**ArchiMate: Integration with Enterprise Architecture**

SIKS basic course on Architectures for IKS Vught, Sept. 28, 2006

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**Overview**

- Introduction: Enterprise architecture & ArchiMate
- Integrated modelling
  - Integration of business, applications, and technology
  - Service orientation
  - Exercise
- Analysis of architectures
  - Quantitative analysis
- Communication and visualisation of architectures
- ArchiMate in practice

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**Context**

- Gap between Business and ICT decreases
- Ever higher demands on ICT: complexity, flexibility
- Many changes, rapid time-to-market required
- Management & control difficult
- **Architecture** as a tool
  - for communication
  - for governance
  - for innovation

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**ArchiMate Focus Areas**

Communication & visualisation
Analysis
Integrated modelling

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"Don’t bother me with your ideas, I’ve got a battle to fight!"
Architecture

IEEE Std 1471: Architecture = Structure of a system in terms of
- components,
- their externally visible properties,
- their relations,
- and the underlying principles
“Structure with a vision”

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 change!
- Communication with stakeholders
  - Architects, managers, customers, engineers, …
- Analysis
  - Impact of change
  - Cost & performance

Enterprise Architecture: Describing Coherence

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

Better Support for the Enterprise Architect

- Increasing need for precise documentation on the enterprise architecture level
  - Integrating various models in many languages (UML, IDEF, BPMN, ARIS, …)
- Communicating about architecture with others
- Tool interoperability
- Needed: well-founded and practical standard for enterprise architecture modelling

The ArchiMate Research Project

- 2½ years, July 2002 - December 2004
- approx. 35 man-years, 4 million euro
- Consortium of companies and knowledge institutes
- Directed by Telematica Instituut

What Has ArchiMate Delivered?

- A vision on enterprise architecture
  - Focus on the relations between business and IT
- A language for describing architectures
  - Models give precision and make tool support possible
- Techniques for visualisation and analysis, aimed at various stakeholders
- A basis and vision for tools
  - Visio stencils
- Long term goal: vendor-independent standard for architecture description
ArchiMate Forum

- Open cooperation between ArchiMate users, vendors, educators, and consultants
- Long term objective:
  - An independent standard for describing enterprise architectures
- Goals of the ArchiMate Forum:
  - Creating critical mass
  - Supporting organizations in applying ArchiMate
  - Contributing to international standards

Members ArchiMate Forum

Standardisation

- Close contacts with OMG (known from UML) and Open Group (from TOGAF)
- Contributors to the OMG SIG on Service-Oriented Architecture
  - First statement of their charter: To support a modeling approach to SOA development that links architecture, business, and technology views of services […]
- The first step towards standardization for enterprise architecture modeling

Integrated Modelling

- An architecture might encompass for example:
  - products
  - organisation
  - business processes
  - information
  - applications
  - systems

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

The ArchiMate Language

High-level modeling within a domain

Modeling relations between domains

Basis for visualizations

Basis for analysis
Integration of Models

- BPMN diagram
- UML component diagram
- UML class diagram

Layers, Aspects, and Domains

- Environment
  - Product domain
  - Process domain
  - Organization domain
- Business
  - Information domain
  - Process domain
- Application
  - Data domain
  - Application domain
- Technology
  - Technical infrastructure domain

Conceptual Tent

- Behavior
- Structure
- Internal
- External

Business Layer metamodel

- Interface
- Collaboration
- Behavior element
- Structure element

Business Functions and Actors

- ArchiSurance
- Contracting
- Claim Handling

Product and Services
Exercise: DMS for Damage Reports
- Damage expert writes damage report
- Scanned report stored in DMS
- Administrator uses report for claim assessment

Analysis of Architectures
- Functional & Quantitative Analysis
  - Analysis of (enterprise) systems
    - Quantitative analysis
    - Functional analysis
      - Performance, costs
      - Discrete-event simulation
      - Analytical techniques
    - Behaviour, structure
      - Animation
      - Formal methods

Metamodel and Quantification of Concepts
- Business Application Technology
  - Information Behaviour Structure
    - Device System software Infrastructure service
    - Artifact
  - Network Infrastructure interface Application component Application function Application service
  - Business actor Business role Business process Business service Business object
  - Event Representation Business interaction Business collaboration
  - Communication path Representation service resource service service
  - Customers Business services Business processes Application services Application components Infrastructural services Technical infrastructure

Analysis of Layered Models
- “horizontal” performance measures
- “vertical” performance measures
- “vertical” performance measures
Example: Damage Reports in ArchiSurence

Administrator: "User"
Damage expert: "Producer"

Claim handling
Claim submission

Database System
Document Management system

Business Service View

Administrator
Damage expert

Claim handling process
Claim submission process

Technical infrastructure
Infrastructural services
Application components
Application services
Business processes
Organisational services
Customers

Application Support View

Claim handling process
Claim submission process
Report scanning application

Technical infrastructure
Infrastructural services
Application components
Application services
Business processes
Organisational services
Customers

Application View

Claim handling process
Claim submission process
Report scanning application

Technical infrastructure
Infrastructural services
Application components
Application services
Business processes
Organisational services
Customers

Deployment View

Database system
Document management system
Database server

Technical infrastructure
Infrastructural services
Application components
Application services
Business processes
Organisational services
Customers

Integration of Analysis Results

Take out insurance
Receive request
Accept Request
Collect premium

Transaction entry
Invoicing

Financial application
Application server
Infrastructure/Application View

\[ \lambda = 400 \text{day}^{-1} \]

\[ T = 10 \text{s} \]

Technical infrastructure

Infrastructural services

Application components

Application services

Business processes

Organisational services

Customers

\[ \text{Little's law} \]

\[ R = \frac{0.014 \times 10}{1-0.34} = 0.14 \text{ s} \]

\[ R = \frac{0.014 \times 14}{1-0.34} = 0.20 \text{ s} \]

Communicating Architectures

Views & Viewpoints

- A viewpoint describes the set of concerns of one or more stakeholders. It defines how to build a view, e.g. by means of a template.
- A view is a representation of a system from a viewpoint. A view is what you see, looking from the perspective of the stakeholder and his/her concerns.

IEEE 1471 Core

Viewpoints for Designing

- Basic design viewpoints
  - Organisation
  - Business function
  - Business process
  - Information structure
  - Application structure
  - Application behaviour
  - Infrastructure
  - Actor coordination
  - Product
  - Service realisation
  - Business process coordination
  - Application usage
  - Application coordination
  - Implementation & deployment

Viewpoints Classification

Deciding

Designing

Informing

Details

Coherence

Overview

product manager, CIO, CEO

architect, software developer, business process designer

customer, employee, others
Application Behaviour

Viewpoints for Deciding

- Give a high-level overview for e.g. business managers
- Can be used to identify problems or possible improvements
- Example: Landscape map
  - 2-D representation
  - Possibly interactive

Viewpoints for Informing

- Process illustration
- Goal is communication
- Pictures aimed at ‘non-architects’

Landscape map ArchiSurance

process Illustration (I)

Process Illustration (II)
Some ArchiMate Users

- User organizations
  - Tax Administration
  - ABN AMRO
  - ABP
  - SGB
  - V&V
  - VZV/ID
  - Vlaanderen
  - IWG
  - NOS

- ICT consultants
  - Online
  - Genonica
  - Peho Software
  - Sogep
  - Axxa Origin
  - CBST
  - IBM
  - LogicaCMG

- Research & education
  - Telemedia Institute
  - University of Liège
  - Radboud University Nijmegen
  - Eindhoven University of Technology
  - Hogeschool van Amsterdam
  - Aarnio Hogeschool Brera

- Others
  - UWV, CWI

- Tool vendors
  - Bizdesign
  - Artachnion
  - Tessia
  - IDS Scheer

Results in Practice

- Applications at over 30 organizations
  - e.g. Dutch Tax Administration and many other companies and government institutes

- Tools
  - Bizdesign, Troux Metis (certified)
  - IDS Scheer, Adaptive, Telelogic (implementing)
  - MEGA, Casewise, ASG, IBM (interested)

- Education
  - Used by several Dutch universities and other educational institutes
  - Rapidly growing international attention

Processing of Payroll Tax Returns

- Tax and Customs Administration
  - Process payroll tax return TCA
  - Process payroll tax return UWV

Service-Oriented Business Process Integration
More Information?

Most ArchiMate results are open to the public and available through the website: [www.archimate.com](http://www.archimate.com)

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