward enterprise-thinking
- **EA Process design**
- **EA Governance** (reinforcing disciplined portfolio project management)
- **Architecture competence development & measurements**
- **Give time to go through maturity stages**
- **Culture Change**
White-Box, Constructive Perspective on Competitive Advantage

- “Not technology, nor a business model or an organizational arrangement is separately creating any competitive advantage. Rather, this advantage lies in an integrated, consistent and coherent business, organizational, informational and technological design.” (HOOGERVORST, 2004)
- vs. blackbox (functional perspective)
White-Box, Constructive Perspective

- **Business Driver** (in previous slides):
  - Business-IT alignment for driving three core imperatives: seamless integration of customer and operational processes, agility, and the ability to change.

- **Design Driver**:
  - Shown in the BITAM-SOA model: Businesses and organizations are complex adaptive socio-technical systems.
  - Establishing system integration, agility and change requires a focus on the system's design, hence necessitates the construction perspective.

- The concept of architecture is considered fundamental for operationalizing the constructional perspective.
  - Various technology, business (process), organizational and information (data, system) architectures are collectively labeled **Enterprise Architecture**.

- Enterprise architecture is positioned as a crucial means for linking strategy development and execution.

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EA: Linking to Strategic Goals

The slide depicts a diagram showing the linkage between Enterprise Architecture (EA) and various strategic components such as Business Model, Strategic Identity, Product Services, Value, Segment of Customers, Activities, Capabilities, Resources, and Competitive Advantage. The diagram illustrates how EA links to strategic goals through various operational processes like Portfolio Operation and Development.
EA: Linking Strategy & Execution

- **Company Goals**
- **EA: Linking Strategy, Execution, and System Development**
  - Business Strategy
  - SDLC
  - Requirements
  - Architecture
  - Design
  - Implementation
  - Evaluation
EA as Strategic Management Tool

- Value delivery
- Standardization, Policy
- Implementing Operating Model
- Integrating Resource management for capability development
- IT Portfolio Management
- Governance
- Etc.

Example: NSN enterprise architecture products

- Business architecture: business models + operating models
- Information, process, application, and technical architecture baseline documentation
- Organization, its competences, processes, and technology
- Implements a business model
- A description of a business capability, or an operating model feature, or IT service
- Considers organizational, competence, process, and IT aspects in a holistic way
- Common architectural design, specialized variants, and localized processes
- Process maps and process models; definition of activities, work products, and work roles
- Application or platform functions, its interfaces, operation and support processes
- Service level agreement or operational level agreement
- Library component that is copied to and instantiated as part of a using IT service
- Limited service level agreement only for maintenance purposes
- Program and project management for deploying a business capability or IT service
- Stakeholder and change management
- Productized way of providing business domain competence
- Standardized best practices and methods for various purposes

NSN Chief Enterprise Architect, Jaakko Rihinen, Presentation Aug. 2007
EA is Involved in IT Processes

"Is the EA group involved in these other IT processes?"

- Lead
- Key participant
- As requested
- No involvement
- Don’t know

<table>
<thead>
<tr>
<th>Process</th>
<th>Lead</th>
<th>Key Participant</th>
<th>As Requested</th>
<th>No Involvement</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital planning</td>
<td>4%</td>
<td>32%</td>
<td>36%</td>
<td>23%</td>
<td>5%</td>
</tr>
<tr>
<td>Procurement</td>
<td>5%</td>
<td>31%</td>
<td>36%</td>
<td>24%</td>
<td>4%</td>
</tr>
<tr>
<td>Capacity planning</td>
<td>10%</td>
<td>21%</td>
<td>41%</td>
<td>24%</td>
<td>4%</td>
</tr>
<tr>
<td>Production Implementation</td>
<td>4%</td>
<td>24%</td>
<td>39%</td>
<td>31%</td>
<td>2%</td>
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<tr>
<td>Service management/IT service delivery</td>
<td>2%</td>
<td>20%</td>
<td>47%</td>
<td>26%</td>
<td>3%</td>
</tr>
<tr>
<td>Training and skills development</td>
<td>2%</td>
<td>16%</td>
<td>49%</td>
<td>30%</td>
<td>3%</td>
</tr>
<tr>
<td>Project management</td>
<td>16%</td>
<td>16%</td>
<td>48%</td>
<td>33%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Base: 176 enterprise architects (percentages may not total 100 because of rounding)

From The Maturing Of The EA Function, October 2005

Strategic EA Management

1. Leadership Agenda
2. EA performance management: scorecards
Recap from yesterday:
Primary Driver for EA

Based on data from over 200 EA programs

Note: There are relationships among these drivers: Business-IT Alignment may mediate other drivers.

Managing EA for Results
(EA Scorecard)

OBJECTIVES

- Business-IT alignment
  - Integration
  - Agility
  - Organizational growth
- Strategic Impact (support)
  - Service & Product Innovation
  - Differentiation
  - Competitive advantages
- Higher return on IT investment
  - Cost reduction
  - Revenue increase
  - Effective portfolio management
  - Effective architectural guidance for project management
  - Operational efficiency
  - Resource efficiency
  - Risk Management
- Capability Improvement
- "happy surprises"

MEASUREMENT

??
Strategic EA Management

3. EA development

EA Group Primary Responsibilities (1)

What are the primary responsibilities of the EA group?

- Developing architectures for apps, information, business, and/or infrastructure: 86%
- Project review and architecture governance: 86%
- Consulting to IT projects and/or developing their governance: 85%
- Performing technology research: 77%
- Leading IT strategy and planning: 74%
- Training and education on architecture topics: 48%
- Leading application integration projects or initiatives: 44%
- Other: 10%

Base: 176 enterprise architects (multiple responses accepted)

From The Maturing Of The EA Function, October 2005
Enterprise Architecture Development

- Framework Selection
  - Multiple views & domains
  - Architectural Principles, standards
- Architecture Description
  - Languages, Models, Standards, etc.
- Architecture for Future State (vision)
- Architecture Analysis and Evaluation
- EA Product Repository & Reuse
- Collaboration Tools
- Architecture Evolution Support
- Tools for EA products (artifacts) development

3-Layer BITAM Architecture

Business Model layer:
- drivers, strategies,
- revenue streams,
- investments, constraints,
- regulations, policy

Business Architecture layer:
- applications, business processes, workflow, data flow, organization, skills

IT Architecture layer:
- hardware, software, networks, components, interfaces, platforms, standards

3-Layer BITAM

Service-Oriented Business-IT Alignment Method (BITAM-SOA) Framework

4. EA enforcement & governance
EA Group Primary Responsibilities (2)

“What are the primary responsibilities of the EA group?”

- Developing architectures for apps, information, business, and IT infrastructures: 86%
- Project review and architecture governance: 86%
- Consulting to IT projects and/or developing their architecture: 85%
- Performing technology research: 77%
- Leading IT strategy and planning: 74%
- Training and education on architecture topics: 48%
- Leading application integration projects or initiatives: 44%
- Other: 10%

Base: 176 enterprise architects (multiple responses accepted)

From The Maturing Of The EA Function, October 2005

Key Architecture Role

Key Integrator Roles (not housed in any business unit)

Enterprise Architecture Team
- Infrastructure Arch. Team
- Applications Arch. Team
- Data Arch. Team
- Other Arch. Teams

Chief Architect

Architecture Management Team: Senior Management Representatives from Business Units and IT

Business Unit #1
- Business Analyst
- Business IT Rep

Business Unit #2
- Business Analyst
- Business IT Rep

Business Unit #N
- Business Analyst
- Business IT Rep

Key Stakeholders and Liaison Roles
EA Governance Mechanisms

- **Define key architecture roles:** The most costly and effective set of mechanisms for complex coordination include defining integrating managerial and architectural roles to govern the setting and use of EA standards.

- **Institutionalize mechanisms to involve key stakeholders:** Less costly mechanisms with less information processing capability include using liaison roles to act as boundary spanners and defining mechanisms to facilitate direct communication between business users and the architecture team.

- **Institutionalize monitoring processes for EA standards:** This category of IT governance mechanisms describes processes organizations use to monitor the setting of and conformance to EA standards.

- **Centralize IT decision making:** How the centralization of IT decision making would affect the use of EA standards in organizations.

Two Key Aspects to be Addressed by Monitoring Processes

- Setting standards based on external standards
- Standards conformance.
Current Issues for Project Management

- Assigning a Project Architect
- Development lifecycle selection
- New metrics: measure development and monitoring
- Cross-project communications
- Virtual team management: web-based project management tools available
- Project management automation?

The US DoC ACMM Framework
(Architecture Capability Maturity Model)

<table>
<thead>
<tr>
<th>6-levels</th>
<th>9 Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>Initial</td>
</tr>
<tr>
<td>2</td>
<td>Under development</td>
</tr>
<tr>
<td>3</td>
<td>Defined</td>
</tr>
<tr>
<td>4</td>
<td>Managed</td>
</tr>
<tr>
<td>5</td>
<td>Measured</td>
</tr>
<tr>
<td>1.</td>
<td>IT architecture process</td>
</tr>
<tr>
<td>2.</td>
<td>IT architecture development</td>
</tr>
<tr>
<td>3.</td>
<td>Business linkage</td>
</tr>
<tr>
<td>4.</td>
<td>Senior management involvement</td>
</tr>
<tr>
<td>5.</td>
<td>Operating unit participation</td>
</tr>
<tr>
<td>6.</td>
<td>Architecture communication</td>
</tr>
<tr>
<td>7.</td>
<td>IT security</td>
</tr>
<tr>
<td>8.</td>
<td>Architecture governance</td>
</tr>
<tr>
<td>9.</td>
<td>IT investment and acquisition strategy</td>
</tr>
</tbody>
</table>
**Level 4: Managed**
(Managed and Measured IT Architecture Process)

1. IT architecture process is part of the culture. Quality metrics associated with the architecture process are captured.
2. IT architecture documentation is updated on a regular cycle to reflect the updated IT architecture. Business, Data, Applications, and Technology Architectures defined by appropriate *de jure* and *de facto* standards.
3. Capital planning and investment control are adjusted based on the feedback received and lessons learned from updated IT architecture. Periodic re-examination of business drivers.
4. Senior management team directly involved in the architecture review process.
5. The entire operating unit accepts and actively participates in the IT architecture process.
6. Architecture documents are updated regularly, and frequently reviewed for latest architecture developments/standards.
7. Performance metrics associated with IT security architecture are captured.
8. Explicit governance of all IT investments. Formal processes for managing variances feed back into IT architecture.
9. All planned IT acquisitions and purchases are guided and governed by the IT architecture.

**Level 5: Optimizing**
(Continuous Improvement of IT Architecture Process)

1. Concerted efforts to optimize and continuously improve architecture process.
2. A standards and waivers process is used to improve architecture development process.
3. Architecture process metrics are used to optimize and drive business linkages. Business involved in the continuous process improvements of IT architecture.
4. Senior management involvement in optimizing process improvements in architecture development and governance.
5. Feedback on architecture process from all operating unit elements is used to drive architecture process improvements.
6. Architecture documents are used by every decision-maker in the organization for every IT-related business decision.
7. Feedback from IT security architecture metrics are used to drive architecture process improvements.
8. Explicit governance of all IT investments. A standards and waivers process is used to make governance-process improvements.
9. No unplanned IT investment or acquisition activity.
EA Governance Mechanisms in Different Architecture Maturity Stages
(Ross, MIT Sloan, 2003)

1) Business Model layer: drivers, strategies, revenue streams, investments, constraints, regulations, policy

2) Business Architecture layer: applications, business processes, workflow, data flow, organization, skills

3) IT Architecture layer: hardware, software, networks, components, interfaces, platforms, standards

3-Layer BITAM Architecture

Application Stakeholder

Architecture Maturity

Strategic Implications of IT

<table>
<thead>
<tr>
<th>Functional Optimization</th>
<th>IT Efficiency</th>
<th>Process Optimization</th>
<th>Strategic Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Model</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Architecture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT Architecture</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mechanisms for Designing & Protecting Architecture

Strategic EA Management

[Chen2007]
Architectural Competence

- Definition: The ability of an organization (its individuals and its teams) to use, grow, transfer, and sustain the duties, skills and knowledge necessary to carry out architectural design practices (Clements, 2007).
- Current research project (CMU & UH).

Architectural Competency (Emphasize on Social Dimension)

- People!!!
- Architecture team role definition
- Skill sets & training
- Organizational learning
- Knowledge management
- Methods & practice: process & tools
- Quality of EA products (artifacts) and service
- EA products (artifacts) repository and access: for architectural evolution, communication and reuse
- Performance measurement
Architecture Competence and Organizational Learning

1) Business Model layer: drivers, strategies, revenue streams, investments, constraints, regulations, policy

2) Business Architecture layer: applications, business processes, workflow, data flow, organization, skills

3) IT Architecture layer: hardware, software, networks, components, interfaces, platforms, standards

3-Layer BITAM Architecture

Application Portfolio Business Processes IT Infrastructure

SOA SOA SOA

Service-Oriented Enterprise Architecture

Cost Benefits

External infrastructure services

Stakeholder Perspective

Financial Perspective

Activity Perspective

BPM + IT Service Management

Resource Perspective

External business services

External application services

Value Proposition

Customers

Social Dimension

Technical Dimension

Service Innovation

Conclusion

1. Leadership Agenda

2. EA performance management: scorecards

3. EA development

4. EA enforcement & governance

5. EA competence

[Chen2007]
Your Thoughts?

Stumbling Blocks in EA Management(1)

- Short term MBA vision training; quarterly report; no long term planning or investment strategies; no patience for results – CEO change jobs every 2.5 years
- Not on CEO and CIO’s agenda
- EA initiative not planned; not top-down
- Vision too narrow or not clear
- EA Value proposition not understood
- What does it mean to go agile?
- Not enough funding secured
- No incentive; no measurement; no action plan
Stumbling Blocks in EA Management(2)

- Policy not matching maturity level; Confused stage
- Too many frameworks, complex; no integrated EA management tools; no architecting tool; no navigational tool; No methodology
- Strategic tool: meta business model → sharing/learning across businesses not easy
- Governance structure not clear: size, composition, responsibility of governance board
- New practice to most businesses; high initial cost (cannot do it halfway!!)

Stumbling Blocks in EA Management(3)

- Implementation: hidden cost of social dimension
- Architecture compliance becomes a burden for projects
- Demanding EA skill sets: Supermen or women wanted!
- Architectural thinking, analysis skills not common
- EA not communicated in business terms
- Etc.
Stumbling Blocks in EA Management

- Short term MBA vision training; quarterly report, no long term planning or investment strategies; no patience for results – CEO change jobs every 2.5 years;
- Not on CEO and CIO’s agenda;
- Policy not matching maturity level; Confused stage;
- Too many frameworks; complex; no integrated EA management tools; no architecting tool; no navigational tool;
- New to many business; high initial cost (cannot do it halfway!!);
- Strategic tool: meta business model;
- Implementation: hidden cost of social dimension;
- Architecture compliance becomes a burden for projects;
- Governance structure not clear: size, composition, responsibility of governance board;
- Demanding EA skill sets: Supermen or women wanted;
- Architectural thinking, analysis skills & not common;
- EA not communicated in business terms;
- EA initiative not planned; not top-down;
- Vision not clear; not enough funding secured;
- No incentive; no measurement; no action plan;
- What does it mean to go agile? Etc.

Too Many!
Help!!

What’s the Payoff???
## Strategic Alignment And EA Effectiveness: The Leading Management Obstacles (1)

*Please indicate the priority of these areas of focus for your EA program.*
(4 or 5 on a scale of 1 [the area is not currently receiving significant focus] to 5 [the focus area is of critical importance to your EA program])

<table>
<thead>
<tr>
<th>Obstacle</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shifting focus from tactical, project-level architecture to strategic architecture development</td>
<td>24</td>
</tr>
<tr>
<td>Improving architecture governance, including SOA governance</td>
<td>22</td>
</tr>
<tr>
<td>Designing an effective architecture road map</td>
<td>21</td>
</tr>
<tr>
<td>Better aligning IT with the business through effective architecture processes</td>
<td>21</td>
</tr>
<tr>
<td>Effective EA organizational structures, roles, and responsibilities</td>
<td>20</td>
</tr>
<tr>
<td>Communicating and marketing EA strategies and plans to IT and business leaders and staff</td>
<td>20</td>
</tr>
<tr>
<td>Creating a network effect among disparate teams to promote greater architecture compliance</td>
<td>20</td>
</tr>
<tr>
<td>Determining the role of EA and architects in improving overall IT governance</td>
<td>19</td>
</tr>
</tbody>
</table>

Base: 44 enterprise architect professionals

Source: July 2006 North American Enterprise Architecture Role Online Survey

May 2007, Role Overview “Role Overview: The Enterprise Architecture Professional In 2007”

## The Leading Management Obstacles (2)

*Please indicate the priority of these areas of focus for your EA program.*
(4 or 5 on a scale of 1 [the area is not currently receiving significant focus] to 5 [the focus area is of critical importance to your EA program])

<table>
<thead>
<tr>
<th>Obstacle</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defining or increasing EA involvement with IT innovation</td>
<td>17</td>
</tr>
<tr>
<td>Demonstrating the value of architects, architecture, and enterprise architecture</td>
<td>16</td>
</tr>
<tr>
<td>Incorporating business architecture into your EA program</td>
<td>16</td>
</tr>
<tr>
<td>Measuring and demonstrating the business value of IT using metrics and scorecards</td>
<td>15</td>
</tr>
<tr>
<td>Engaging business users with architects, even if that's not a management priority</td>
<td>15</td>
</tr>
<tr>
<td>Managing organizational change in IT and EA to make architecture more successful</td>
<td>11</td>
</tr>
<tr>
<td>Determining the role of architecture in addressing compliance and risk management</td>
<td>9</td>
</tr>
<tr>
<td>Career paths from enterprise architecture forward: What are they, and how should I prepare?</td>
<td>9</td>
</tr>
<tr>
<td>Cost-justifying infrastructure improvements in a project-level cost justification environment</td>
<td>9</td>
</tr>
</tbody>
</table>

Base: 44 enterprise architect professionals

Source: July 2006 North American Enterprise Architecture Role Online Survey
Agility, Data Architecture, And Technology Decision-Making: The Leading Tech Obstacles (1)

“Please indicate the potential for the following issues or pain-points to be an obstacle to success for you or your organization in 2007.” (4 or 5 on a scale of 1 [the issue is not important to you or your organization] to 5 [the issue is of critical importance to you or your organization])

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making and supporting technology decisions</td>
<td>24</td>
</tr>
<tr>
<td>Implementing a data/information architecture strategy</td>
<td>20</td>
</tr>
<tr>
<td>Improving delivery rate and quality of solutions, or just improving agility</td>
<td>19</td>
</tr>
<tr>
<td>Server virtualization and leveraging commodity hardware for large-scale systems</td>
<td>18</td>
</tr>
<tr>
<td>Developing strategies for improved security and privacy</td>
<td>17</td>
</tr>
<tr>
<td>Implementing new architecture initiatives such as SOA or Digital Business Architecture</td>
<td>17</td>
</tr>
</tbody>
</table>

Base: 44 enterprise architect professionals
Source: July 2006 North American Enterprise Architecture Role Online Survey

Agility, Data Architecture, And Technology Decision-Making: The Leading Tech Obstacles (2)

“Please indicate the potential for the following issues or pain-points to be an obstacle to success for you or your organization in 2007.” (4 or 5 on a scale of 1 [the issue is not important to you or your organization] to 5 [the issue is of critical importance to you or your organization])

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving performance of integration and other key middleware platforms and processes</td>
<td>16</td>
</tr>
<tr>
<td>Advancing SOA adoption</td>
<td>14</td>
</tr>
<tr>
<td>Educating architects and the organization at large on SOA, its costs, and potential benefits</td>
<td>13</td>
</tr>
<tr>
<td>Methods for cost-justifying and demonstrating the value of SOA</td>
<td>7</td>
</tr>
<tr>
<td>Revisiting your application platform strategy for Java vs. .NET vs. other (LAMP, etc.)</td>
<td>5</td>
</tr>
<tr>
<td>Mainframe strategy (migration strategies or incorporating mainframe into your SOA)</td>
<td>5</td>
</tr>
<tr>
<td>Migrating from VMS to .NET, or other key generational language migrations</td>
<td>2</td>
</tr>
</tbody>
</table>

Base: 44 enterprise architect professionals
Source: July 2006 North American Enterprise Architecture Role Online Survey
Enterprise Architecture Tools, Q2 ‘07

3. EA development

Conclusion

1. Leadership Agenda
2. EA performance management: scorecards
3. EA development
4. EA enforcement & governance
5. EA competence

Value Proposition

External application services

External business services

IT Infrastructure

SOA

IT Service Management

BPM

Resource Perspective

Perspective

Perspective

Perspective

Perspective
Conclusion

Mahalo and Aloha!