Overview

- Introduction
- Enterprise architecture & ArchiMate
- The ArchiMate modeling language
  - Integration of business, applications, and technology
  - Service orientation
  - Example
- Communicating architectures
- ArchiMate adoption in practice
Partners Telematica Instituut

Enterprise Architecture & ArchiMate
Context

- Business and ICT become closer
- 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

Architecture

IEEE Std 1471:
Architecture = structure(s) 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

Role of Enterprise Architecture
Enterprise Architecture: Describing Coherence

Information architecture

Product architecture

Process architecture

Application architecture

Technical 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 modeling
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
Integrated Modelling

Integration

• An architecture might encompass for example:
  − products
  − organisation
  − business processes
  − 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 analyses

Layers, Aspects, and Domains

Environment

Business

Application

Technology

Product domain

Information domain

Process domain

Organization domain

Data domain

Application domain

Technical infrastructure domain

Information

Behavior

Structure
Generic Structure at Each Layer

- Internal
  - Object
  - Behaviour element
  - Structure element

- External
  - Service
  - Interface

Information - Behavior - Structure

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Business Functions and Actors

- ArchiSurance
- Contracting
- Claim Handling

- Business function: Contracting
- Business actor: ArchiSurance
- Assignment

- Business function: Claim Handling
- Business function: Insurance policies
- Flow
Product and Services

Travel Insurance

- Insurance application service
- Claim registration service
- Customer information service
- Claim payment service
- Policy

Customer

Security

business role
value
product
contract

business service

Business Process

Customer

Insurer

business actor
business role

Claim registration service
Customer information service
Claim payment service

Damage occurred

event

business process

Handle Claim

Register → Accept → Valuate → Pay

business service

realisation
used by

Notification

access
Business Layer Metamodel

Application Concepts
Application Usage by Business Processes

Application Layer Metamodel
Technology Layer Metamodel

Layered Architecture

Business layer

Application layer

Technology layer
Services as Binding Concept

Customer

External business service

Internal business service

External application service

Internal application service

External infra. service

Internal infra. service

Business

Application

Technology

ArchiMate in Practice:
Tax Administration - UWV
Service-Oriented Business Process Integration

Company/Agent

Submit tax return

Payroll tax return

Tax and Customs Administration

Process payroll tax return TCA

Transfer tax return data

Process corrections

UWV

Process payroll tax return UWV

Process Refinement

Tax and Customs Administration

Payroll tax return

Submit tax return

Confirmation

Notification rejection

Correction request

Notification error

Receive tax return TCA

Levy

Collections administration

Transfer tax return data

Levying administration

Notify

Process corrections

Process corrections

Send notification

Collections information
Detailed Process with Application Support

Receive tax return

Receive electronic PTR

Medium - independent processing

Nominative data

FOS

MOS

UKV

internal messaging

AVANTI

Temporary storage file

DCS

Notification

FOL

convert

receive and check

handle

discards

make available

notify receipt

BvR

BBA

WGA

Receive paper PTR

Receive PTR document

Receive PTR small

Receive PTR large

Receive PTR web

Digital Imaging

Scan document

decode

small:
98,10%

web:
1,72%

OB 2000

PTR msg.

Paper PTR

Electronic PTR

Legal archive

F = 22,000 / month

F = 638,000 / month

Process – Detailed Applications

Medium - independent processing

Structural conversion

Convert

Receive and check

Handle discards

Notify receipt

Send PTR

Make available

Collective part

Nominative part

Medium independent PTR data

Message Conversion

Message Reception

FOS Internal

File processing

OB 2000

FOS external

FOS internal

Make available

Send nominative lines

XML-message conversion & splitting

10%
Applications – Infrastructure

Total Infrastructure
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.
Viewpoints Classification

• Deciding
  – Architect, software developer, business process designer
• Designing
  – CIO, CEO
• Informing
  – Customer, employee, others

Details

Coherence

Overview

Viewpoints for Designing

• Basic design viewpoints
  – Organisation
  – Business function
  – Business process
  – Information structure
  – Application structure
  – Application behaviour
  – Infrastructure

• Resemble ‘diagrams’ of e.g. UML

• Actor coordination
• Product
• Service realisation
• Business process coordination
• Application usage
• Application coordination
• Implementation & deployment
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
Landscape map ArchiSurance

- **Business Functions**
  - Products
  - Home Insurance
  - Travel Insurance
  - Liability Insurance
  - Car Insurance
  - Legal Aid Insurance

- **Maintaining Customer & Intermediary Relations**
  - Web portal
  - Call center application

- **Contracting**
  - Customer relationship management system
  - Home & Away Policy administration
  - Legal Aid back office system

- **Claim Handling**
  - Home & Away application

- **Financial Handling**
  - Car insurance application

- **Document Processing**
  - Document management system

Viewpoints for Informing

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

ArchiMate and TOGAF

- TOGAF: The Open Group Architecture Framework
  - Provides methodical support for architects
  - Architecture Development Method (ADM) gives you a process
- ArchiMate and TOGAF nicely complement each other:
  - ArchiMate provides no architecture process
  - TOGAF provides no architecture modelling technique
- E.g. Atos Origin NL use ArchiMate and TOGAF together
ArchiMate and Zachman

<table>
<thead>
<tr>
<th>Planner</th>
<th>Owner</th>
<th>Designer</th>
<th>Builder</th>
<th>Sub-contractor</th>
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<tbody>
<tr>
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<td>Application</td>
<td>Technology</td>
<td>Structure</td>
<td>Attributes</td>
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<tr>
<td>Data</td>
<td>Function</td>
<td>Network</td>
<td>People</td>
<td>Time</td>
</tr>
</tbody>
</table>

Scope (contextual) | Enterprise model (conceptual) | System model (logical) | Technology model (physical) | Detailed representations (out of context)

ArchiMate and UML

- ArchiMate connects architectural domains
  - It has a broader scope, but less detail than UML
  - It acknowledges the need for specialized languages for different architectural domains, such as UML, BPMN and others
  - Transformations to more detailed, specialized models
- Several ArchiMate concepts derived from UML (esp. for application and infrastructure)
- First version of a UML profile for ArchiMate available
ArchiMate and Model-Driven Architecture

- Computation Independent Model (CIM)
  Business model
  Domain model
  Business requirements

- Platform Independent Model (PIM)
  e.g. BPMN Model independent of workflow engine, or
  UML model independent of computing platform

- Platform Specific Model (PSM)
  e.g. UML model for a J2EE platform

ArchiMate may help bridge the gap between CIM and PIM

Results in Practice

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

- **Tools**
  - BiZZdesign, 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**
ArchiMate Users

- User organizations
  - Dutch Tax Administration
  - ABN AMRO
  - ABP
  - SVB
  - UWV
  - ABZ
  - VGZ-IZA
  - SNS Reaal
  - Interpolis
  - Zilveren
  - Fortis
  - Qion
  - Slater
  - NS
  - TNT
  - Philips
  - Kluwer
  - Vitens
  - Dutch Police
  - Autoriteit Financiële Markten
  - Province of Groningen
  - Province of Overijssel
  - Province of Gelderland
  - Ministry of the Interior
  - Raad van State
- CFI
- CITO
- Leiden University
- Avans Hogeschool
- Hogeschool van Amsterdam
- Fontys Hogescholen
- NHTV

- ICT consultants
  - Ordina
  - Getronics PinkRocadace
  - Sogeti
  - Atos Origin
  - CIBIT
  - LogicaCMG

- Tool vendors
  - BiZZdesign
  - Troux
  - IDS Scheer
  - Adaptive
  - Agilelense

- Research & education
  - Telematica Instituut
  - Leiden University
  - Radboud University Nijmegen
  - Centrum voor Wiskunde & Informatica
  - Hogeschool van Amsterdam
  - Avans Hogeschool
  - CIBIT
  - University of Twente
  - Lisbon Technical University
  - Delft University of Technology
  - TU Eindhoven

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