Enterprise IT Architectures

EA (Enterprise Architecture)
Agenda

I. Positioning Enterprise Architecture (EA)

II. Enterprise Architecture – Main Aspects

III. Enterprise Architecture Methods

IV. Dynamic Infrastructure – Cloud Computing
Recap: Aligning Strategy with Business and IT Execution
Positioning Enterprise Architecture (EA)
Why “Enterprise Architecture”

- *EA is helping enterprises do the right things right*

- *EA is a holistic approach to the control and co-ordination of IT based business projects*

- **Two viewpoints:**
  - Solution Architects are focused on creating an IT based solution to a business problem
  - Enterprise Architects with a sense of what the enterprise needs to be and do, and how IT should be used in a wider sense
Winchester House Syndrome

Yesterday’s management approaches are not working in today’s complex and fast-paced environment.

This house may function, but…

Does it meet business objectives?
Is it an ‘Asset Junkyard’?
Is it cost effective?
Does it fit with the community (standards)?
Is it documented - who knows what it consists of?
Can it be repaired easily or economically?
Can it be adapted to changing needs?

’If you don't know where you're going, any road will get you there.'
Lewis Carroll
It can be a challenge to ensure IT based business solutions implement the business strategy…

Strategy

Business Opportunity

Business Strategy

Information Technology Strategy

Technology Availability

Business Operating Environment and IT Infrastructure

IT Solutions

System Architecture
- functional aspects
- operational aspects
“the infrastructure and single building design”

The Gap

If you do not know where you are, a map will not help.

If you do not know where you are going, any road will do.
Enterprise Architecture provides the vital linkages between “strategy” and “implementation”

- Business Opportunity
- Business Strategy
- Information Technology Strategy
- Technology Availability

**Enterprise Architecture**

EA tells the organization where they are on the map.

EA identifies where the organization wants to be and how to get there.

**System Architecture**
- functional aspects
- operational aspects
  - “the infrastructure and single building design”
Enterprise Architecture embraces both Business and IT Architectures, providing the “city plan” for “building projects”
Bridging the Gap Between Strategy and Delivery

Enterprise Strategy
- Bus Strategy
- IT Strategy

Enterprise Architecture
- Transition Planning
- Business Architecture
- IT Architecture
- Architecture Governance

Change Programs
- Business Operating Environment and IT Infrastructure

Processes
- Business Strategy and Planning
- EA Methods and Tools

Content
- Process and Content Modeling
- Solution Design and Delivery

SOA

Strategy
- Business Opportunity
- Technology Availability

Planning

Design and Delivery
- Program focus

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Definition “Enterprise Architecture”

“The EA discipline defines and maintains the architecture models, governance and transition initiatives needed to effectively co-ordinate semi-autonomous groups towards common business and/or IT goals.”

- EA provides reference material in many forms
- EA ensures the architecture is maintained and used
- EA is not just passive or reactive, it is proactive
- “neutral phrasing”: EA works at many levels
- EA can address the business and IT domains
Enterprise Architecture vs. Solution Architecture

Enterprise Architecture is the formal organization (design or layout) of the components, structures and processes required or relevant to the attainment of the goals and visions invested or envisioned in an enterprise.

Solution architecture aims to address specific problems and requirements, usually through the design of specific information systems or applications.
So we recognise two different types of IT Architect...

- Are responsible for ensuring the design of IT based business solutions meet the functional and non-functional requirements, within the constraints of budget, time, skills and other givens (such as IT Standards).
  
  "Solution Architects"

- Are responsible for ensuring an IT Organisation approaches the identification, specification and implementation of these IT based business solutions in a co-ordinated and standardised manner, aligned to the Enterprise’s Business and IT Strategies.
  
  "Enterprise Architects"

- Are generally not product specialists, although they must be able to work at a sufficient level of technological detail to be sure their architectures can be implemented.
Enterprise Architecture Defined

- **Strategy**: Define the enterprise strategy, goals and objectives.
- **Business**: High-level business process blueprint that supports the strategy.
- **Information Systems**: Implementation of the business functions in the IT systems.
- **Technology**: Infrastructure that supports the Information Systems.
EA provides a context and guidance, keeping everyone “on the same road”
Benefits (1): Analyze the Linkage Between Technology and Business, Communicate Actionable Information

“How have we aligned technology investment with our business objectives?”

“If we change our technology stack, what applications and organizations will be effected?”
Benefits (2): Analyze Change to Processes...

What Happens If....?

Focus on Information needed to make a decision
Enterprise Architecture – Main Aspects
Main aspects of an Enterprise Architecture

- Enterprise Architecture is between the Business and IT Strategy and the programs and projects to be carried out.

- Enterprise Architecture includes Business Architecture as well as IT Architecture (which is IS Architecture – Information System – and Technology Architecture).

- Enterprise Architecture guides the programs and projects.
“Do the right things right”

**UPSTREAM:** Identifying viable projects that help realize the enterprise architecture requires a good “map”, capable of portraying the overall “as is” and “to be” architectural landscape.

**DOWNSTREAM:** Ensuring projects can exploit the architecture’s “standard components” or building blocks requires each part to be described and published in an easy-to-use, easy-to-find “catalogue like” format.

- **Business Motivation and Strategy (goals, objective, vision, capability, etc.)**
- **Governance**
- **Enterprise Architecture Models**
- **Building blocks, rules, patterns, constraints**

These are the things we should do:

- **Project Portfolio Planning**
- **Solution Development & Delivery**

Are we still moving in the right direction?

Are our target architectures still right?

Are we doing these things the way we said we want them done?

This is the way things should be architected.

“Do the right things right”
EA is More than Architecture

“Things we should do”

“Are we still moving in the right direction?”

“Are we doing these Things the way we said We want them done?”

“Are our target architectures still right?”

“This is the way these things should be architected”

Business as usual project prioritization & Planning

Achieving Business Objectives
Therefore there are three aspects to implementing an Enterprise Architecture

Implementing the EA

- Architecture
  - Models
  - Principles
  - Enterprise Tech Framework

- Transition
  - Transition Plan
  - Management Action Plan

- Governance
  - Organisation
  - Processes
  - Evaluation & Selection
Enterprise Architecture Methods

- Enterprise Architecture methods provide guidelines and templates for the definition of an Enterprise Architecture.

- Templates are available for Work Products / Artifacts – most of them as described in Architecture Methods.

- Most popular Enterprise Architecture Methods
  - IBM
  - Zachman (www.zifa.com)
  - TOGAF (www.opengroup.org)
A popular way of structuring an EA’s architecture framework: is to adopt a simple layered approach

How the business will be run

Logical model of information needs

Automated business functions

Physical model of data

Hardware & software products

Strategy

Business Architecture

Information architecture

Component architecture

Data architecture

IT architecture

"increased focus on a ‘Market of one’”

"Customer information will be integrated across all bus units”

"applications will use catalogue services”

"some personal data may be stored locally”

"Business units may use local SAP servers”

Source: European Government Agency, 2002
And this structuring is closely followed in IBM’s EA Method through “architecture neighbourhoods”
All EAs have a “framework” – a means of organizing, managing and communicating the architecture.
What is TOGAF

- TOGAF consists of the following:
  - Architecture Development Method (ADM)
  - Enterprise Continuum
  - Resource Base

- The ADM is depicted as the ‘crop-circle’ and represents the core of the TOGAF specification. It is a method for deriving a specific enterprise architecture.

- The Enterprise Continuum is a model for structuring a ‘virtual repository’ of architectural assets such as patterns, models, & architecture descriptions.

- The Resource Base is a set of ‘good practice’ resources such as guidelines, checklists and templates provided to assist the architect when using TOGAF ADM.
Standard TOGAF (currently Version 9)
EA Method Overview – Emphasizing Iterative Approach

Client Objectives → Proposal and Engagement Planning → Transition → Strategic Gap Analysis → Current Environment → Emerging Opportunities → Business Architecture

Enterprise Capabilities → Technology Architecture → IS Architecture → Governance
All EAs have a “framework” – a means of organizing, managing and communicating the architecture
Enterprise Capabilities: Linking Strategy to Architecture (Example Amazon)
EA Work Products guide and govern how Solution Work Products are constructed (Same Types of Work Products)

“EA constrains and co-ordinates the construction of IT based business systems”
Enterprise Architecture – Business View
Example Business Context
Recap: Approach for SOA

Step 1: Break down your business into components
- Decide what is strategically important, and what is just operations in the value chain domains
- Analyze the different KPIs attached to these components
- Prioritize and scope your transformation projects

Step 2: Define a Service Model
- Identify your services based on your business components
- Specify the services and components accordingly
  - Make SOA realization decisions based on architectural decisions

Step 3: Implement a Service Model
- Develop a service-oriented architecture to support the Componentized Business
- Implement service based scoping policy for projects
- Implement appropriate governance mechanism

Business-Aligned IT Architecture
A **Business Component** is a part of an enterprise that has the potential to operate autonomously, for example, as a separate company, or as part of another company.

An **Operational Level** characterizes the scope of decision making. The three levels used in CBM are direct, control and execute.
- Direct is about strategy, overall direction and policy.
- Control is about monitoring, managing exceptions and tactical decision making
- Execute is about doing the work

**Columns** are Business Competencies, defined as large business areas with characteristic skills and capabilities, for example, product development or supply chain.
CBM – Definition (2): The building block of a component business model is a ‘business component’

A component is a business in microcosm. It has activities, resources, applications, infrastructure. It has a governance model. It provides goods and services (business services)

Business Component Elements

Each business component has differentiated capabilities

Each business component defines and decides on the use of all resources needed to perform the defined activities

Each business component has a governance structure within which it manages its activities

Each business component has business services which form the interfaces to other business components
### Domain Decomposition– Component Business Modeling for JKE

<table>
<thead>
<tr>
<th>Directing</th>
<th>Controlling</th>
<th>Executing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Planning</td>
<td>Business Unit Tracking</td>
<td>Account Administration</td>
</tr>
<tr>
<td>Sector Planning</td>
<td>Sector Management</td>
<td>Product Directory</td>
</tr>
<tr>
<td>Account Planning</td>
<td>Relationship Management</td>
<td>Marketing Campaigns</td>
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<tr>
<td>Sales Planning</td>
<td>Credit Assessment</td>
<td>Credit Administration</td>
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<tr>
<td>Fulfillment Planning</td>
<td>Sales Management</td>
<td>Customer Service</td>
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<tr>
<td>Portfolio Planning</td>
<td>Compliance</td>
<td>Document Management</td>
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<td>Reconciliation</td>
<td>General Ledger</td>
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</table>

- **Business Administration**
- **New Business Development**
- **Relationship Management**
- **Servicing & Sales**
- **Product Fulfillment**
- **Financial Control and Accounting**

- **Competency**
  - Base
  - Competitive
  - Differentiated
## Domain Decomposition – Component Business Modeling for JKE

<table>
<thead>
<tr>
<th>Financial Control and Accounting</th>
<th>Product Fulfillment</th>
<th>Servicing &amp; Sales</th>
<th>Relationship Management</th>
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<th>Business Administration</th>
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<tr>
<td>Compliance</td>
<td>Fulfillment</td>
<td>Sales Planning</td>
<td>Account Planning</td>
<td>Sector Planning</td>
<td>Business Unit Planning</td>
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<tr>
<td>Reconciliation</td>
<td>Monitoring</td>
<td>Product Management</td>
<td>Relationship</td>
<td>Business Planning</td>
<td>Account Planning</td>
</tr>
<tr>
<td>Customer Accounts</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Directing

**Cost control opportunity**

### Controlling

**Revenue/Profit improvement opportunity**

**Cost control opportunity**

### Executing

**Cost control opportunity**

**“Hot” Component**

**Investment Review**
- Contribution
- Cost (H, M, or L)

**Target Competency**
- Base
- Competitive
- Differentiated

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# CBM and IT Systems Coverage for JKE

## Business Administration
- Business Planning
- Staff Appraisals
- Siebel

## New Business Development
- Sector Planning
- Staff Appraisals
- Product Management

## Relationship Management
- Account Planning
- Credit Assessment

## Servicing & Sales
- Sales Management
- Fulfillment Monitoring

## Product Fulfillment
- Product Fulfillment
- Collections

## Financial Control and Accounting
- Portfolio Planning
- Reconciliation

### Target Competency
- Base
- Competitive
- Differentiated

### Investment Review
- Contribution
- Cost
- (H, M, or L) "Hot" Component

### Gaps
- Account Administration
- Purchasing
- Branch/Store

### Over-extension
- Marketing Campaigns
- Credit Administration

### Duplication
- Collections
- Customer Service

### AR
- SAP
- Customer ODS Ordering / Billing

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Key Performance Indicators for JKE

– Account Administration
  Automate the manual tasks for creating and administering accounts
  Decrease cost of account activation by 50%

– Credit Administration
  Design and build optimized services to support converged organization
  Negotiate better prices with our vendors taking advantage of our combined size
  Decrease negotiated cost (Vendor volume discounts) of credit report retrieval by 20%
  Automate 75% of all credit report retrievals
  Implement consistent business rules to manage risk
  Decrease number of credit report retrievals by 10%

– …
### Business Goals and Key Performance Indicators

**Business Goals**

<table>
<thead>
<tr>
<th>Requirements</th>
<th>ROI</th>
<th>Cost</th>
<th>Benefit</th>
<th>Priority</th>
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</thead>
<tbody>
<tr>
<td>GOAL1: Cost Reduction</td>
<td>100000</td>
<td>20000</td>
<td>102000</td>
<td>High</td>
</tr>
<tr>
<td>GOAL2: Increase Products Per Customer</td>
<td>250000</td>
<td>50000</td>
<td>300000</td>
<td>Medium</td>
</tr>
<tr>
<td>GOAL3: Increase Availability</td>
<td>25000</td>
<td>15000</td>
<td>40000</td>
<td></td>
</tr>
<tr>
<td>GOAL4: Reduce Risk of Regulatory Non-Compliance</td>
<td>100000</td>
<td>20000</td>
<td>120000</td>
<td></td>
</tr>
<tr>
<td>GOAL5: Increase Customer Self-Service</td>
<td>50000</td>
<td>50000</td>
<td>55000</td>
<td></td>
</tr>
<tr>
<td>GOAL6: Decrease Time to Market</td>
<td>250000</td>
<td>300000</td>
<td>280000</td>
<td></td>
</tr>
</tbody>
</table>

**Key Performance Indicators**

- **KPI 1**: Decrease cost of account activation
  - Decrease negotiated cost of credit report retrieval by 10%
- **KPI 2**: Decrease negotiated cost of credit report retrieval
  - Decrease negotiated cost (Vendor volume discount) of credit report retrieval by 10%
- **KPI 3**: Automate credit report retrievals
  - Automate 75% of all credit report retrievals
- **KPI 4**: Decrease number of credit report retrievals
  - Decrease number of credit report retrievals by 10%
- **KPI 5**: Increase electronic applications
  - Increase electronic applications by 25%
- **KPI 6**: Reduce call center calls
  - Reduce number of call center calls by sales force and offices [stated]

- **Priority**
  - Medium

- **Status**
  - Proposed

- **Business Goals** are used to define a metric (simple or composed measurable unit) that measures of much the service implementation fulfills the initial requirements (business goal).

- **Each Business Goal** that is going to be realized with a specific service implementation should have an associated KPI.
Dynamic Infrastructure – Cloud Computing
What is Cloud Computing?

A user experience and a business model
- Cloud computing is an emerging style of IT delivery in which applications, data, and IT resources are **rapidly provisioned** and provided as **standardized offerings** to users over the web in a **flexible pricing model**.

An infrastructure management and services delivery methodology
- Cloud computing is a way of **managing** large numbers of highly **virtualized resources** such that, from a management perspective, they resemble a single large resource. This can then be used to deliver services with **elastic scaling**.
Cloud-onomics

...leveraging virtualization, standardization and automation to free up operational budget for new investment.
Major Factors Driving Cloud-onomics

**Infrastructure Leverage**
- **Virtualization of Hardware**
  - Drives lower capital requirements
- **Utilization of Infrastructure**
  - Virtualized environments only get benefits of scale if they are highly utilized

**Labor Leverage**
- **Automation of Management**
  - Take repeatable tasks and automate
- **Standardization of Workloads**
  - More complexity = less automation possible = people needed
The key ingredients of Cloud Computing

**High Quality User Experience**
- Easy access to “best in class” functions
- Flexibility and choice
- Lower costs
- Enhanced security and reliability
- Rapidly Provisioned

**Significantly Improved Supply Economics**
- Lower operating costs via standards and automation
- Improved capital efficiency
- Rapid, flexible services enhancements

**Changes in Consumption**
- User provisioned
- Self service model
- Tiered, flexible pricing

**Changes in Delivery**
- Standardized offerings
- Virtualized and automated

**Enabled by dynamic Infrastructure**
- Open, standards-based
- Common components and processes
- Elastic scaling and fault recovery
Cloud Computing Delivery Models

**Flexible Delivery Models**

**Public …**
Service provider owned and managed.
Access by subscription.
Delivers select set of standardized business process, application and/or infrastructure services on a flexible price per use basis.

**Private …**
Privately owned and managed.
Access limited to client and its partner network.
Drives efficiency, standardization and best practices while retaining greater customization and control.

**Hybrid …**
Access to client, partner network, and third party resources.

Cloud Services

Cloud Computing Model

... Standardization, capital preservation, flexibility and time to deploy

... Customization, efficiency, availability, resiliency, security and privacy
Cloud Computing Deployments and Services Models

Public Clouds
(provider - Internet)

Private Clouds
(data center - Intranet)

Hybrid Clouds
(public and private)

Services

Applications, Processes and Information as a service

Software platforms as a service
(optimized middleware – application servers, database servers, portal servers, etc.)

Infrastructure as a service
(virtualized servers, storage, networking)
Lifecycle of a Cloud Service

**Service Offering Subscription & Instantiation**
- Select Service, specify parameters and SLA’s
- Automatically instantiate the Service

**Service Offering Creation & Registration**
- Define Service based on Template and register it in the Catalog

**Service Template Definition**
- Create Build- and Management Plans for Service

**Subscription & Instantiation**
- Select Service, specify parameters and SLA’s
- Automatically instantiate the Service

**Production**
- Ensure SLA Conformance

**Service Instance Termination**
- Destroy Service and free up resources

**Manual or Autonomic Execution of Management Plans leveraging Automation and Virtualization**
- IBM / ISV / IT Dept
- Administrator / SLM
- Subscriber (e.g. Line of Business)

**Cloud Service**
- System z Ensemble
- Power Ensemble
- System x Ensemble
- Virtualizers (e.g. z/VM)
- Virtualizers (e.g. PHYP)
- Virtualizers (e.g. Xen)
- Ensemble Hardware
- Individual Servers
- Storage Ensembles
Architectural Model for Cloud Computing

Service Request & Operations

IT Infrastructure & Application Provider

Service Creation & Deployment

End User Requests & Operators

Virtual Image Management

Service Management

User Request Management/Self Service Portal

Service Lifecycle Management

Image Lifecycle Management

Provisioning/Usage Accounting

Performance Management

Availability/Backup/Restore

Security: Identity, Access, Integrity, Isolation, Audit & Compliance

Non-Traditional IT Asset Management

License Management

Service Oriented Architecture

Information Architecture

Optimized Middleware

(image deployment, integrated security, workload mgmt., high-availability)

Virtualized Infrastructure

Virtual Resources & Aggregations

Server Virt.

Storage Virt.

Network Virt.

System Resources

SMP Servers

Blades

Storage Servers

Storage

Network Hardware