A Stakeholder Based Approach to EA Engineering
The Open Group Conference, Munich, October 22nd, 2008

Dr. Stephan Aier
Project Manager
Competence Center Integration Factory
Institute of Information Management
University of St. Gallen
Müller-Friedberg-Strasse 8, 9000 St. Gallen, Switzerland
Tel: +41 71 224 3360 Fax: +41 71 224 2189
stephan.aier@unisg.ch
www.iwi.unisg.ch | ccif.iwi.unisg.ch | adoben.iwi.unisg.ch
Background
University of St.Gallen (HSG)

- St.Gallen: “Switzerland's prestigious business school” (Business Week)
- 5000+ Students (incl. 850 Ph.D. students, 250 students in Executive programmes)
- Focus on Management, Technology and Law
- First continental European university to be accredited from top European as well as top US accreditation bodies:
Background

Institute of Information Management (IWI-HSG)

- 4 chaired professors
- 70+ full time researchers in 6 competence centres
- Research program ‘Business Engineering HSG’ 100% funded by industry partners
- Core faculty for HSG degree programs
  - M.A. in Information, Media and Technology Management
  - Executive Master of Business Engineering
  - Ph.D. in Business Innovation
- Associated with SAP Campus Engineering Centre St.Gallen, Deutsche Bahn Systems Lab
- Regular open programs
  - Anwenderforum St.Gallen (3 p.a., each 200 participants)
  - DW2008 (every other year, 350 participants)
  - CIO Roundtable (3 p.a., 15 Swiss CIOs)
Executive Master of Business Engineering

- Focus on IT-enabled transformation: multidisciplinary approach
- Part-time layout: 20 weeks within 16-18 months
- 15 weeks in Switzerland
  4 weeks in Silicon Valley
  1 week in China
- 13 weeks specific business engineering content, 7 weeks general management content
- Home of the business engineering community (http://bec.unisg.ch)
- Started 1998, currently 11th class enrolled
- ‘Light’ EMBE: Diploma in IT Business Management (45+15 days)
Background
Research Program “Business Engineering HSG”

- Development of methods, models and prototypes
  - e.g. process method PROMET® for business process redesign, strategy development, systems and technology planning etc.
  - e.g. reference architectures for business networking, retail banking etc.
  - e.g. integration management method, generic enterprise architecture method
  - e.g. St.Gallen approach to industrialised information management, strategy development, IT governance
- Strict business/management perspective on IT
- Applied research with a dominant design science approach
Background

Competence Centre Integration Factory (CC IF)

CC Integration Factory

Development of information technology
- Strategy
- Design
- Management
- Governance

Management of Information Systems
- Architecture Management
  - Service Orientation
  - Governance
  - Business-IT-Alignment
- Integration Management
  - Domain, Application and Service Design
  - Alignment Architectures
  - Situational Methods
  - Modelling, Analysis, Design, Transformation of Enterprise Architecture: ADOben®

Partners

CC IF Intranet

Workshops
- Partner Projects
- Reference Architect.
- Methods Models
- Working Papers
- Dissertations
- Books/Articles
- Conferences
- CC IF Intranet

http://ccif.iwi.unisg.ch
How “we” deal with architecture

Views on “Architecture”

- **Modeling/Representation**
  - Frameworks (e.g. Zachman, TOGAF, FEAF)
  - Meta-models and notations (e.g. MOF, UML, eEPC)
  - Reference models (e.g. IAA, eTOM)

- **Architecture design** and Architecture management
  - Architecture guidelines
  - Architecture processes (e.g. communication, enforcement)
  - Architecture roles and -competencies

- **Using** architectures for operational tasks
  - Application scenarios (e.g. business driven projects, IT projects, risk management, project management)
  - Analyses (e.g. dependency analyses, heterogeneity analyses, complexity analyses, consistency analyses)
A conceptual foundation
Business Engineering Framework

- **Strategy Layer**
  - Strategy design
    - Business network models
    - Customer process models
    - Output models
    - Corporate objectives

- **Organization Layer**
  - Organisational design
    - Process models
    - Process services
    - Organisational structure
    - Information map

- **Integration Layer**
  - Integration design
    - Application map
    - Enterprise services

- **Software Layer**
  - Software design
    - Software components
    - Software services
    - Data models

- **Infrastructure Layer**
  - IT infrastructure design
    - Platform infrastructure
    - Network infrastructure
It is impossible to be wide and detailed at the same time

Enterprise Architecture scope

- Business-strategy
- Markets
- Software and Data
- Enterprise Services
- Server and Platforms
- Processes
- Detailed Structures
A conceptual foundation

Business Engineering Framework

Systems Layer

- Strategy Layer
- Organization Layer
- Integration Layer
- Software Layer
- Infrastructure Layer

- Business driven projects (top-down)
- Technology driven projects (bottom-up)
- Alignment projects
- Simplification/agility projects (SOA)

Business driven projects (top-down)
Technology driven projects (bottom-up)
Alignment projects
Simplification/agility projects (SOA)
Business Engineering-Framework
Meta-model „Business Core“

Strategy design
- Business network models
- Customer process models
- Output models
- Corporate objectives

Organisational design
- Process models
- Process services
- Organisational structure
- Information map

Integration design
- Application map
- Enterprise services

Software design
- Software components
- Software services
- Data models

IT infrastructure design
- Platform infrastructure
- Network infrastructure
Enterprise Architecture application scenarios

What do these questions have in common?

- **Customer orientation**
  - “Which products depend on which application?”
  - “Which turnover is created by which processes and applications?”

- **Sourcing**
  - “Which sourcing scenarios require multi client capability of which applications?”
  - “Are process interfaces compatible with service provider’s offerings?”

- **IT strategy**
  - “Are IT investments proportional to turnovers related to platforms and applications?”
  - “Which products are affected by a freeze of this application?”
  - “May this product also be offered over that channel?”

- **Business continuity planning & security**
  - “Which requirements concerning availability of this system/platform/application can be derived from the priority of that product?”
  - “Which customer data is managed in which applications/platforms because of which products/offerings?”
  - “Is the role structure of this process correctly transferred into the authorization management component of that application?”

- **Service management**
  - “Are the agreed service levels of this group of applications consistent to the turnover and/or priorities assigned to that product?”

Typically nobody in a company is able to answer these questions.
Impact analyses

To answer the alignment questions it is necessary to have transparency of the interdependencies over various layers of abstraction usually spanning various departments, detailed model repositories etc.

**Customer process**
- service activity: claim management
- customer activity: claim report
- customer process: motor insurance

**Process map**
- process: claim management

**Application repository**
- applications: claims core
- application domain: claim/benefit management

**Components and platforms**
- platform: J2EE
- software components: order, events, partner, claims catalogue
# Initial EA implementation and stakeholder orientation

**Enterprise Architecture project structure**

<table>
<thead>
<tr>
<th>Project phase</th>
<th>Content</th>
<th>Result</th>
</tr>
</thead>
</table>
| 1. Analysis and specification | - Identification of stakeholders and information needs  
- EA application scenarios and questions it should answer  
- Required object types and relationship types  
- Identification of available data sources  
- Selection/adaptation/design of the meta model | - Requirements Specification  
- Functional Specification  
- Meta Model |
| 2. Modeling and implementation | - Implementation of the adapted meta model in the selected tool platform  
- Implementation of interfaces to third-party systems | - Meta Model Implementation  
- Interface Implementations |
| 3. Roll-Out              | - Tool Roll-Out  
- Modeling EA  
- Establish application scenarios and maintenance processes | - Organizational concept |
EA design should be driven by stakeholders

Application Scenarios

- Project Portfolio Management/Project Selection
- Project Initialization
- Business Continuity Planning
- IT-Business-Alignment
- Business Process Redesign/Optimization
- Compliance Management
- Business Development
- Future Screening/Innovation Management
- Sourcing Decisions
- Quality Management
- Application Portfolio Management
- Client-Management
- IT Consolidation
- Application Integration
- Standard Software Integration
- Service Modeling
- Service Planning
- IT Resource Planning
- Product Planning
- Security Management
- Technology Risk Management
- Post-Merger-Integration
- Partner Integration/Desintegration
EA design should be driven by stakeholders

**Stakeholder Orientation**

- **Design Focus**
  - Enterprise Architecture aims at enterprise development. EA analyses the as-is architecture, designs a to-be and enables their communication and implementation.

- **Stakeholder Orientation**
  - EA visualization and reports are aligned with the information and communication needs of different stakeholder groups
  - Design Objective is the alignment of stakeholder concerns (tradeoffs)
Engineering of meta-models based on application scenarios

Meta-model engineering

1. Identification of Relevant Concerns
2. Requirements Elicitation
3. Viewpoint Relationship Overview
4. Meta Model Fragment Selection or Design
5. Meta Model Fragment Integration

List of Relevant Concerns

Viewpoint 1
- Viewpoint Requirements Specification 1
- Design
- Validation
- Meta Model Fragment 1

Viewpoint 2
- Viewpoint Requirements Specification 2
- Design
- Validation
- Meta Model Fragment 2

... Viewpoint n
- Viewpoint Requirements Specification n
- Design
- Validation
- Meta Model Fragment n

Integrated Meta Model

vgl. [Kurpuweit/Winter 2007]
## Application scenarios (examples)

<table>
<thead>
<tr>
<th>App. Scenario</th>
<th>IT Consolidation</th>
<th>Business IT Alignment</th>
<th>Component Reuse</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain / Model Type</td>
<td>Processes Applications</td>
<td>Processes, Applications</td>
<td>Software Architecture</td>
<td>IT-related artifacts</td>
</tr>
<tr>
<td>Purpose</td>
<td>Analysis</td>
<td>Analysis</td>
<td>Design</td>
<td>Documentation</td>
</tr>
<tr>
<td>Concern</td>
<td>Cost of application operation and maintenance</td>
<td>Providing adequate IT for business processes</td>
<td>Cost of application development</td>
<td>Correct implementation of ownership policies</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Application architect</td>
<td>Process owner</td>
<td>Software architect</td>
<td>IT audit</td>
</tr>
<tr>
<td>Design Strategies</td>
<td>Consolidation of applications that are in use for similar purposes / Consolidation of system software of the same type (e.g., DBMS, WFMS)</td>
<td>Providing IT functionalities for each process step / reduction of media breaks</td>
<td>Reuse of software components across multiple applications / reuse of system software (e.g., DBMS, WFMS)</td>
<td>Assigning explicit owners to applications and other IT-related artifacts (like information objects, components, environments, etc.)</td>
</tr>
<tr>
<td>Questions</td>
<td>Which applications are used in the individual processes (sorted by organizational unit, product, distribution channel)? / Which system software of the same type is currently in use?</td>
<td>Which process activities are not IT supported? Which processes include media breaks? / Which applications are supported by multiple applications?</td>
<td>Which components are available in existing applications? / Which interfaces are available to use these components? Which system software of different types is currently in use?</td>
<td>Are there applications for which no owners have been defined? Are there applications that have not been audited for more than two years?</td>
</tr>
</tbody>
</table>

### Information Model

- **Product**
- **Distribution Channel**
- **Org Unit**
- **Application**
- **System Software**
- **Process**
- **Application**
- **Software Component**
- **Interface**
- **Org. Unit**

[Kurpujeuweit/Winter 2007]
EA operations

Establish maintenance processes (1/2)

- Holistic Approach

- Federated Approach
EA operations
Establish maintenance processes (2/2)

- Maintenance and Usage Procedures/Processes

- Roles and Responsibilities

<table>
<thead>
<tr>
<th>Activities</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Initiate maintenance cycle</td>
<td>Chief Enterprise Arch.</td>
</tr>
<tr>
<td>(2) Deliver model data from specialized architecture</td>
<td></td>
</tr>
<tr>
<td>(3) Check data consistency</td>
<td></td>
</tr>
<tr>
<td>(4) Revise inconsistencies</td>
<td></td>
</tr>
<tr>
<td>(5) Prepare change report &amp; notify affected stakeholders</td>
<td></td>
</tr>
<tr>
<td>(6) Check intended changes</td>
<td></td>
</tr>
<tr>
<td>(7) Coordinate vetoes</td>
<td></td>
</tr>
<tr>
<td>(8) Authorize repository update</td>
<td></td>
</tr>
<tr>
<td>(9) Perform repository update</td>
<td></td>
</tr>
<tr>
<td>(10) Communicate repository update</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agenda</td>
</tr>
<tr>
<td>---</td>
<td>----------------</td>
</tr>
<tr>
<td>1</td>
<td>Views on architecture</td>
</tr>
<tr>
<td>2</td>
<td>EA application scenarios</td>
</tr>
<tr>
<td>3</td>
<td>EA tool support</td>
</tr>
<tr>
<td>4</td>
<td>Conclusion</td>
</tr>
</tbody>
</table>
The St. Gallen Approach to Enterprise Architecture Management

Business Engineering Navigator

- The BEN approach is the central platform for all business engineering models and methods. It is the basis for systematic enterprise architecture management:

  - Enterprise architecture documentation
  - Enterprise architecture analysis
  - Enterprise architecture design
  - Enterprise architecture communication
Continuous Enterprise Architecture Management

**Business Engineering Navigator**

- The Business Engineering Navigator supports continuous enterprise architecture management processes:
  - Periodic update of the enterprise architecture as-is
  - Enterprise architectural compliance of individual change projects
  - Multi-stage design of the enterprise architecture to-be
**ADOben® Model Types**

- ADOben® model types facilitate stakeholder group aligned enterprise architecture modeling, visualization, and communication:

  - Business Networks, Products, Supplier and Customer Processes, Strategic Position
  - Information Landscapes, Business Process Landscapes, and Organizational Structures
  - Server Landscapes, Environments, and System Software
  - Objectives, Success Factors, KPIs, and Projects
  - Application Landscapes, Software Architectures, and Data Models
  - Reports, Matrix Analyses, and Dependency Analyses

http://adoben.iwi.unisg.ch
Why another EA tool?

USP of ADOben

Existing tools

- Are often IT architecture tools
- Therefore do not support comprehensive impact analyses
- Are hardly extendable to address business aspects sufficiently
- Do not consistently focus on meta-modeling to implement meta-model extensions fast and consistently
- Are purely commercially oriented
Application Scenarios of the BEN Approach

Example 1: Introducing a New Product

- Stakeholders’ information need (exemplary):
  - Are there adequate applications that could be adopted for the new product?
  - Are the potential breaks between applications along the process chain?

- These questions are answered by following BEN analysis:

  "Which applications are used for the individual products along the process chain?"
Application Scenarios of the BEN Approach

Example 2: Business Continuity Management

- Stakeholders‘ information need (exemplary):
  - Which applications are affected in case of power failure?
  - Are all critical applications deployed on redundant server clusters?

- These questions are answered by following BEN analysis:
  
  „How are the applications distributed across servers/server clusters?“
Application Scenarios of the BEN Approach

Example 3: Compliance Management

- **Goal:** Proof compliance with Solvency II, Basel II or SOX
- **Stakeholders’ information need (exemplary):**
  - Implementation rate of process ownership or data ownership (organization layer)
  - Implementation rate of authorization and reuse (software layer)

- These questions are answered by following BEN analysis:
  
  „Show all applications that have not been assigned an owner.“
Application Scenarios of the BEN Approach

Example 4: Business Development

- Stakeholders‘ information need (exemplary):
  - Across which channels are the individual product distributed?
  - Which target group are addressed by the individual products?

- These questions are answered by following BEN analysis:

„Strategic Position“
## Agenda

<table>
<thead>
<tr>
<th></th>
<th>Views on architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>EA application scenarios</td>
</tr>
<tr>
<td>3</td>
<td>EA tool support</td>
</tr>
<tr>
<td>4</td>
<td>Conclusion</td>
</tr>
</tbody>
</table>
Conclusion

- EA is no end in itself
- EA is complex – so is its management as well as the maintenance of EA models
- Therefore it is vital systematically and pragmatically align EA to tangible goals
- It is not easy to convince architects to stay high-level (which typically improves the 2\textsuperscript{nd} time they do the EA project)
- Tools \textit{are} important – but really not all-dominant
- It is more important to have an explicit method and a tool that naturally conforms to the requirements of that method – everything else is (politically) exhausting in the long run
Contact

Institute of Information Management

University of St. Gallen

Dr. Stephan Aier
stephan.aier@unisg.ch
www.iwi.unisg.ch
+41 71 224 3360