Modeling Data, Documents, Products, Applications

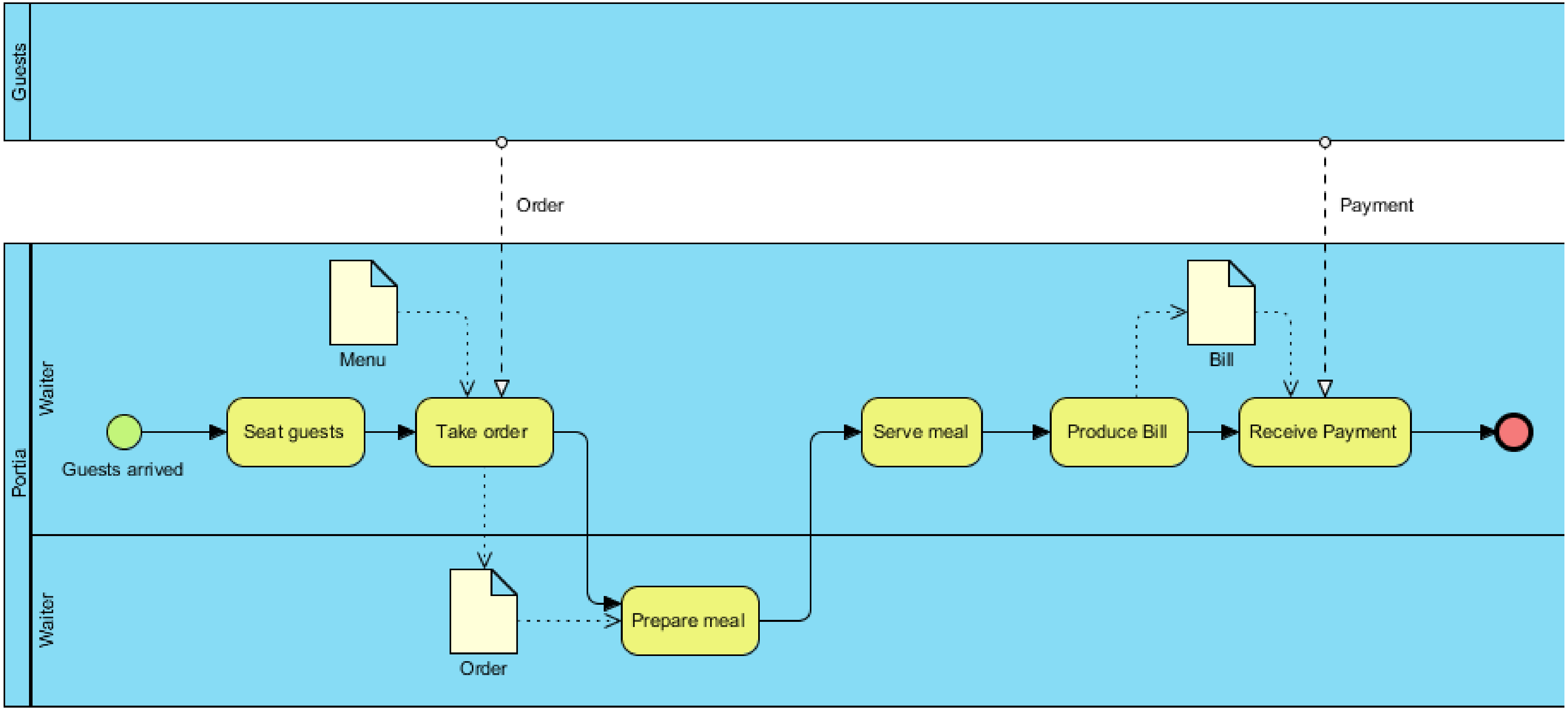
Knut Hinkelmann

Prof. Dr. Knut Hinkelmann
MSc Business Information Systems

MODELING DATA AND DOCUMENTS

An Example Process

- This is a simplified version of the process for serving guests
- There are three data objects. Can you see a difference between these data objects?



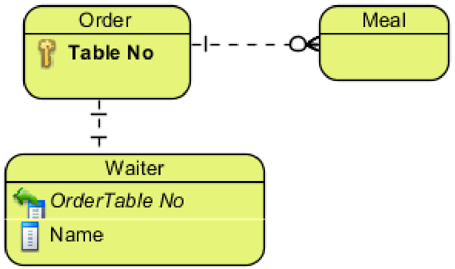
Modelling Data

- Data objects in BPMN can represent different kinds of data
  - structured data
  - documents
- Documents themselves either represent
  - **a document class** represents a generic documents for which a specific instance exists for each process instance
    - Example: The bill
  - a **specific document**
    - Example: The menu which the guests get to choose their meals
    - Hint: For a specific document we can specify a file name or a URL
- Another example: An application form is a specific document while an application would be represented as a class

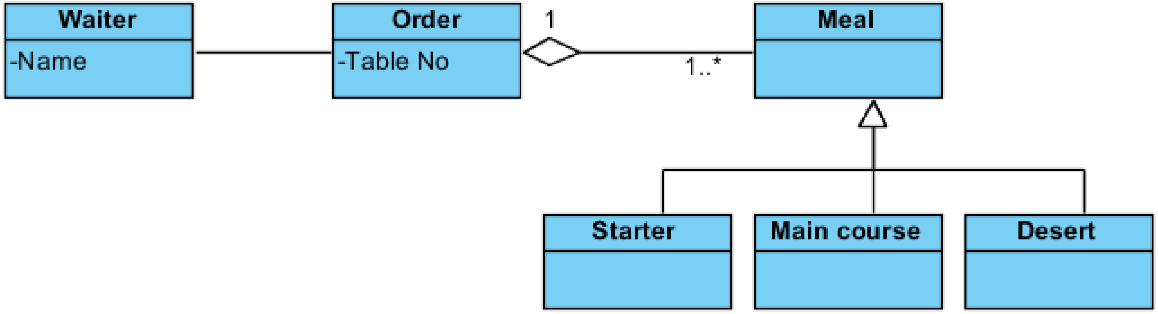
Modelling Structured Data

- Structured data can be represented for example as
  - Entity Relationship Diagram
  - UML Class Diagram/Object Diagrams
- Data models represent
  - entities/classes
  - columns/attributes
  - relations/associations

ERD:

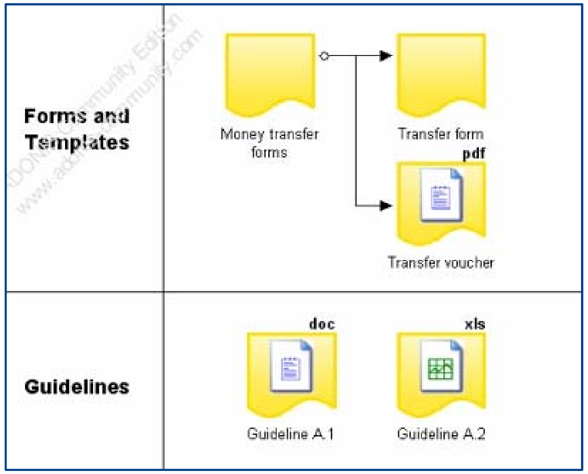


UML Class Diagram:



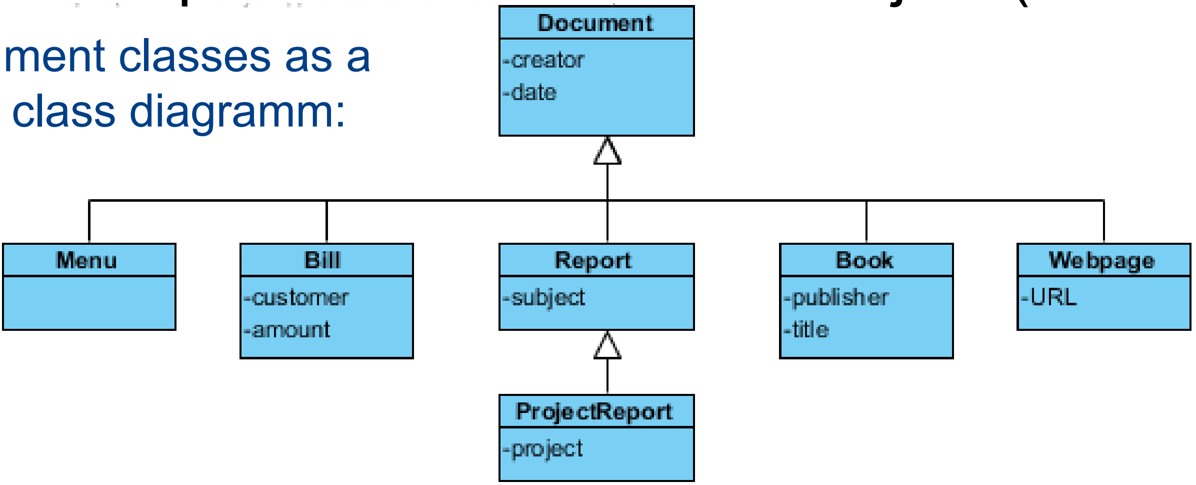
Document model

ADONIS document model:



- Although some tools like ADONIS have a model type for documents, there is no standard for modeling documents
- However, we can use UML class diagrams and object diagrams to model documents [1)]
  - A document class is represented as a class object with attributes describing the meta-data
  - A specific document is an object (i.e. an instance of a class)

document classes as a UML class diagramm:


Document: -creator, -date

Menu

Bill: -customer, -amount

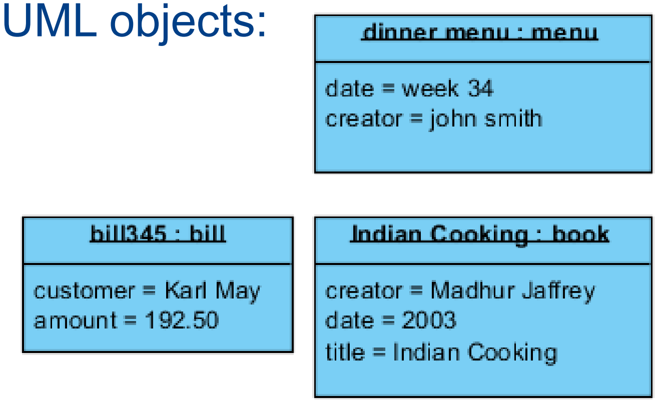
Report: -subject

Book: -publisher, -title

Webpage: -URL

ProjectReport: -project

specific documents as UML objects:


dinner menu : menu
date = week 34
creator = john smith

bill345 : bill
customer = Karl May
amount = 192.50

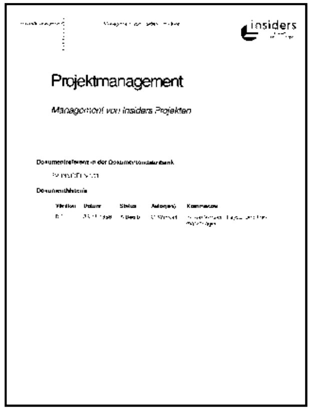
Indian Cooking : book
creator = Madhur Jaffrey
date = 2003
title = Indian Cooking

Document Models

- Documents can be grouped into ***document classes*** (also called document types) according to their usage:
  - ♦ Examples: invoice, application, menu, report
- There can be specialisations of document classes.
  - ♦ Example: There can be special kinds of reports like project report, expert opinions, or reviews.
- ***Metadata*** are attribute values which describe documents.
  - ♦ Example: a report might have an creator, a creation date and a subject.
- There are standards for metadata like the Dublin Core Metadata Initiative (http://dublincore.org)

Data and Meta-data – Examples

user data (document)



insiders

Projektmanagement

Management von insiders Projekten

Dokumentreferenz in der Dokumentendatenbank

[illegible]

Dokumenthistorie

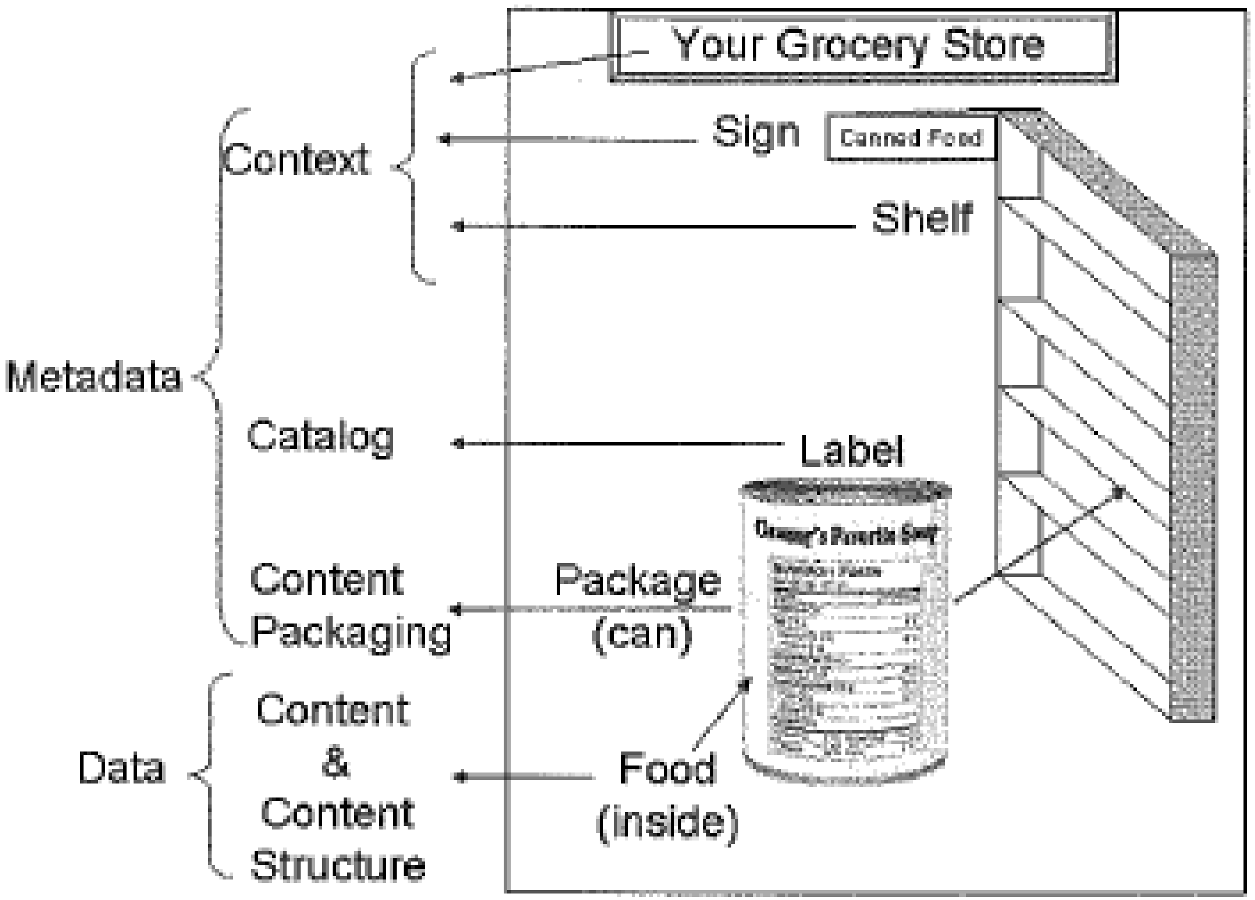
Version	Datum	Status	Autor(en)	Kommentar
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

meta-data

name:	ELENA-Ber
creation:	18.3.2001
modification:	25.6.2001
format:	Word
document type:	project report
recipient:	All Life Insurance Inc.
author:	Smith

- Each document consists of the
  - usage data (document itself, content)
  - meta-data
- Kinds of meta-data
  - General metadata
    - can be used for any kind of information
    - Examples: author, date of creation, subject
  - Application-specific metadata
    - Examples:
      - For a letter: sender and recipient
      - For a report: project name
  - Meta-data are structured data and can easily be modeled in UMS

Information as product



Michael C. Daconta: Information as Product, 2007

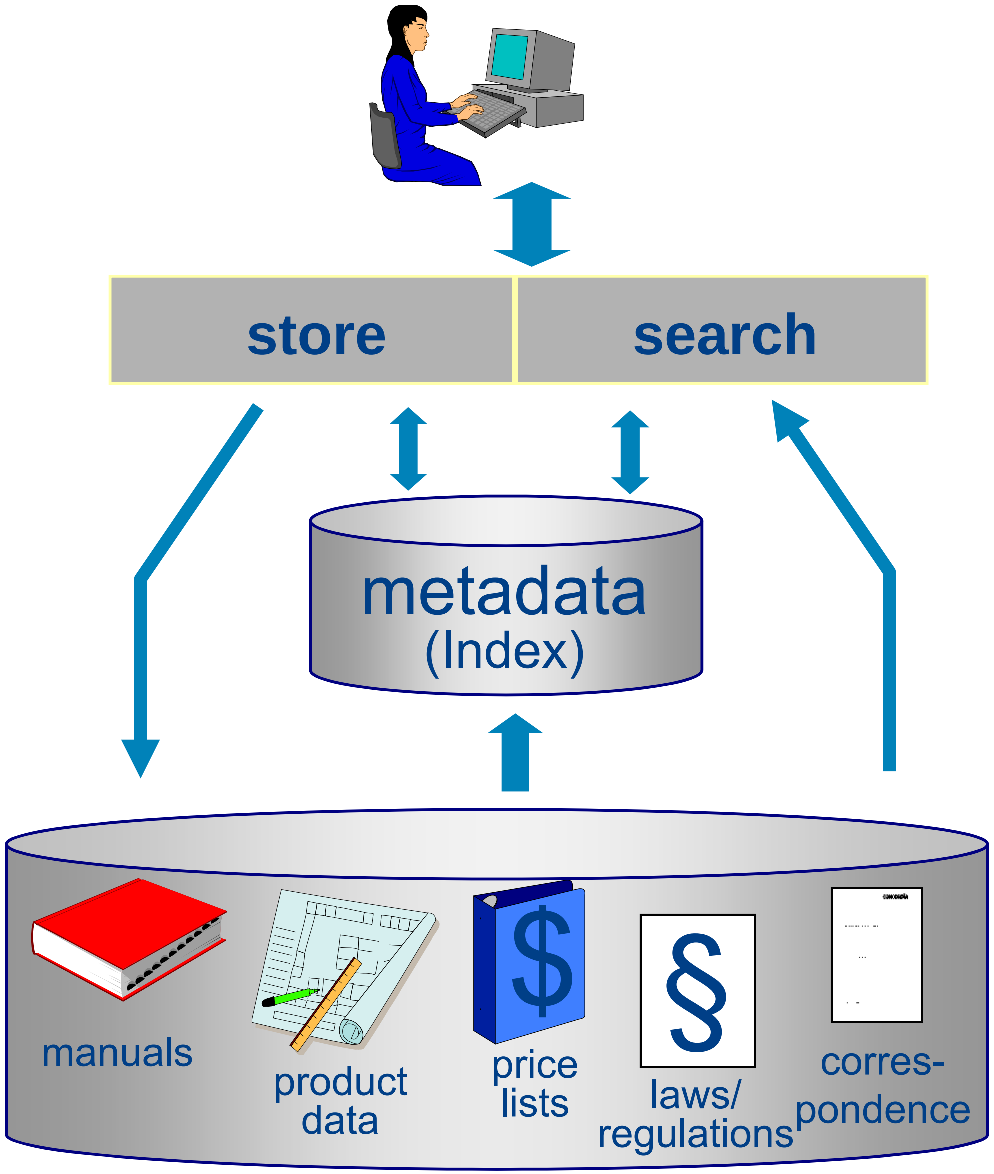
Meta-data

user
(producer/ consumer)

services

description
(catalog)

resources
(information
products)



store

search

metadata
(Index)

manuals

product
data

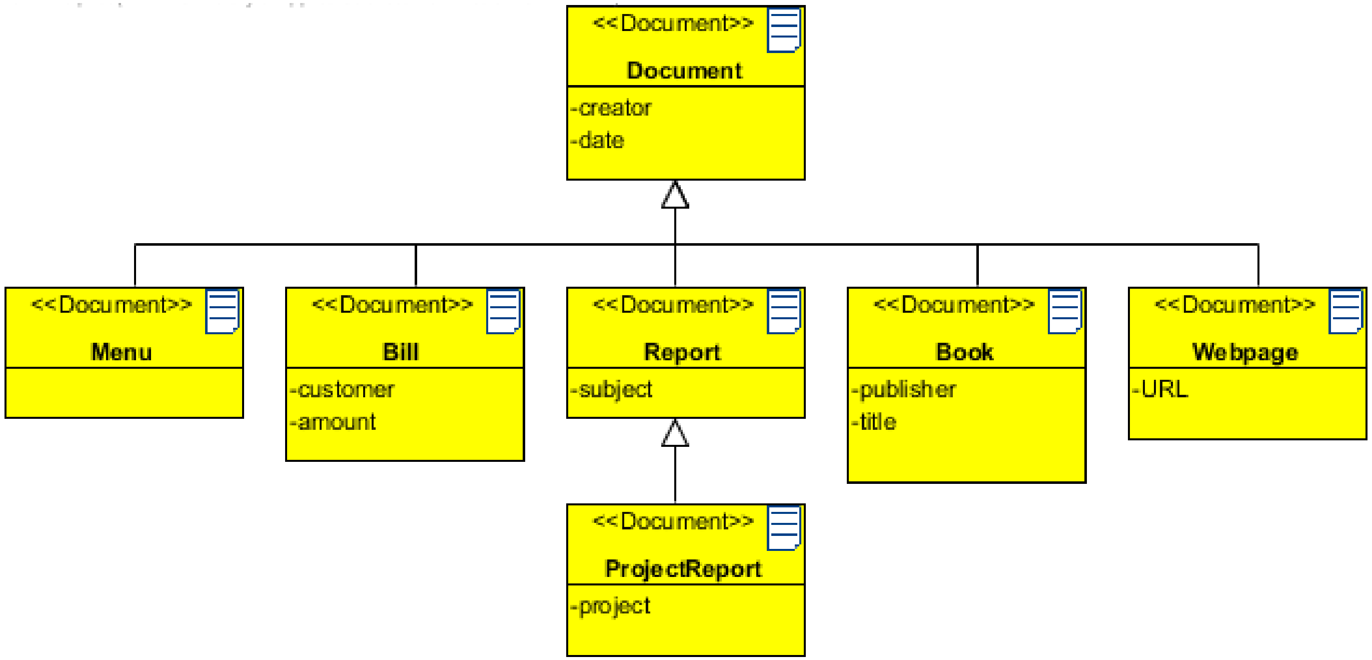
price
lists

laws/
regulations

corres-
pondence

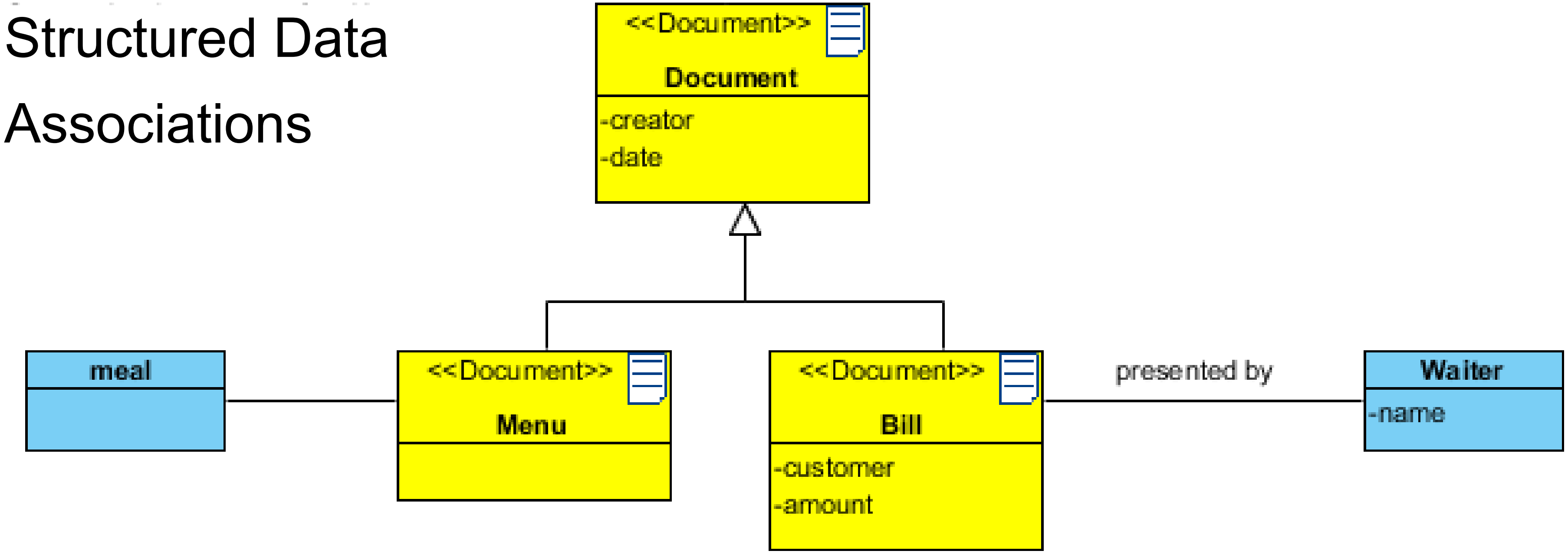
Modeling Documents in Agilian

- In the Agilian Enterprise tool we can use stereotypes to specialize UML class diagrams for modeling documents.
- We can define a new stereotype "Document" and
  - ♦ change color
  - ♦ add an icon



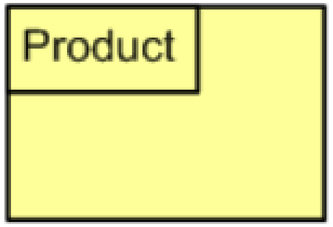
Combining Document and Data Modeling

- Information about Documents and Data can be combined in one model
  - Document classes
  - Objects
  - Structured Data
  - Associations



MODELING PRODUCTS

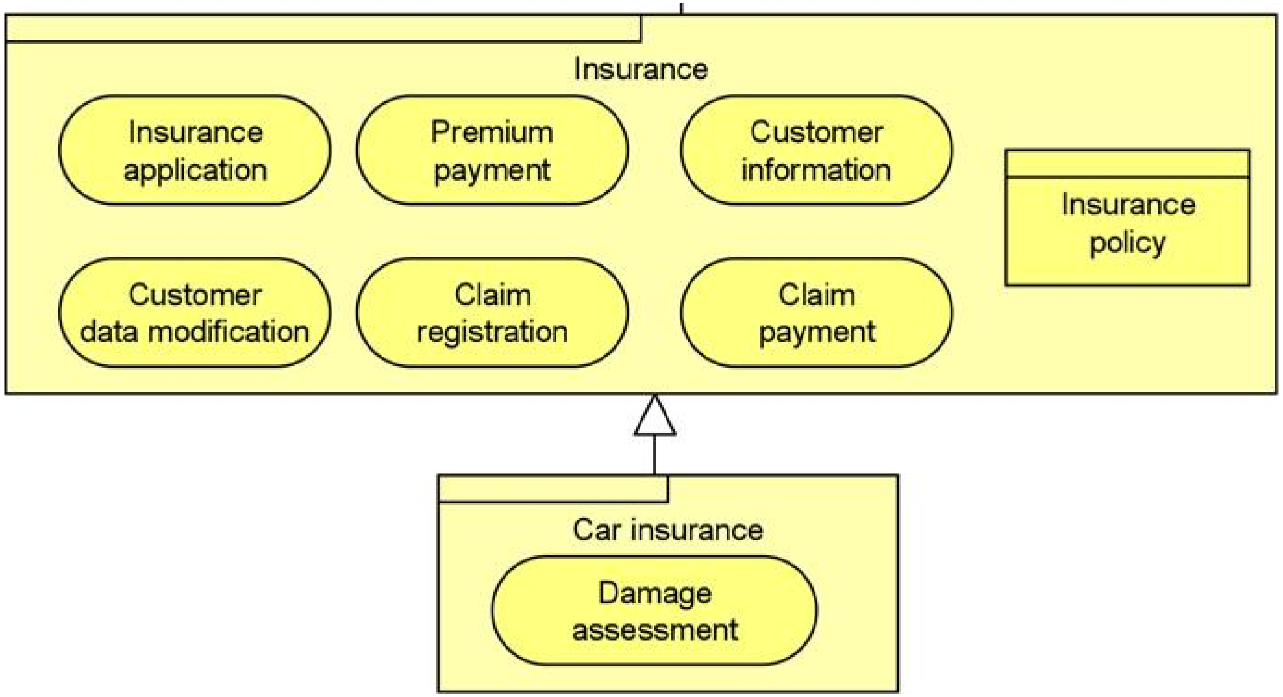
Product Models



- Products are another aspect that can be modeled in the business layer of an Enterprise Architecture (c.f. ArchiMate).
- Products can be physical products, financial products, information products orservices.
- Product models list products (goods or services) created by processes.
- Products can be composed of other products or components.
- In a product model we do not model individual products but product types.
- There are no standard model types for products or services.

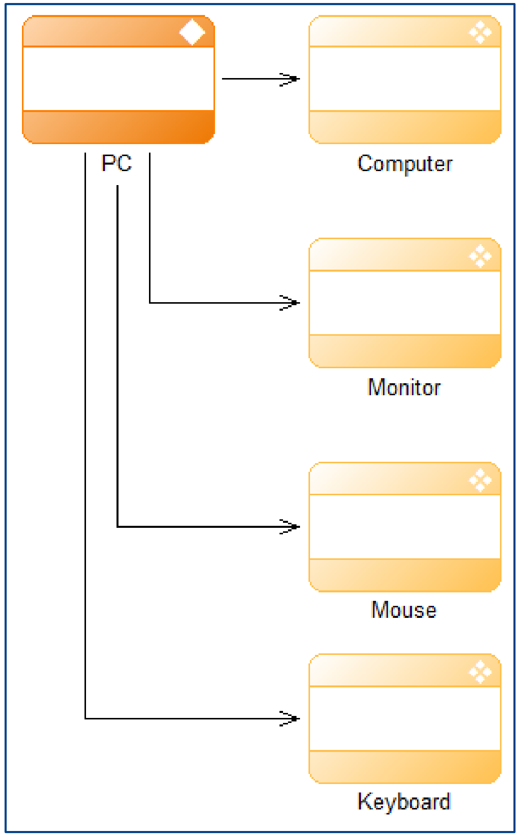
Products in ArchiMate

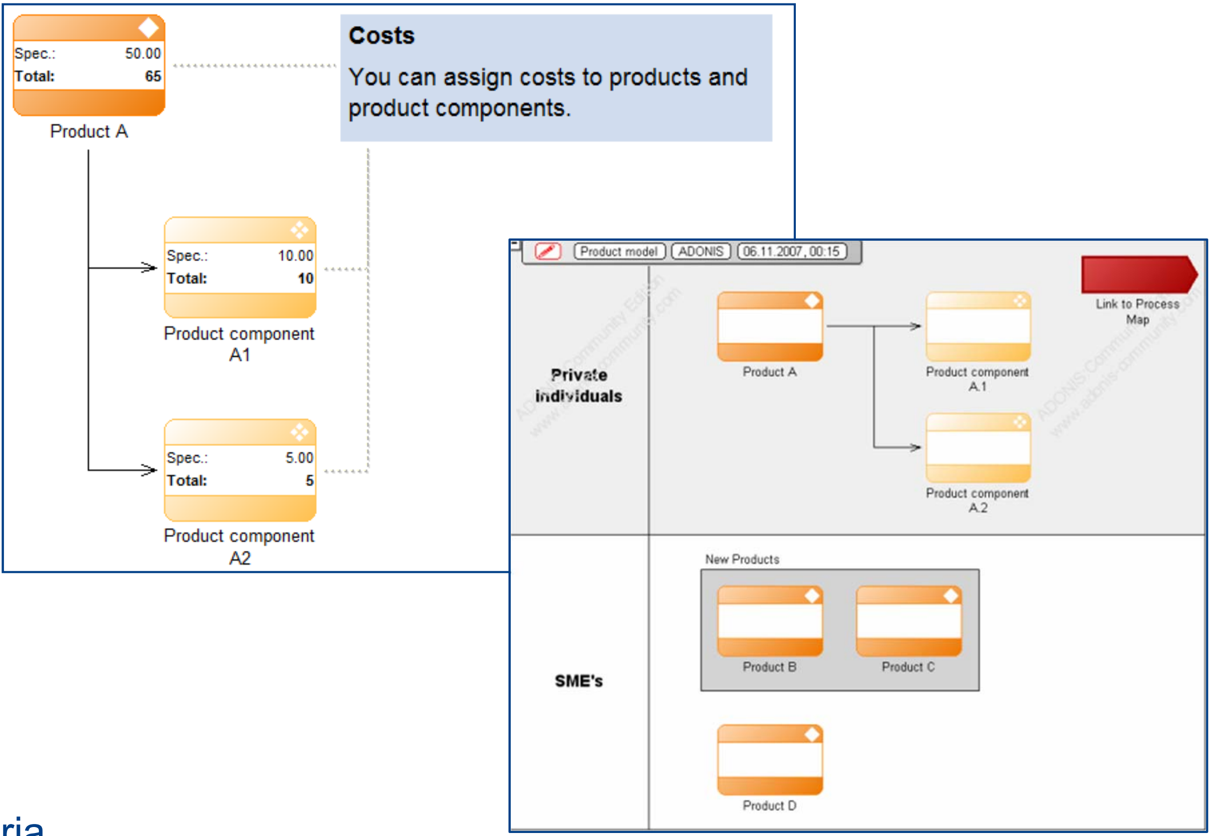
- In ArchiMate a product may aggregate business services or application services, as well as a contract
- This is an example showing two products and the services they consist of. The insurance policy is a contract for the Insurance product.



Product Models in ADONIS

- These are examples of product models as the are modeled in ADONIS[*)]
- The modeling elements are represents products and product components





Costs

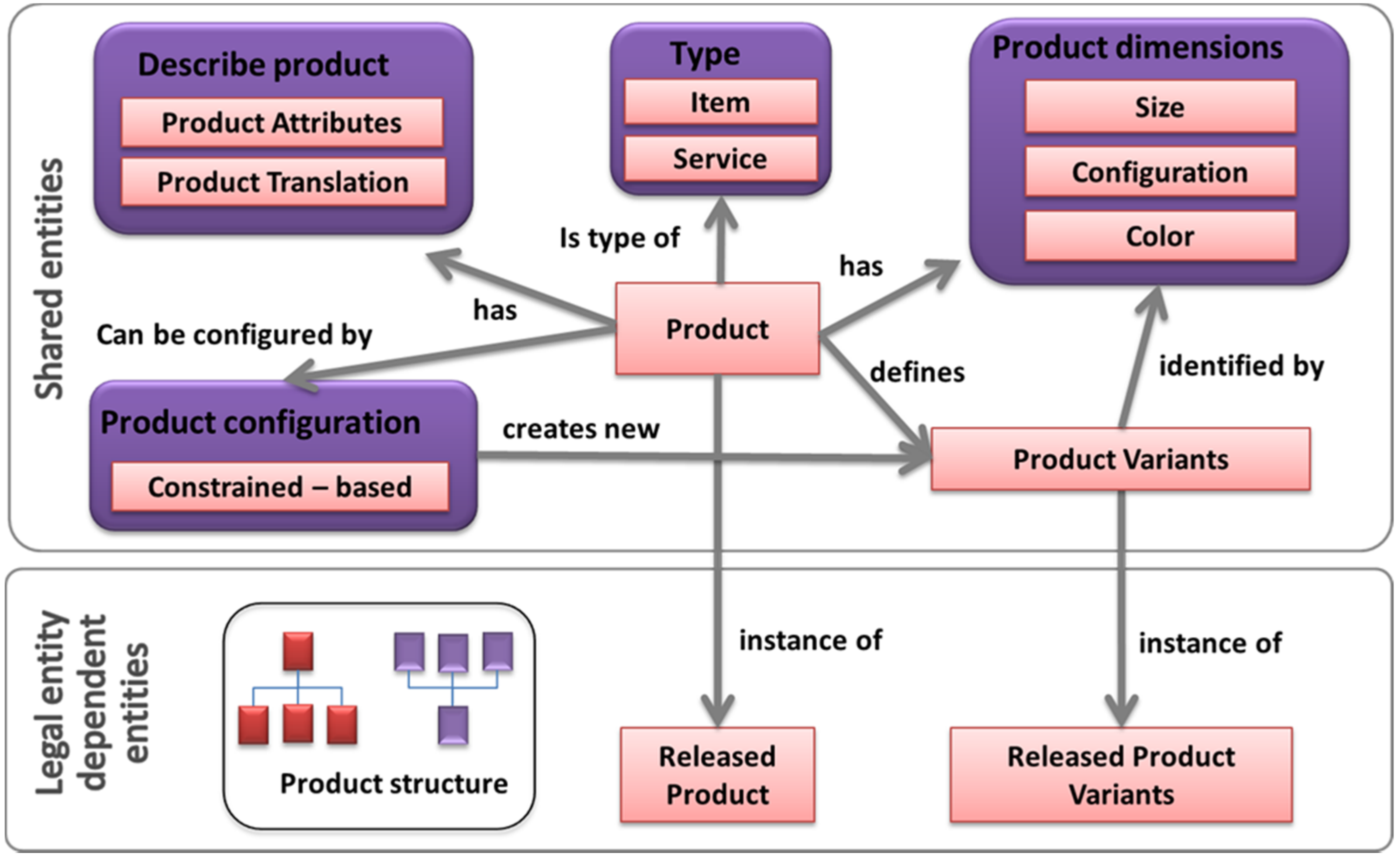
You can assign costs to products and product components.

*) ADONIS is a tool from BOC GmbH, Austria

© BOC

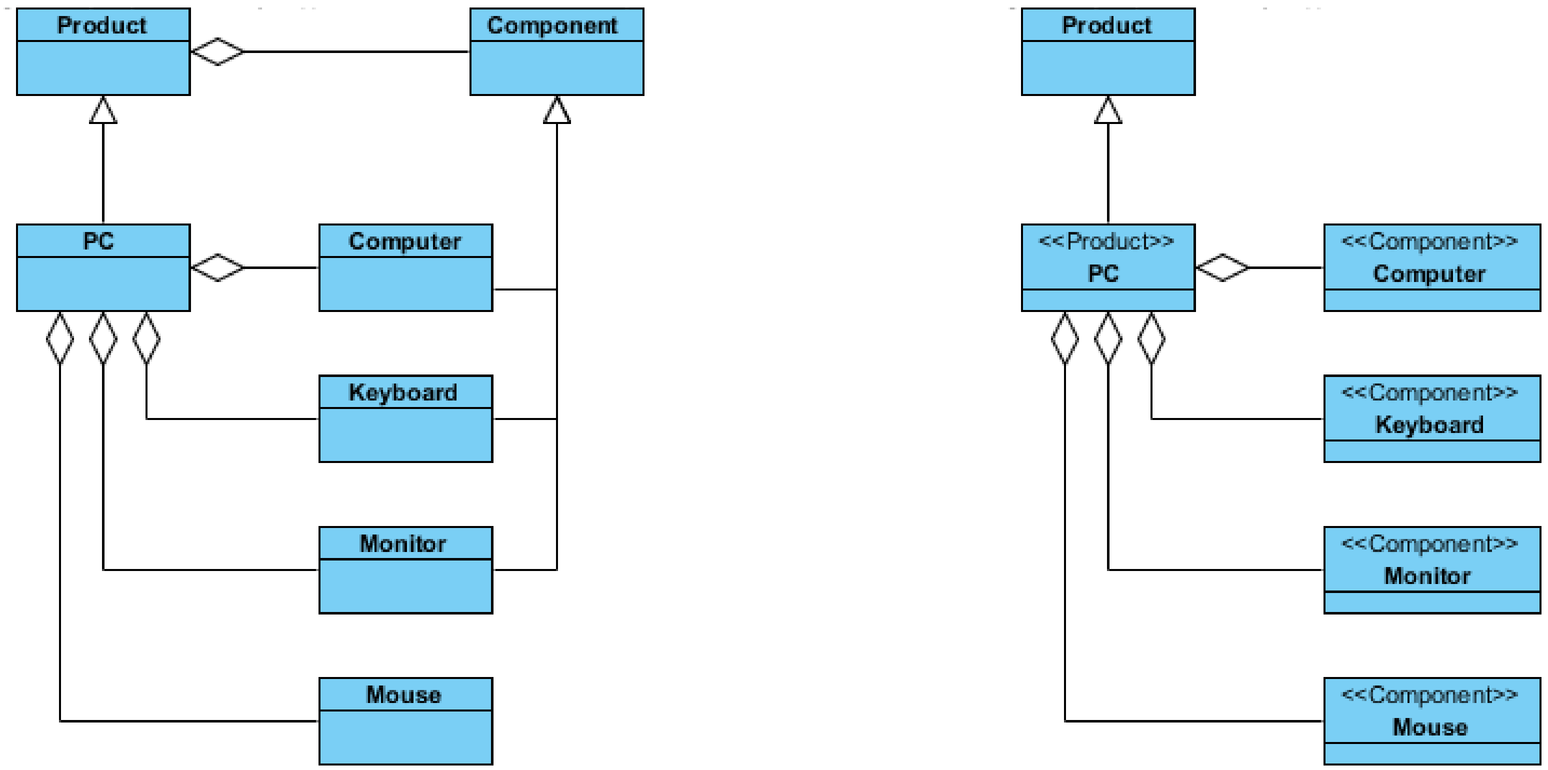
Product Model as a Class Diagram

- This Product model consists of classes with attributes and associations



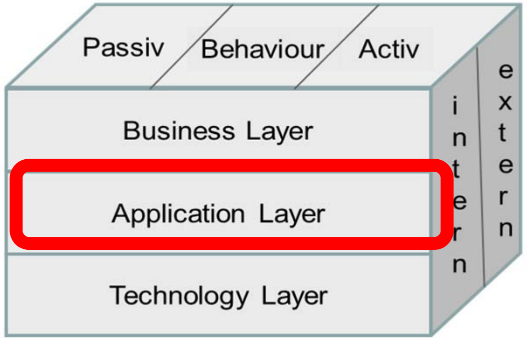
Product Models

- If we do not have an model type for products, we can use ML class diagrams to model products (similar as for documents)
- In Agilian we can again define specific sterotypes

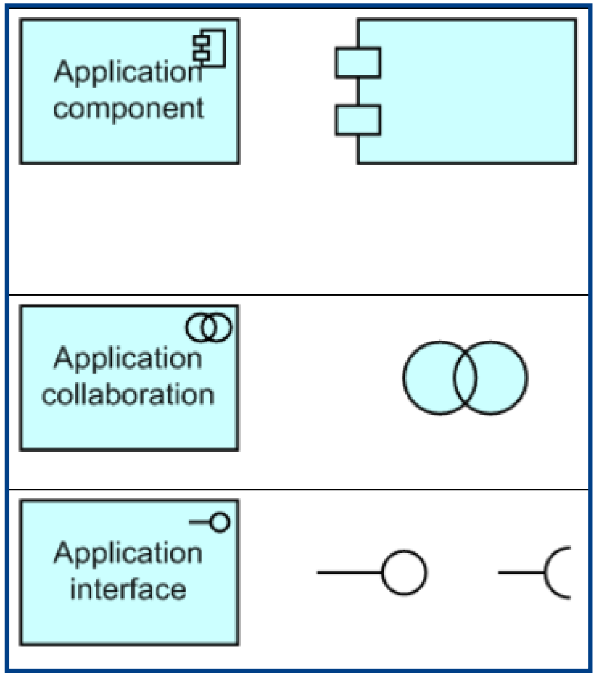


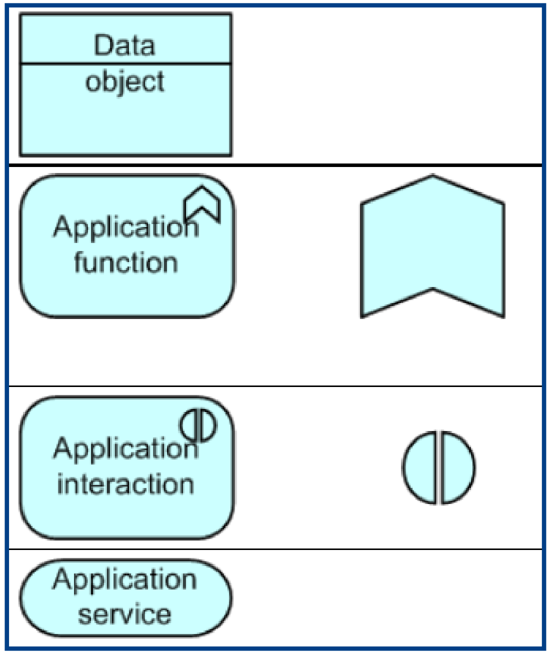
APPLICATION MODELS

Application Layer



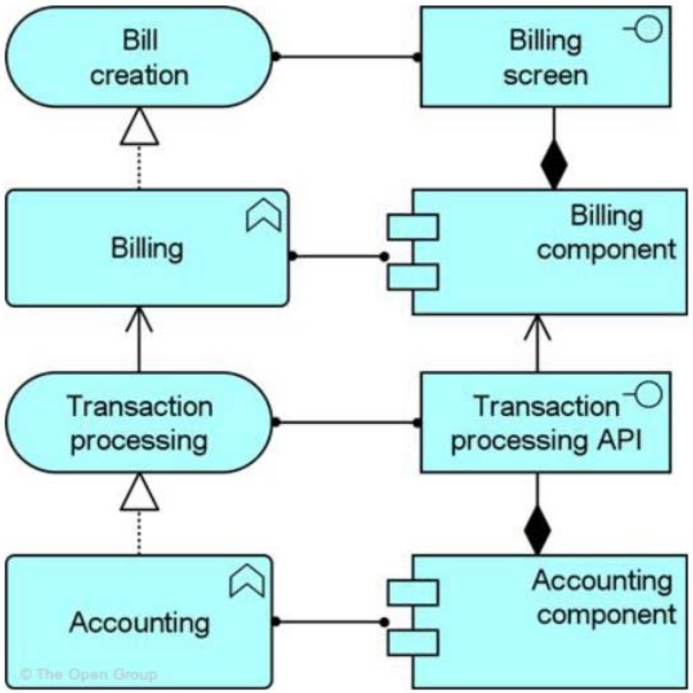
- The application layer represents application services, applications and information objects.
- ArchiMate contains concepts to model applications.



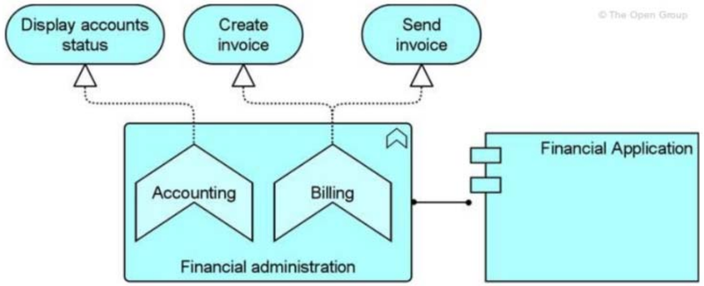


Modeling the Application Layer in ArchiMate

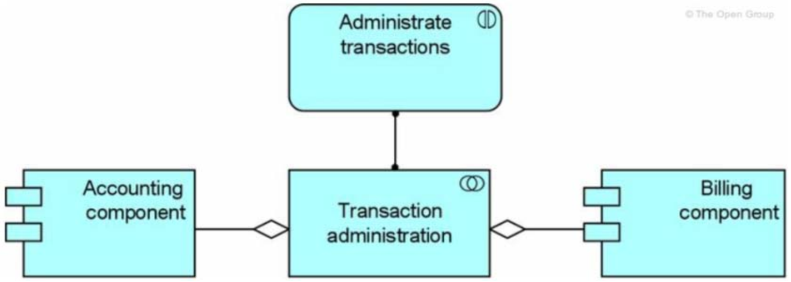
- Some examples for elements of the application layer in ArchiMate



Application Service

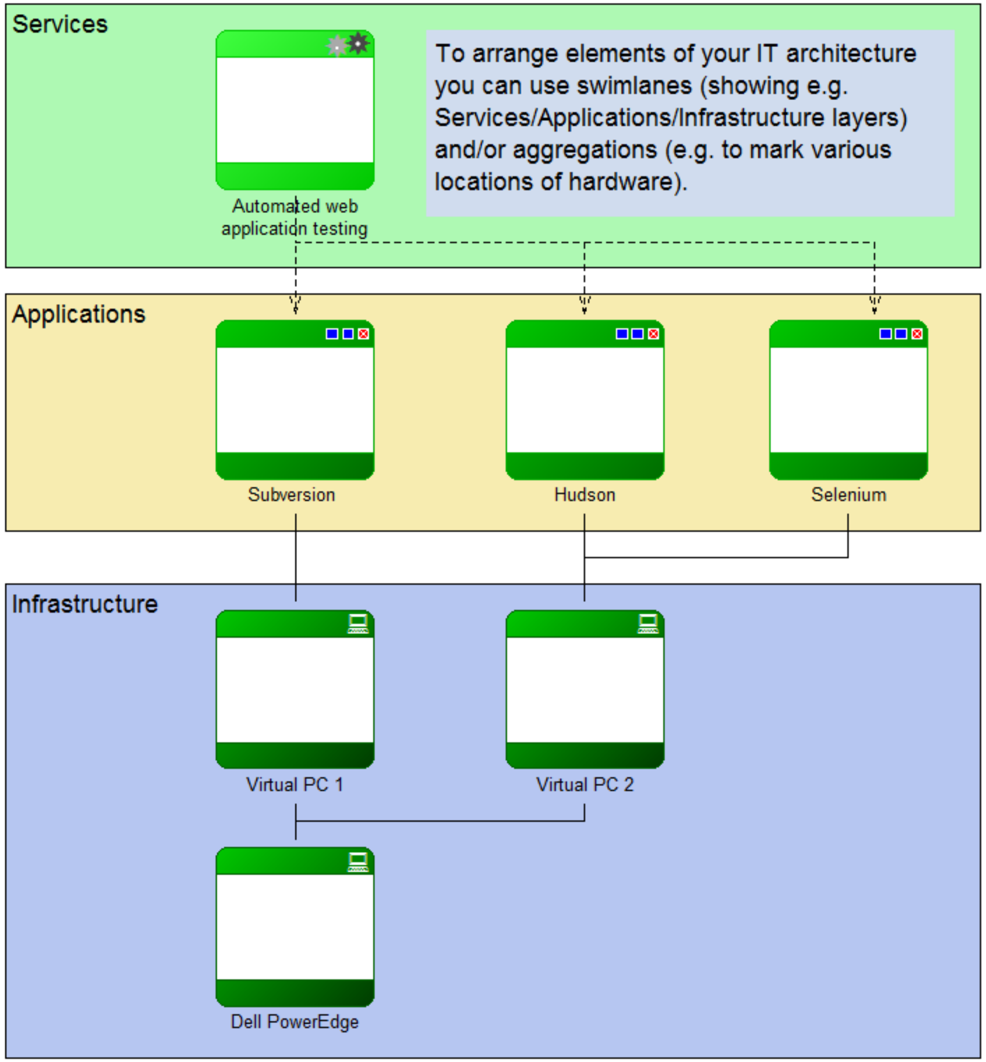


Application Function



Application Interaction

Proprietary Models for Applications



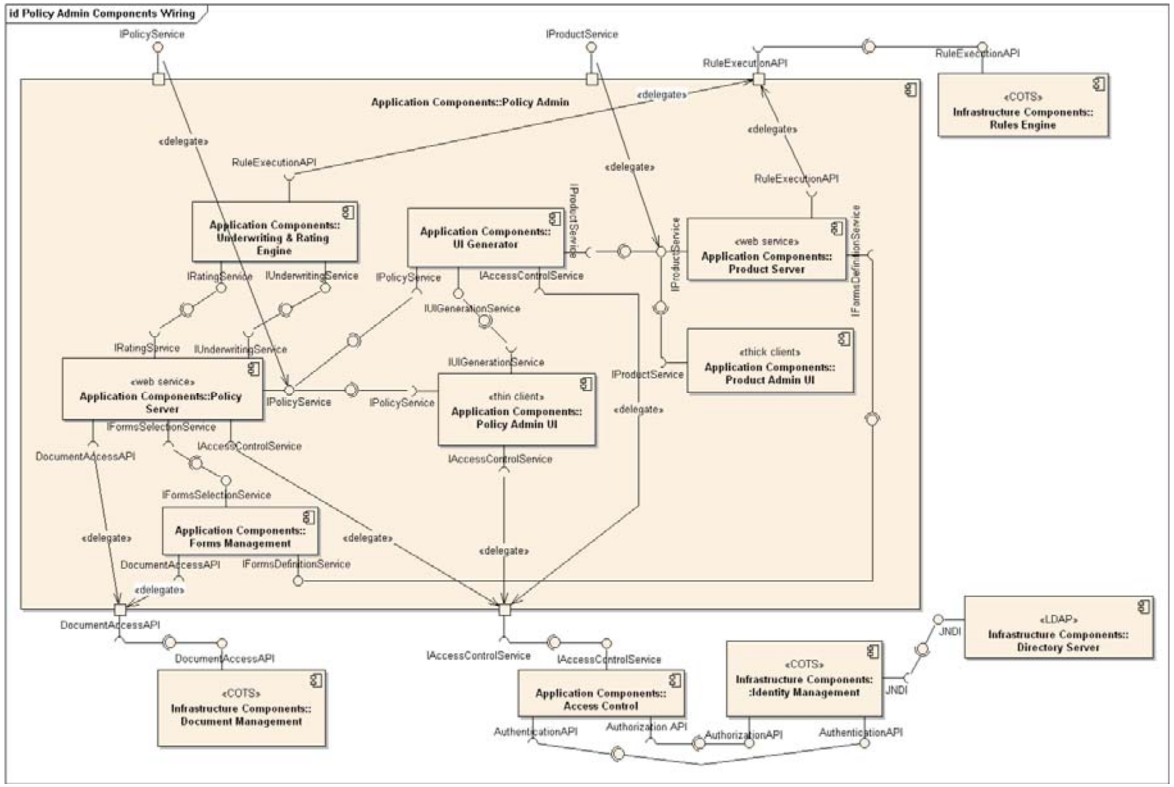
To arrange elements of your IT architecture you can use swimlanes (showing e.g. Services/Applications/Infrastructure layers) and/or aggregations (e.g. to mark various locations of hardware).

- Many tools have proprietary model types to model applications.
- This is an example of an IT system model of ADONIS.
- It shows the IT landscape of an organisation; services, applications, infrastructure elements and their dependencies.

© BOC

Component Diagram of an Insurance Policy Administration System

- It is also possible to use the UML Component Diagram to model applications[1)].
- This example shows a Component Diagram of an Insurance Policy Administration System



1) The UML component diagram,however, is not intended to model applications but to get an idea of the implementation of a system.

Source of the Figure: Wikipedia

Or we can use UML Class Diagrams to make our own model type …