Referenzarchitekturen
Brauchen wir sie und wenn ja, wie viele?

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Background

University of St. Gallen (HSG)

- St. Gallen: “Switzerland's prestigious business school” (Business Week)
- 7100+ Students
- Focus: Management, Technology and Law
- Consistent top-ten rankings among Europe’s top universities
- First continental European university to be accredited from top European as well as top US accreditation bodies (since 2003)
The Network
Institute of Information Management (IWI-HSG)

IWI-HSG provides an extensive network based on their research program, executive education, and their community events.

- Executive Master of Business Engineering
- IT Business Management
- Individual Programs (e.g. DQM, EAM, BE-Methods)
## Background

### EAM, Transformation and Intelligence Group

<table>
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<th>What</th>
<th>Enterprise Architecture Management</th>
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<td>▪ Modeling</td>
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<td>▪ Analyses</td>
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<tr>
<th>What</th>
<th>Enterprise Transformation Management</th>
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<td>▪ Principles</td>
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<td>▪ Value of Infrastructure</td>
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<td>▪ Coordination of Transformation from an Architecture Perspective</td>
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<td>▪ Models</td>
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<th>Who</th>
<th>Barmenia Versicherungen</th>
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<td>finanz informatik</td>
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<td>University of St. Gallen</td>
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<td>COMMERZBANK</td>
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<td>Bundesagentur für Arbeit</td>
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<th>How</th>
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<td>▪ Projects</td>
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<th>How</th>
<th>Exclusive Community</th>
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<td>▪ Competence Center Workshops</td>
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<td>▪ Benchmarking</td>
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<td>▪ Exchange of Best Practices</td>
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<th>Public Community</th>
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<td>▪ Conferences (St.Galler Anwenderforum, DW2012, BE Forum)</td>
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<td>▪ Research Events</td>
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Picture: HSG central institute's building
Development of Enterprise Architecture Research @ IWI-HSG
More than Ten Years of Experience

Banking Architecture of the Information Age

Application Integration Management

Integration Factory
CC IF (2004–2010)

CC Competence Center
CI Corporate Intelligence

Picture: HSG main building
Agenda

1. Why Reference Architectures?
2. How many Reference Architectures?
3. Case Finanz Informatik
4. Discussion
## Definition
### Reference Model / Reference Architecture

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<th>Reuse</th>
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<td>Through deployment and use of reference models <strong>resulting systems</strong> may <strong>become more consistent</strong>.</td>
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[based on Fettke/vom Brocke 2012]
St. Gallen’s Enterprise Architecture Approach

Our EA Playing Field

- **Strategy Layer**
  - 1-2 years
  - Strategy Design
    - Business network models
    - Customer process models
    - Output models
    - Corporate goals

- **Organization Layer**
  - 3-6 months
  - Organizational Design
    - Process models
    - Process landscapes
    - Organizational structure
    - Information map

- **Alignment Layer**
  - Alignment Design
    - Domains
    - Application map
    - Capabilities

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

- **Infrastructure Layer**
  - IT Infrastructure Design
    - Platform infrastructure
    - Network infrastructure

- **Timeline**
  - 1-2 years: Strategy Design
  - 3-6 months: Organizational Design
  - 6-10 years: Software Design

University of St. Gallen

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St. Gallen’s EA Playing Field

Where are the Reference Architectures?

<table>
<thead>
<tr>
<th>Layer</th>
<th>Models</th>
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<tr>
<td>Strategy Layer</td>
<td>Strategy Design: Business network models, Customer process models, Output models, Corporate goals</td>
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<td>Organizational Design: Process models, Process landscapes, Organizational structure, Information map</td>
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<td>Alignment Layer</td>
<td>Alignment Design: Domains, Application map, Capabilities</td>
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<td>Software Layer</td>
<td>Software Design: Software components, Software services, Data models</td>
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<tr>
<td>Infrastructure Layer</td>
<td>IT Infrastructure Design: Platform infrastructure, Network infrastructure</td>
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</tbody>
</table>
Some Examples
Scheer’s Y-Model
Some Examples
Becker’s Handels-H
Some Examples
Enhanced Telecom Operations Map (eTOM)
Some Examples

IT Infrastructure Library (ITIL)
Some Examples

IBM/CS Banking Capability Model

5 Strategy & Governance

5.2 Strategy & Planning

5.2.1 Bus. Res. & Sales Planning

5.2.2 Bus. Strategy Planning

5.2.3 Alliance Planning

5.2.4 Cus/ Mkt Research & Analysis

5.1 Governance

5.1.1 Business Architecture

5.1.2 IT Architecture

5.1.3 E2E Service Level Mgt

5.1.4 Exec. Stakeholder Mgt

3 Processing

3.3 Data

3.3.1 Counterparty & Acct. Maint.

3.3.2 Fin. Inst. Ref. Data Mgt

3.3.3 Market Data Management

3.3.4 Document Management

3.3.5 Gen. Ref. Data Mgt.

3.4 Product Specific

3.4.1 OTC/ Deriv./SP Processing

3.4.2 Commd./Banknotes Proc.

3.4.3 SLB & Repo Processing

3.4.4 Funds Processing

3.4.5 Subscr. Proc. (incl. IPO)

3.4.6 Sec. Specific Processing

3.4.7 FX/MM Processing

3.1 Client Facing Common Proc.

3.1.1 Credit Approval Mgt

3.1.2 Credit Review/ Risk Mgt

3.1.3 Cash Services

3.1.4 Client Vault Services

3.1.5 Fees/Comm./ Billing Mgt

3.1.6 Client Reporting

3.2 Common Processing

3.2.1 Clearing & Settlement

3.2.2 Collateral Handling

3.2.3 Matching and Confirmation

3.2.4 Credit Admin.

3.2.5 Asset Servicing

3.2.6 Bank Trans. Risk

3.2.7 Payments

3.2.8 Client Bank Pos./ Contr.Acct / Accnt Mgt

3.2.9 Invest/Except Handling

3.2.10 Reconciliation

3.2.11 Safe Management

6 Support Infrastructure

6.3 Other

6.3.1 Communications (excl. Client)

6.3.2 Legal

6.3.3 Procurement

6.3.4 Facilities, Organ. & Maint

6.3.5 Pgm & Change Mgmt

6.3.6 Business Continuity

6.1 HR

6.1.1 HR Operations

6.1.2 Strategic HR Management

6.2 IT

6.2.1 6.2.2 Build Appl & IT infra.

6.2.3 Operate & Maintain Appl & IT infra.

6.2.4 IT Security

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Some Examples
AXA Tech’s TAP (Technische Applikationsplattform)

Eine zusammengehörende Menge von technischen Komponenten, zusammen mit Prozessen und Guidelines für Entwicklung, Bereitstellung und Betrieb von technisch ähnlichen Applikationen

[Source: Michael Schoch, 26. St. Galler Anwenderforum, 02.06.2008]
Some Examples
AXA Tech’s TAP (Technischen Applikationsplattform)

Blueprints
Lösungsvarianten auf Basis des Katalogs der verfügbaren Building Blocks

Building Blocks
Eine Menge von zusammengehörenden und aufeinander abgestimmten SW- und HW-Komponenten zur Erfüllung bestimmter Funktionen

[Source: Michael Schoch, 26. St. Galler Anwenderforum, 02.06.2008]
Some Examples
Generalised Enterprise Reference Architecture and Methodology (GERAM)

“… a generalised framework for describing the components needed in all types of enterprise engineering/enterprise integration processes”

GERA
Generalized Enterprise Reference Architecture
Identifies concepts of Enterprise Integration

EEM
Enterprise Engineering Methodology
Describe processes of Enterprise Engineering

EMLs
Enterprise Modeling Languages
Modeling constructs for Human, process & IT

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PENs
Partial Enterprise Models
Provide reusable reference models

EEMCs
Generic Enterprise Modeling Concepts
define the meaning of modeling constructs

EETs
Enterprise Engineering Tools
Support of Enterprise Engineering

EMs
Enterprise Models
Enterprise models to support analysis & operation

EOS
Enterprise operational Systems
Support the operation of a particular Enterprise

Source: [GERAM99]
## Recap

### Why Reference Architectures?

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First and foremost reference architectures provide a valuable facilitator for business/IT alignment.
Recap
Why NOT Reference Architectures?

- **Reuse**: Reference models that may be inappropriate (in its details) may be reused.

- **Configuration**: The basically good reference models are rewritten/abused with great effort.

- **Economic Benefits**: The model was quickly found, the consequences were long felt.

- **Consistency**: Consistency may restrict the diversity and therefore hinder progress.

If built on the wrong basis, the corrections are usually expensive.
The Dilemma of Reference Modeling

There is no “One-Size-Fits-All” Reference Model

Source: Robert Winter
Agenda

1. Why Reference Architectures?
2. How many Reference Architectures?
3. Case Finanz Informatik
4. Discussion
The Case
Finanz Informatik

- Is the **IT provider** of the German **Sparkassen Finance Group**
- The group is **comprised of more than 400** banking institutes with more than **10,000 branches** in Germany.
- About **50% of the retail banking transactions in Germany** is processed on systems of Finanz Informatik.
- Runs a **consistent core banking system** (OS plus)
How to cope with variety of customers and still make a business case?

The Challenge

- Finanz Informatik provides **IT services to 438 banking institutes**
- “Every” institute considers itself as being “different”
- There will only be a **business case** if Finanz Informatik treats them all the same

**Is this a case for a Reference Business Process Model?**
- And how to address the **diversity of customers?**

How to cope with variety and still make a business case?

The Reference Model

- Provide a **process configuration tool** that uses services of the core banking system
- However, which is the **best reference model**?

Analysis of the Differences of existing Process Variants

Solution Approach

Get a model of all existing process variants and compute their distances

Find clusters of similar processes

Find and understand cluster centers and make them the new reference model variants

Example
• Process “Customer Registration”
• Found 581 process variants at 371 banking institutes
• Resulted in 3 new reference business process models

Abstract Example

How similar are these 4 processes?

A → B → C → D

A → C → B → D

A → B → E → D

A → B → E → C → D

How to calculate similarities among processes

- **Activity Type Vector**
  - Do certain activity types exist or not?

- **Adjacent Matrix**
  - Do certain relations between activity types exist?

- **Transitive envelope**
  - Are certain activity types “somehow” connected?
Example

Customer Registration

Example

Results after Clustering

Agenda

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Discussion

- Where is the value?
  - Less configuration effort of process models
  - Good practices, banking institutes can learn from each other
  - Standardization of the actually used processes
  - Acceptance of reference processes, the business is even more happy (customer view, service dominant logic)
  - Finanz Informatik is happy, too (production view, efficiency in resource allocation)

- Which are the prerequisites?
  - A solid understanding of the business
  - One consistent service oriented banking system
  - Clear separation of data, business logic and presentation
  - Central metadata repository

- Which are the limitations of such an approach?
  - Backwards view
  - Needs some existing processes
Discussion

What are the advantages and disadvantages of reference models/architectures on the different layers of EA?

Where are such clustering approaches useful in your organization?

What are your experiences with reference models?
Thank You!

Institute of Information Management

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