Enhancing Enterprise Architecture Models with Cost, Quality and Risk Dimensions

Graham McLeod
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Inspired / Promis Solutions AG
at University of Cape Town
Coverage

- Enterprise Architectures
- Traditional Models
- Inspired Model
- Operationalising the Model in a Knowledge Repository
- Challenges for Organizations post 2000
- Extending the Models
- Demonstration
- Conclusions
- Questions
What is an Enterprise Architecture?

1. Blue Print
   - High Level Conceptual Design
   - Covers whole business/enterprise
   - A current "best plan"
   - Guides acquisition and implementation choices

2. An inventory
   - What have we got?
   - How good is it?
   - Redundancies
   - Gaps
Facets of a Business

- Business Objectives
- Clients, Markets
- Products/Services
- Processes
- Organisation/Channels
- Information
- Systems
- Technical Infrastructure
Facets of a Business - Relationships

- Processes
- Systems
- Information
- Technical Infrastructure
- Organisation/Channels
- Products/Services
- Clients, Markets
- Business Objectives
Why We Need Enterprise Architecture

- Improve business benefit derived from I.T.
- Reduce costs associated with I.T.
- Reduce risk in adopting and exploiting I.T.
- Enable desirable business changes, pursuit of opportunities.
- Shorten lead times to realizing benefits.
- Exploit emerging technologies which can provide strategic advantage.
- Provide framework for decision making and practice within development, technology purchase and operations.
# Coverage of an Enterprise Architecture - Zachman

<table>
<thead>
<tr>
<th>SCOPE</th>
<th>DATA</th>
<th>FUNCTION</th>
<th>NETWORK</th>
<th>PEOPLE</th>
<th>TIME</th>
<th>MOTIVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTERPRISE MODEL</td>
<td>Identify Entities</td>
<td>Identify Business Processes</td>
<td>Map of Business Locations</td>
<td>Identify External &amp; Internal Agents</td>
<td>List Significant Events</td>
<td>Business Goals and Strategy</td>
</tr>
<tr>
<td>SYSTEM MODEL</td>
<td>Entity Relationship Model</td>
<td>High Level Process Flow Diagram</td>
<td>Logistics Network</td>
<td>Organization Chart</td>
<td>Master Schedule</td>
<td>Business Plan</td>
</tr>
<tr>
<td>TECHNOLOGY MODEL</td>
<td>Attributed Data Model</td>
<td>Data Flow Diagram</td>
<td>Distributed System Architecture</td>
<td>Human Interface Architecture Function&lt;=&gt; Person Role</td>
<td>Processing Structure</td>
<td>Knowledge Architecture</td>
</tr>
<tr>
<td>COMPONENTS</td>
<td>Relational Model</td>
<td>Module Structure Chart</td>
<td>System Architecture</td>
<td>Human Technology Interface</td>
<td>Control Structure</td>
<td>Knowledge Design</td>
</tr>
<tr>
<td>FUNCTIONING SYSTEM</td>
<td>Database Schema</td>
<td>Program Source</td>
<td>Network Architecture</td>
<td>Security Architecture</td>
<td>Timing Definition</td>
<td>Knowledge Definition</td>
</tr>
</tbody>
</table>
Models in the Zachman Framework

<table>
<thead>
<tr>
<th>Scope</th>
<th>Enterprise Model</th>
<th>System Model</th>
<th>Technology Model</th>
<th>Components</th>
<th>Functioning System</th>
</tr>
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<tbody>
<tr>
<td>Data</td>
<td><img src="data.png" alt="Diagram" /></td>
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Models are tightly coupled within a cell, but loosely / informally integrated across cells. Semantics are not resolved or normalised.
## Models in the Inspired Framework

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Integrated model spans all areas of concern/interest.
Semantics are resolved and unified. Relationships defined across all dimensions.
Framework and Architecture

A FRAMEWORK defines Types of Parts and their relationships.

Roof
- Thatch
- Slate
- Tile

Walls
- Wood
- Brick
- Concrete

Floors
- Tile
- Wood
- Carpet

Decision Criteria
- Load bearing capacity
- Aesthetics
- Ease of cleaning
- Cost
- Durability
- Safety
...

Requirements
- Requirements act as a filter. Give us values for the criteria.

An ARCHITECTURE reflects choices for each component.

Decision Criteria help us choose between options.
Standards are vital to enable parts to fit and work together, even if provided by multiple suppliers.

A frame may be chosen to fit a "standard door", for example.

Wall sockets will take a standard plug.

There can be flexibility in the actual components chosen, provided that they meet the requirements and interoperate correctly.
Key Concepts

- **Framework**
  - Zachman - what should be addressed, suggested models
  - Inspired - what elements are there, how are they interrelated, what state are they in, how should they evolve, how do we manage this?

- **Components**

- **Interfaces, boundaries, responsibilities**

- **Per Component and Interface**
  - Requirements
  - Criteria
  - Choices
  - Standards

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<th>CRITERION</th>
<th>COMMENTS</th>
<th>REFERENCE</th>
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<tr>
<td>1</td>
<td>Consistent with Business Objectives</td>
<td>Business Architecture</td>
</tr>
<tr>
<td>2</td>
<td>Data Resides in a formal database compatible with Technical Architecture</td>
<td>Typically relational with ODBC or SQL 2 access, DRDA also acceptable. Object DB OQL, ODMG 2.0</td>
</tr>
<tr>
<td>3</td>
<td>Data Model is available and expressed in a standard form</td>
<td>Normally Entity Relationship Diagram or UML Class Diagram. Meta Data online</td>
</tr>
<tr>
<td>4</td>
<td>Runtime environment is compatible with Technical Architecture</td>
<td>Relates to processor family, DBMS, operating system, etc.</td>
</tr>
<tr>
<td>5</td>
<td>Supplier is approved, stable and has sound strategy</td>
<td>Local support capability preferred</td>
</tr>
<tr>
<td>6</td>
<td>Meets functional requirements</td>
<td>Business Architecture, Processes</td>
</tr>
<tr>
<td>7</td>
<td>Application will scale to anticipated volumes (5 years)</td>
<td>Check file (batch), transaction and number of users limits</td>
</tr>
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</table>
The current organization, systems, data, networks and infrastructure has an architecture too. It may not be pretty...

Strategy is about moving from one to the other with minimal disruption, risk, effort and cost.

The desired goal may not be attained in full, but it is a target to aim for.

It can change over time to reflect new priorities, realities or needs.
The Inspired Frameworks

Business Architecture
- Markets
- Products
- Services
- Channels
- Suppliers
- Resources
- Technology
- Processes
- Culture
- Competitors

Applications
- Types/Classes
- Inventory

Information
- Types/Classes
- Inventory

Technical Architecture
- User Access
- Application Enablers
- Data Storage and Management
- Connectivity
- Platforms
- Services

Drivers
Services and Products are delivered to customers in markets via channels.

Customers

Channels

Markets

Partners participate in the business process.

Partners

Services

Culture

Cultures and Technology are used in the business process to produce the products and services.

Products

Services

Resources

Resources

Suppliers contribute inputs to the products and services.

Suppliers

Business Processes

Business Processes

Control

Control

Organization

Organization

Other Stakeholders

Include shareholders, community etc. Provide and expect a variety of things.

Other Stakeholders

Technology

Deals

Business Model

Deals

Contracts

Services and Products are delivered to customers in markets via channels.
Application Architecture

- **User Group**
- **Business Rules**
  - govern
- **Location**
  - services
  - distributed at
  - runs on
- **Platform**
- **Business Communication**
  - generates/consumes
  - interfaces to
  - provides/requires
- **Application**
  - produces
  - requires
- **Tools/Technology**
  - uses/changes state of
  - monitors
- **Key Indicators**
- **Business Object**
- **Business Object**
Information Architecture

Subject Area
Describes:
- Products
- Services
- Customers
- Staff
- Processes
- Activities...

Business Object

Attributes
- name
- balance
- date
- location

Related Business Object

Business Process

Database

Computer System

Information Types

- includes
- requires
- stored in/retrieved from
- uses/changes state of via
EVA Architecture

Web Server

EVA Server

Relational DBMS

XML

Other Tools

System Parameters

Instances

Model

Templates

Managed Documents

External Pages

Portal Users

Web Client

Architect

Strategist

Program/Project Manager

Modeler/Knowledge Engineer

Web Client

Web Client

Web Client

Web Client

Web Client

Web Client

Web Client

Web Client

Web Client

Web Client

Web Client
Different Views of the same Data

Item Browser

Content Browser

Custom View

Person

Course

Enrollment

Title
String

Duration
String

Description
Archie2Discussion

eva+ netmodeler
Demonstration

Show Architecture Meta Model
Knowledge Management
and Navigation in EVA
Challenges for Organizations post 2000

- **Costs**
  - Imperative to have low cost base to survive and be competitive

- **Quality**
  - Necessary to have sustained market acceptance
  - Required to contain costs
  - Focus for continuous improvement
  - Key way to achieve higher levels of productivity (especially in IT critical organisations)
  - Requires metrics, baseline, monitoring

- **Process Management**
  - Allows focus on end to end chain of events leading to customer / stakeholder value
  - Cuts across traditional organizational/functional boundaries
  - Needs a holistic view, since it can be risky to reengineer what we don't understand

- **Risk**
  - Sept 11 and other events made people acutely aware of need to manage risk
Enhancing the Models - Cost Perspective

Turns out that most of the cost elements are already in the architecture models! We need to add attributes to individual items to record the various relevant costs; then implement a mechanism to accumulate them. This adds a model element for Cost Centre. Costs accumulated there can, in turn, be apportioned across business units. This is a flexible approach that allows various cost categories to be monitored - various models can be simultaneously implemented.
Cost Centre Model in EVA
Declarative formulas are created in "Calculated Property" Fields
These are similar to the concept of a spreadsheet formula, but can reference
→ Attributes of item on which the formula is defined
→ Attributes of related items
→ Other items (e.g. a global rate) elsewhere in the repository via type/name/attribute
name
Formula on Cost Centre pulls details together and computes summary
Formulas on Business Units pick up their proportion of expenses

(aAttrValue tNodeType: 'DBMS - File System'
 propVal:
 'Cost Per Month - Curr') +
(aAttrValue tNodeType: 'Development Tool'
 propVal:
 'Cost Per Month - Curr') +
(aAttrValue tNodeType: 'Project' propVal:
 'Cost Per Month - Curr') +
(aAttrValue tNodeType: 'Application System'
 propVal:
 'Cost Per Month - Curr').
Demonstration

Show Model Extensions
Links to Cost Centre
Derivation of Values in EVA
Architectures and Process Management
Enable Quality Improvement
Models can be enhanced with additional dimensions of:

- Methods, Process, Deliverables
- Costs
- Metrics and Quality

The above can reflect both:

- Current Position
- Benchmarks from Industry/Competitors
- Goals

TIMING and RISK can also be brought into the picture.
Conclusions

- **Enterprise Architecture Models**
  - Form an excellent foundation for integrated modeling of extra dimensions including Cost, Quality, Risk.
  - Allow strategic planners, architects and business managers to view Current Picture, Future Scenarios with proper appreciation for implications of decisions.

- **Potential for future integration of architecture models**
  - with ERP systems for integrated planning and management

- **Challenges**
  - Keeping models updated and in synch with planning, ideas, shifting realities.
    - Possible solutions: time triggered reminders; distributed responsibility; feeds from / to other systems (XML based)
Questions?