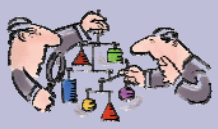
ArchiMate: Integration with Enterprise Architecture

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



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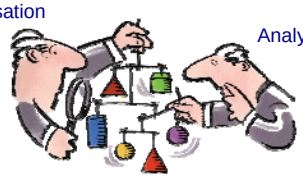
ArchiMate Focus Areas

Communication & visualisation

Analysis

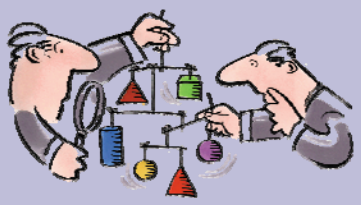


Integrated modelling

Overview

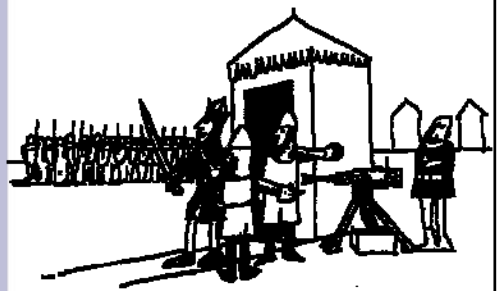
- Introduction: Enterprise architecture & ArchiMate
- Integrated modelling
  - Integration of business, applications, and technology
  - Service orientation
  - Exercise
- Analysis of architectures
  - Quantitative analysis
- Communication and visualisation of architectures
- ArchiMate in practice

Enterprise Architecture & ArchiMate



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



"Don't bother me with new ideas, I've got a battle to fight"

Architecture

IEEE Std 1471:

Architecture = Structure of a system in terms of

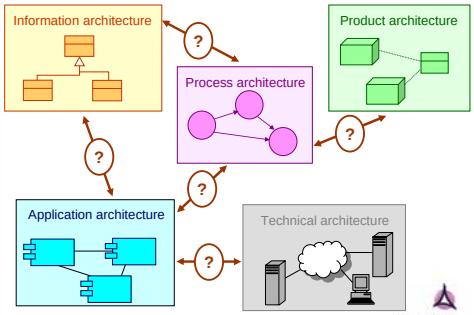
- *components*,
- their *externally visible properties*,
- their *relations*,
- and the underlying *principles*

"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*



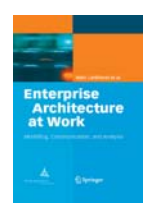
Better Support for the Enterprise Architect

- 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

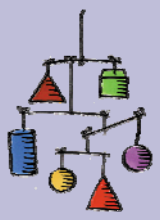
- Open cooperation between ArchiMate users, vendors, educators, and consultants
- Long term objective:
  - An independent standard for describing enterprise architectures
- Goals of the ArchiMate Forum:
  - Creating *critical mass*
  - *Supporting* organizations in applying ArchiMate
  - Contributing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

Members ArchiMate Forum

Standardisation

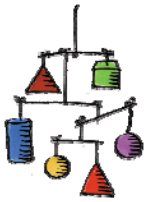
- Close contacts with OMG (known from UML) and Open Group (from TOGAF)
- Contributors to the OMG SIG on Service-Oriented Architecture
  - First statement of their charter: *To support a modeling approach to SOA development that links architecture, business, and technology views of services [...]*
- The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

Integrated Modelling



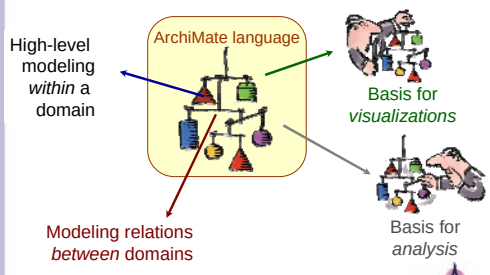
Integration

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

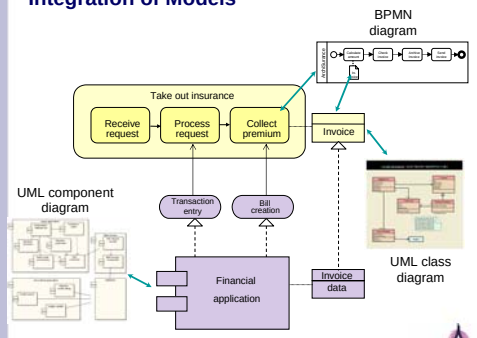


This requires *concepts* for domains and relations, linked with existing techniques

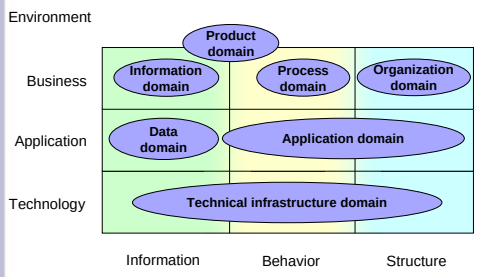
The ArchiMate Language



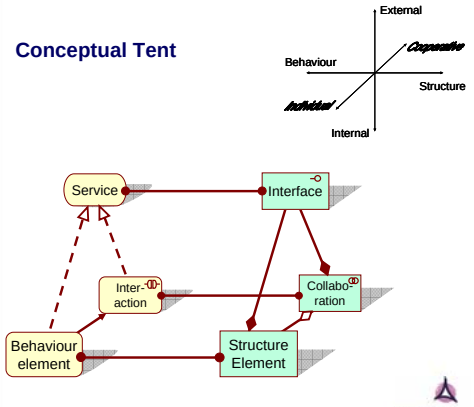
Integration of Models



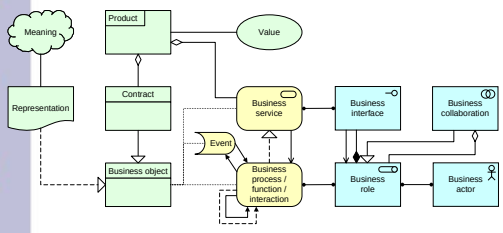
Layers, Aspects, and Domains



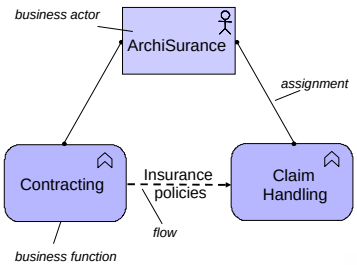
Conceptual Tent



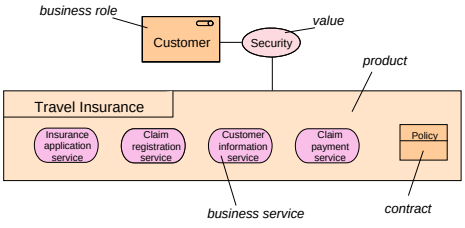
Business Layer metamodel



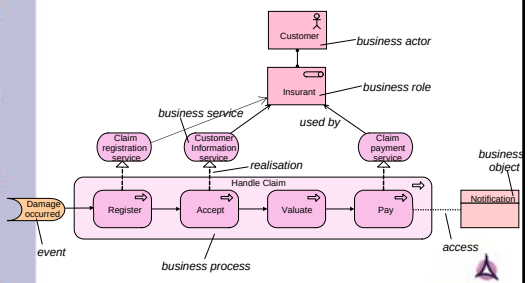
Business Functions and Actors



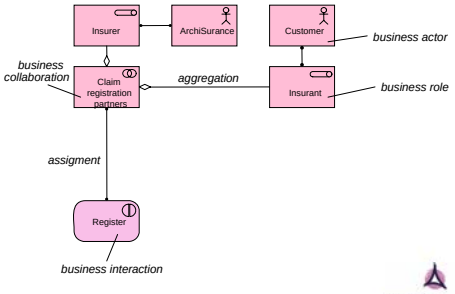
Product and Services



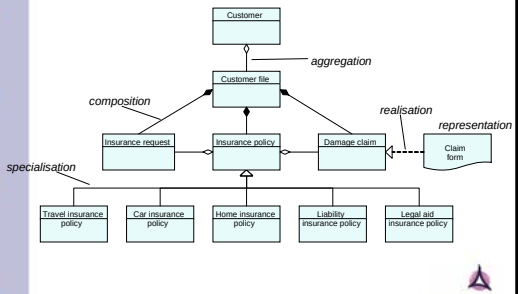
Business Process



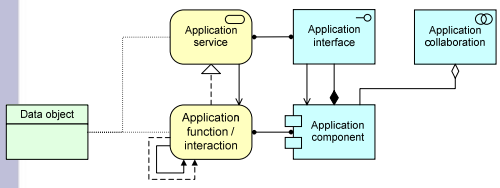
Business Interactions



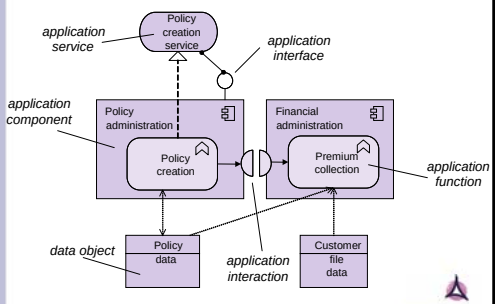
Information



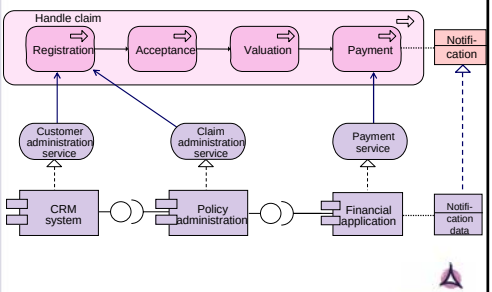
Application Layer Metamodel



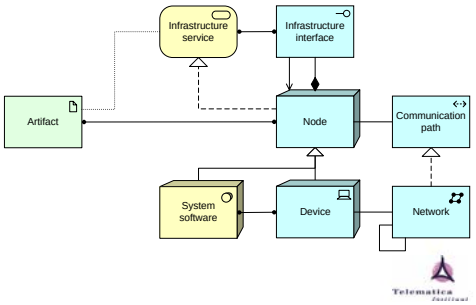
Application Concepts



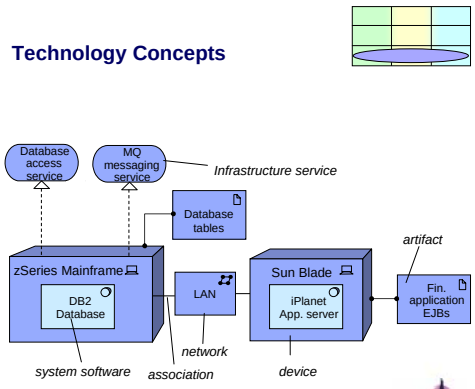
Application Usage by Business Processes



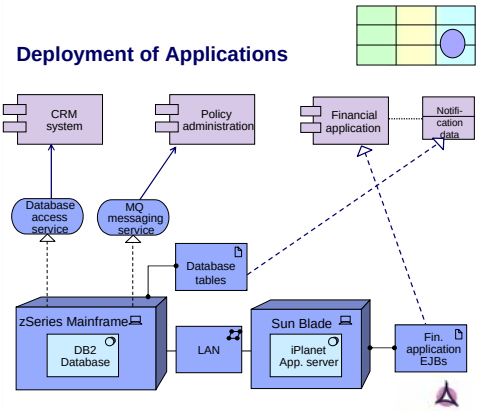
Technology Layer Metamodel



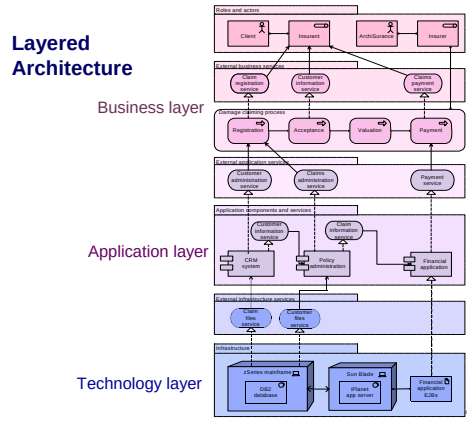
Technology Concepts



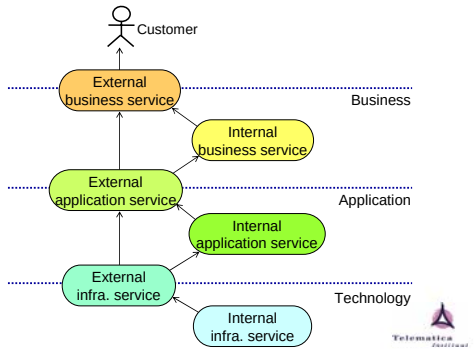
Deployment of Applications



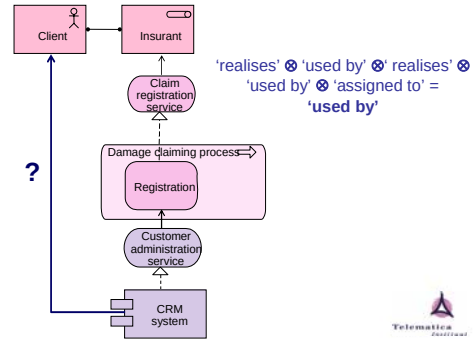
Layered Architecture



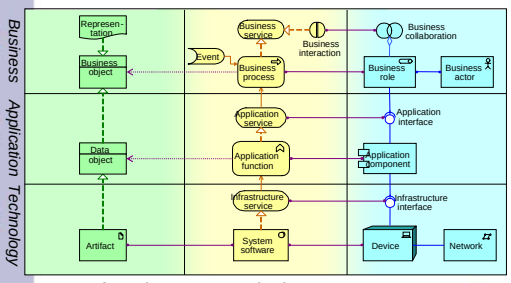
Services as Binding Concept



Derivation of indirect relationships



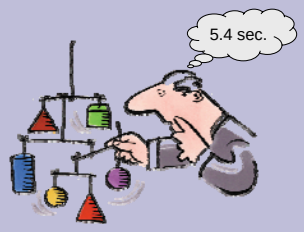
Summary of Main Concepts



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

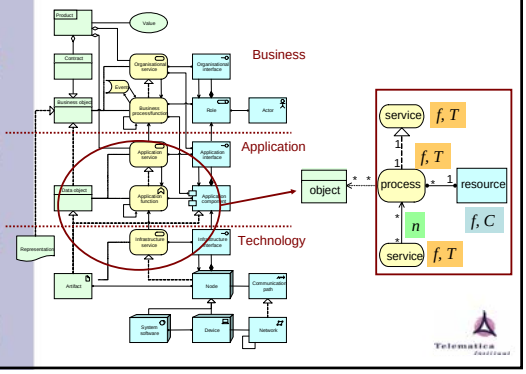
Quantitative analysis

- Performance, costs
- Discrete-event simulation
- Analanalytical techniques

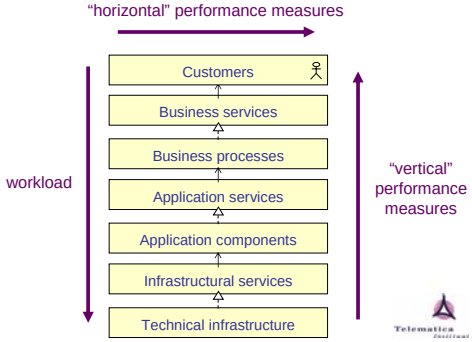
Functional analysis

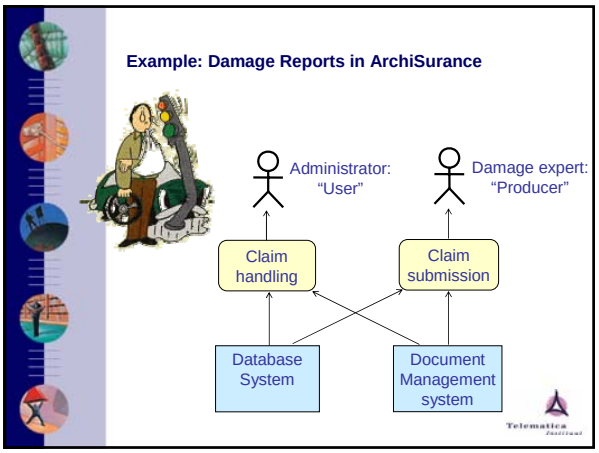
- Behaviour, structure
- Animation
- Formal methods

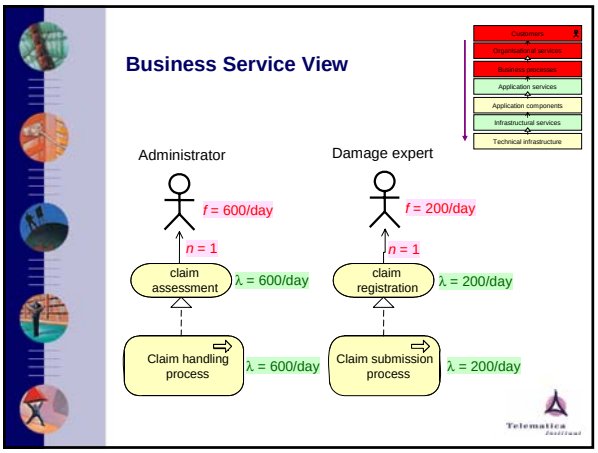
Metamodel and Quantification of Concepts

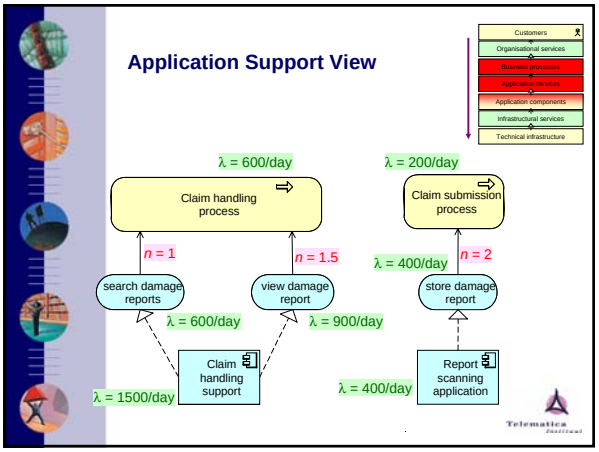


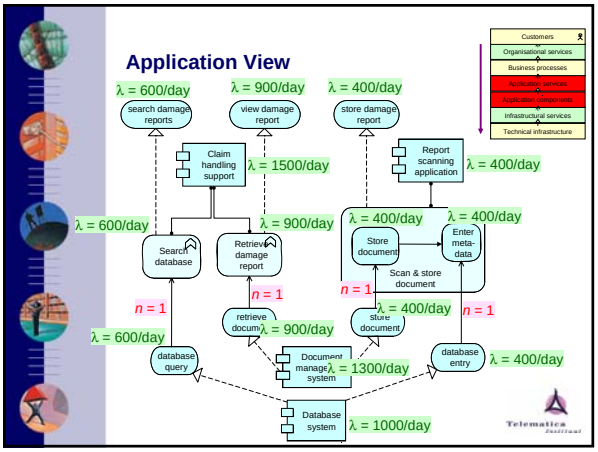
Analysis of Layered Models

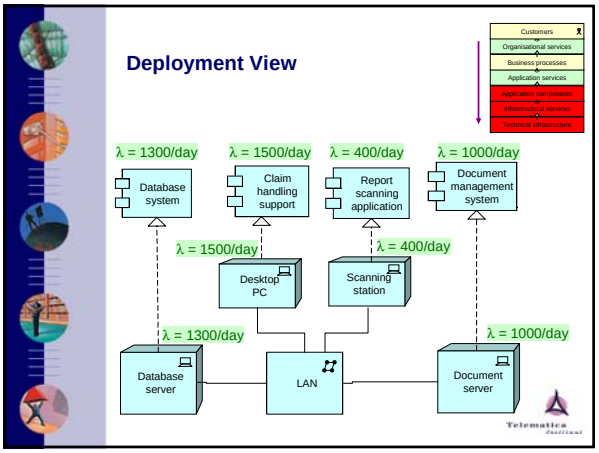


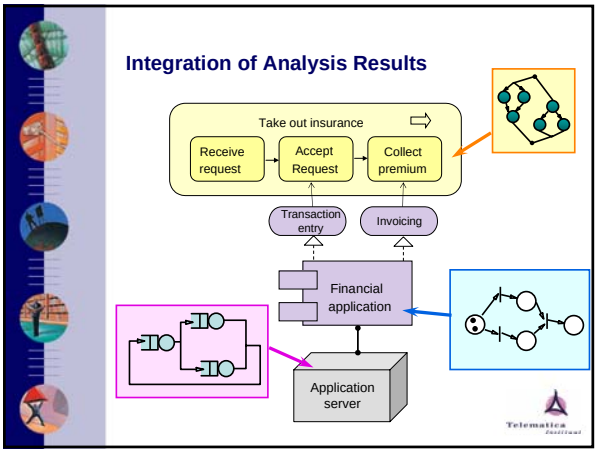

Example: Damage Reports in ArchiSurance
Administrator: "User"
Damage expert: "Producer"
Claim handling
Claim submission
Database System
Document Management system


Business Service View
Administrator
Damage expert
f = 600/day
f = 200/day
n = 1
n = 1
claim assessment
λ = 600/day
claim registration
λ = 200/day
Claim handling process
λ = 600/day
Claim submission process
λ = 200/day

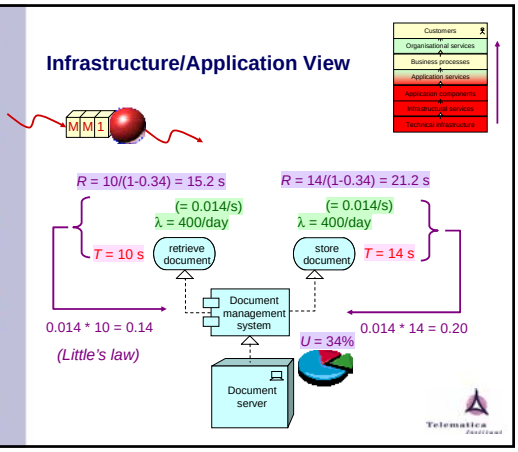

Application Support View
λ = 600/day
λ = 200/day
Claim handling process
Claim submission process
n = 1
n = 1.5
n = 2
λ = 400/day
search damage reports
view damage report
store damage report
λ = 600/day
λ = 900/day
Claim handling support
Report scanning application
λ = 1500/day
λ = 400/day


Application View
λ = 600/day
λ = 900/day
λ = 400/day
search damage reports
view damage report
store damage report
Claim handling support
λ = 1500/day
Report scanning application
λ = 400/day
λ = 600/day
λ = 900/day
λ = 400/day
λ = 400/day
Search database
Retrieve damage report
Store document
Enter meta-data
Scan & store document
n = 1
n = 1
n = 1
λ = 400/day
n = 1
λ = 600/day
λ = 900/day
database query
Document manage system
λ = 1300/day
database entry
λ = 400/day
Database system
λ = 1000/day

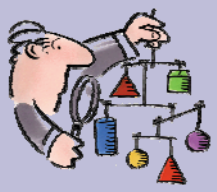

Deployment View
λ = 1300/day
λ = 1500/day
λ = 400/day
λ = 1000/day
Database system
Claim handling support
Report scanning application
Document management system
λ = 1500/day
λ = 400/day
Desktop PC
Scanning station
λ = 1300/day
λ = 1000/day
Database server
LAN
Document server


Integration of Analysis Results
Take out insurance
Receive request
Accept Request
Collect premium
Transaction entry
Invoicing
Financial application
Application server

Infrastructure/Application View



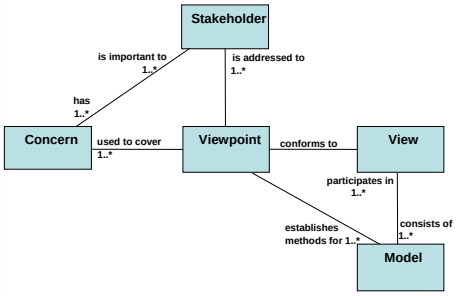
Communicating Architectures



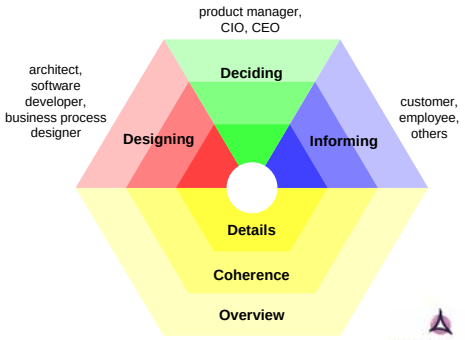
Views & Viewpoints

- 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



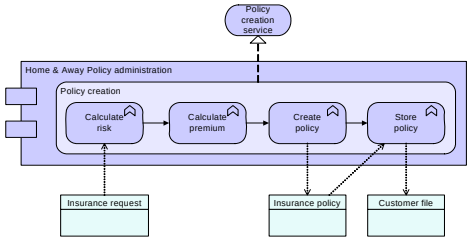
Viewpoints Classification



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
- Resemble 'diagrams' of e.g. UML

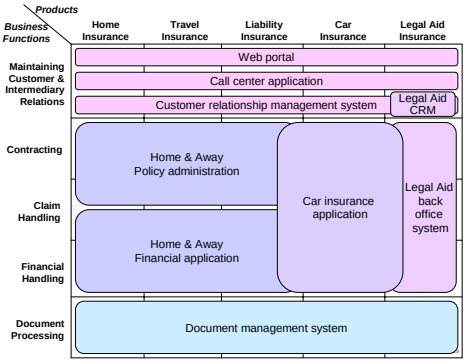
Application Behaviour



Viewpoints for Deciding

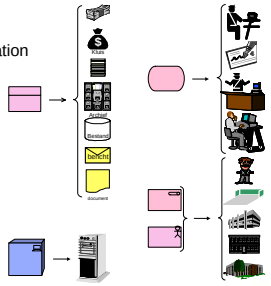
- Give a high-level overview for e.g. business managers
- Can be used to identify problems or possible improvements
- Example: Landscape map
  - 2-D representation
  - Possibly interactive

Landscape map ArchiSurance

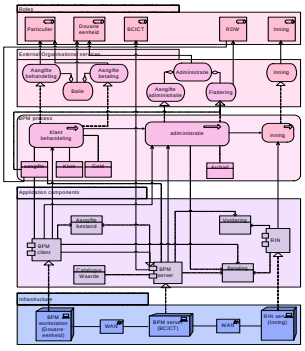


Viewpoints for Informing

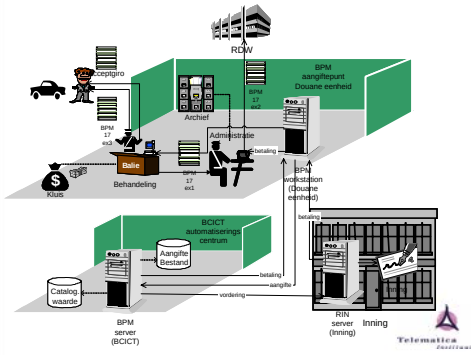
- Process illustration
- Goal is communication
- Pictures aimed at 'non-architects'



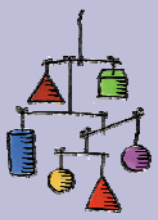
Process Illustration (I)



Process Illustration (II)



ArchiMate in Practice



Results in Practice

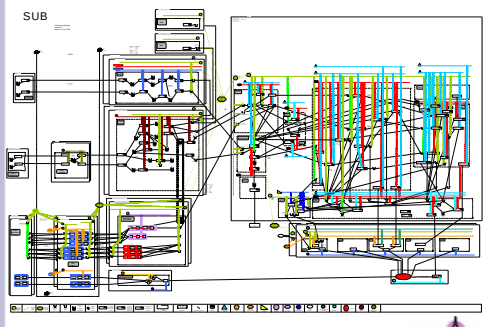
- *Applications* at over 30 organizations
  - e.g. Dutch Tax Administration and many other companies and government institutes
- *Tools*
  - BiZZdesign, Troux Metis (certified)
  - IDS Scheer, Adaptive, Telelogic (implementing)
  - MEGA, Casewise, ASG, IBM (interested)
- *Education*
  - Used by several Dutch universities and other educational institutes
- Rapidly growing *international attention*

Some ArchiMate Users

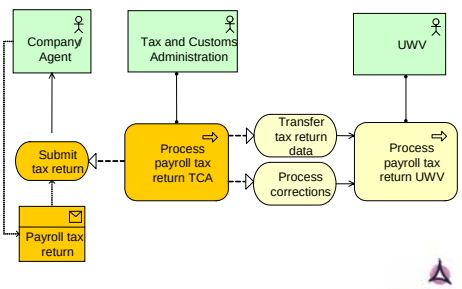
- User organisations
  - Tax Administration
  - ABN AMRO
  - ABP
  - SVB
  - ADP
  - VGZ-IZA
  - Kluwer
  - Interpolis
  - NS Reizigers
  - Quion
  - CVZ
  - Provincie Groningen
  - Provincie Gelderland
  - Vitens
  - TPG
  - UWV, CWI
- Tool vendors
  - BiZZdesign
  - Adaptive
  - Troux
  - IDS Scheer
  - interest from Telelogic, ASG, MEGA, Casewise, IBM
- ICT consultants
  - Ordina
  - Getronics PinkRoccade
  - Sogeti
  - Atos Origin
  - CIBIT
  - IBM
  - LogicaCMG
  - Capgemini
- Research & education
  - Telematica Instituut
  - Universiteit Leiden
  - Radboud Universiteit Nijmegen
  - Centrum voor Wiskunde & Informatica
  - Hogeschool van Amsterdam
  - Avans Hogeschool Breda
  - CIBIT
  - Universiteit Twente
  - Lisbon Technical University
  - TU Delft

Processing of Payroll Tax Returns

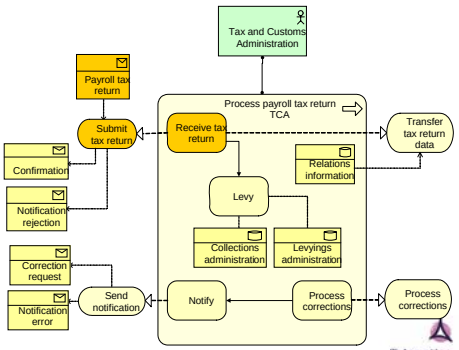
Input Material



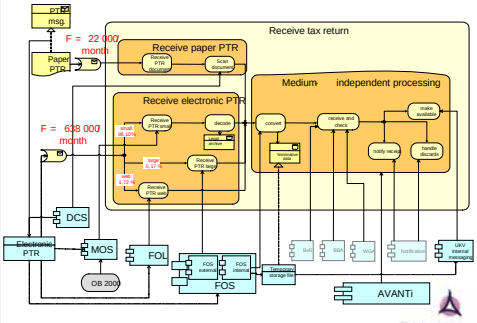
Service-Oriented Business Process Integration



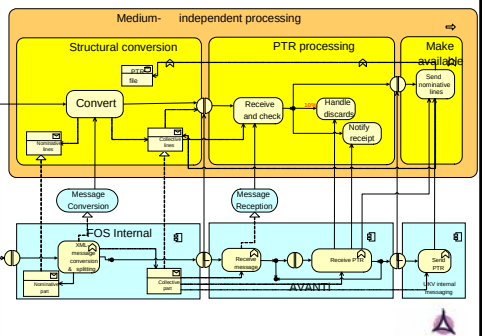
Process Refinement



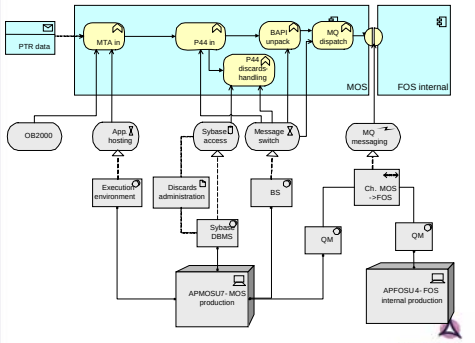
Detailed Process with Application Support



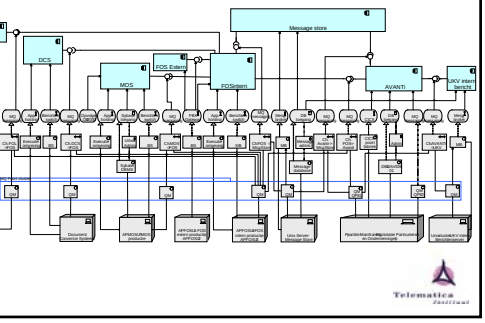
Process – Detailed Applications



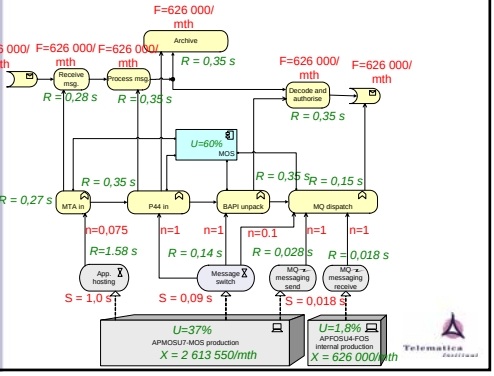
Applications – Infrastructure



Total Infrastructure



Quantitative Analysis Results



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More Information?

Most ArchiMate results are open to the public and available through the website: www.archimate.com

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