# SOM based on ADOxx

Fundamentals,
Model Transformation and
Project Overview

## 13.09.2012

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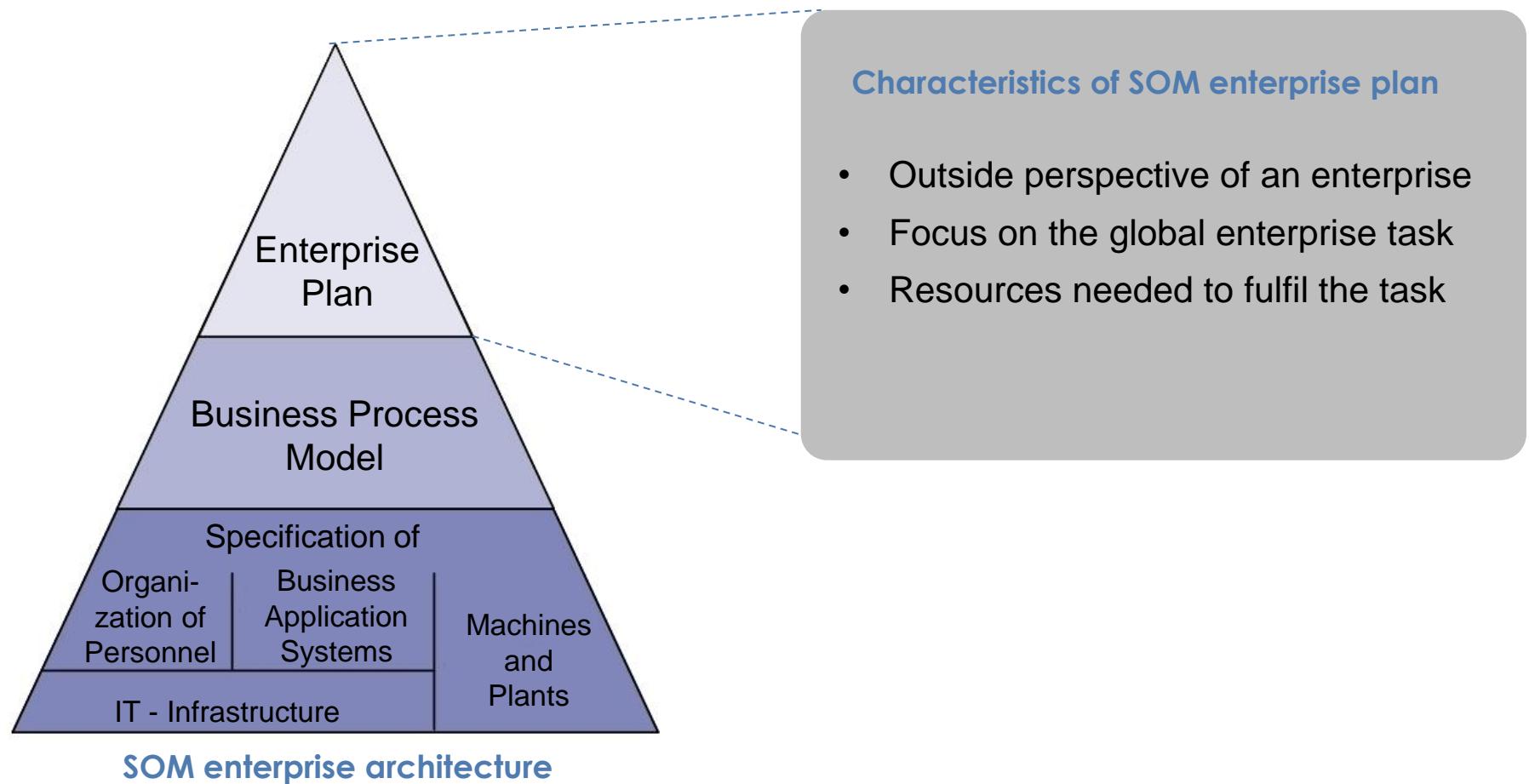
# 1. Semantic Object Model (SOM)
## 1. Charakteristics of SOM

**Characteristics of SOM enterprise plan**

- Outside perspective of an enterprise
- Focus on the global enterprise task
- Resources needed to fulfil the task

Enterprise Plan

Business Process Model

Specification of

Organi-zation of Personnel

Business Application Systems

Machines and Plants

IT - Infrastructure

**SOM enterprise architecture**

Source: Ferstl and Sinz, Grundlagen der Wirtschaftsinformatik

# 1. Semantic Object Model (SOM)
## 1. Charakteristics of SOM

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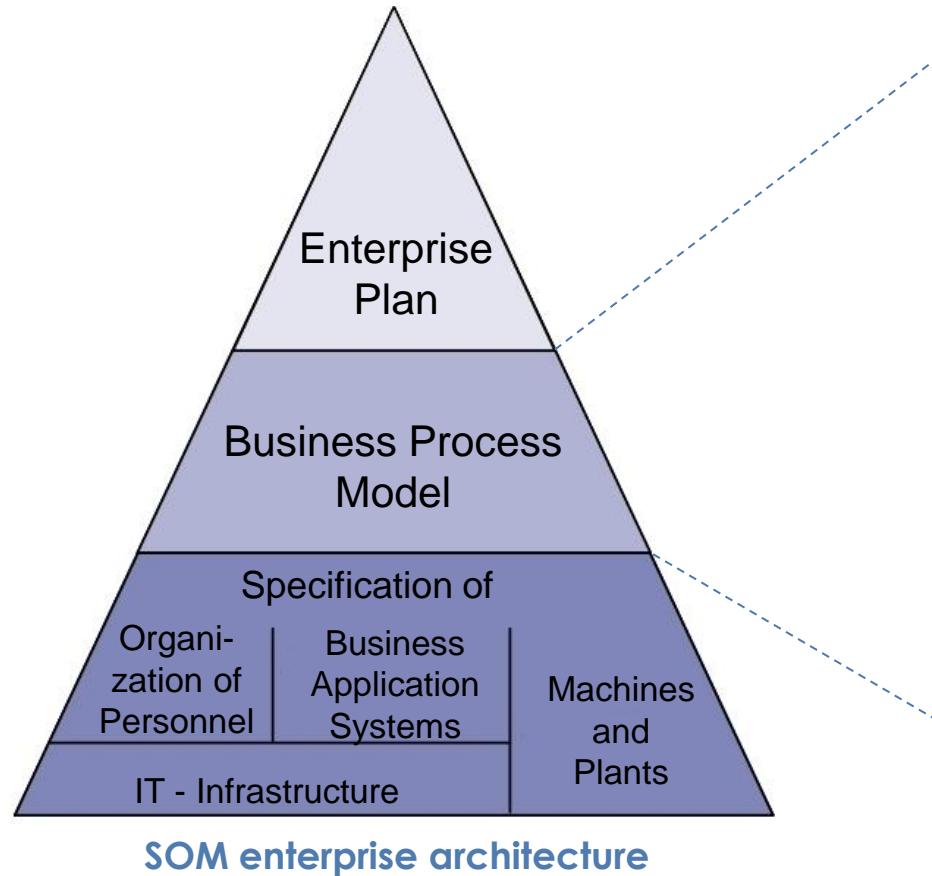
**Characteristics of SOM business process modelling**

- Inside perspective of an enterprise

- Specification of the task layer of an enterprise

- Modelling is grounded in systems theory and organisational theory

- Specification as a distributed system, consisting of business objects and business transactions

- Recursive refinement of business objects and business transactions

- Model representation using a graph-based multi-view approach

Enterprise Plan

Business Process Model

Specification of

Organi-zation of Personnel

Business Application Systems

Machines and Plants

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**SOM enterprise architecture**

Source: Ferstl and Sinz, Grundlagen der Wirtschaftsinformatik

# 1. Semantic Object Model (SOM)
## 1. Charakteristics of SOM

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**SOM enterprise architecture**
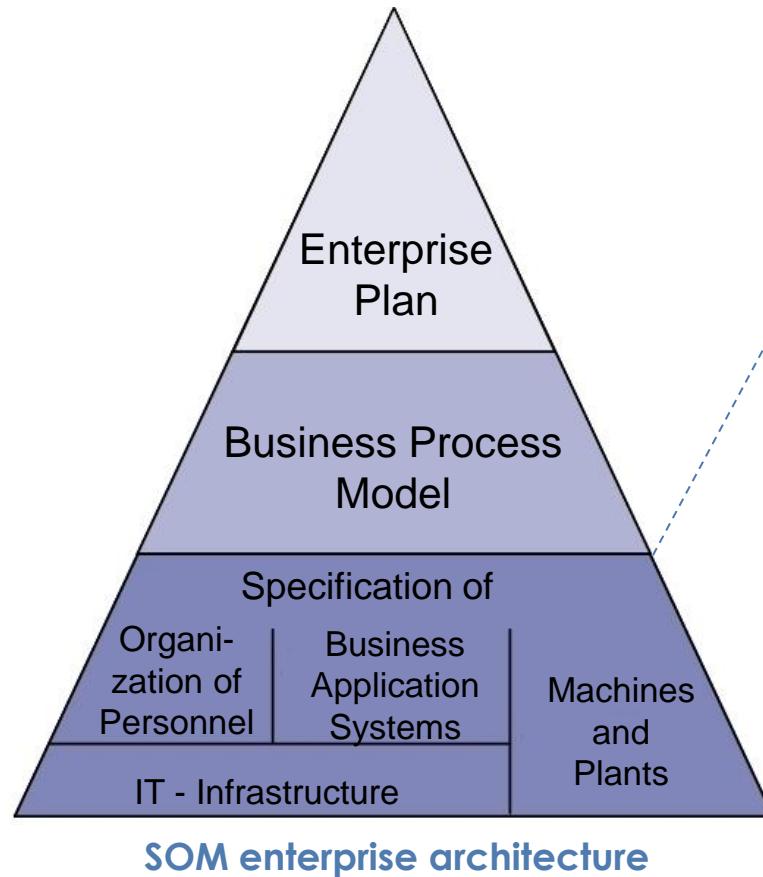
**Characteristics of SOM specification of resources**

- Inside perspective of an enterprise

- Specification of the resources needed to fulfil the business processes

- Business application systems for the execution of automated tasks

- Personnel for the execution of non-automated tasks

Source: Ferstl and Sinz, Grundlagen der Wirtschaftsinformatik

# 1. Semantic Object Model (SOM)
## 2. A first SOM business process model

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**Decomposition of business transactions:**

E: Product Delivery
   I: Information
   C: Order
   E: Delivery

$T(O,O') ::= [[T_i(O,O') \; seq] \; T_c(O',O) \; seq] \; T_e(O,O')$

i = initiating; c = contracting; e = enforcing

**Decomposition of business objects:**

Enterprise
   Sales
   Warehouse
   R: Delivery Order
   F: Delivery Report
Customer

$O ::= \{O', O'', T_r(O',O''),[T_f(O'',O')]\}$

r = control; f = feedback
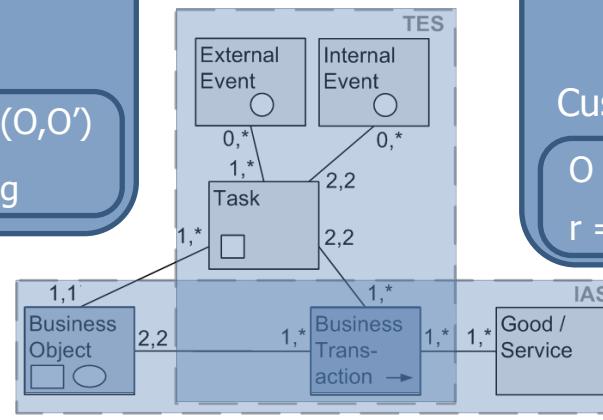


**SOM business process meta-model**



Interaction Schema (IAS)
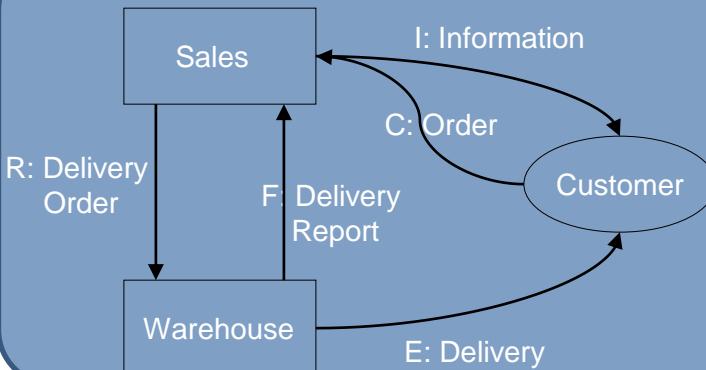


Task-Event Schema (TES)
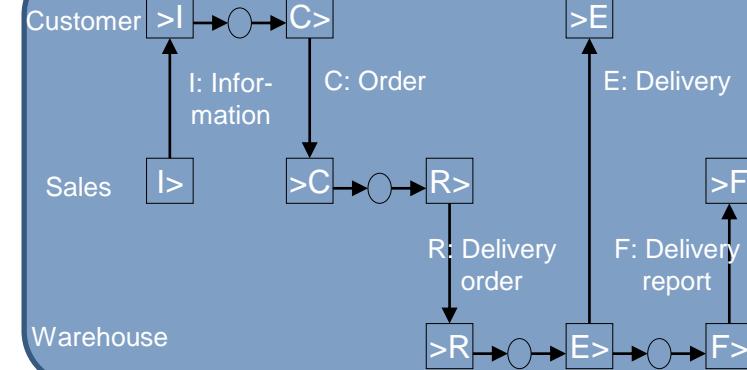
# 1. Semantic Object Model (SOM)
## 3. Process model of the SOM methodology

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## V-Model

1. Layer

2. Layer

3. Layer



| Structure View | Behaviour View |

Methodic
dependency of
specifications
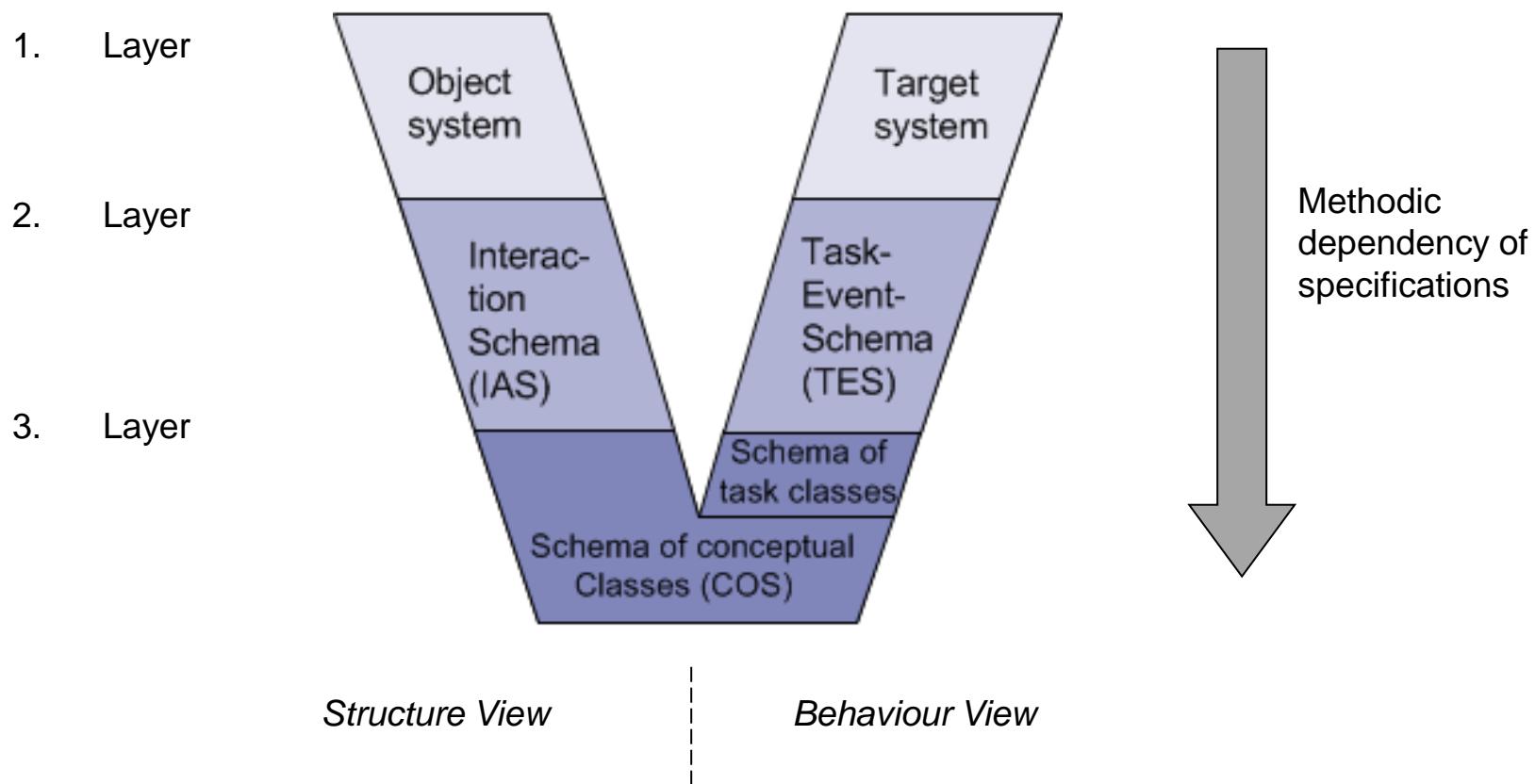
# 1. Semantisches Objektmodell (SOM)
## 4. SOM decomposition rules

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## Decomposition of business objects and business transactions

| Rule Nr. | Object Decomposition Rules: | |
|---|---|---|
| (1) | O | $::= \{ O', O'', T_r(O', O''), [ T_f(O'', O') ] \}$ |
| (2) | O | $::= \{ O', O'', [ T(O', O'') ] \}$ |
| (3) | O | $::= \{ \text{spez } O' \}^+$ |
| (4) | $O' \mid O''$ | $::= O$ |
| | **Transaction Decomposition Rules:** | |
| (5) | $T(O, O')$ | $::= [ [ T_i(O,O') \text{ seq } ] T_c(O', O) \text{ seq } ] T_e(O, O')$ |
| (6) | $T_x$ | $::= T'_x \{ \text{ seq } T''_x \}^+ \mid T'_x \{ \text{ par } T''_x \}^+$ |
| | | (für x = i, c, e, r, f) |
| (7) | $T_x$ | $::= \{ \text{spez } T'_x \}^+$ |
| | | (für x = i, c, e, r, f) |
| (8) | $T_i \mid T_c \mid T_e$ | $::= T$ |
| (9) | $T_r \mid T_f$ | $::= T$ |

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# 1. Semantisches Objektmodell (SOM)
## 5. Model Transformation 1: COS and TAS

**Meta-model-based Transformation**

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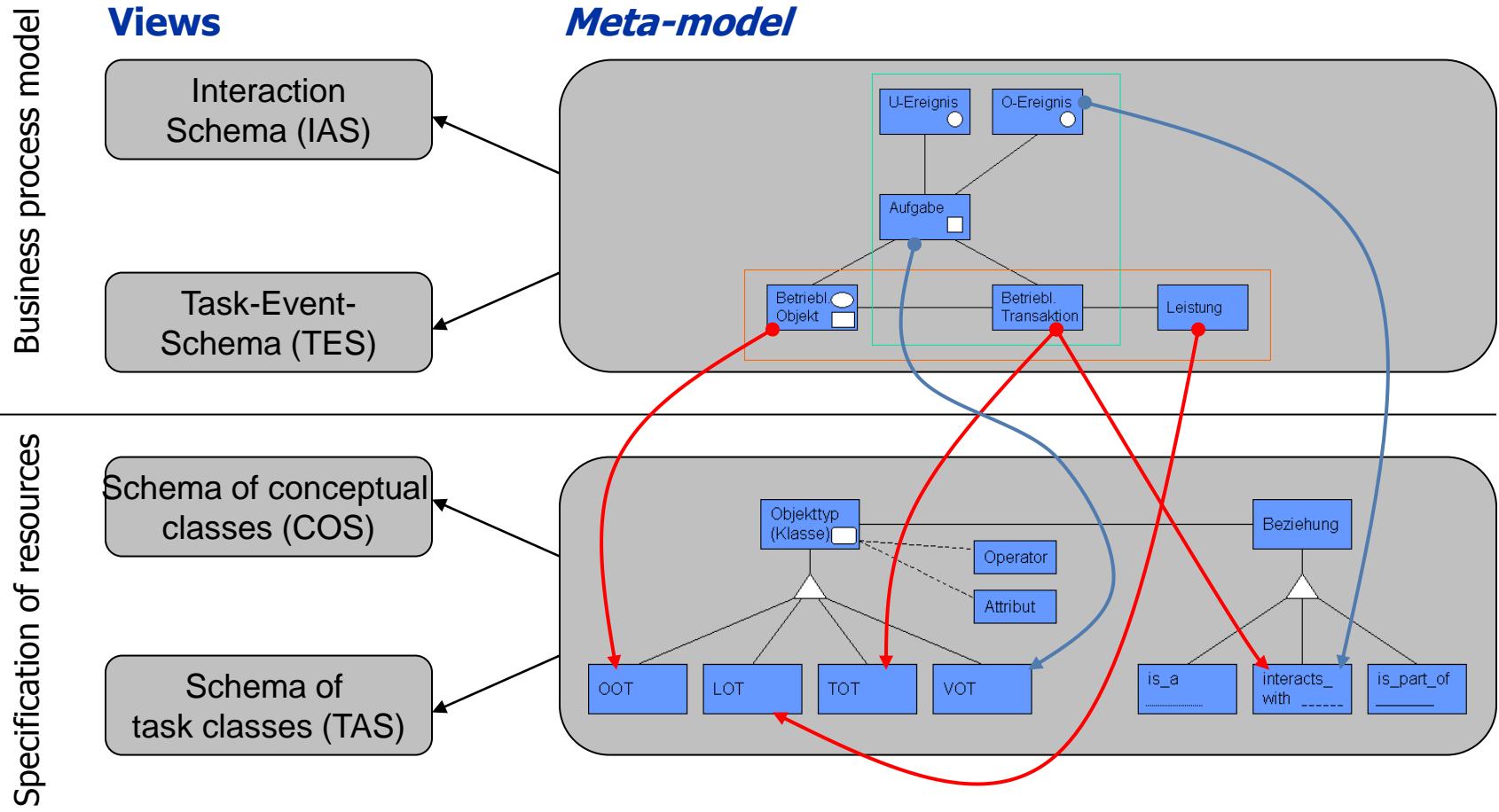
# 1. Semantisches Objektmodell (SOM)
## 5. Model Transformation 2: BPMN
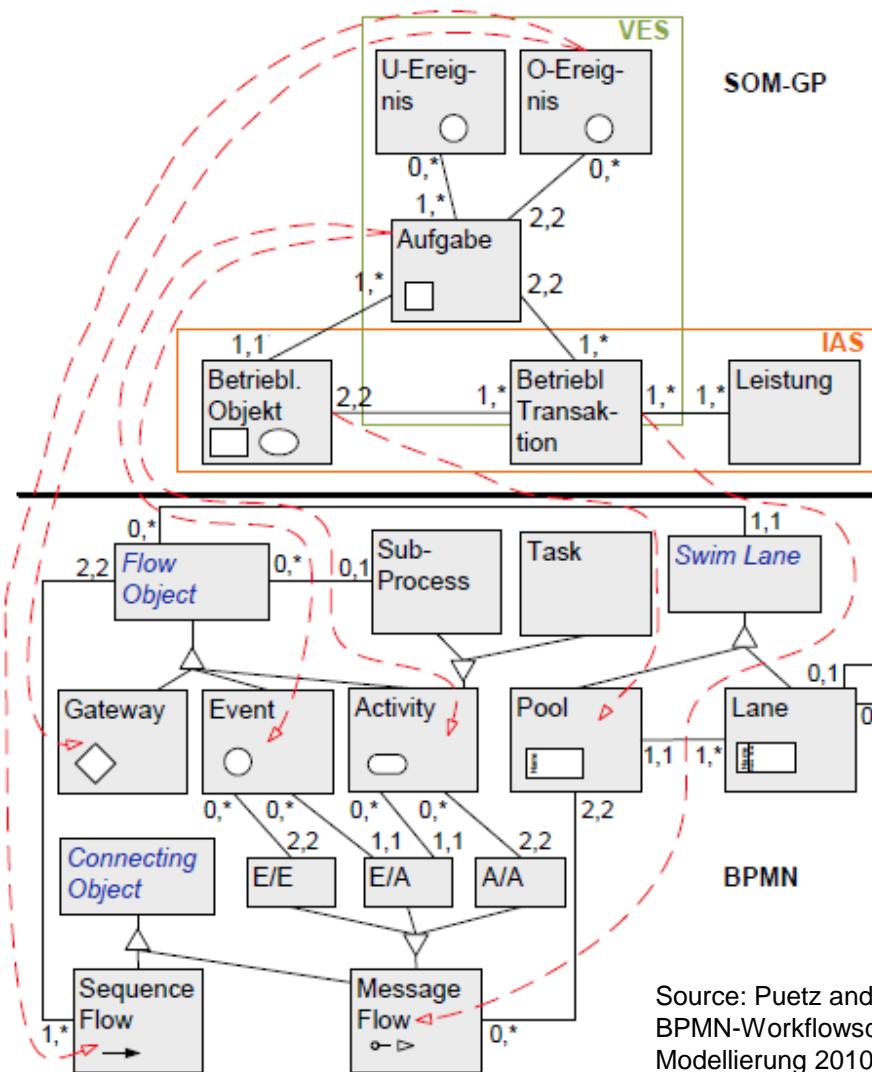


Source: Puetz and Sinz, Modellgetriebene Ableitung von
BPMN-Workflowschemata aus SOM-Geschäftsprozessmodellen,
Modellierung 2010, Klagenfurt

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## 2. Project Overview and Outlook

### ToDos Dezember 2010

- Orthogonalize the operators ✅

- Improve the model transformation (COS / TAS / BPMN) ✅

- Implementation of new dialogues => context-aware! ✅

- Testing the model transformations => Debugging! ✅

- Model validating expansion ✅

- Import/Export of SOM models ✅

- Consider the feedback of the first prototype ✅

- Expand model attributes ✅

- Comprehensive user's manual ❗

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**Additional work between Dez'10 and Sep'12**

**Modelling methodology:**

- Integration of context in SOM business process models

- Consideration of context during model transformation

- Integration of *PRE- & POST-Conditions* in TES

- Consideration of *PRE- & POST-Conditions* during model transformation

- Improvement of *COS/TOS/BPMN* model transformation

- *Debugging & Performance* Improvements

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**Additional work between Dez'10 and Sep'12**

**Modelling usability:**

- Customizability (Color, font size, line-break, view visualisation, auto-layouting, etc.)

- Context menus depending on the active model (= view)

- Automatic zooming

- Rearrangement of visible area after object/transaction deletion

- Enabling/Disabling of automatic-zooming

- Configurable Context Visualisation

- *Debugging & Performance* Improvements

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**Additional work between Dez'10 and Sep'12**

**Project Work**

- Utilization of the tool in teaching classes and theses of students

- Configuration of the client/server infrastructure at the University of Bamberg

- Tutorial at Modellierung 2012 together with Hans-Georg Fill

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### ToDos September 2012

- Consider context information in COS and TAS

- Consider PRE/POST Conditions in COS/TAS/BPMN

- Integration of simulation (current research work)

- Visualise degree of automation in SOM models

- Derivation of pSOA architectures (current research work)

- Integrate the first layer of the SOM process model (current research work)

- Further improve the model transformation (COS / TAS / BPMN)

- Import/Export of SOM models independent from platform/library

- Debugging

- Improving Usability

- Improving Performance

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## 2. Project Overview and Outlook

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**1.** SOM Business Process Model (IAS / TES)

**2.** Definition of the SOA-AS / Mapping of surrounding AS (IAS / TES)

**3.** Functional Specification of the SOA-AS (COS / TAS)

**4.** Defining external interfaces of the SOA-AS

**5.** Service identification

Quelle: Teusch A., Sinz E.J.:
Konzeptuelle Modellierung partieller SOA.
In: Mattfeld D.J., Robra-Bissantz S. (Hrsg.)
Multikonferenz Wirtschaftsinformatik 2012.

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Quelle: Hartmann, B.; Wolf, M.: Erweiterung einer Geschäftsprozessmodellierungssprache zur Stärkung der strategischen Ausrichtung von Geschäftsprozessen. In: Sinz, E.J., Schürr, A. (Hrsg): Modellierung 2012.

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### Functionality of the second prototype:

- No limitation to business process modelling
- Model validation (rudimental level)
- Model-driven derivation of
    - Schema of conceptual classes (COS)
    - Schema of task classes (TAS)
    - BPMN
- Modelling of context-aware business process models

### Project roadmap

- September 2012:
    - Release of the 2nd prototype

- Until summer 2013
    - Usage of the 2nd prototype at the university of Bamberg
    - Usage of the user's feedback for debugging and improvement
    - (Mature) Version 3 of the tool.

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### Nice2Have

- „*Do-Undo-Redo*" protocol

- „*Copy & Paste"* of modelling steps

- „*Copy & Paste"*  of complete models as submodels

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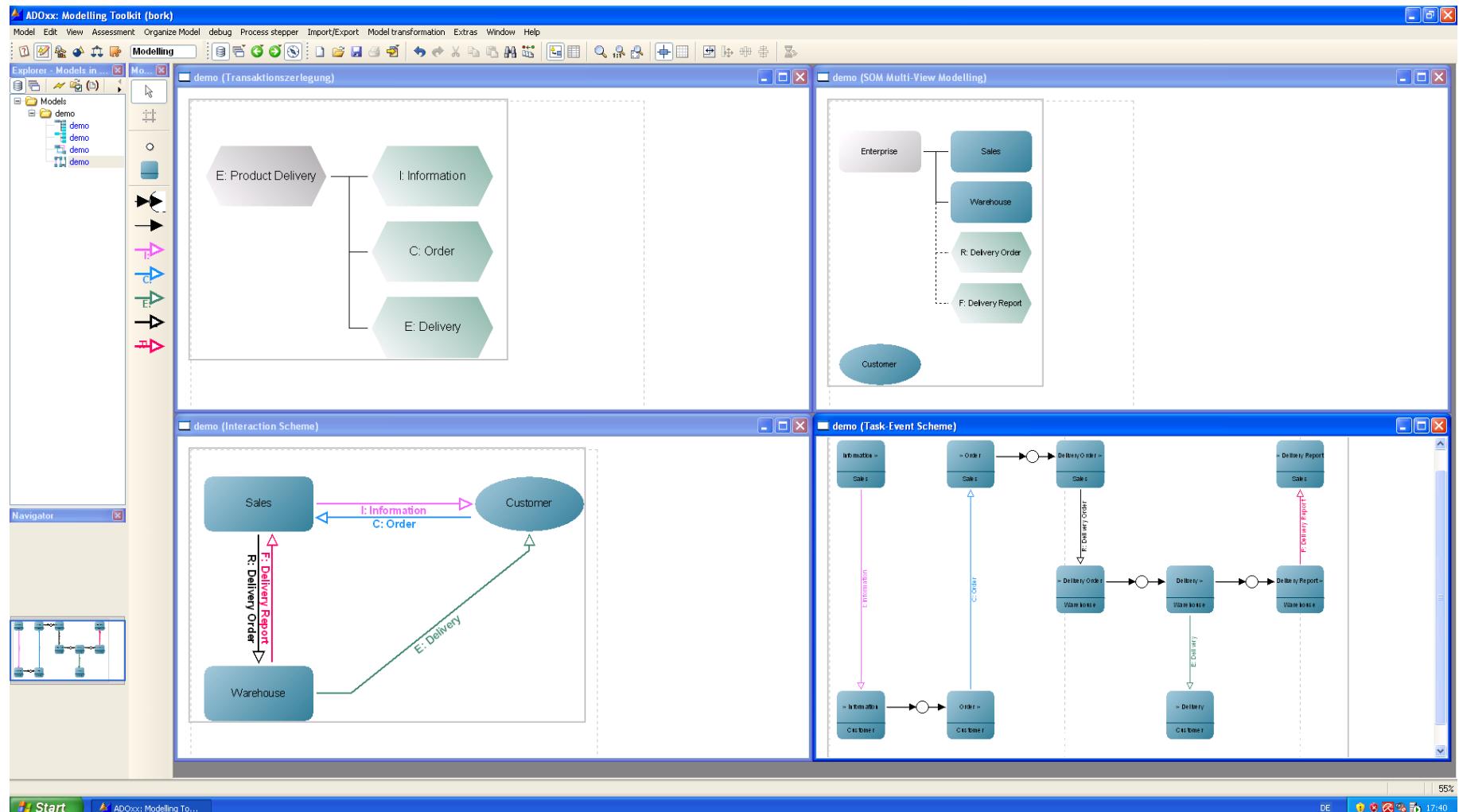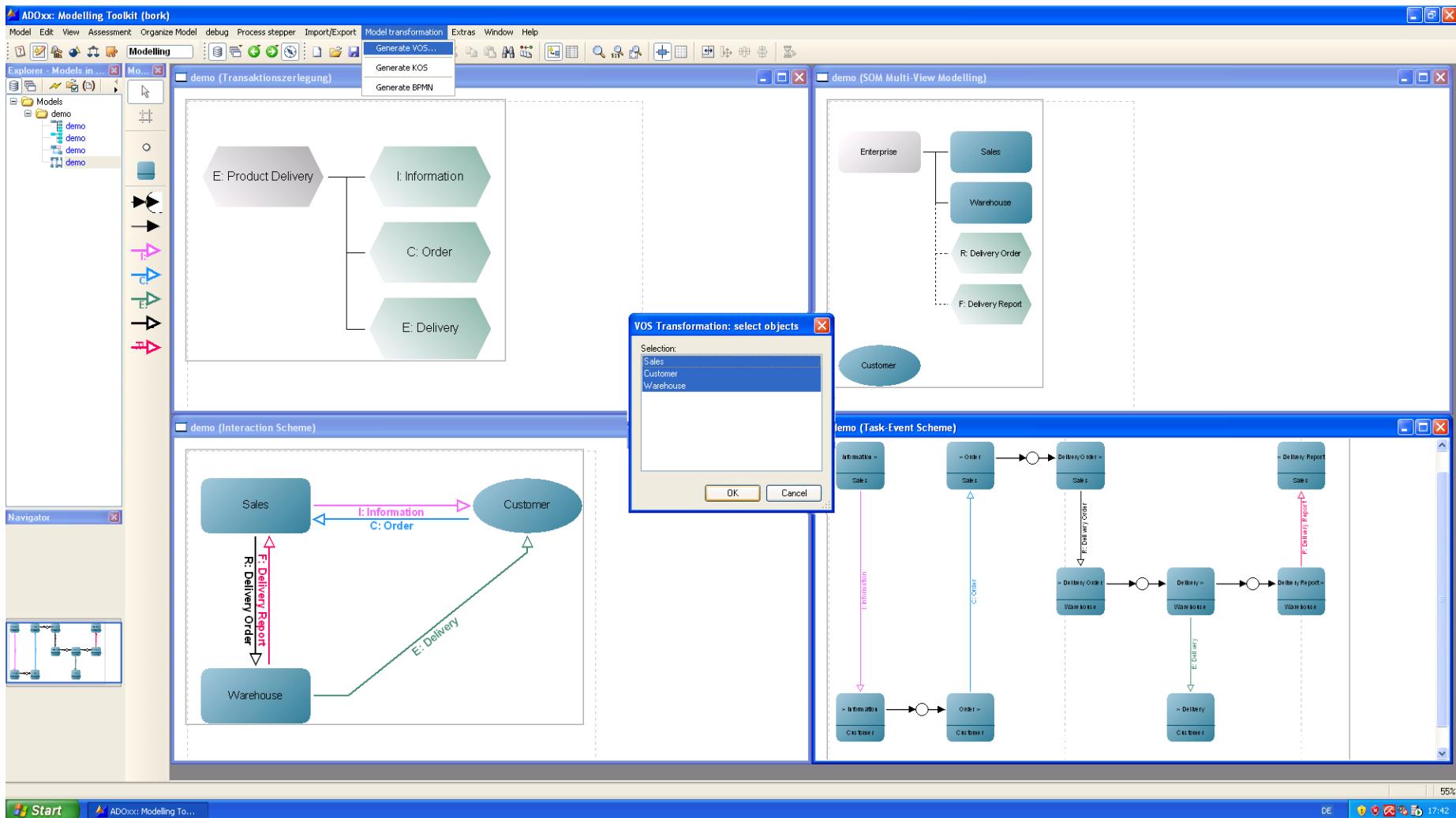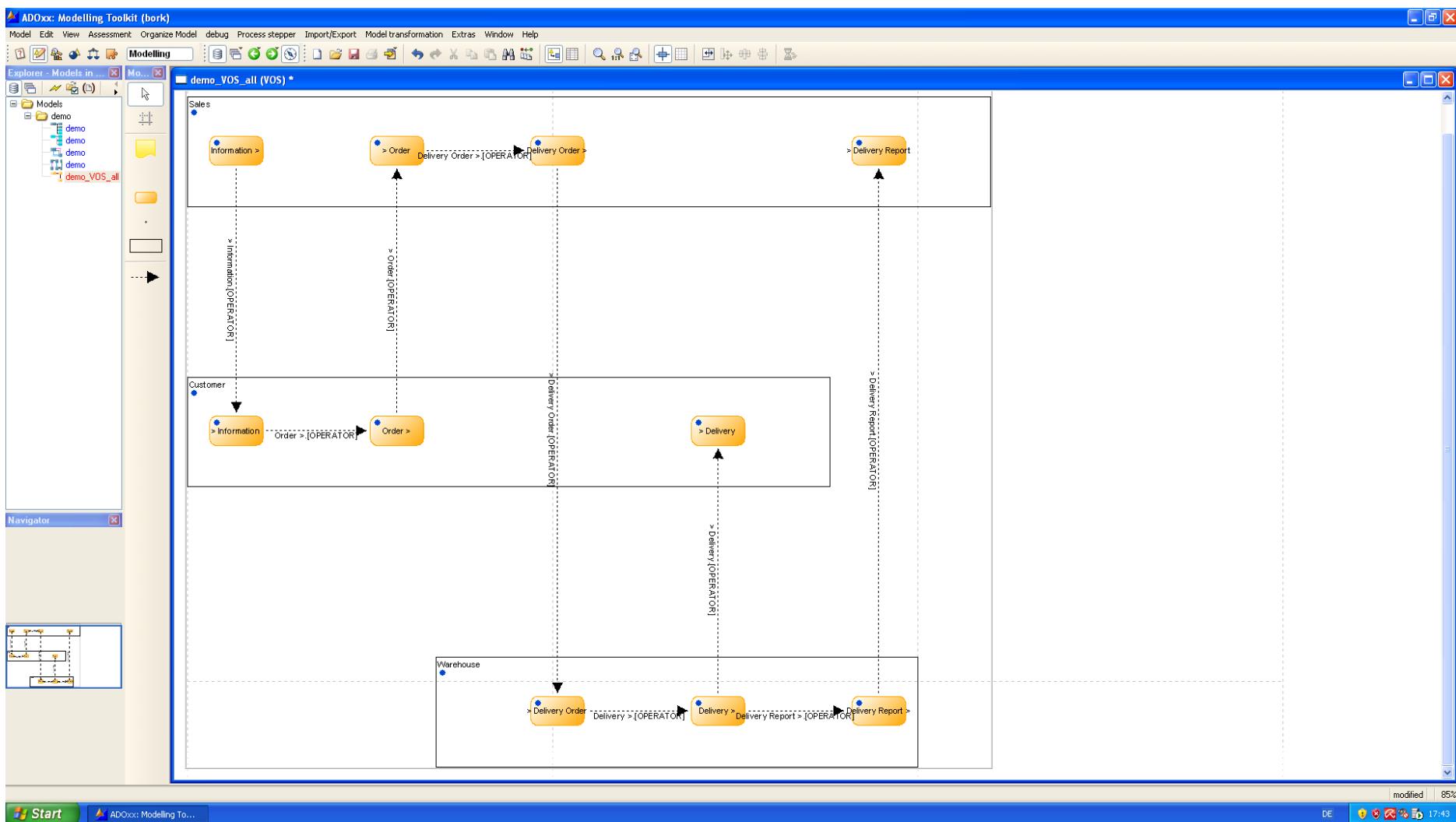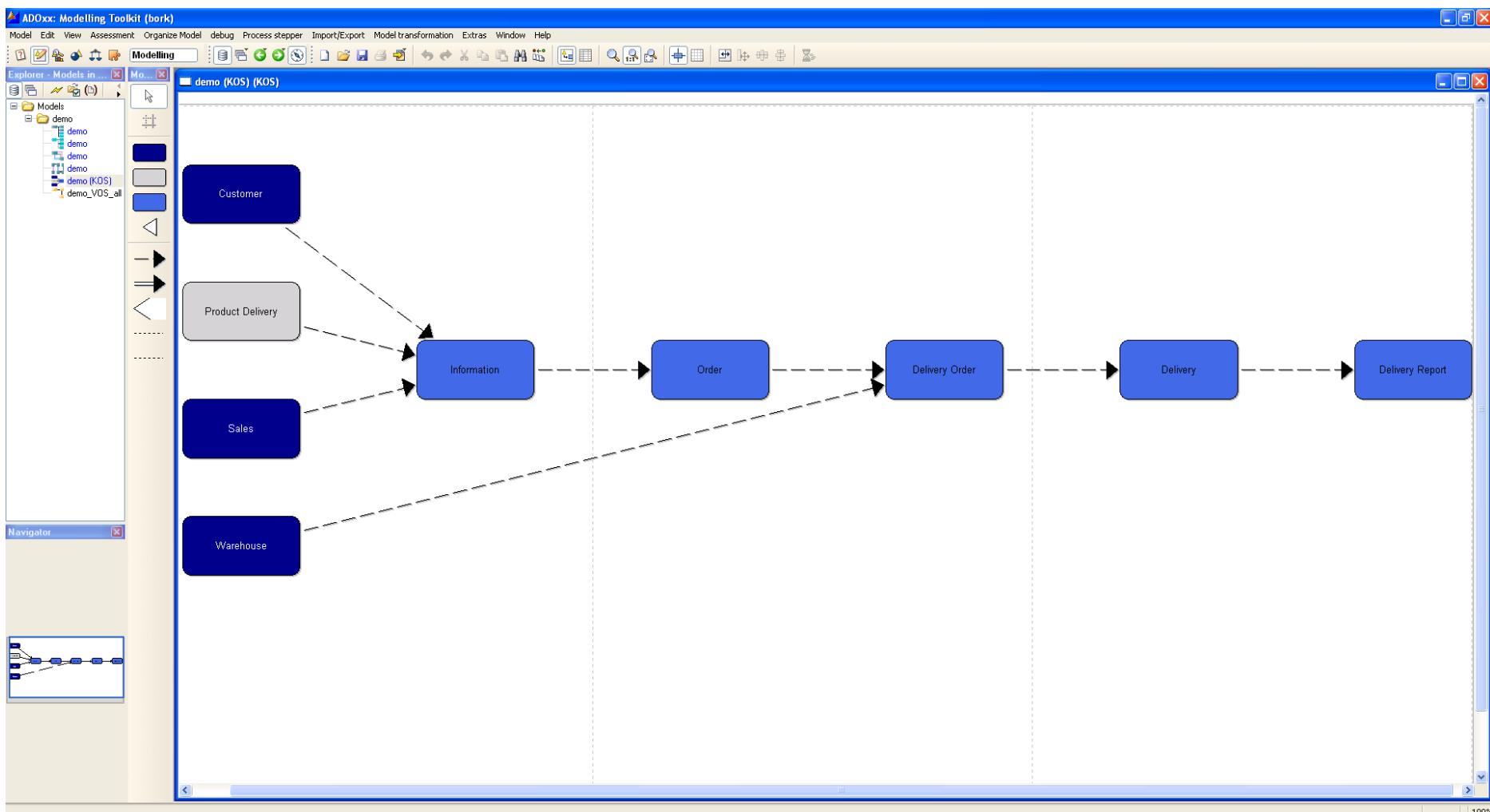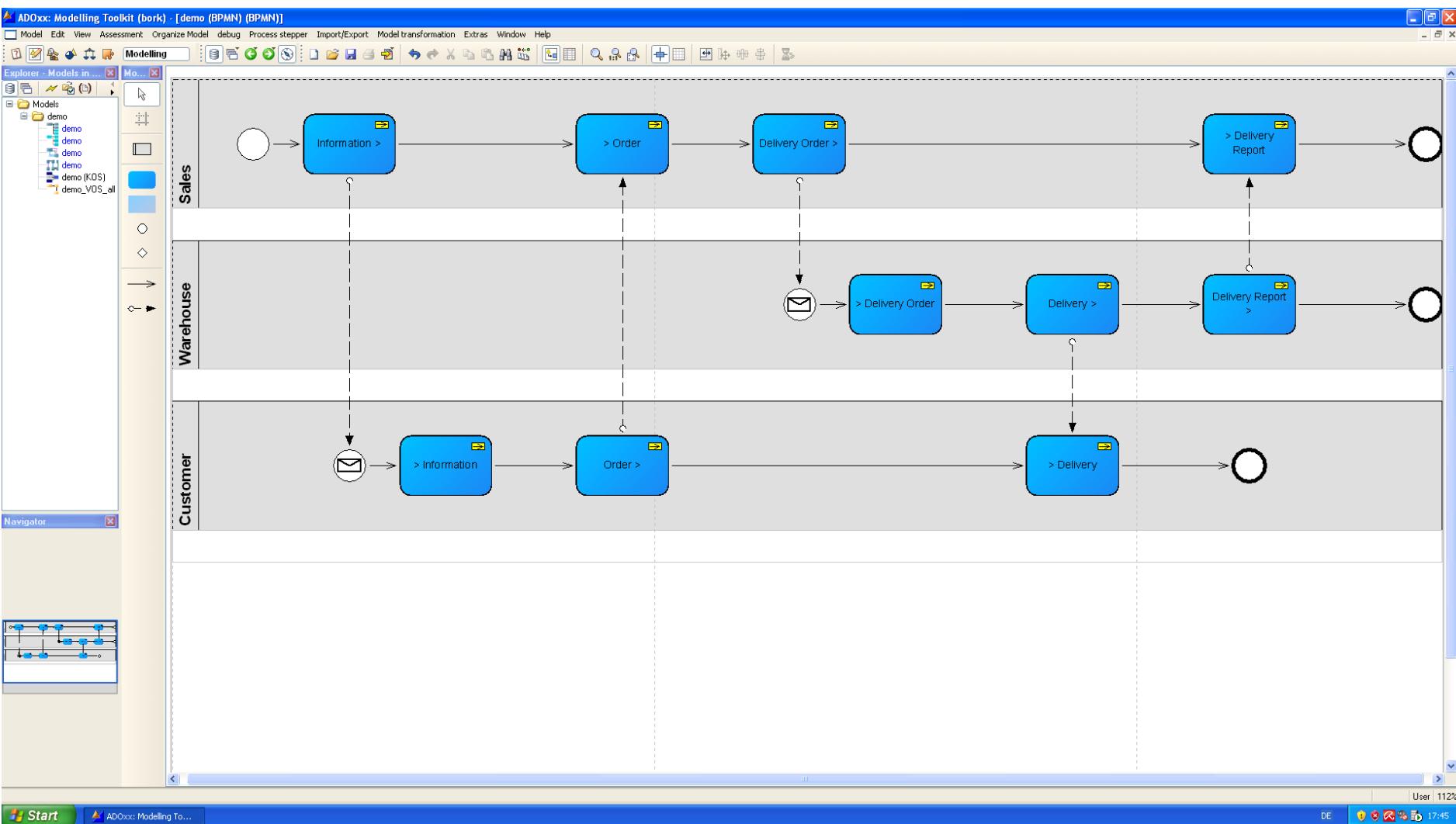
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