An Integrated Approach to Enterprise Architecture

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Context

- Business and ICT become closer
- Ever higher demands on ICT: complexity, flexibility
- Many changes, rapid time-to-market required
- Management & control difficult

- *Enterprise Architecture* as a tool
  - for communication
  - for governance
ICT
Business
Architecture

Architecture = structure(s) of a system in terms of

- *components*,
- their *externally visible properties*,
- their *relations*,
- and the underlying *principles*
What good are architectures?

- Provide the overview: the most important functions, the most important domains, etc.
- A means of communication between various stakeholders (architects, managers, customers, engineers, …)
- A starting point for more detailed designs
- No description of implementation!
- Correctness & completeness
Governance with architecture

• Architecture is a strategic tool
  • not just high-level design
  • Architecture goes beyond ICT: enterprise architecture

• Stability & flexibility
  • Seem to be contradictory, but a good architecture facilitates changes! It’s no ‘blue-print’ that will hold forever.

• Communication with stakeholders
  • architects, managers, customers, engineers

• Analysis
  • impact-of-change
  • cost & performance
Enterprise architecture: describing coherence

- Information architecture
- Process architecture
- Application architecture
- Technical architecture
- Product architecture
Frameworks

- Zachman
- Nolan Norton
- TOGAF
- Tapscott
- ...

<table>
<thead>
<tr>
<th>ENTERPRISE ARCHITECTURE - A FRAMEWORK™</th>
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</thead>
<tbody>
<tr>
<td><strong>DATA</strong></td>
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<tr>
<td>List of Things Important to the Business</td>
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<tr>
<td><strong>Planner</strong></td>
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<tr>
<td><strong>SYSTEM MODEL (CONCEPTUAL)</strong></td>
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<td><strong>SYSTEM MODEL (LOGICAL)</strong></td>
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<td><strong>Designer</strong></td>
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<td><strong>TECHNOLOGY MODEL (PHYSICAL)</strong></td>
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<td><strong>FUNCTIONING ENTERPRISE</strong></td>
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<td><strong>Sub-Contractor</strong></td>
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Methods

- Information planning
- Information engineering (James Martin)
- Rational Unified Process
- TOGAF
- DYA
- ...
Modelling languages (I)

- Data models (ER diagrams)
- Business process models (BPML)
- UML
Shortcomings

• Each approach or tool addresses only one or a few aspect architectures

• Tools lack semantics
  • Consistency has to be checked manually
  • Analysis of architectures is difficult or impossible
Experiences

• Internal inconsistencies
  • at the model level
  • at the concept level
  • at the instance level

• Processes and functions not well separated

• Tension between different architecture methods

• Many relations between models, hard to determine

• Document and version management difficult
Overview

• ArchiMate.

• The ArchiMate metamodel.

• Mapping to UML.

• The ArchiSurance Case.
What is ArchiMate?

- A Research initiative that aims to provide concepts and techniques to support enterprise architects in the visualization, analysis and communication of integrated enterprise architectures.

Idea: Use enterprise architecture (business & ICT) as a basis for stability in changing organizations.

- Should give a better insight in the dependencies and correspondences between company domains and the impact of making changes in one of the domains.
The ArchiMate Project

- 2½ years, July 2002 - December 2004
- approx. 35 man-years, 4 million euro
- Consortium of companies and knowledge institutes
  - Telematica Instituut leads the project
  - Ideas also originated from Ordina
  - ABN AMRO, Belastingdienst, ABP
  - KU Nijmegen, CWI, Universiteit Leiden
Goals

• To describe architectures and their *relations*

• *Communicate* enterprise architectures with all stakeholders

• Judge the impact of *changes*

• *Realise* architecture by relating to existing standards, techniques and tools
The ArchiMate language

High-level modelling within a domain

ArchiMate language

Modelling relations between domains

Basis for visualisations

Basis for analyses
Abstraction levels

Generic concepts

Enterprise architecture concepts

Company-specific concepts, standards

Object

Relation

Application

Process

more generic

more specific
Scope

Views & visualisation

Integrated architecture descriptions

Analysis
Integration

An architecture might encompass for example:

- products
- organisation
- business processes
- applications
- systems

This requires *concepts* for domains and relations, linked with existing techniques
Integrated Architecture

Services as central notion for linking business & IT, but also business & environment

Services do not exist in UML
Integration of Languages

Archimate architecture model relates to other models
Visualisation

Architecture in the eyes of

• the manager
• the engineer
• the customer
• …

This requires techniques to create *views* on architectures for different stakeholders
Analysis

“I want to introduce a new product, what does that mean?”

• for our business processes
• for our security
• for our workforce
• …

This requires techniques for analysis of interrelated architectures
Overview

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The ArchiMate metamodel
Overview

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Introduction

• Detail of UML makes UML difficult to understand for business managers and other persons involved with business architecture.

• ArchiMate keeps diagrams global instead of detailed, like UML.

• ArchiMate builds on existing standards (UML). Examples taken from a case, displaying mapping of ArchiMate to UML.
ArchiMate to UML

• Focus only on the domain integration

• ArchiMate interesting since it:
  • Gives relations and consistency between diagrams.
  • Makes UML accessibly to less experienced users by applying a simplification to UML.

• Mapping to UML (2.0) makes it possible to map ArchiMate models to UML models. In the future, use UML tools to verify models.

• Domain integration makes it possible to verify models concerning different domains.
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The ArchiSurance Case

• A Business Case, concerning an Insurance Company with a Intermediary and a Customer. Here restricted to four operations.

• Used to verify and explain ArchiMate.

• Three models from the case will be discussed: Business Structure, Business Process and Application Structure.
ArchiSureance business structure

Diagram showing the business structure with nodes for:
- Intermediary
- Premium collection
- Contracting
- Customer
- Insurance company
- Claim handling

Roles and collaborations are indicated by arrows connecting these nodes.
Business Structure, Class diagram

<<Role>> Intermediary

<<Collaboration>> Negotiation
<<Collaboration>> Premium Collection
<<Collaboration>> Contracting

<<Role>> Customer
<<Role>> Insurance Company

<<Collaboration>> Claim Handling
ArchiSurance Business Process

- **request for insurance**
- **investigate**
- **formalize request**
- **create contract**
- **check contract**
- **sign contract**
- **register policy**

**Classes**:
- **contracting**
- **insurance company**

**Objects**:
- **customer**
- **negotiation**

**Activities or Sequence diagram**:
- **request**
- **formal request**
- **create contract**
- **check contract**
- **sign contract**
- **register policy**

**Interaction**

**Events**

**Class + Collaboration**
Business Process, Interaction Overview Diagram
Business Process, Interaction Overview Diagram

sd negotiation-formalize request

sd create contract

sd contracting-check contract
ArchiSure Application structure

- print contracts
- print bills
- view requests
- create & edit policies
- view policies

Class Interface
- PrintWise
- ArchiSure

Collaboration
- printing

Class
- Operation
- Actor or Role
- Interface
Application Structure, class diagram
Questions?