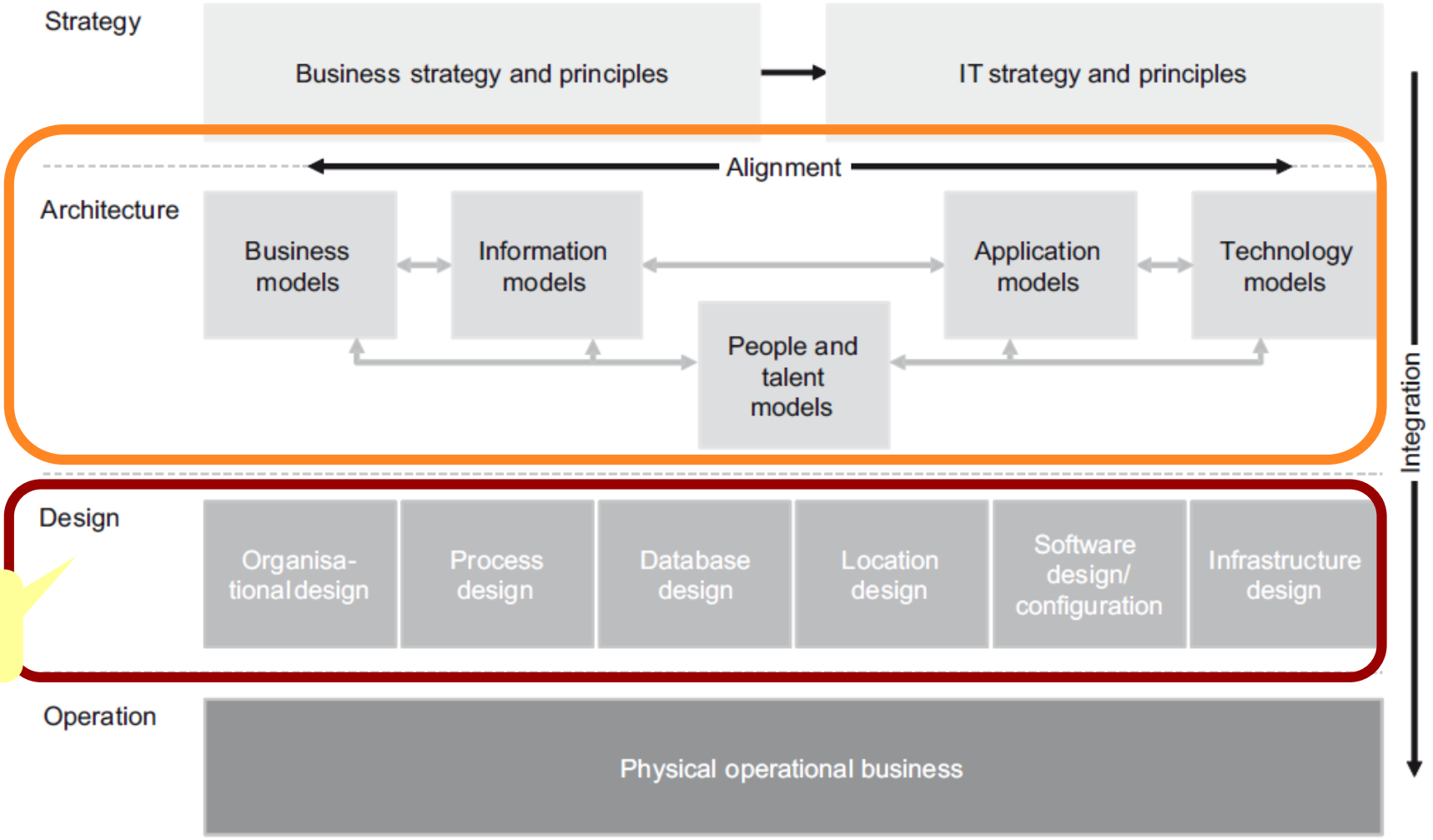
Modeling Details of Business Architecture

Knut Hinkelmann

Distinction of Architecture and Design Level



Details of Architecture

(Ahlemann et al. 2012, p. 61)

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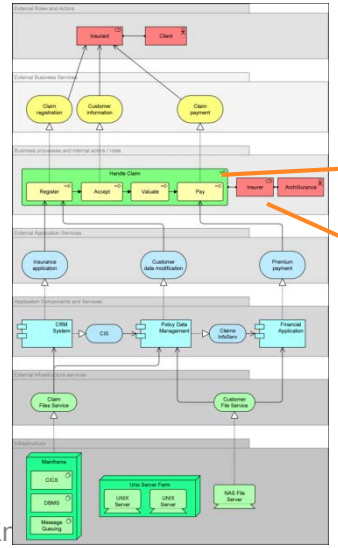
Modeling Details of the Architecture

- ArchiMate represents the relevant aspects on architecture level.
- Specific aspects of an architecture can be designed in more detail using specific model types (e.g. process models, data model, organisation models)
- Design models can
  - represent details of elements in an ArchiMate model
  - be related to the cells of the Zachman Framework

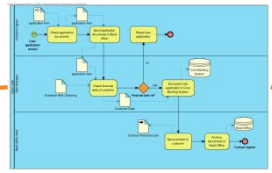
Overview: ArchiMate



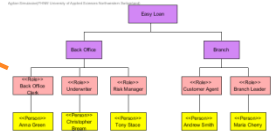
Detailed Models

Process Map

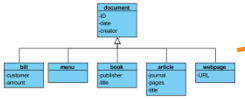
BPMN



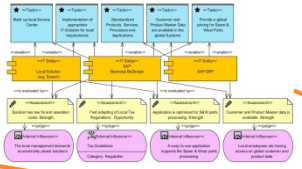
Organisation Model



Data/Documents

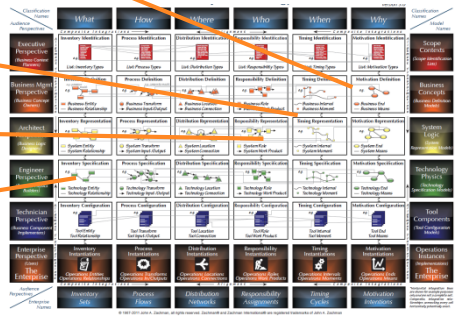


Business Motivation



Business Rules

Overview: Zachman



Referencing Detail Models from the Business Perspective of the Zachman Framework

process maps

ArchiMate overview

data models

business process models

business motivation models

organisation models

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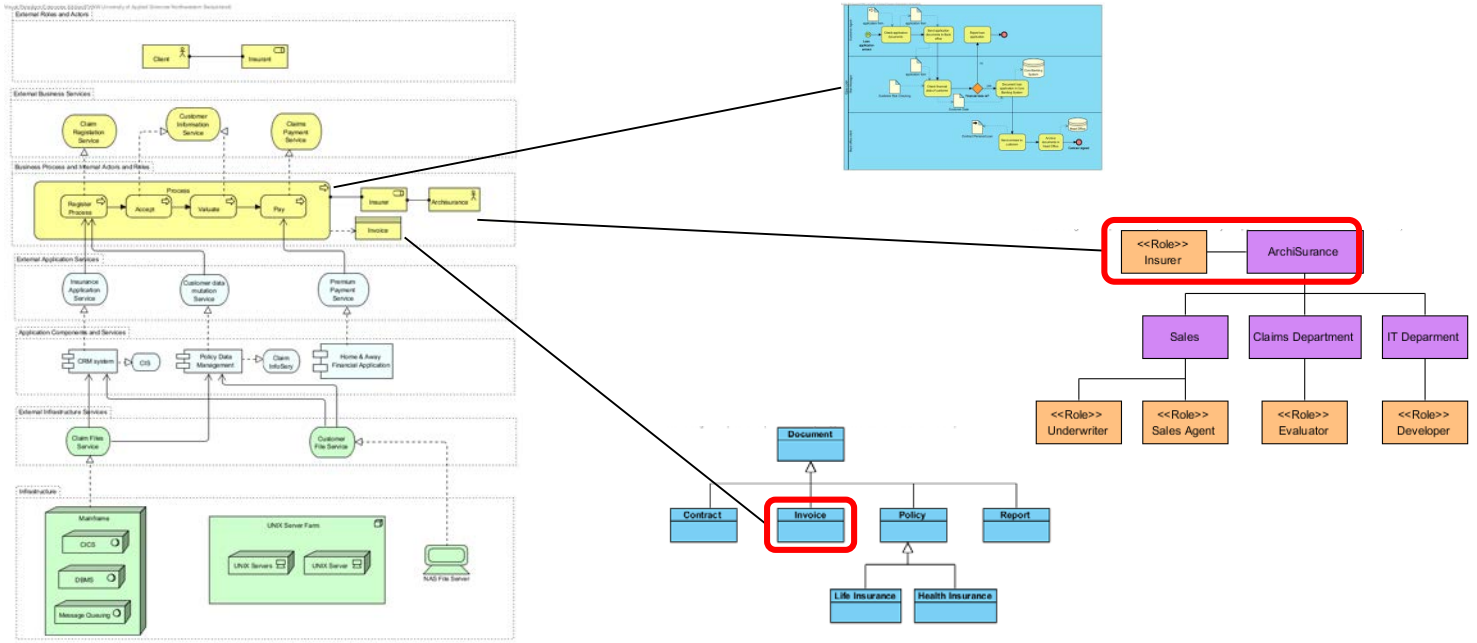
Referencing Detail Models from ArchiMate

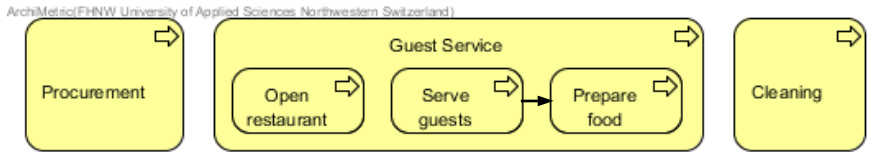
- ArchiMate represents an overall architecture
- Elements in an ArchiMate model can be modeled more detailed in a separate model (e.g. modeling conditional flows and events of a business process in BPMN)
- Detail models can show the context of buiness architecture elements (e.g. actors and roles arepart of an organisation model, business objects are part of a data model)



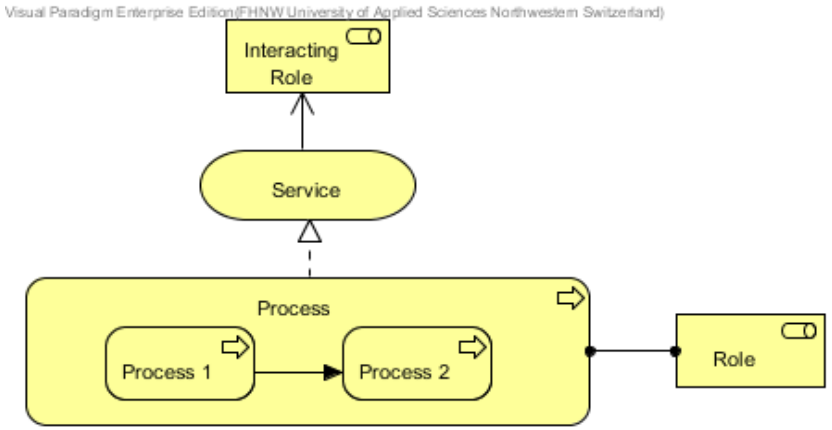
Business Processes and Their Context

Business Processes on Architecture Level

- ArchiMate represents processes on an architecture level. It shows relationships
  - Between processes (subprocess, trigger, logical order)

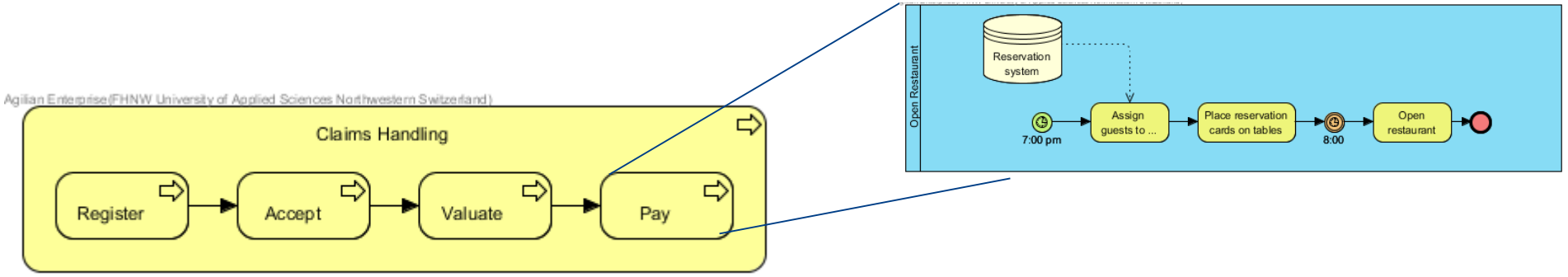


  - Between processes and other elements (application services used, business services realized, roles assigned, …)

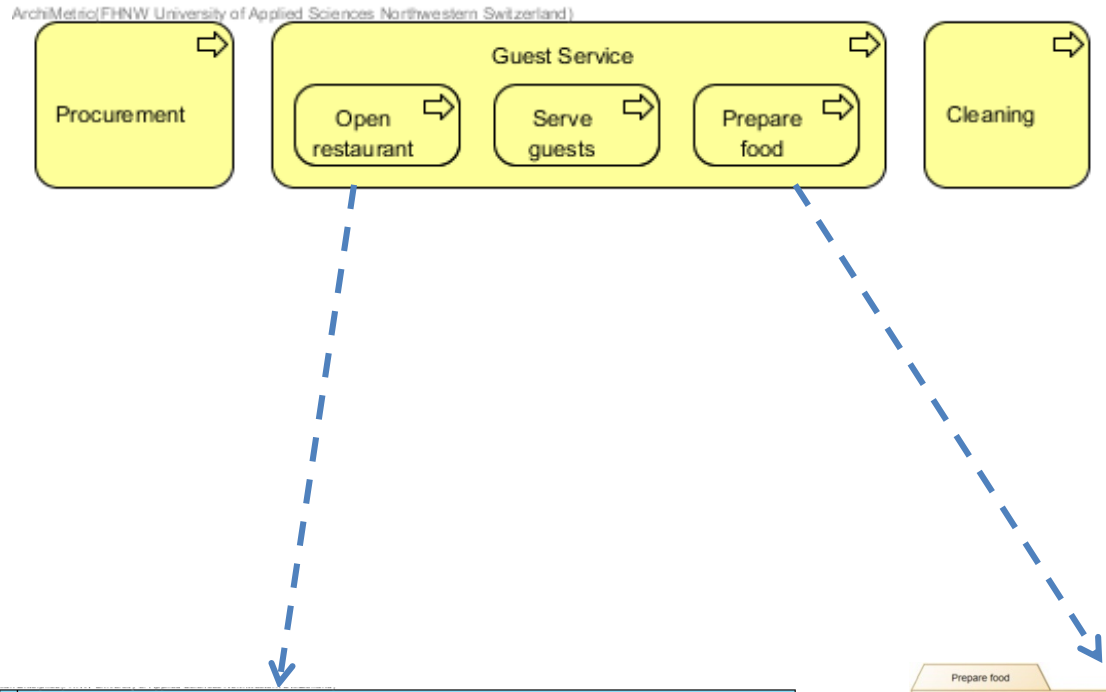


Business Process Models and ArchiMate

- An ArchiMate Model is an overall representation of an Enterprise Architecture
- To model details of elements (e.g. conditional flows and events of a process) one can use specific models
- Example: Modeling the flow of a process in BPMN



Hierarchical Processes

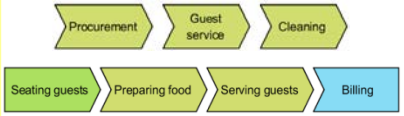


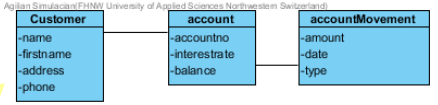
- ArchiMate processes can be organized hierarchically. An element either represents
  - another set of processes (i.e. a process map)
  - a business process (e.g. in BPMN or CMMN)

References in BPMN

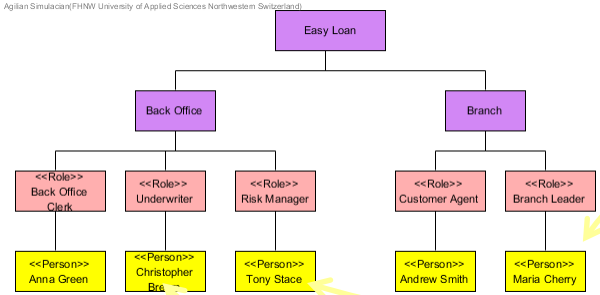
- Process models represent the flow of work.
- Processes are related to other aspects of business
- These are represented by references to other models.

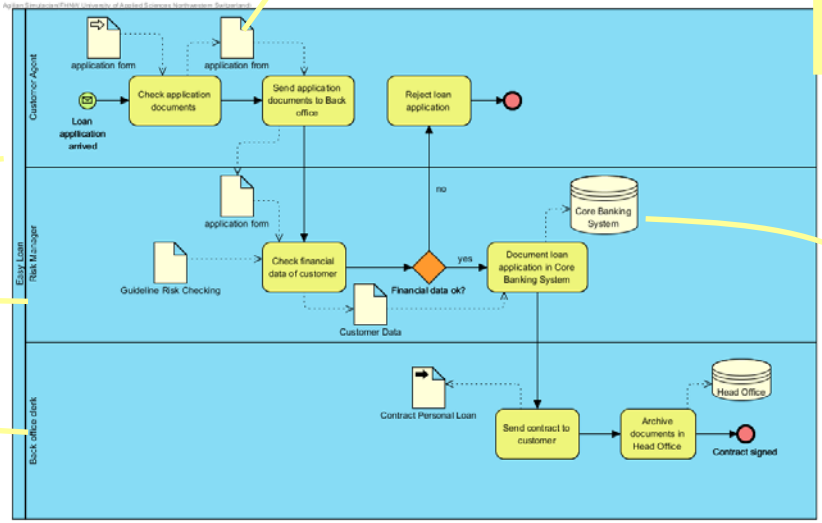
An element in a process map corresponds to a process diagramm





Data Objects can refer to
- *data models*
- *document models*





Data stores may refer to applications

Lanes refer to elements in an organisation model

Relationships from and to Business Process Diagrams

There are two kinds of relations from/to BPMN

- Relations **to process models** as a whole from
  - Process maps
  - Architecture model (ArchiMate)
- Relations **from process elements** to elements in other models
  - data objects in document models and data models
  - organisation units or roles in organisation models
  - products in product models
  - applications and application services in IT models
  - business rules

References in BPMN

There are two important references from BPMN

- **Data objects** can represent different kinds of **data**
  - Structured data
  - Documents
  - Data store (applications)

  } data/document model

- **Lanes and pools** represent **active** elements
  - Organisation units
  - Roles
  - People

  } organisation model

  - Applications

  } application model

Data, organisation and applications are modeled in their own models; their elements can be referenced from BPMN

Horizontal Relations between Processes and other Aspects on the Business Perspective

The references from/to BPMN represent the relationships between cells in the Zachman Framework on a detailed level.

process maps

data models

business process models

business motivation models

organisation models

Organisation Models

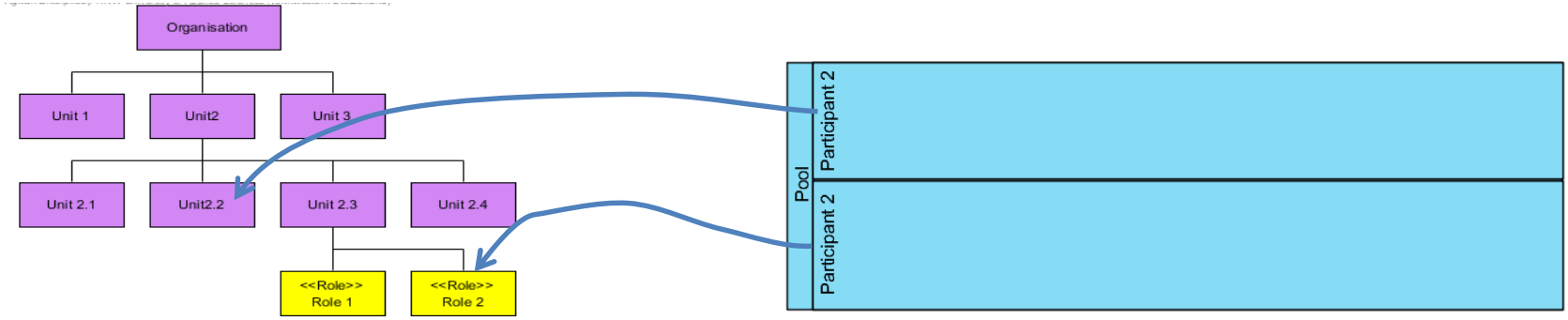
Literature

This chapter is mainly based on the following literature:

- Bridgeland David M.; Zahavi, Ron (2009): Business Modeling - A Practical Guide to Realizing Business Value. Morgan Kaufman Publishers. Chapter 4: Business Organization Models.

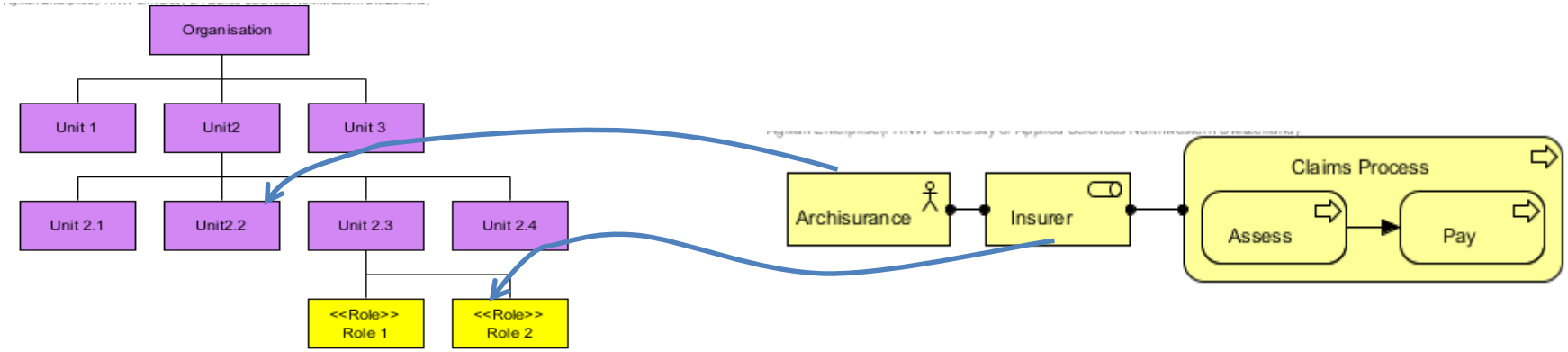
Referencing Organisation Units from Business Processes

- The lanes of a BPMN models graphically show who performs which activities.
  - Each lane is named by the role, organization or system.
- The roles (or organizations) represented by the lane are modeled in an organization model
  - There should be a reference from the lane to a role or organization in the organization model.



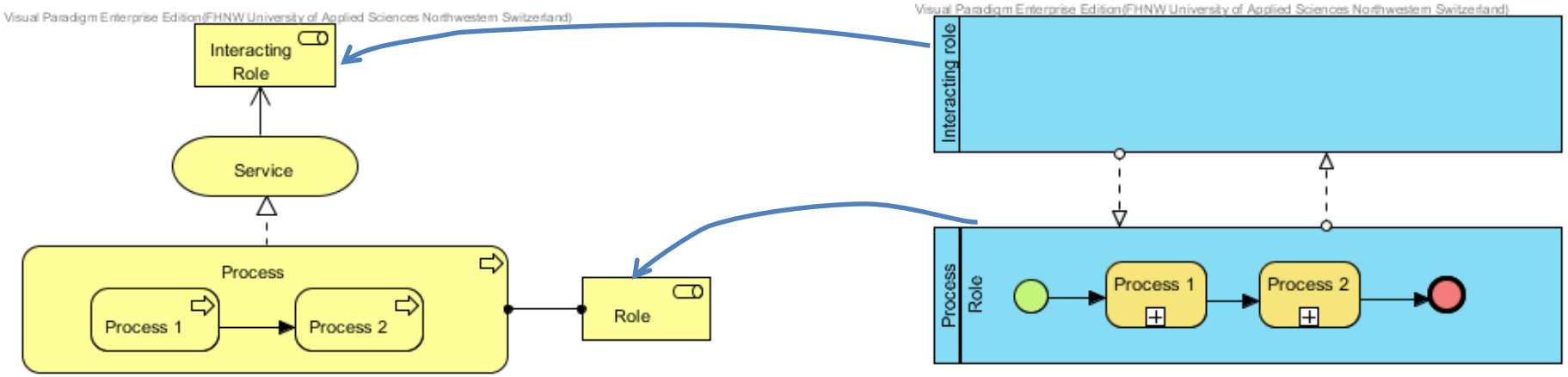
Referencing Organisation Units from ArchiMate

- The business layer of ArchiMate contains Business Roles and Business Actors.
- The Business Actors and Business Roles are modeled in an organization model
  - Actors correspond to organisations
  - Business Roles are roles



Distinction between Participants

- There are two ways a role can be related to a process
  - Participants executing (part of) the process are connected via the "assign to" relation – they ar represented as lanes in BPMN
  - Participants for whom the process "produces" something are assigned via services – they are represented as pools (external participants) in BPMN



Organisations

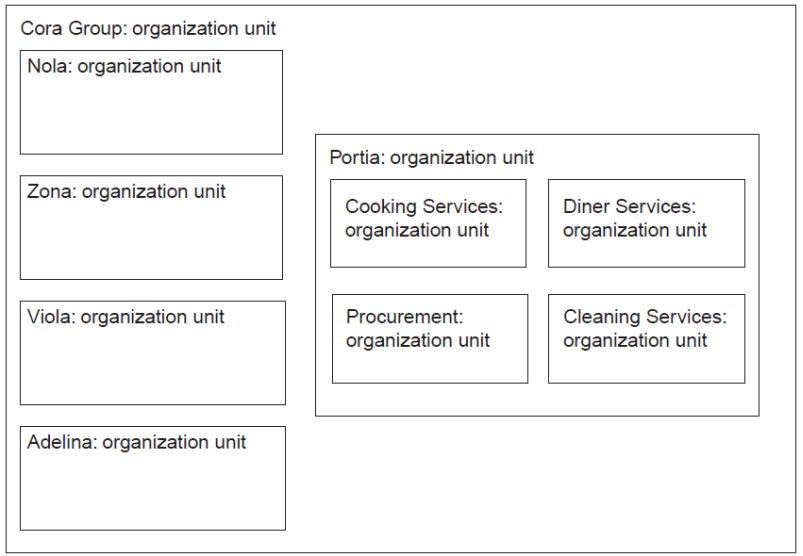
- An organization unit (or simply stated, an organization) is a collection of people who work together toward a common goal.
- An organization can be a commercial company, a nonprofit, or a government agency.
- An organization has a clear boundary. Some people are part of it and others are not.
- An organization can be a group of people within a larger organization.
  - An organization can be part of another organization and an organisation can have sub-organisations
  - In a corporate holding each company has its own management structure, its own performance goals, and its own budgets and resources. But their performance flows up to the holding company, and their goals are part of a larger plan.
  - An organization can even be temporary. A project team is an organization which exists while the project is performed and then disappears after the project is finished

Business Organisation Models

- A Business Organisation Model describes
  - how a company is organized – the business units, departments and working groups
  - the roles that people play in the company
  - the interactions – who interacts with whom to get the work done
  - the way the organisation interacts with other organisations
- When we model organizations,
  - we look at the way they are structured, the work they perform, and the way they are associated with other organizations.
  - we do **not** focus on **how** organisations perform their work (this is modeled as a business process)

Example of an Organisation Model

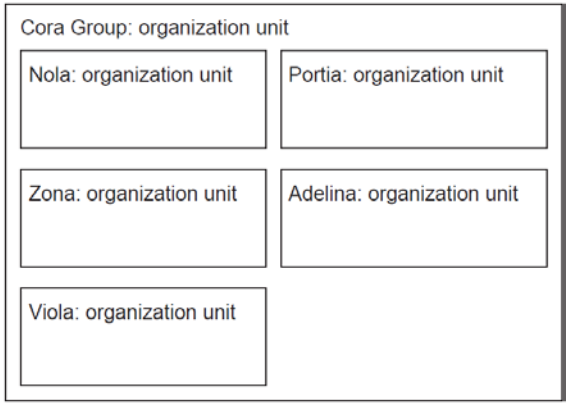
- This model shows Cora Group as composed of five restaurants.
- One of those five—Portia—has four organizations that are part of it: Diner Services, Procurement, Cooking Services, and Cleaning Services



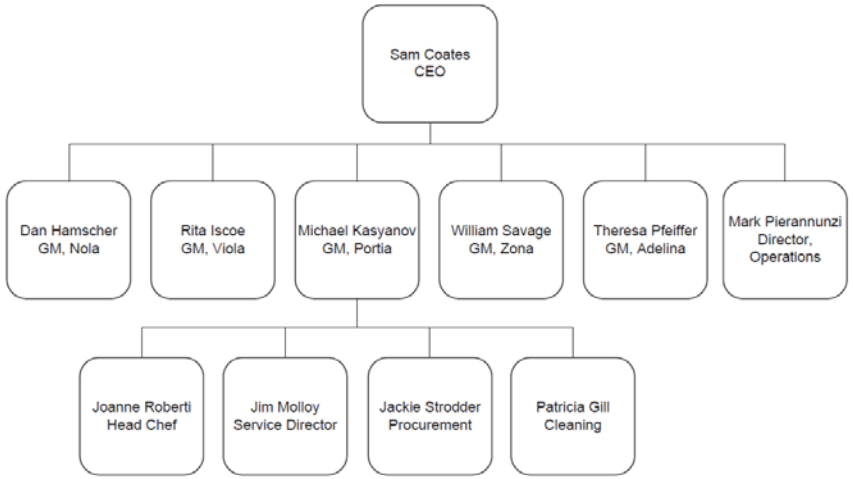
- Diner Services is responsible for all interactions with the customers of Portia: hosting, reservations, and serving food.
- Procurement is responsible for all interactions with external vendors and suppliers.
- Cooking Services is responsible for the creation of all meals.
- Cleaning Services is responsible for cleaning the facilities, including the dining area, bathrooms, and immediate restaurant surroundings

Organisation Model vs. Organisational Chart

Example of a Organisation Model:



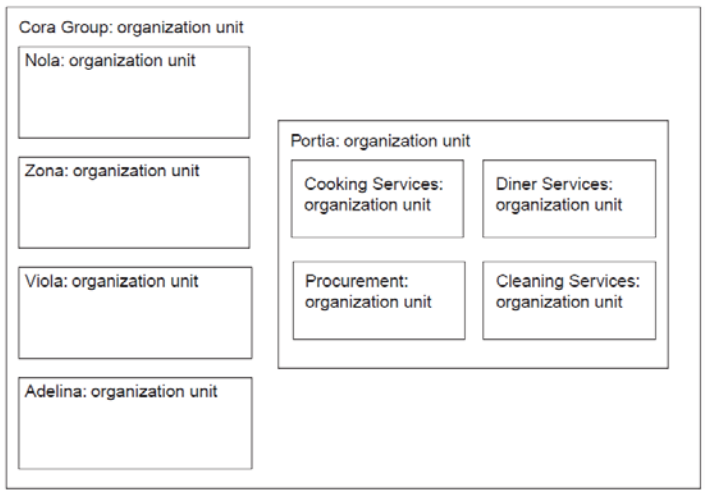
Example of an Organisational Chart:

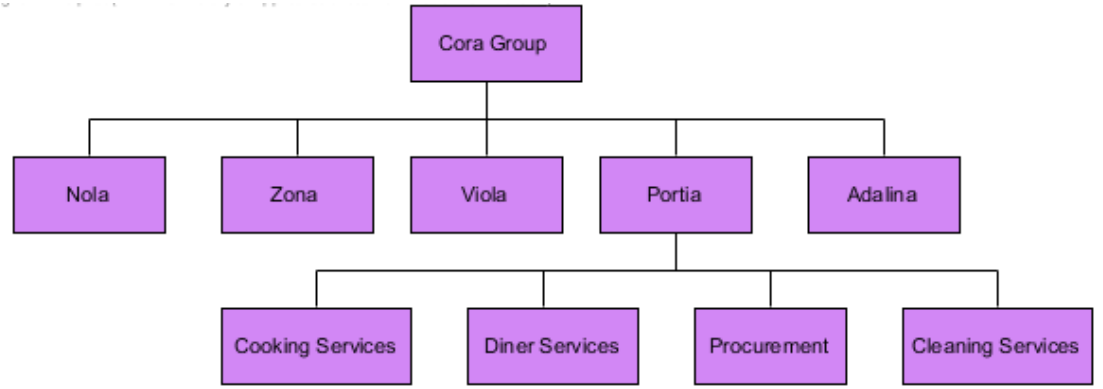


- Business organization models are different from organization charts.
  - An organization model is about groups of people (organizations and roles) while
  - Organization charts are about individual people within an organisation
- Example:
  - The business organization model (on top) shows us what organizations are part of Cora Group
  - The organisational chart shows the roles of individual people and the reporting relationships between people

Business Organisation Modeling

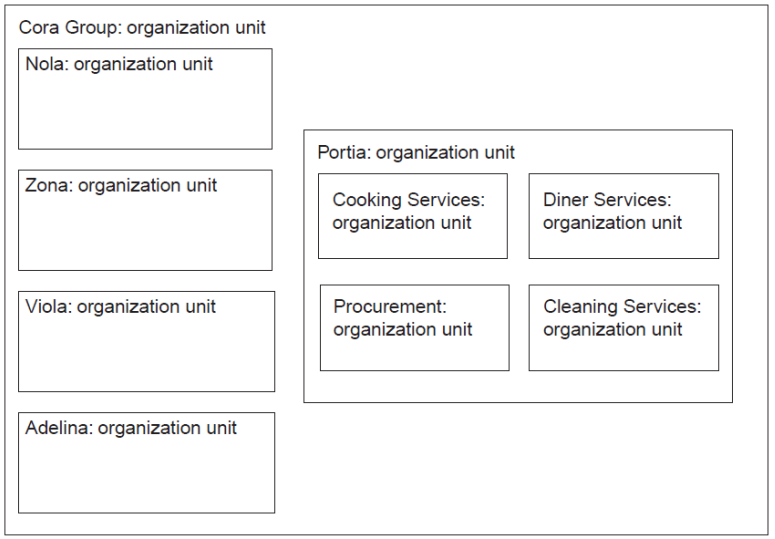
- There is no standard for organisation modeling
  - ♦ nearly every modeling tool has its own approach
- Here are two possible representations of an hierarchical organisation unit

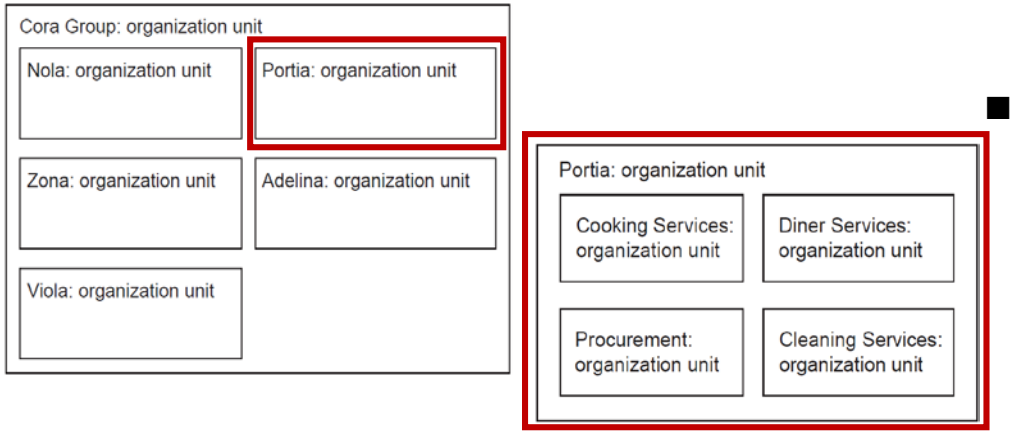




(Bridgeland & Zahavi 2009, p. 79f)

Representing Organisations and Suborganisations





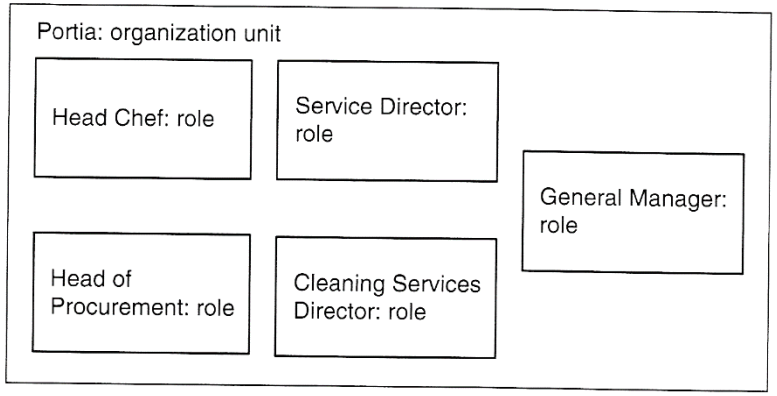
- Business organisation models are inherently hierarchical
  - An organisation is composed of several other organisation which are again composed of other organisation
- The hierarchy can be represented
  - in one model or
  - in several models
- Example: The top diagram shows three levels. If we a diagram becomes too complex, one can show the organizations within a unit as a separate diagram (see second diagram)

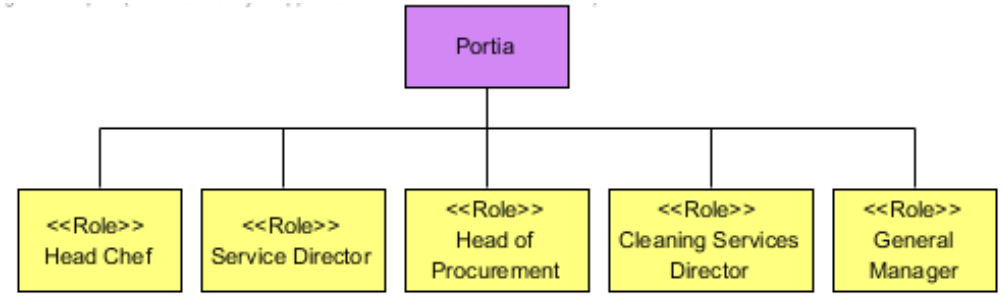
(Bridgeland & Zahavi 2009, p. 81ff)

Organisation with Roles

- Organisations contain roles
- A role is a responsibility a person assumes when he or she holds a position in an organisation
- People can at the same time play multipe roles

Organisation Model with roles



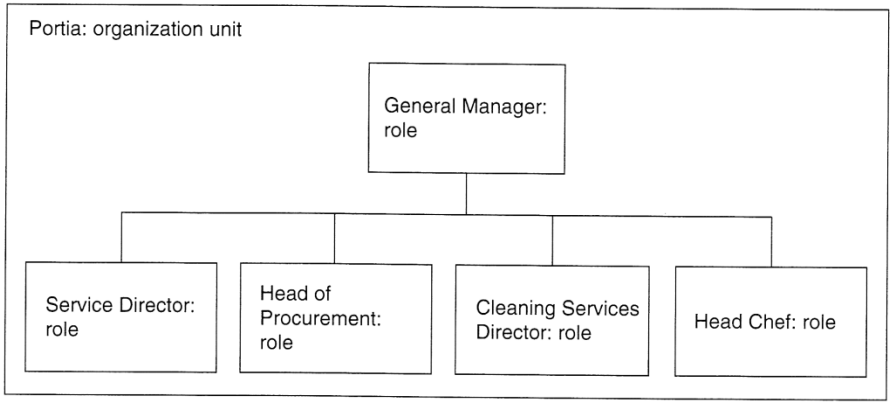


(Bridgeland & Zahavi 2009, p. 82ff)

Reporting Relationships

- It can be useful to model the reporting relationships that exist between roles (not between individual persons)
- The supervising role can tell the reporting role what to do and when to do it
- Reporting only occurs between two roles, a role cannot report to an organisation

Organisation Model with reporting relationships

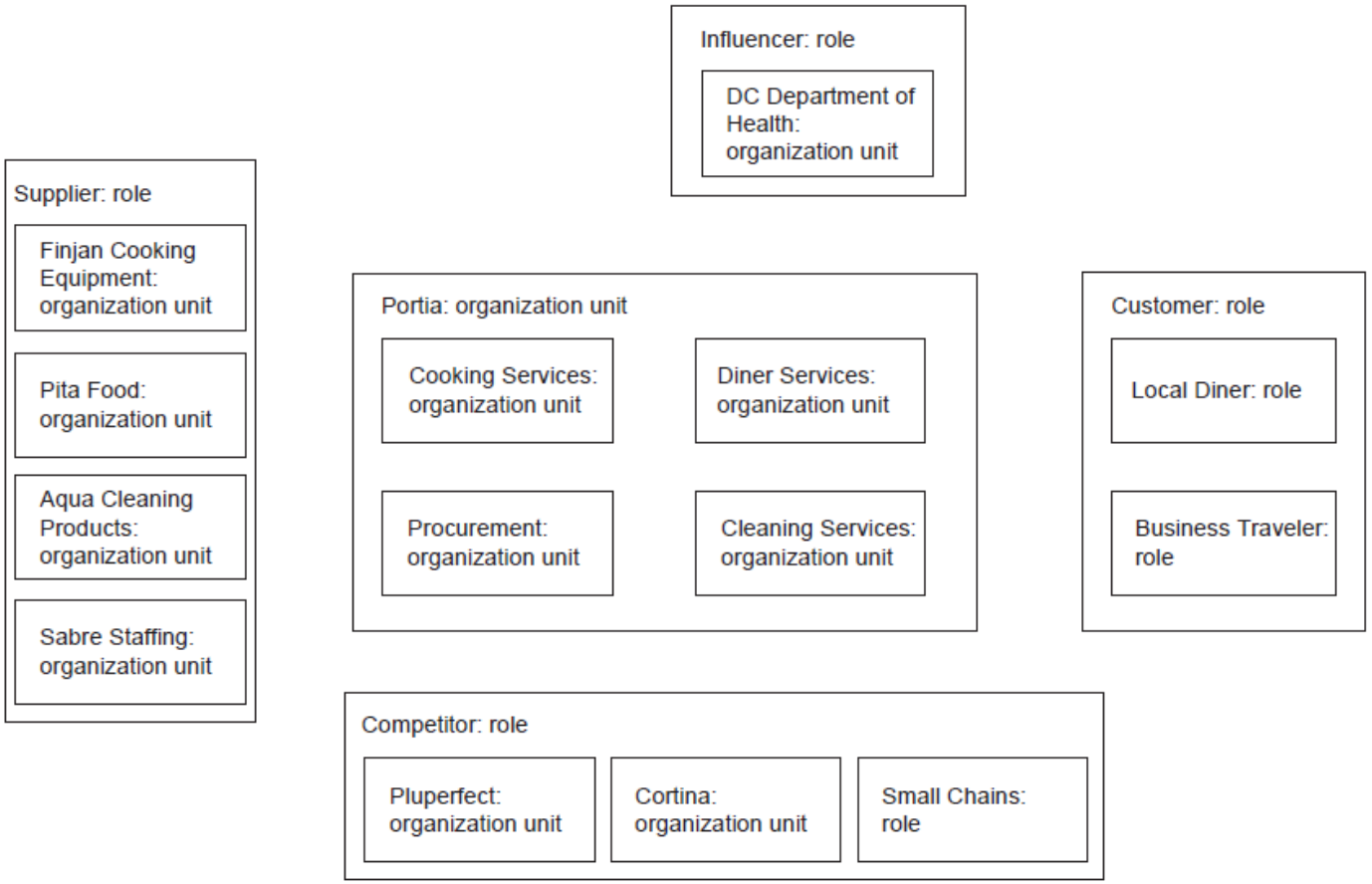


(Bridgeland & Zahavi 2009, p. 82ff)

Interactions

External Organisations and External Roles

Sometimes it can make sense to model also external roles



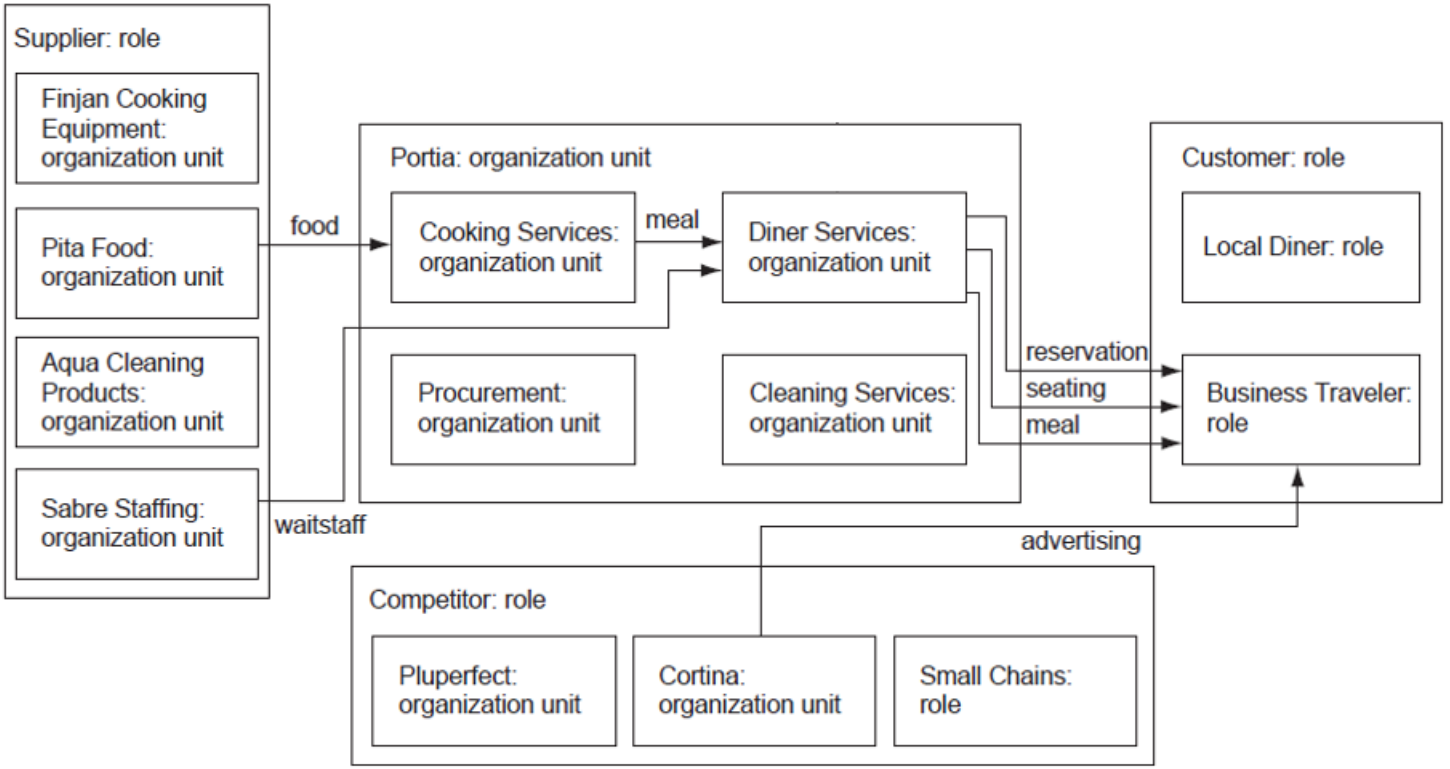
A role inside a role means the the inner role plays the role of the outer role, i.e. a Local Diner is also a Customer

When an organization is represented as part of a role, it means that the organization plays that role, i.e. Cortina plays the role of a Competitor.

(Bridgeland & Zahavi 2009, p. 86f)

Interactions

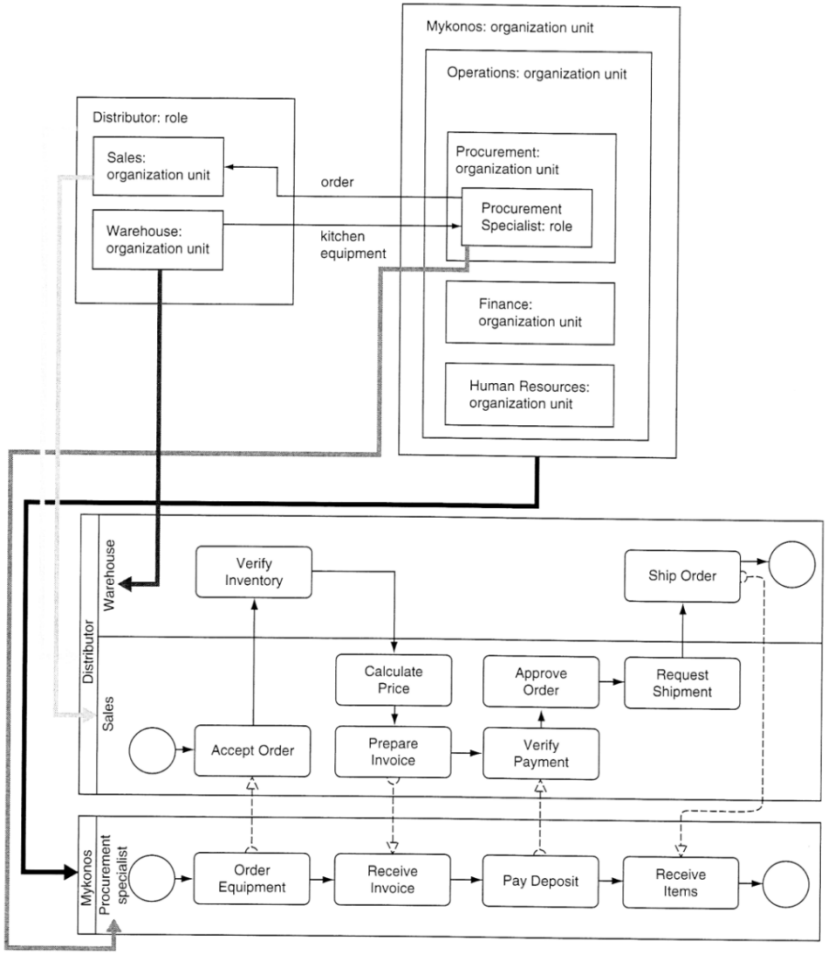
- Interactions shows who works with whom
- An interaction is represented as an arrow between organisations and roles
- An interaction is labeled with the name of the deliverable, which can be information, a physical good, a service or money



(Bridgeland & Zahavi 2009, p. 92f)

Business Processes, Organisations, and Interactions

- A pool contains a process
  - The pool is labeled with the participant who manages this process
- A lane in a process model is labeled with the participant who performs the action
  - an role or organisation in the pool
- Interactions to external roles/organisations are modeled as message flows in a process

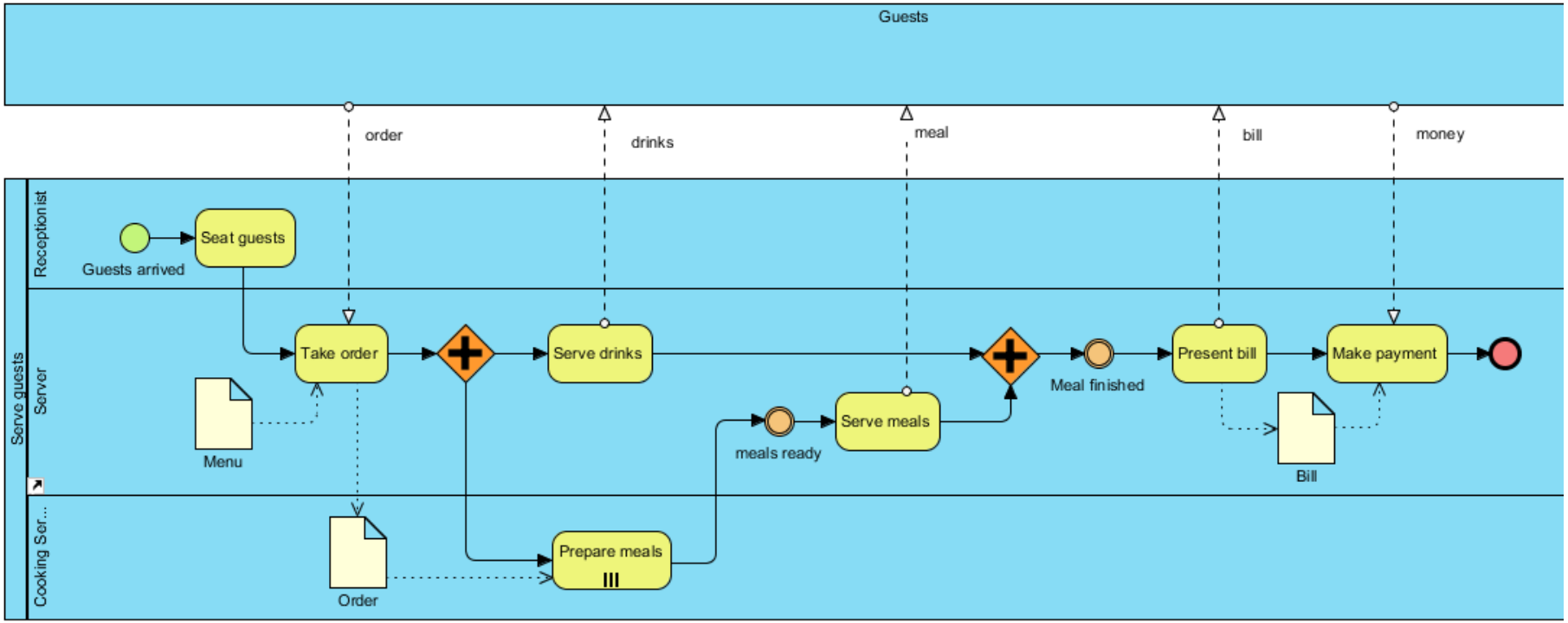


(Bridgeland & Zahavi 2009, p. 130f)

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

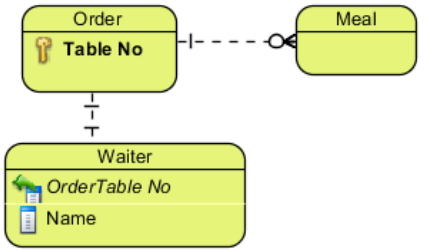
Data objects in BPMN can represent different kinds of data

- **Structured data**
- **Documents**, which either represent
  - a **specific document**
    - Examples: An application form, the terms and conditions, the menu from which the guests can choose their meals
    - Hint: For a specific document we can specify a file name or a URL
  - **a document class,** i.e. a generic documents for which a specific instance is created during process execution
    - Examples: A bill or a filled application form

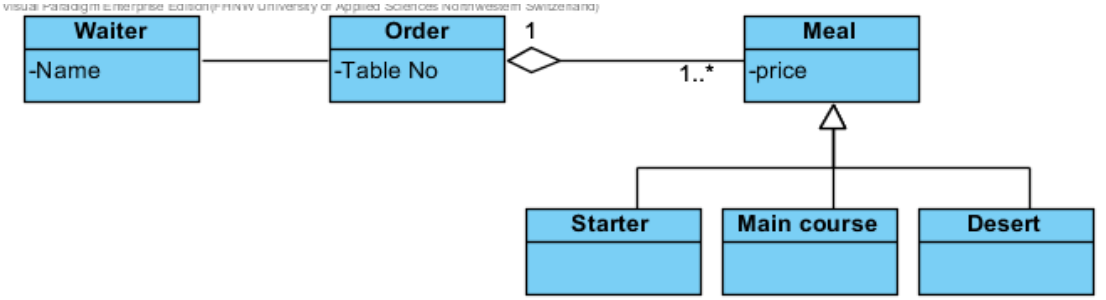
Modelling Structured Data

- 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:

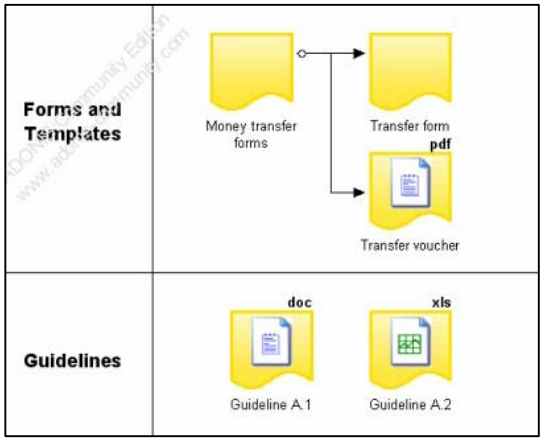


UML Class Diagram:



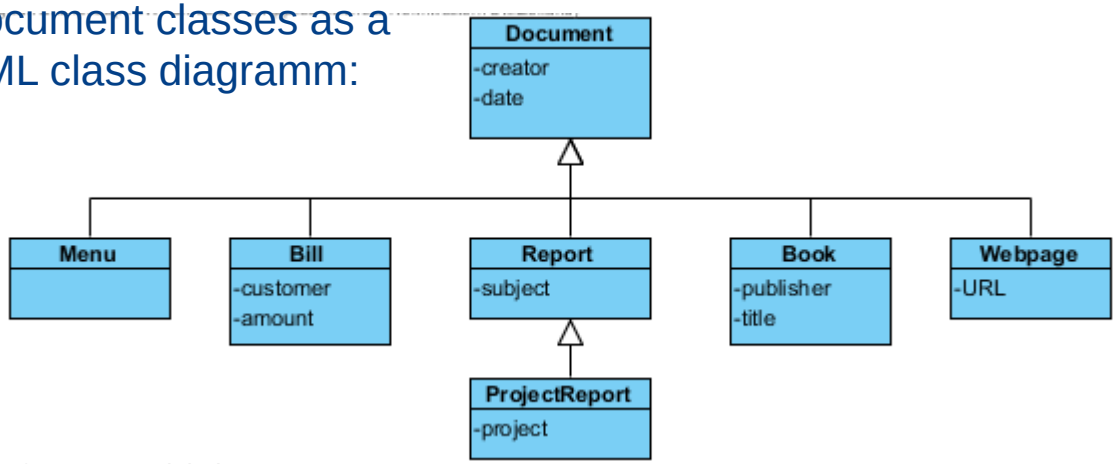
Document modeling

ADONIS document model:

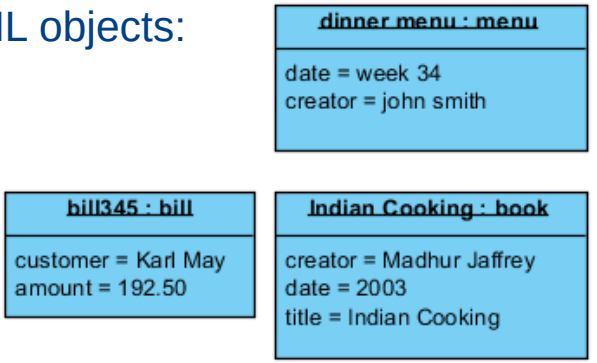


- Although some tools like ADONIS have a model type for documents, there is no standard for modeling documents
- However, we can use UML class diagrams and object diagrams to model documents [1)]
  - A document class is represented as a class object with attributes describing the meta-data
  - A specific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

Document classes as a UML class diagramm:



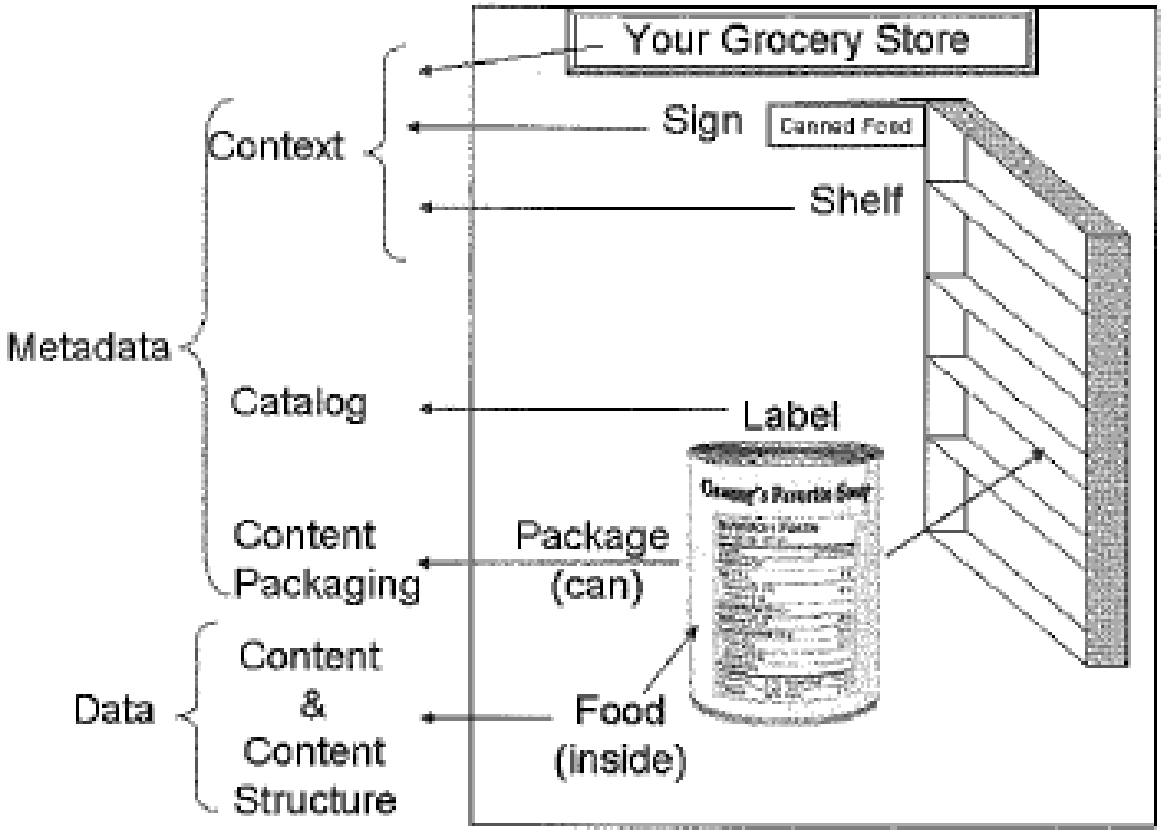
Specific documents as UML objects:



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)

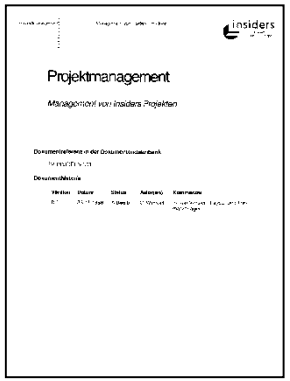
Information as product



Michael C. Daconta: Information as Product, 2007

Data and Meta-data – Examples

usage data (document)



meta-data

name:	Projektmanagement
creation:	18.3.2011
modification:	25.6.2011
format:	PDF
document type:	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 UML

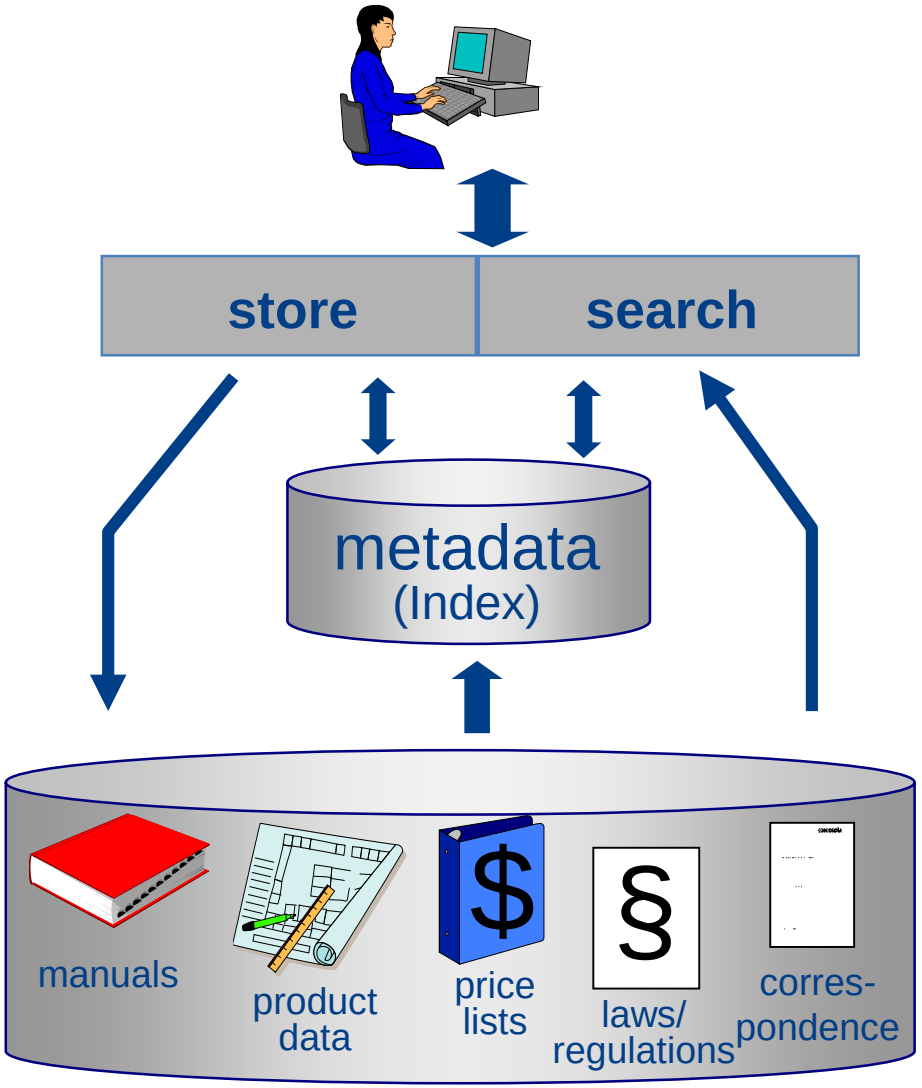
Meta-data

user
(producer/ consumer)

services

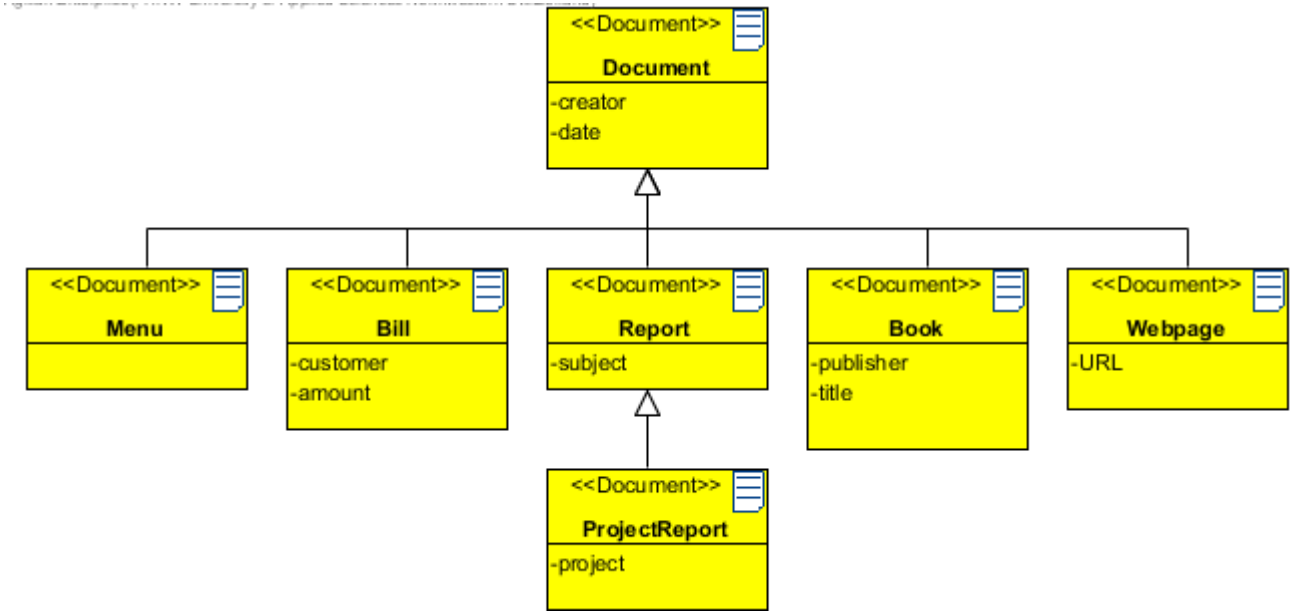
description
(catalog)

resources
(information
products)



Modeling Documents in ArchiMetric

- In the ArchiMetric 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