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## **Integrating Ontology Models and Conceptual Models using a Meta Modeling Approach**

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## **Agenda**

- Motivation
- Conceptual Modeling
- Meta Modeling
- Three approaches for an integration
- Implementation and Application Scenarios
- Outlook

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## Motivation

- Several business cases for the use of web-based ontologies:
  - Enterprise Content Management
  - Enterprise Information Integration
  - Enterprise Service Bus
  - ...
- Some common goals:
  - Let machines manage complexity
  - Using explicit semantics and reasoning
  - Based on shared, web-based, explicit conceptualizations
- How to analyze the contribution to business value?



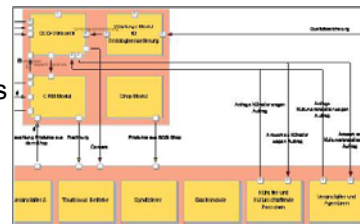
Picture source: [http://www.atibatechnology.com/ECM\\_DM.html](http://www.atibatechnology.com/ECM_DM.html)

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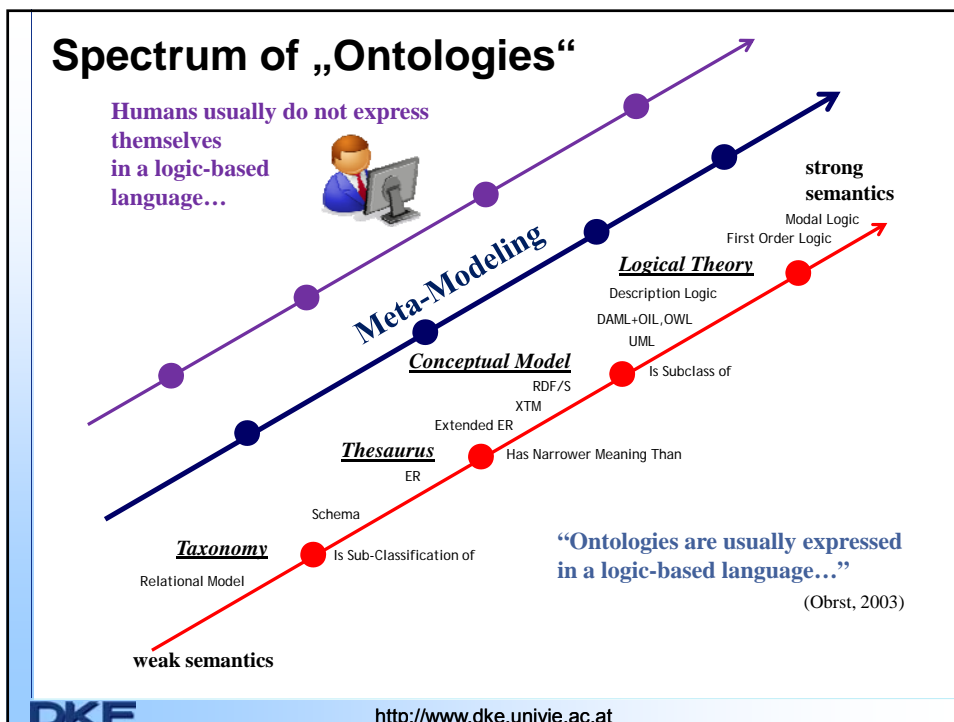
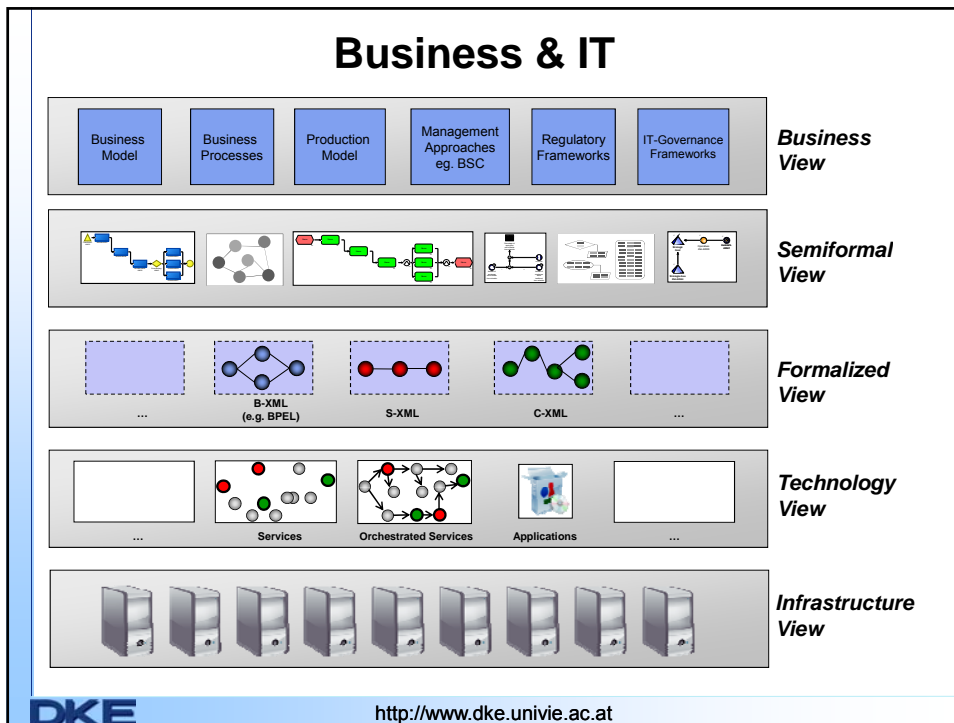
## Conceptual Modeling

- Conceptual Modeling:
  - Supporting humans to analyze organizational and technical relationships
  - Based on formal syntax and notation
  - Optional definition of formal semantics
  - Goal: Improvement of Human understanding
- Examples:
  - Analysis of business models, strategic goals, performance measurements, opportunities for action
  - Management of business processes including representation, analysis, simulation
  - ...
- How to bring together ontologies and conceptual models?

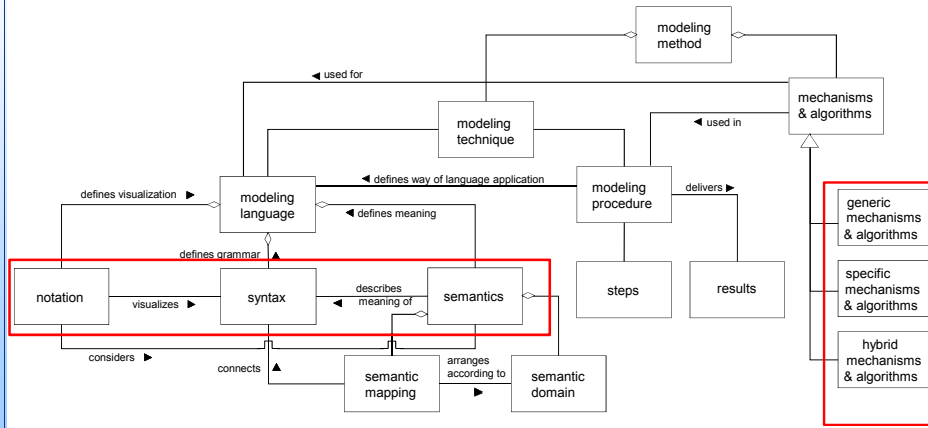


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# DKE Meta Modeling Framework

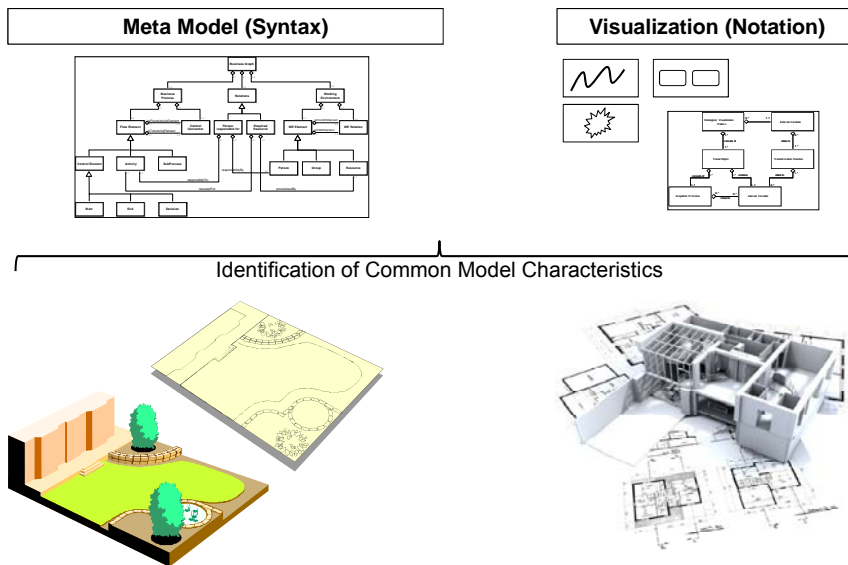


(Karagiannis et al., 2002)

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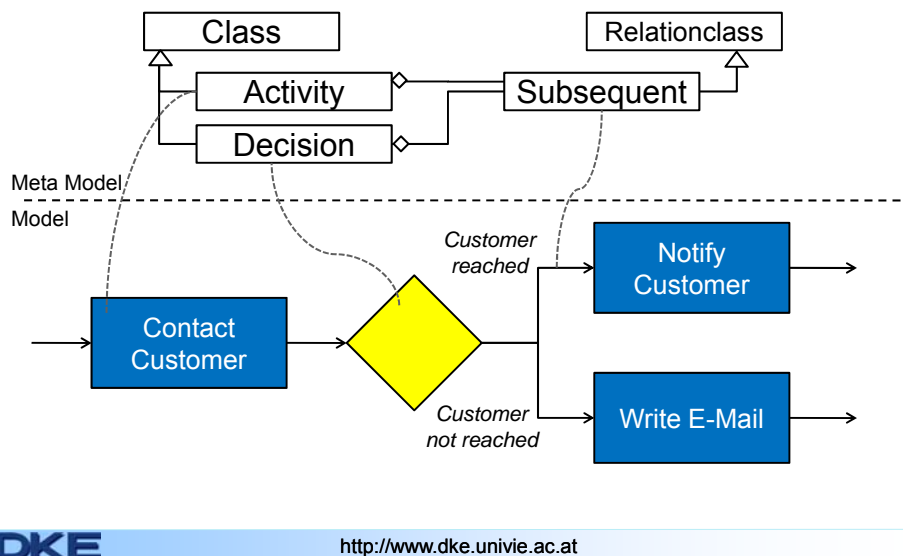
# Meta Modeling Approach



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## Example for the Realization of a Process Meta Model



## Semantic Issues

- Meta Models for Conceptual Modeling:
  - Assumption of implicit, human-interpreted semantics
  - Only „execution“ of models requires strict formalization incl. formal semantics
  - Formalization of semantics only for particular purposes, e.g. simulation
  - No consideration of *inherent semantics* of the model content, e.g. an activity in a process is named „print report“ but no information about ‚print‘ or ‚report‘ is made explicit
  - *IT-based communication of semantic information* requires common semantic base, e.g. an ontology

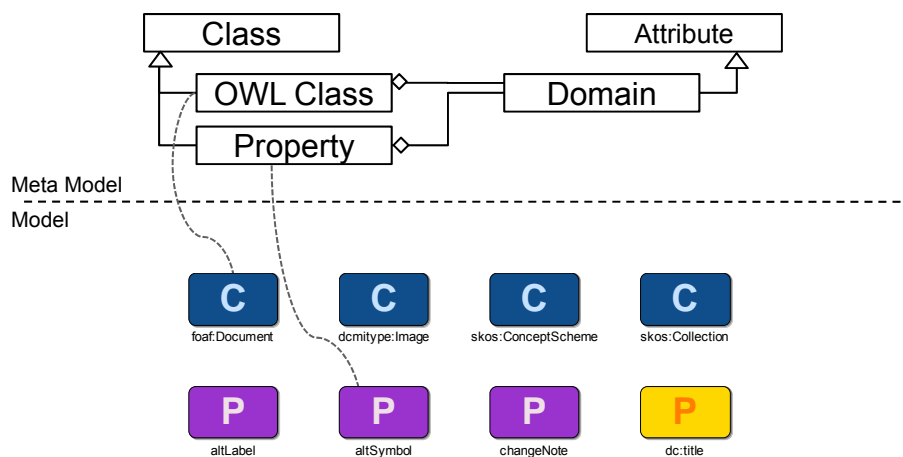
**How to make semantics explicit?**

## Integrating Explicit Semantics

Three Approaches:

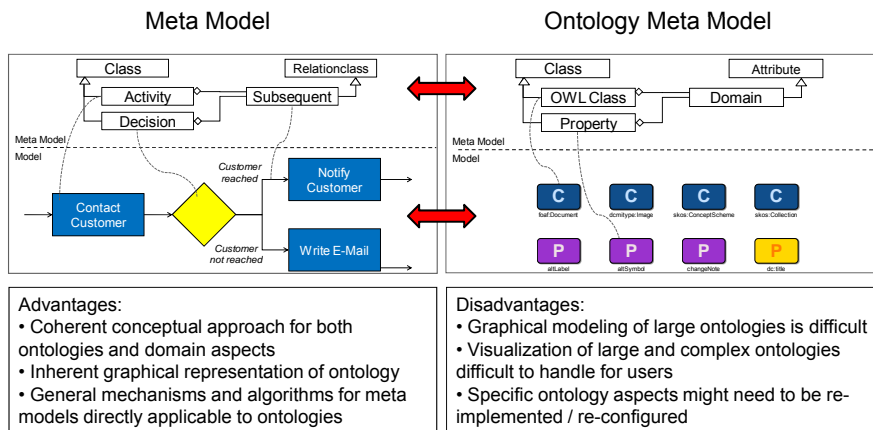
- Integrating Ontologies on the Meta Model Level
- Defining References between Meta Model Elements and externally kept Ontologies, resp. between Model Elements and Ontologies
- Using a Combination of Integration and External Linkage

## Example for the Realization of an Ontology Model



# Integrating Ontologies on the Meta Model Level

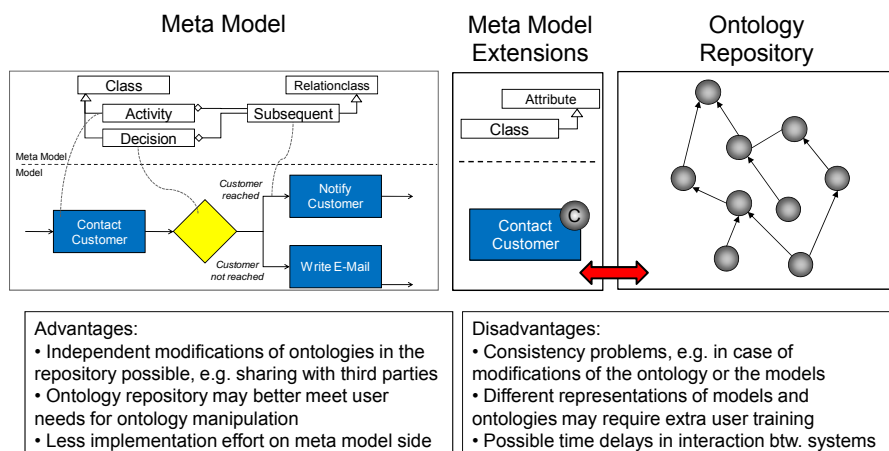
## Linkages on the Meta Model Level



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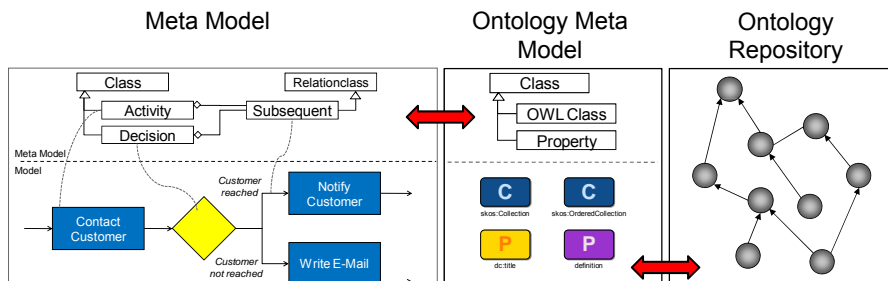
# References between (Meta) Models and External Ontologies



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## Using a Hybrid Approach of Integration and Referencing



### Advantages:

- Coherent conceptual approach for both ontologies and domain aspects
- Independent modifications of ontologies in the repository possible, e.g. sharing with third parties
- Ontology repository may better meet user needs for ontology manipulation
- No consistency problem on meta model side
- Not all ontology concepts required on meta model side

### Disadvantages:

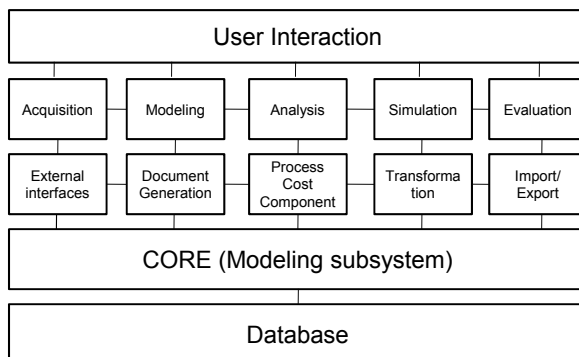
- Consistency problems still persist btw. ontology meta model and ontology repository
- Specific ontology aspects might need to be re-implemented on meta model side

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## Implementation Platform

The meta modeling approach has been implemented as a multi-user platform (ADONIS®).



Adonis Community Edition for free download:

<http://www.adonis-community.com>



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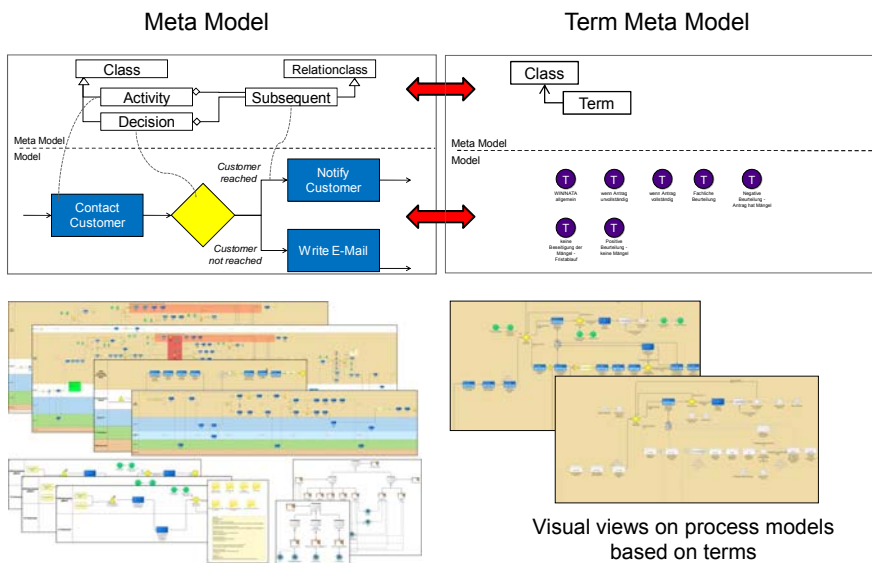


# Scenarios

Scenario A: AGES Management of Clinical Trials  
 → Integrating Ontologies on the Meta Model Level

Scenario B: Semantic Culture Guide  
 → Using a Hybrid Approach of Integration and Referencing via Protégé

## Implementation A



## SCG Project Outline



**Goal:** „Make Austria's culture events accessible through a decentralized one-stop shop by using semantic technologies.”

### Innovative Aspects:

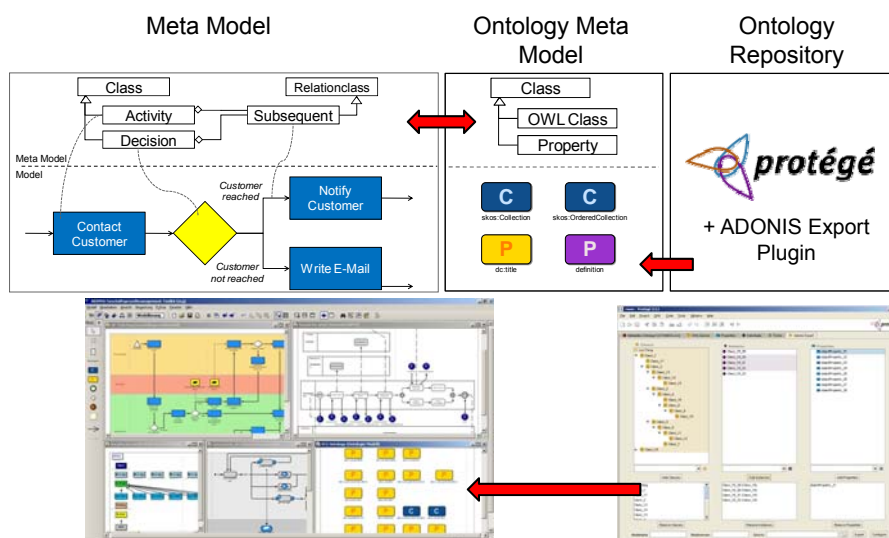


- Creation of an adequate **Modeling Method** for the description of Business Models, Business Processes and Services of the organizers of culture events.
- Creation of a **Culture-Ontology** for the coherent description of the involved actors, the culture events and genres and the user feedback dimensions
- Implementation of **semantic services** and **serviceworkflows** for the support of visitors and event organizers
- **Practical trial** of the semantic services and workflows



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## Implementation B



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## Outlook: [www.openmodels.at](http://www.openmodels.at)



Open Model  
Community



Open Model  
Projects



Open Model  
Technologies



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## SeMFIS on Open Model

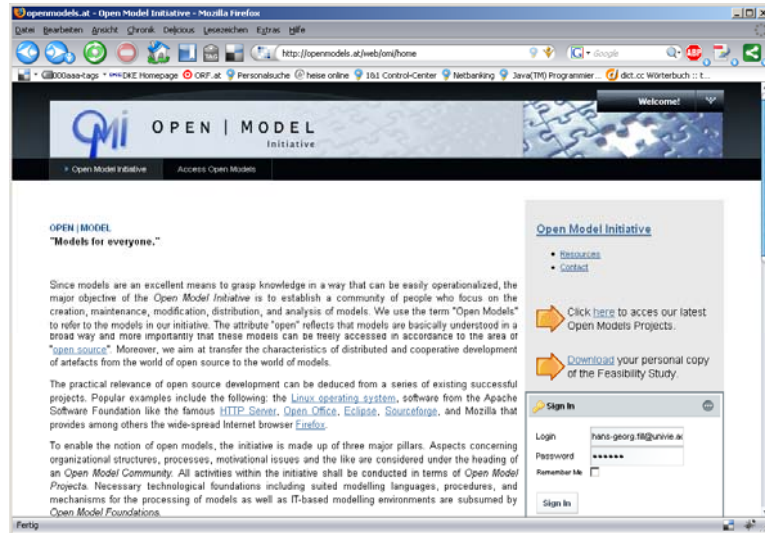


- Semantic-based Modeling Framework for Information Systems (SeMFIS)
- Provision of modeling framework, technologies, and tools to support semantic information models
- Current tasks:
  - Provision of a web-based modeling tool based on Java applets (AdoWeb)
  - Coupling of AdoWeb and Protégé on a common platform
  - Extension of the modeling functionalities for using ontologies and conceptual models
  - ...



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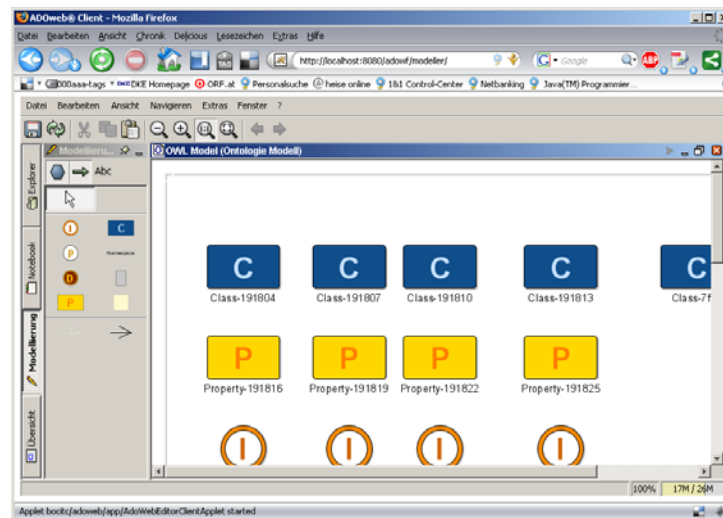
# SeMFIS Community



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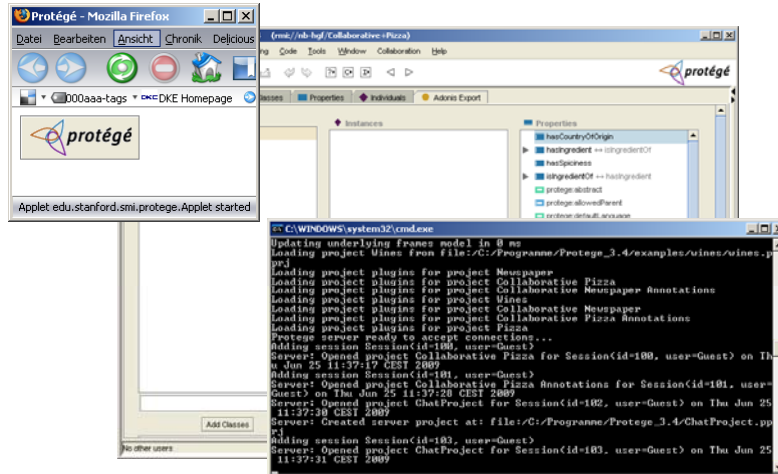
# SeMFIS Technologies: Web-based Modeller



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# SeMFIS Technologies: Applet Version of Protégé incl. Plugin



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Thank you for your attention!  
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