TDT4252
Enterprise Modelling and Architecture – Process Modelling

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Overview of lecture today

- Process Modelling: SeeMe and IDEF/0

Based on the following articles:

- SeeMe in a Nutshell, Thomas Herrmann http://www.imtm-iaw.ruhr-uni-bochum.de/imperia/md/content/seeme/seeme_in_a_nutshell.pdf

- Menzel, Christopher, Mayer, Richard J. The IDEF Family of Languages. (pages 1-11 only) http://cmenzel.org/Papers/idef-family.pdf

From lecture on perspectives to conceptual modelling

- Structural
- Functional
- Behavioral
- Rule-oriented
- Object-oriented
- Social communication
- Actor/role-oriented
- Topological

SeeMe –
Semi-structured socio-technical modeling notation

Based on a presentation by Alexander Nolte and Michael Prilla – Ruhr-Universität Bochum (RUB)

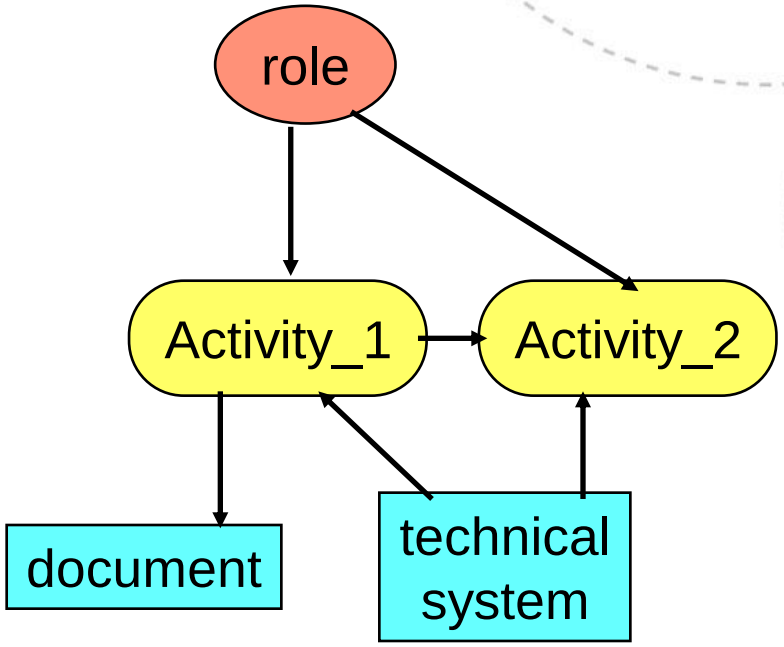
SeeMe Basics

Basic concepts/perspectives

Role – filled by single persons or ad-hoc or official groups like a departments. A role typically have a set of rights and responsibilities.

Activity – activities which are carried out by roles. They usually use entities or modify them.

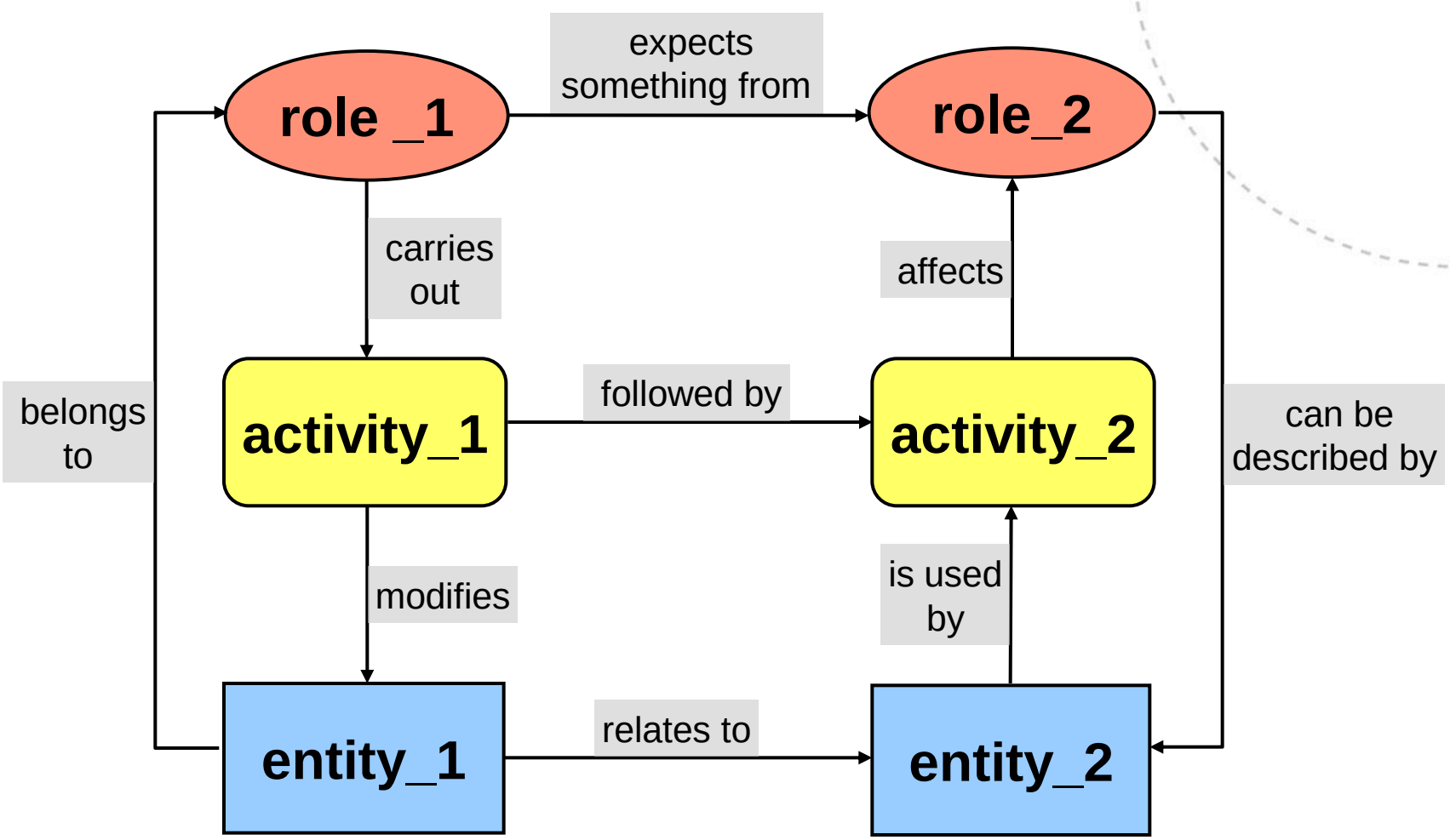
Entity – static aspects of the setting relevant for the process (e.g. data, systems)



Compare to Archimate:
Active (role), Behaviour (activity), Passive (entity)

SeeMe Basics

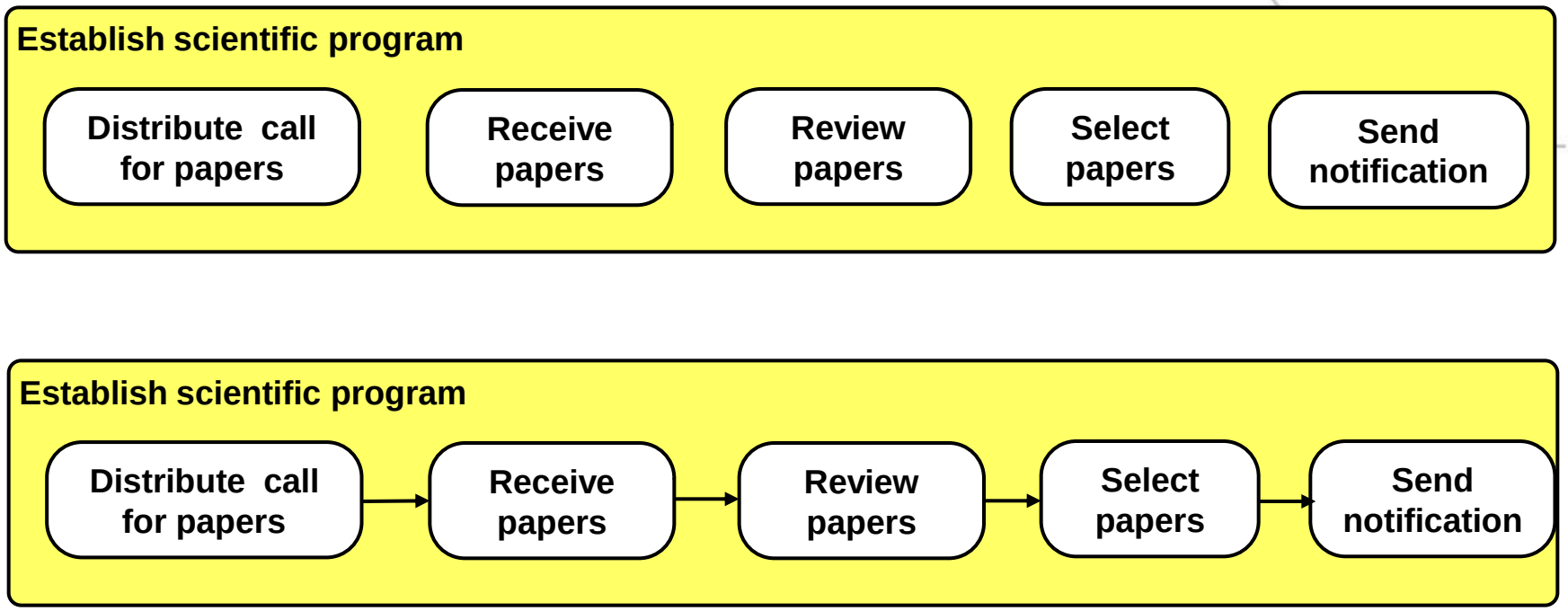
Relations



The standard definitions can be over-ridden by attaching alternative labels to the relations.

SeeMe Basics

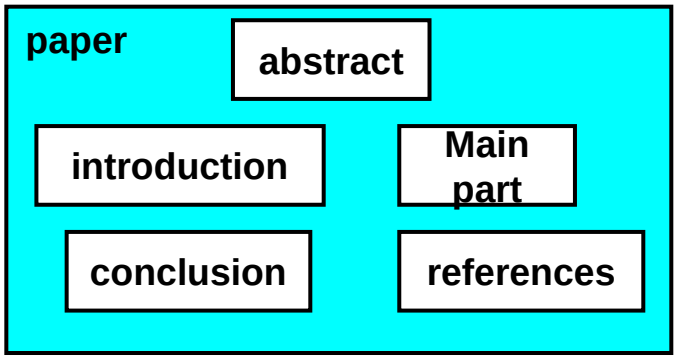
Decomposition with defined vs. undefined activity sequence



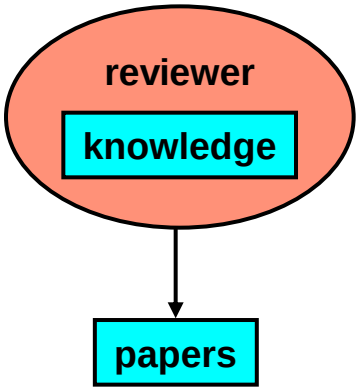
SeeMe requires activities to be connected by relations in order to express that they are conducted sequentially

SeeMe Basics

Embedded elements



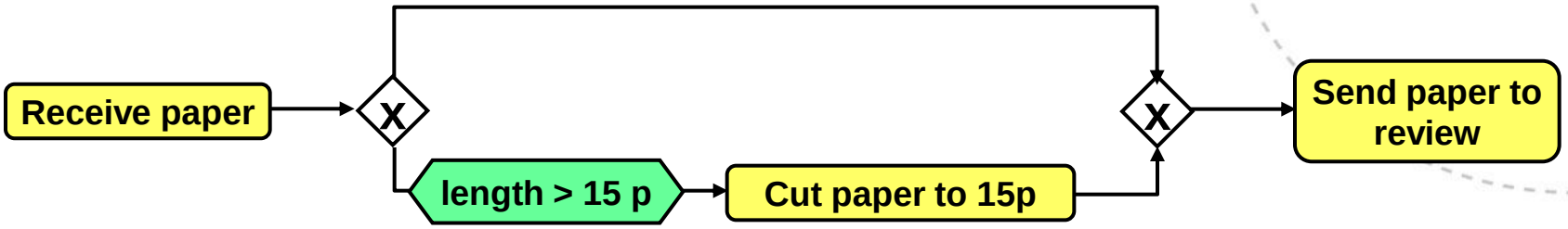
Embedding elements into each other shows that (sub-elements) are a part of other elements (super-elements) (aggregation).



Any basic element can be embedded into any other basic element. (vs. GEMAL)

SeeMe Basics

Modifiers and connectors



Modifiers contain conditions or events that describe when an element is of relevance for the process or when a certain path will be taken.

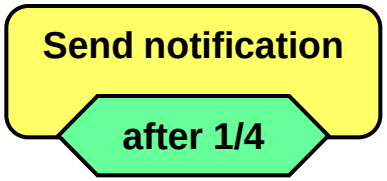
- > 500 — Depending on a value or event
- ? | 0,2 — Probability of an event
- undefined (vagueness)

Connectors connect paths according to logical operators. Values:

- ^ — AND: Both paths are taken simultaneously
- V — OR: One or both paths are taken (inclusive)
- X — XOR: One of the paths is taken (exclusive)
- undefined (vagueness)

SeeMe Basics

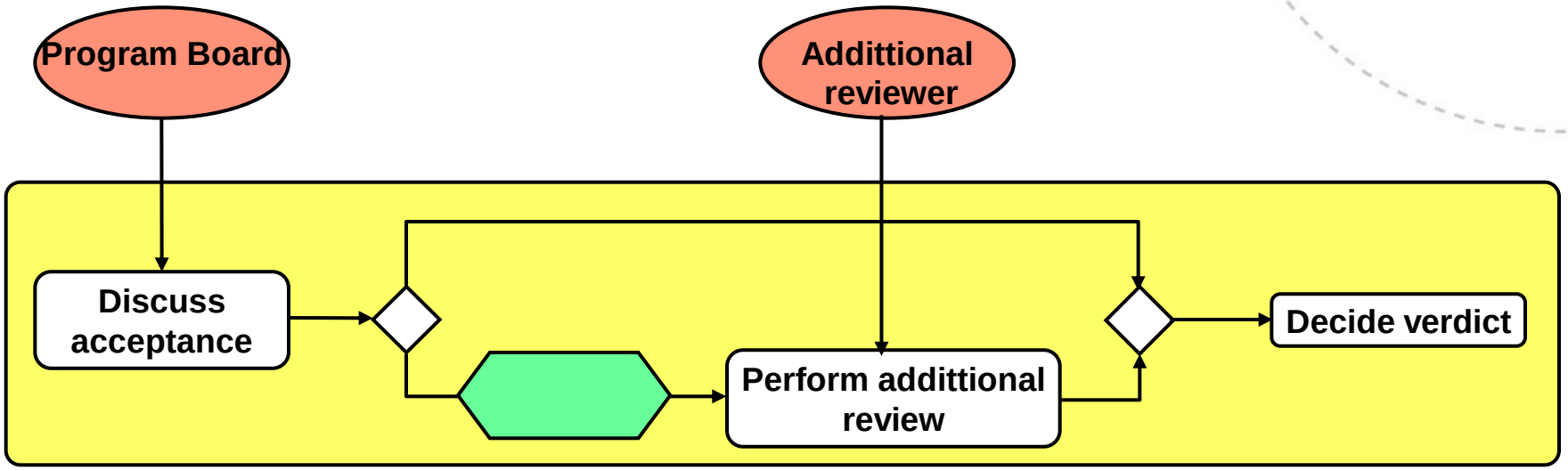
Modifiers on elements



The notification is sent after April 1.

SeeMe Basics

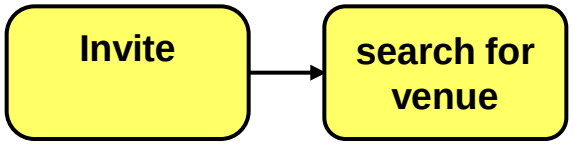
Vagueness: Modifiers and connectors



When a modifiers or connectors remains undefined within a model the participating roles decide which path to take under which circumstances. This is especially relevant when not all influencing factors can be determined during process design.

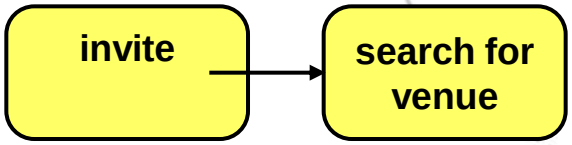
SeeMe Basics

Vagueness: Relations

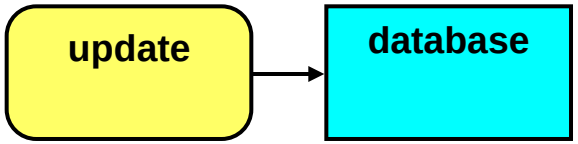


The activity *search for venue* is executed right **after** the activity *invite* has been completed.

vs.

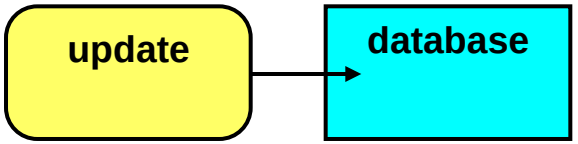


The activity *search for venue* is being executed **between the beginning and end** of the activity *invite*.



The activity *update* affects the **whole** database.

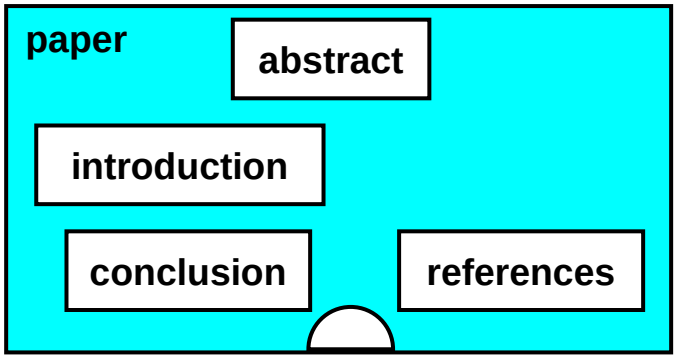
vs.



The activity *update* affects only parts of the database. Which parts are affected remains undefined

SeeMe Basics

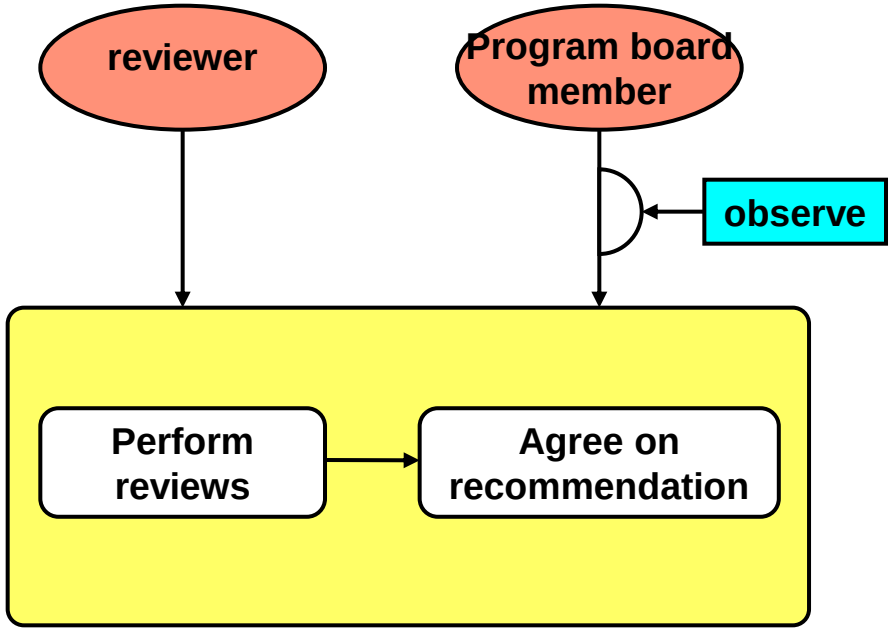
Elements vagueness

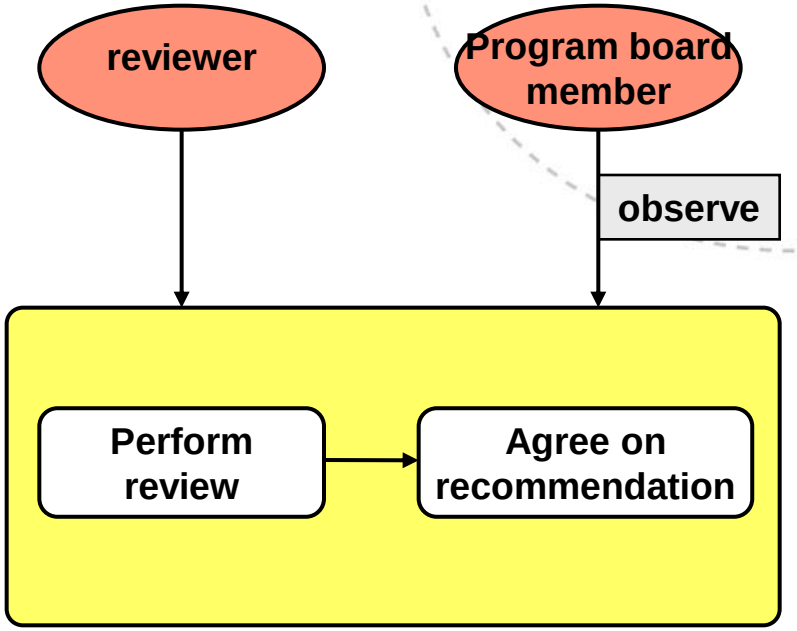


White semi-circles (**mouseholes**) at the bottom of elements indicate that there are more details that were intentionally left out. Used for different reasons
-Explicit (wanted) incompleteness of model
-Indicate that there will be more details modeled later, but that the modeling process is not finalized

SeeMe Basics

Re-specifying relations





SeeMe Basics

Attributes and comments

author;
email: a@idi.ntnu.no;
affilliation: NTNU;

Paper writing;
duration: >2 days;
software: word

paper;
Style: LNCS;
format: pdf
Length: max 15 pages

Attributes allow to specify charateristics of an element.

Who does that?

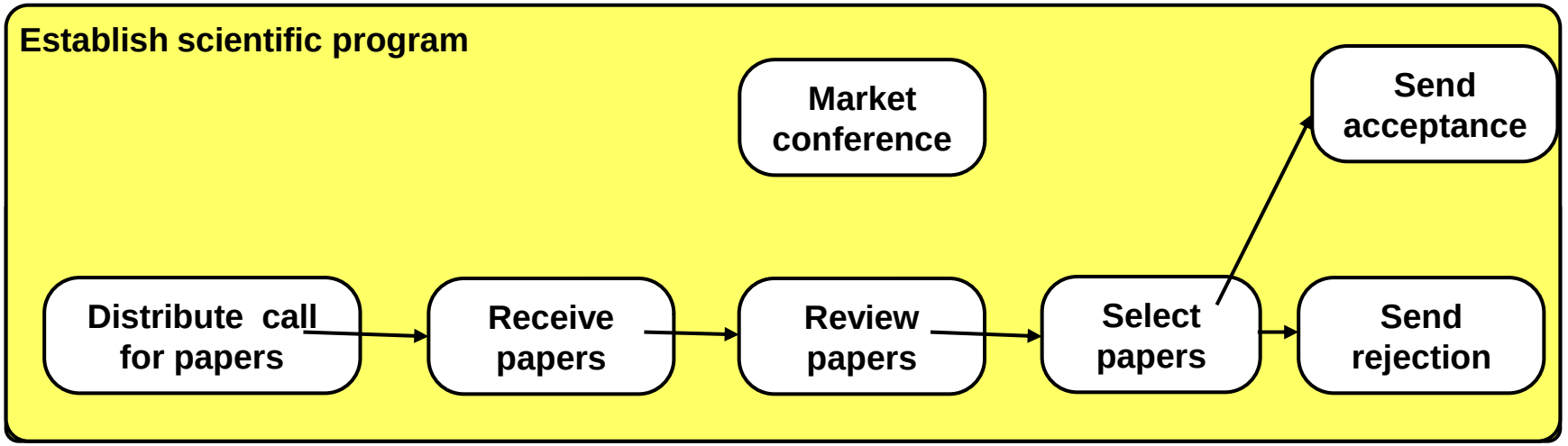
Send notification

Comments are used to include information into a model that is not supposed to be part of the model (yet), e.g.:

- Examples for possible issues
- Questions that cannot be answered immediately but that are important for the process

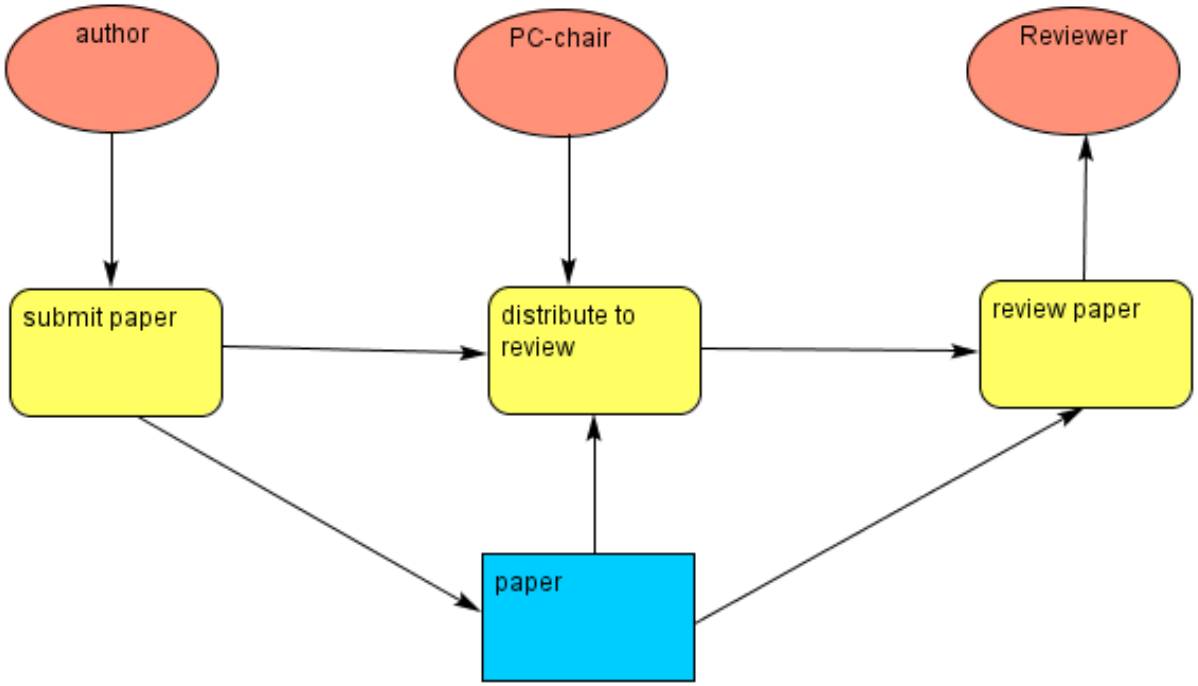
SeeMe in practice

Vague sequences



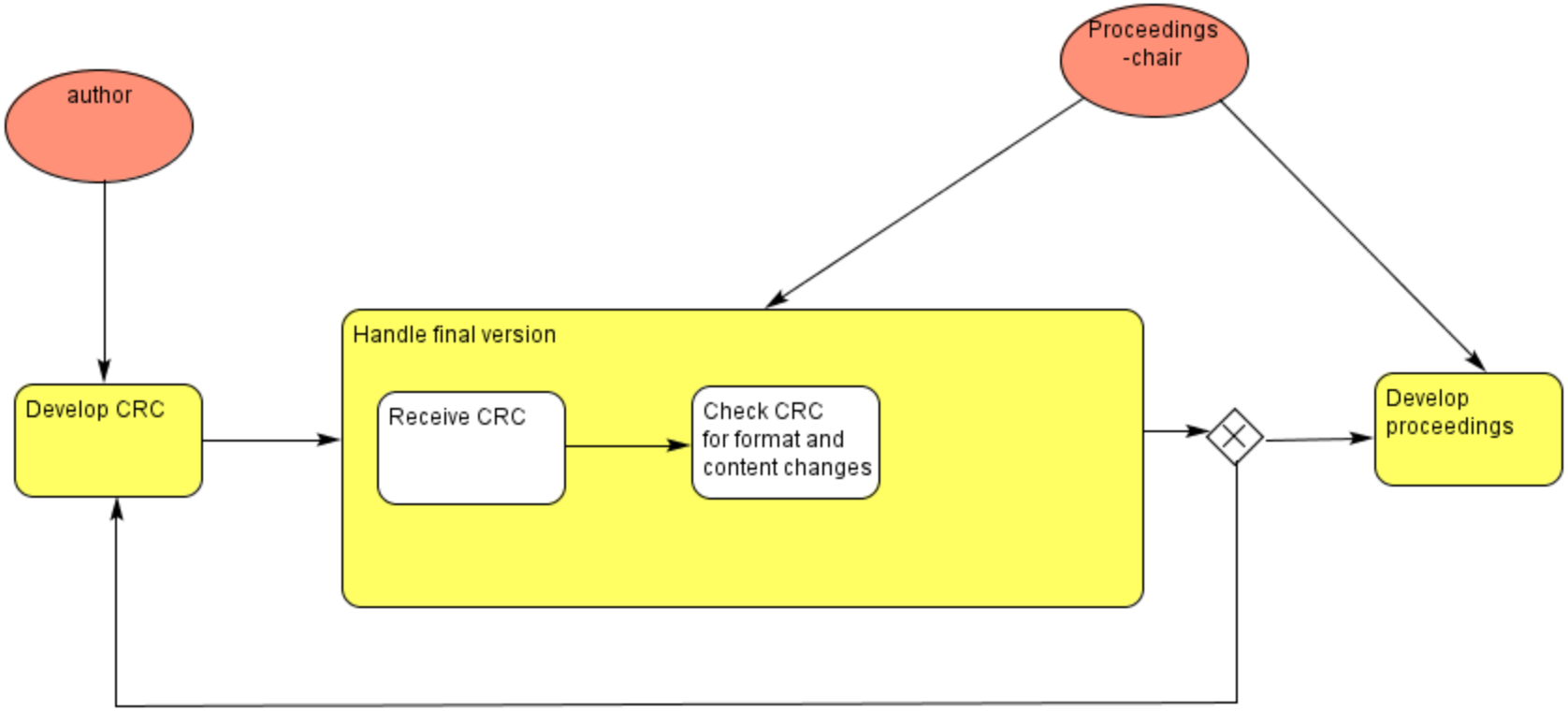
SeeMe in practice

Handover between activities



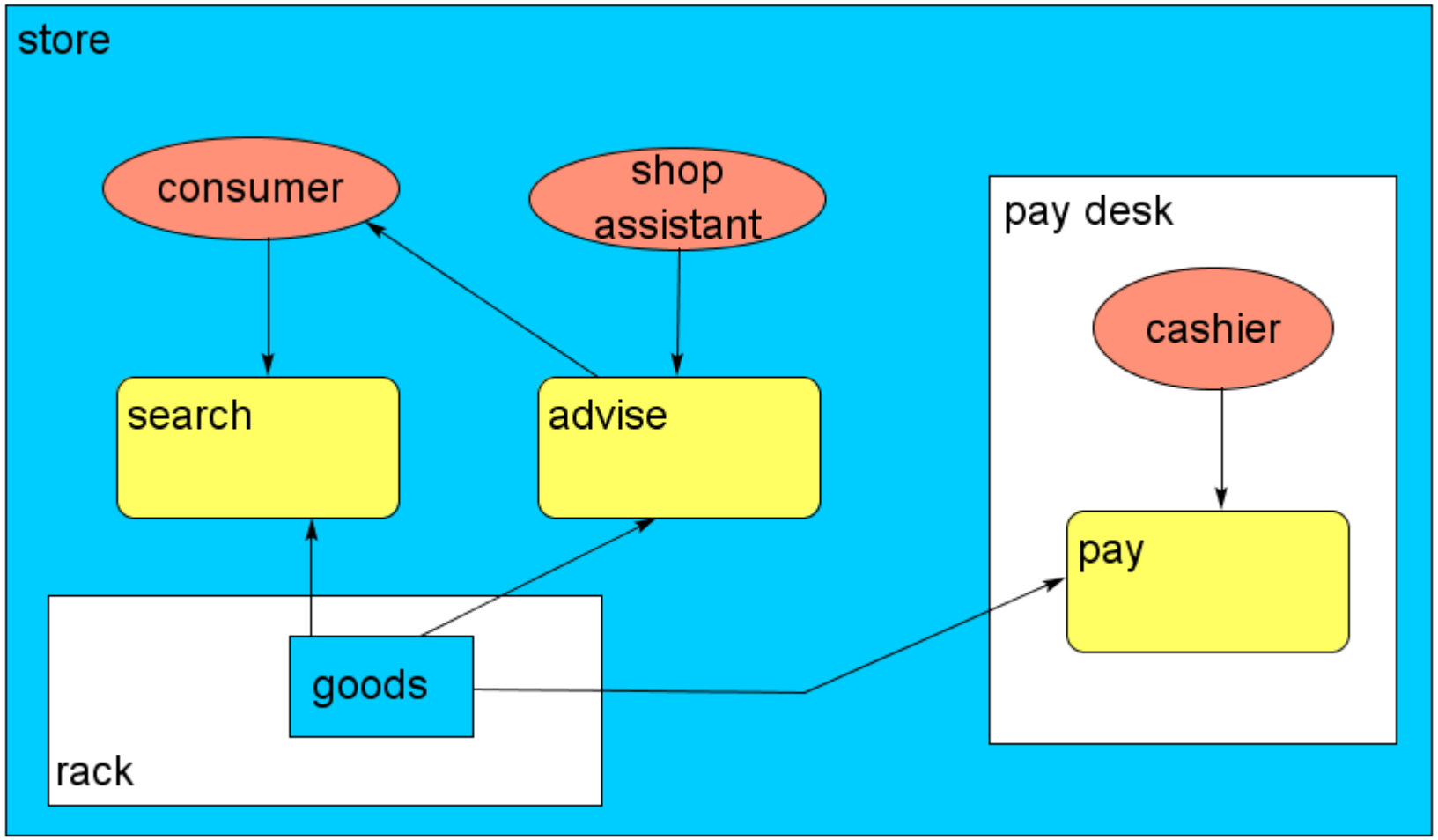
SeeMe in practice

Loops



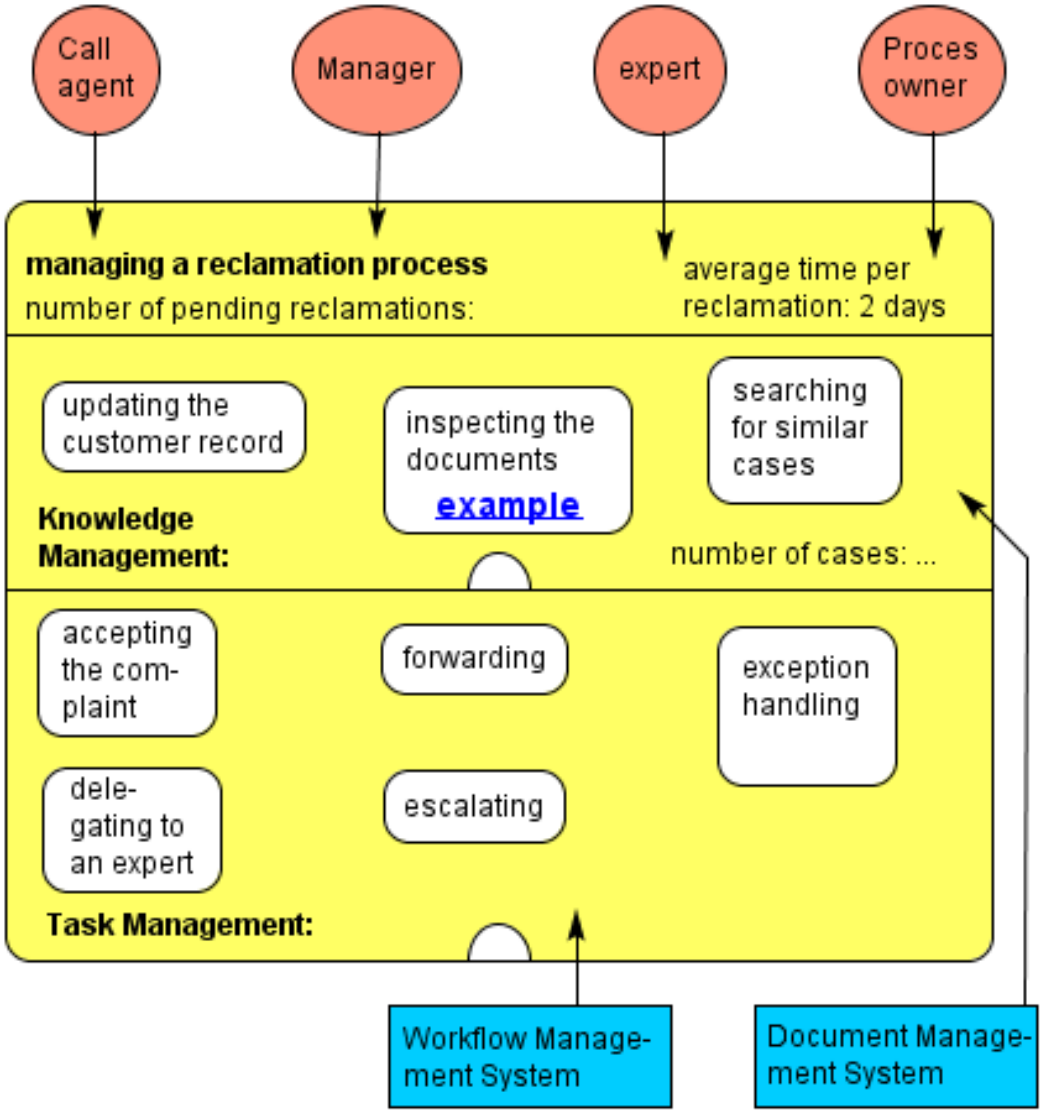
SeeMe in practice

Rooms and container



SeeMe in practice

Different perspectives



Discussion

- How does BPMN compare to SeeMe?

More on SeeMe and other aspects of enterprise/organizational modelling ?

Subject-driven role-guided externalization of organizational models (SURGEOM)
http://surgeom.eu/ Summer-school (2 weeks) in Linz, end of July/early August

Focus on collaborative modelling in multi-national groups

- Students and staff from 7 universities
  - Travel and stay covered
  - Feedback on 2013 edition:

Contact me
preferably during february
if interested in attending

Norwegian University of Science and Technology

IDEF/0 – Functional modeling from the point of view of a manufacturing organization

Taxonomy of Manufacturing Enterprise Activities

Design	Production Control	Production Engineering	Manufacturing	Production Planning
Preliminary design	Inventory control	Process planning	Machining and assembly activities	Long-term forecasting
Detailed design	Master production scheduling	Manufacturing plant layout design	Process control	Master production scheduling
Engineering design/ analysis	Material requirements planning	Part programming	Quality control	Material requirements planning
Documentation	Production scheduling	Tool and fixture design		Production scheduling

Scheduling

Planning

IDEF Languages (1)

- ICAM (Integrated Computer Aided Manufacturing)
- IDEF = ICAM DEFinition Language
- Originated in the 1970s, in the US Air Force and the ICAM program.
- Initially intended for use in Systems Engineering
- IDEF0 : for functional modelling.
- Later a suite of languages: IDEF1, IDEF2… for more advanced modelling.
- We will focus on IDEF0!

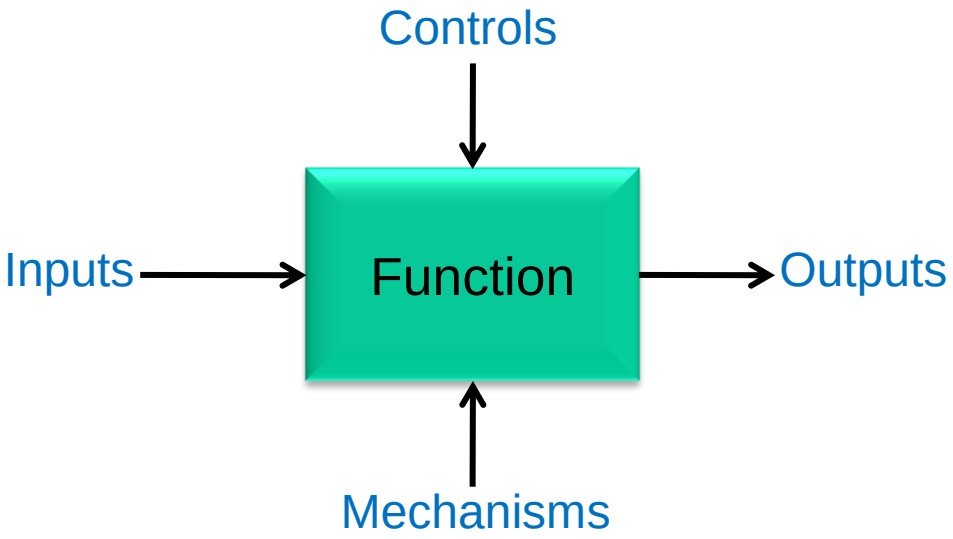
IDEF0

- IDEF0 : for functional modelling.
- Models the decisions, actions and activities of an organisation or system, in order to communicate the functional perspective of a system.

IDEF0: Syntax

- A model of a function at the highest level of inputs, outputs, controls and mechanisms.

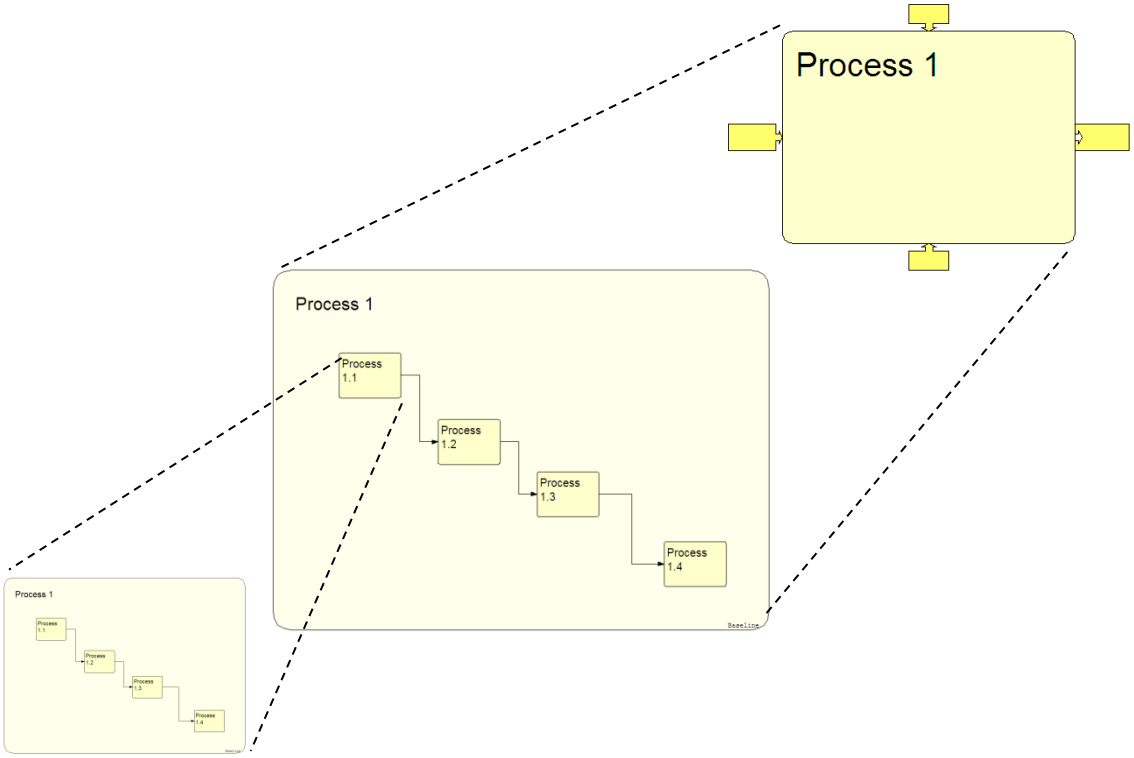
ICOMs



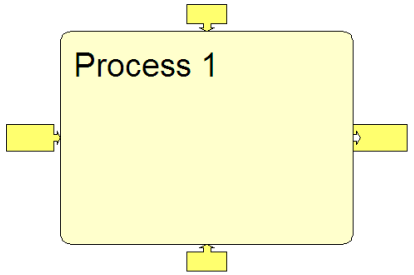
•Inputs: items that trigger or are transformed in the activity
•Controls: guide or regulate the activity
•Mechanisms: resources used to perform the activity
•Outputs: results of the activity or items processed or transformed

IDEF0: Decomposition

- The top level is called a context.



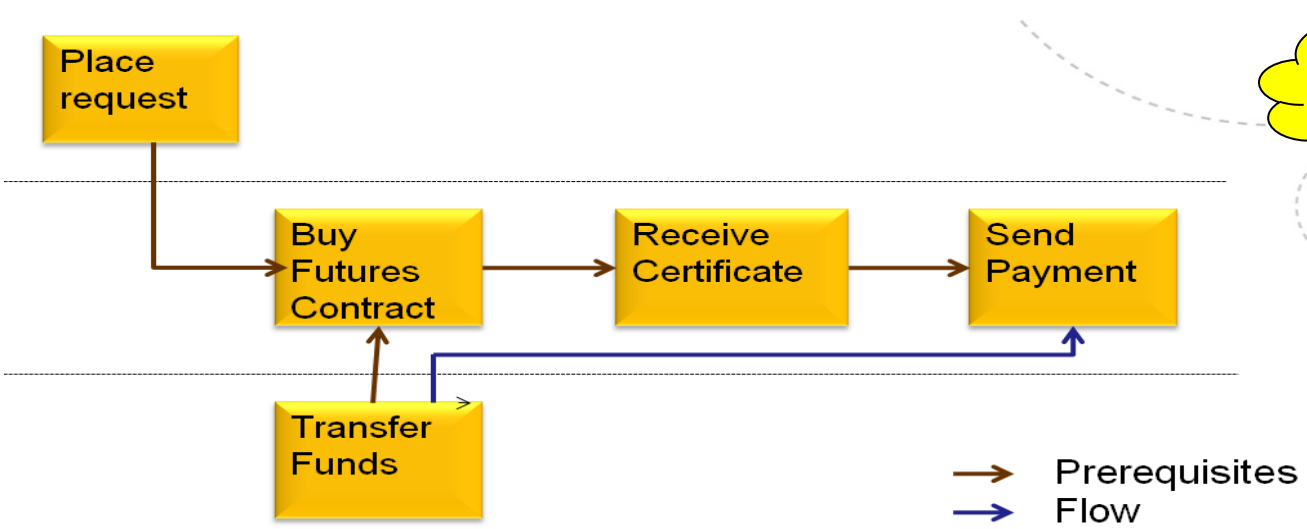
IDEF0: ICOMs



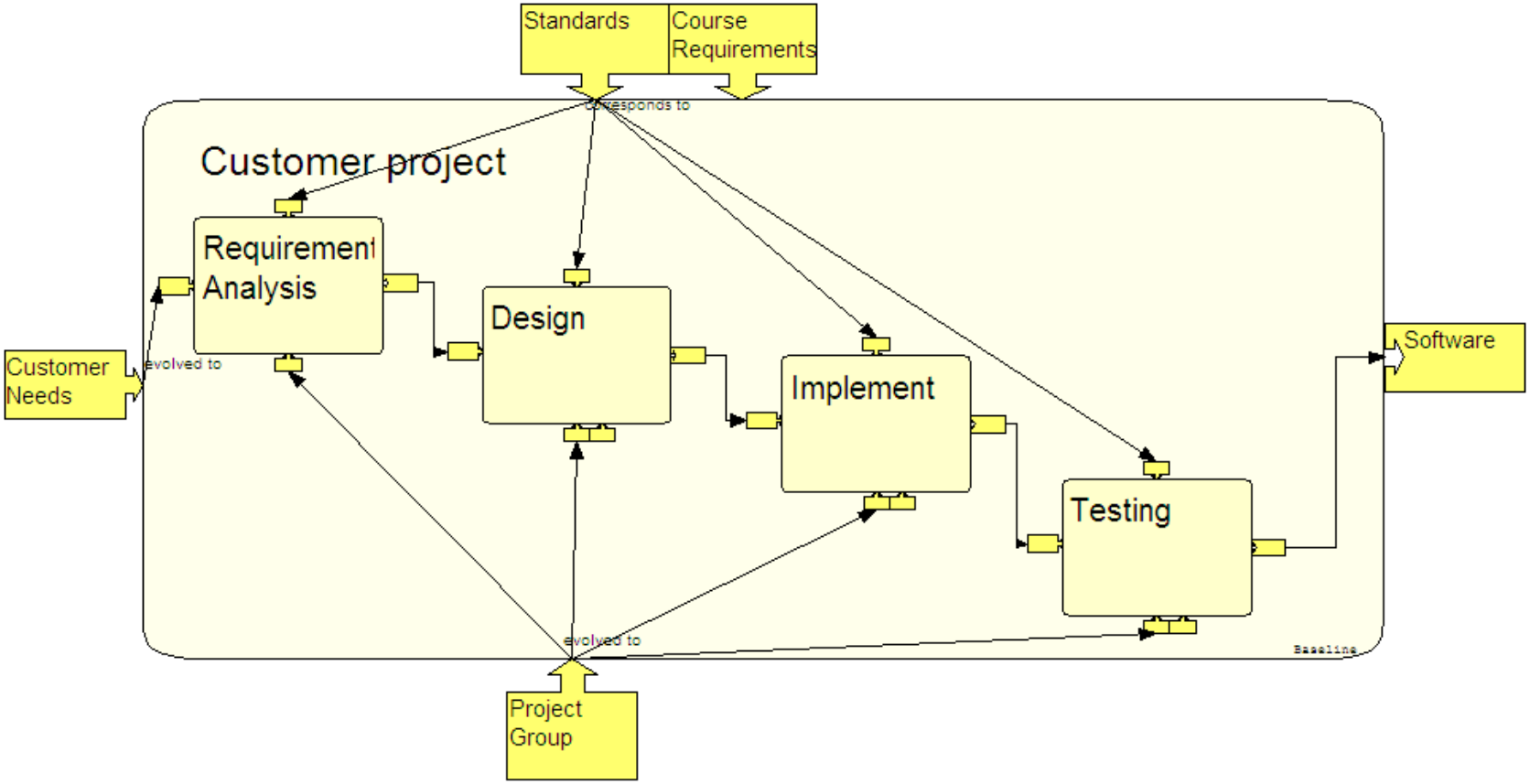
- Input:
  - Can be a trigger
  - Input that is transformed to output.
- Control
  - Guide or regulate activity
  - !!! Distinction between input and control: inputs change, controls remain unchaged.
- Mechanism: resources needed to perform activity
  - People
  - Equipment, IT
  - Financial resources
- Outputs
  - Results of a performing the activity

IDEF0: Dependency & Flow

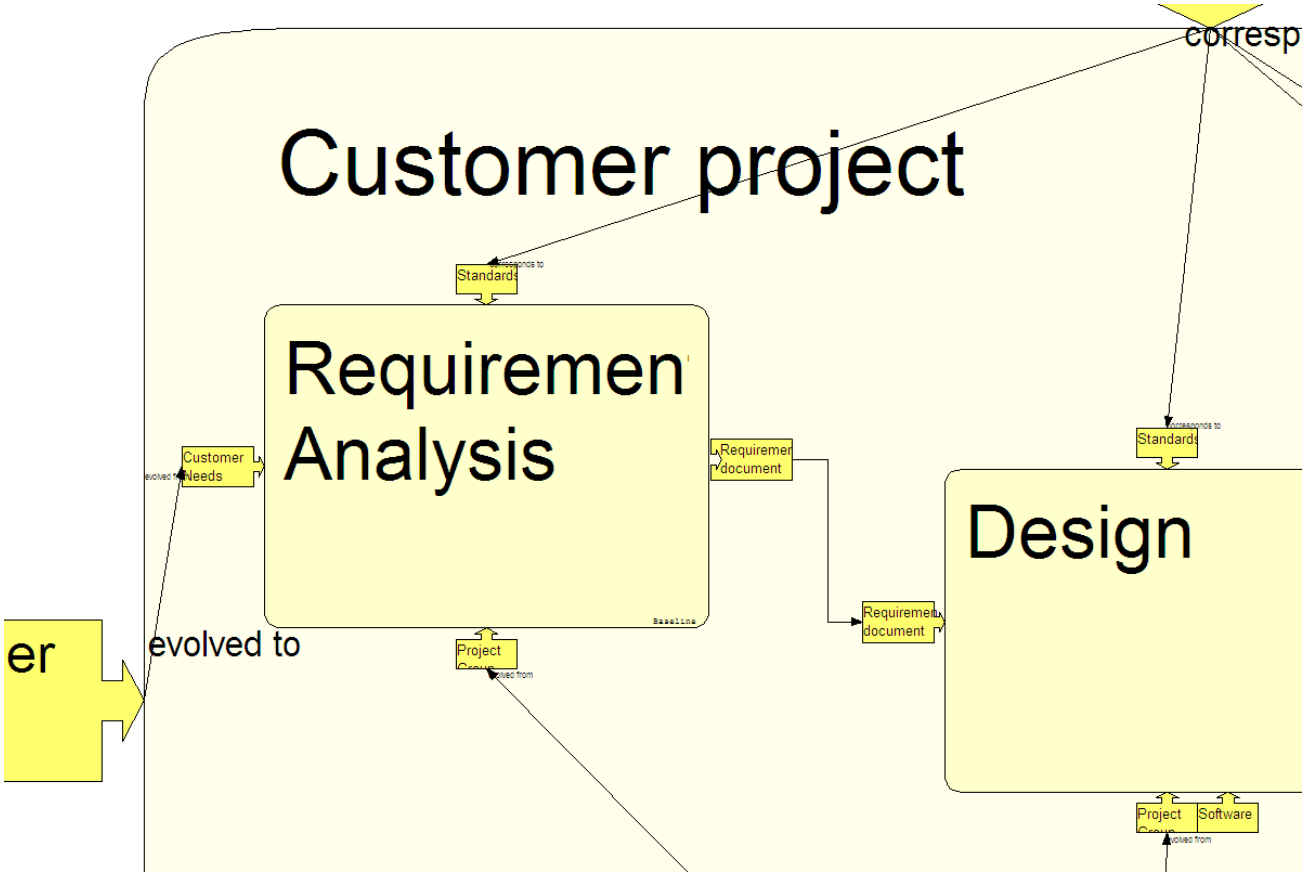
- Dependency: One process depends on another.
- Flow: something flows between processes: Information, material



IDEF0 Model in Metis (1)



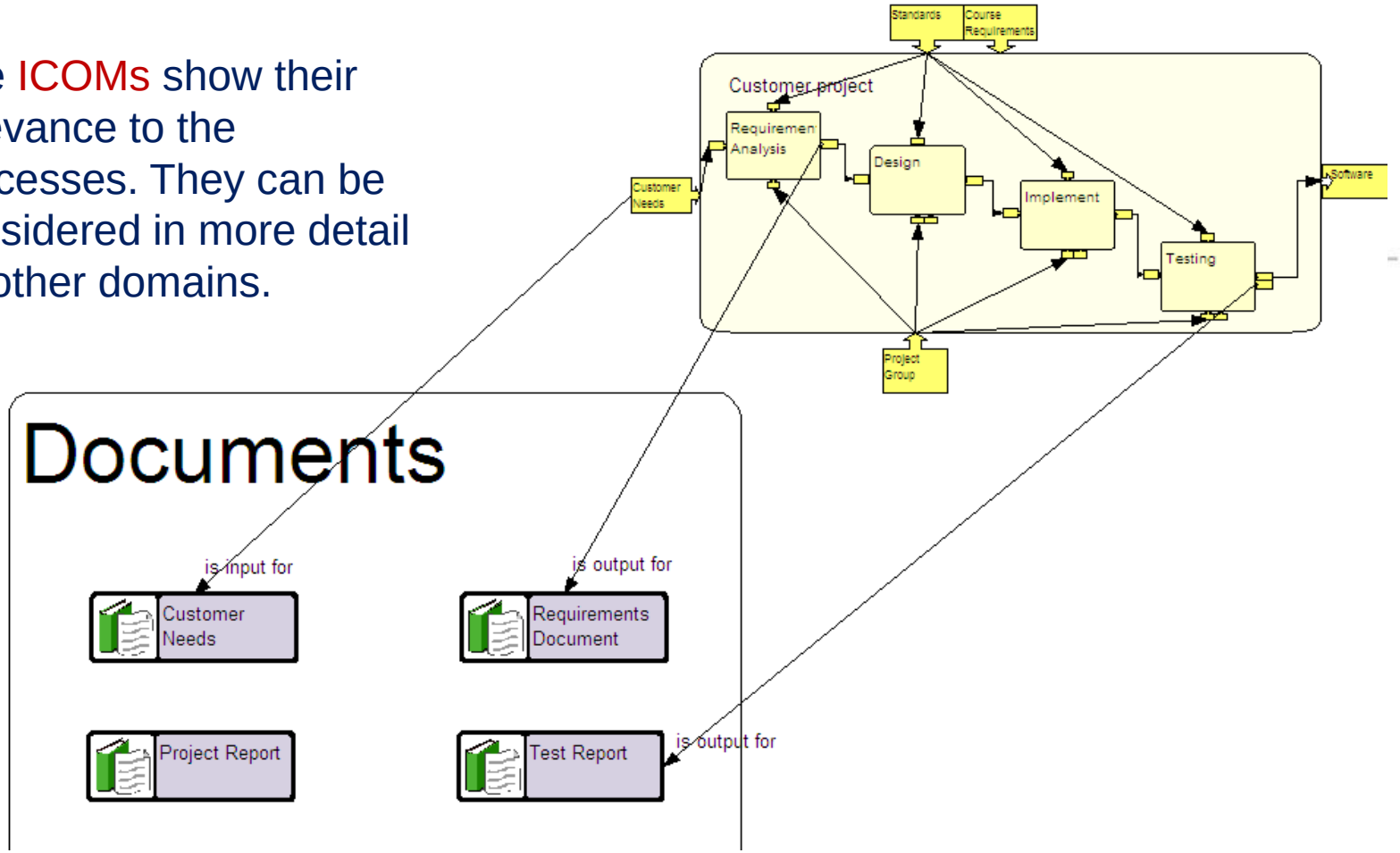
IDEF0 Model in Metis (2)



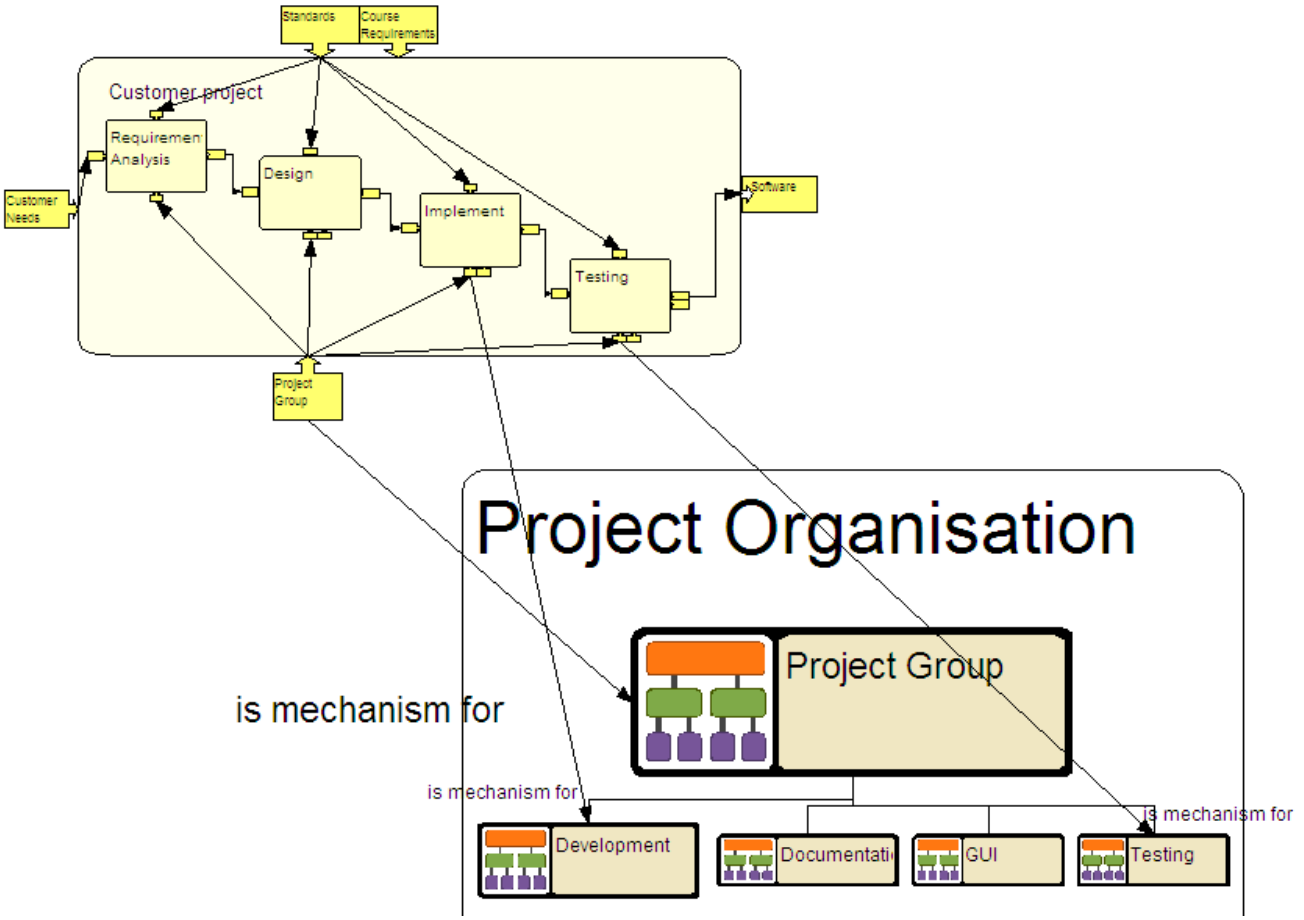
Role of ICOMs

IDEF0 Model in Metis (3)

The ICOMs show their relevance to the processes. They can be considered in more detail as other domains.

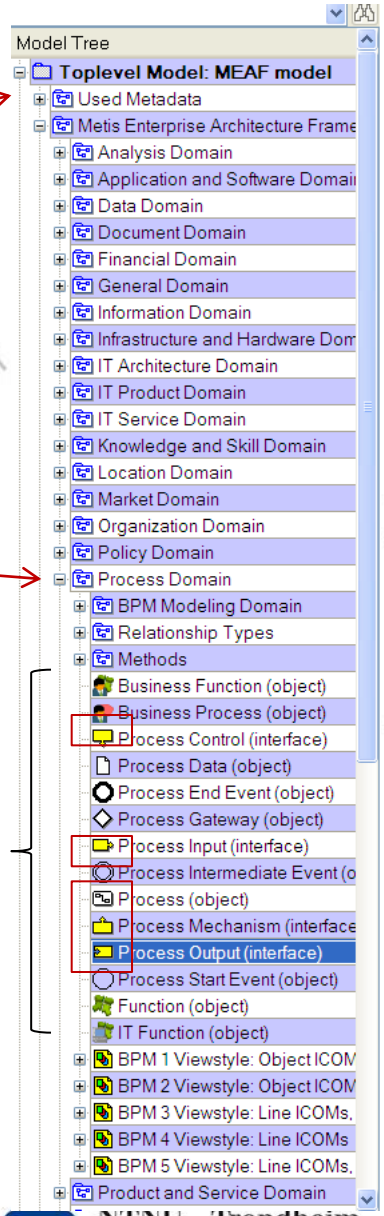


IDEF0 Model in Metis (4)

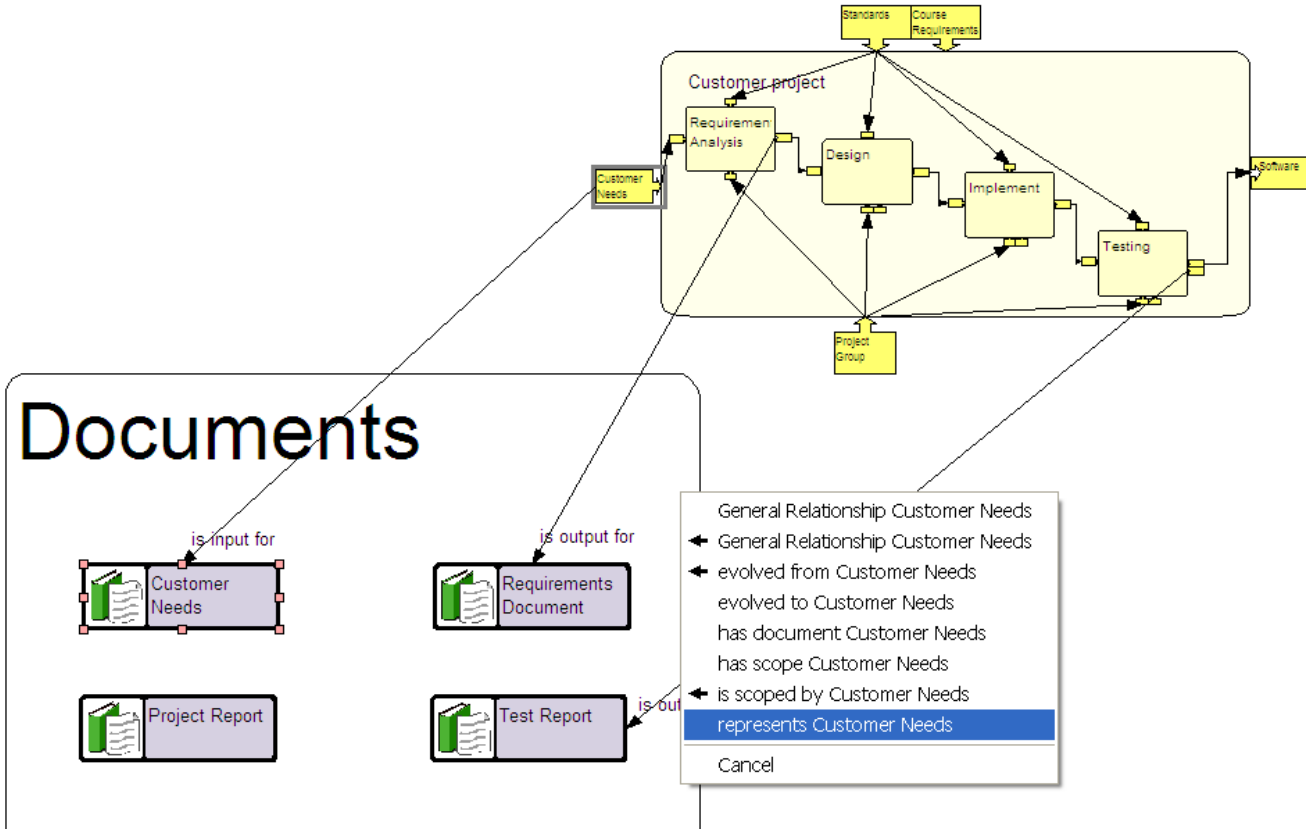


IDEF0 Modelling in Metis

- Use MEAF template
- From Model Tree view, select:
  - Metis Enterprise Architecture Framework
    - Process Domain
- Use Modelling Objects:
  - Process (object), Process Input (interface), Process Control(interface), Process Output (interface), Process Mechanism (interface)
- To link processes via the ICOMs, use the menu process modelling menu, available on the process and ICOM objects:
  - Point to a process or an ICOM
  - Click right mouse button, a list of possible relationships appear
  - Select appropriate relationship



Connecting IDEF0 ICOMs to Other Domains in Metis



To link ICOMs to other domains in the model :

- Select the desired object (e.g. a document)
- Point to an ICOM
- Click right mouse button, a list of possible relationships appear
- Select appropriate relationship

IDEF0: Benefits

- Supports understanding of the organisation
- Helps improve our knowledge about the organisation
- Supports decision making
- Supports planning and improvement (e.g. by adding new processes easily)

IDEF0: Strengths & Weaknesses

- Strenghts:
  - Effective in detailing the system activities for function modelling.
  - Provide a concise description of systems, by using the ICOMs (Input, Control, Mechanism, Mechanism)
  - The hierarchical nature allows the system to be easily refined into greater detail.

- Weaknesses:
  - Can be so concise that only domain experts can understand.
  - Can be misinterpreted as representing a sequence of activities.
  - Limited support of the behavioural aspects of the process that is supported in e.g. BPMN

Discussion: IDEF0

- Is IDEF0 functional modeling or Process Modelling or both?
- How can you use IDEF0 in your assignment?
- How does IDEF0 link to the other modelling methods and languages we have looked at?
- How does BPMN compare to IDEF0?
- How does BPMN link to the other modelling methods and languages we have looked at?