

Model Driven Software Development

ATLAS Model Management Architecture (AMMA)

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Agenda

- **ATLAS Group**
- ATLAS Model Management Architecture
- Kernel MetaMetaModel
- ATLAS Transformation Language
- ATLAS Model Weaver
- Quellenverzeichnis

- Forschungsgruppe der LINA und INRIA
 - Laboratoire d'Informatique de Nantes-Atlantique
 - Institut National de Recherche en Informatique et en Automatique
- ATLantic dAta Systems (ATLAS) als Prototyp für komplexes Datenmanagement
- Zusammenarbeit mit dem W3C
- Weitere Forschungsprojekte:
 - CaML
 - Caml Light
 - O'Caml
 - Scilab (MuPAD 3.0)

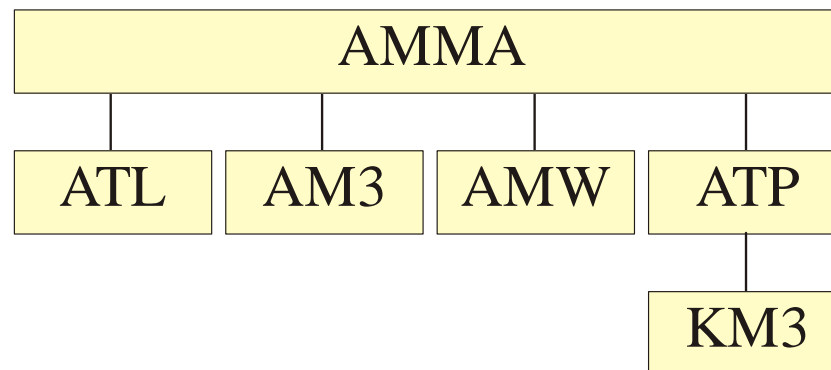
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AMMA

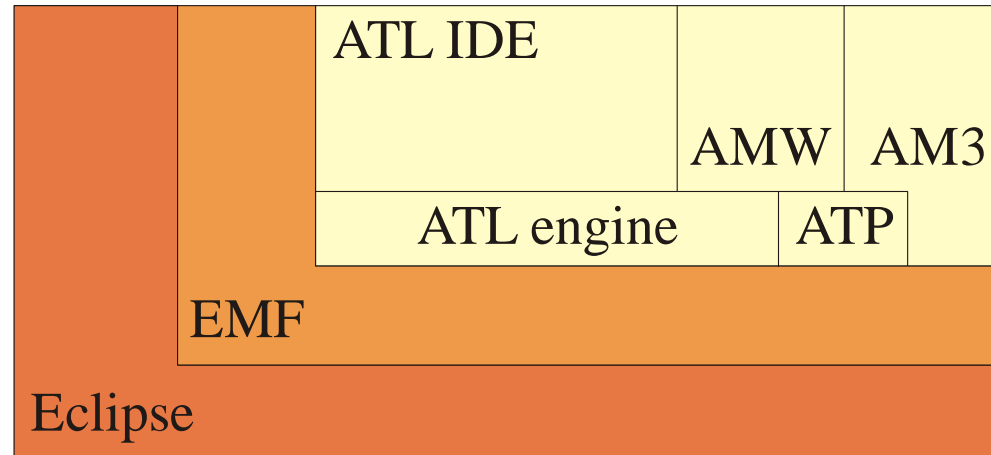
- Grundpfeiler von AMMA:
 - ATLAS Transformation Language ATL
 - ATLAS Model Weaver AMW
 - ATLAS MegaModelMangement AM3
 - ATLAS Technical Projectors ATP

 - Kernel MetaMetaModel KM3



Installation

- Basierend auf Eclipse und EMF



- Anhaltender Entwicklungsprozeß:
 - Builds aktuell aber nicht zwingend kompatibel
 - Dokumentation und Funktionsumfang bedingt nutzbar

Installation

	Version	
Eclipse	3.1.0	3.0.0
EMF	2.1.0	2.0.2
ATL	Build 20051102	Build 20050601
AMW	-	Build 20050610
ANTLR	2.7.5	2.7.5
MDR	Build 20050711	-

- ANother Tool for Language Recognition (ANTLR): Parser Generator
- Metadata Repository (MDR) für MOF

Agenda

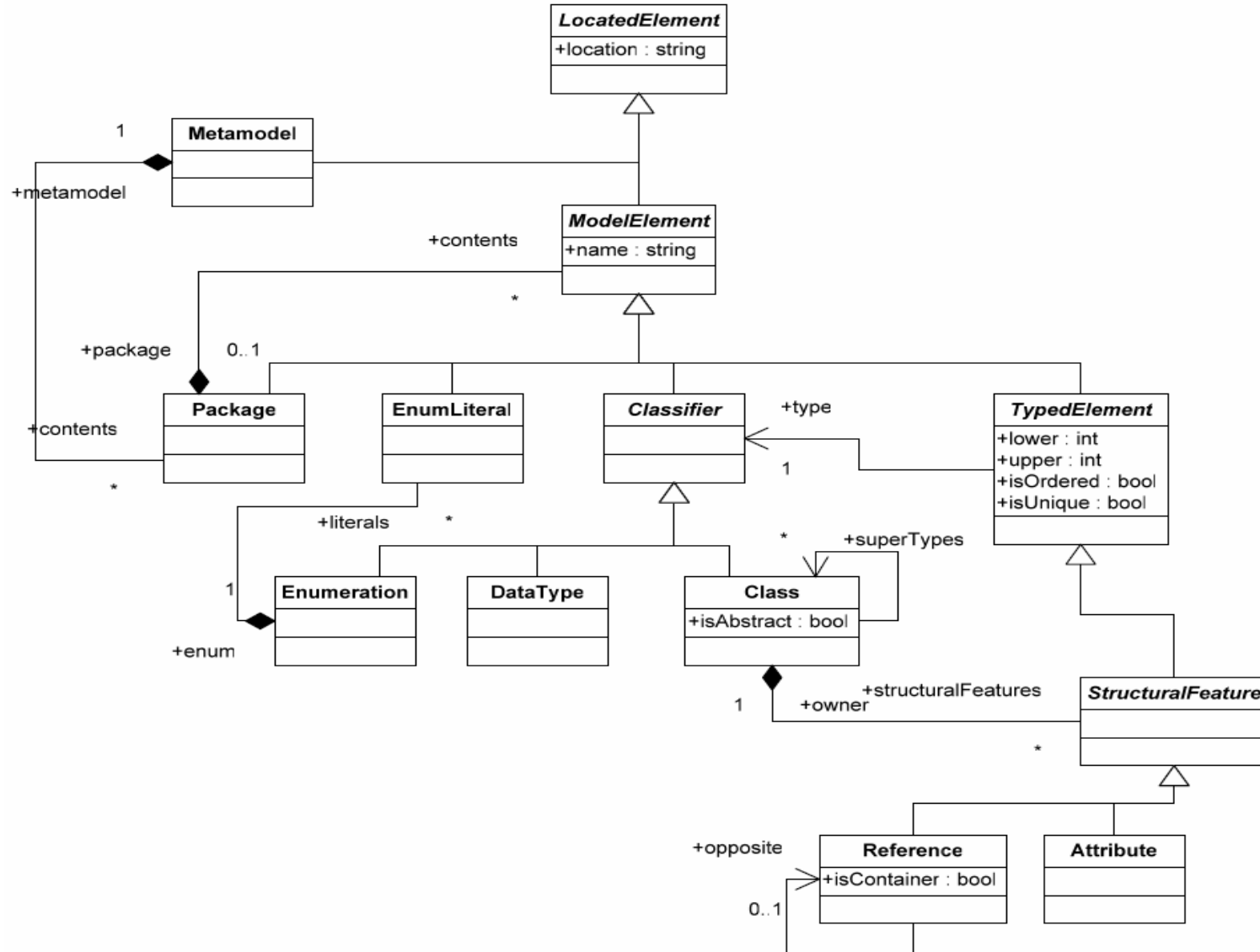
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Kernel MetaMetaModel (KM3)

- Anlehnung an Ecore und eMOF 2.0
- weniger komplex/mächtig im Vergleich zu MOF 1.4

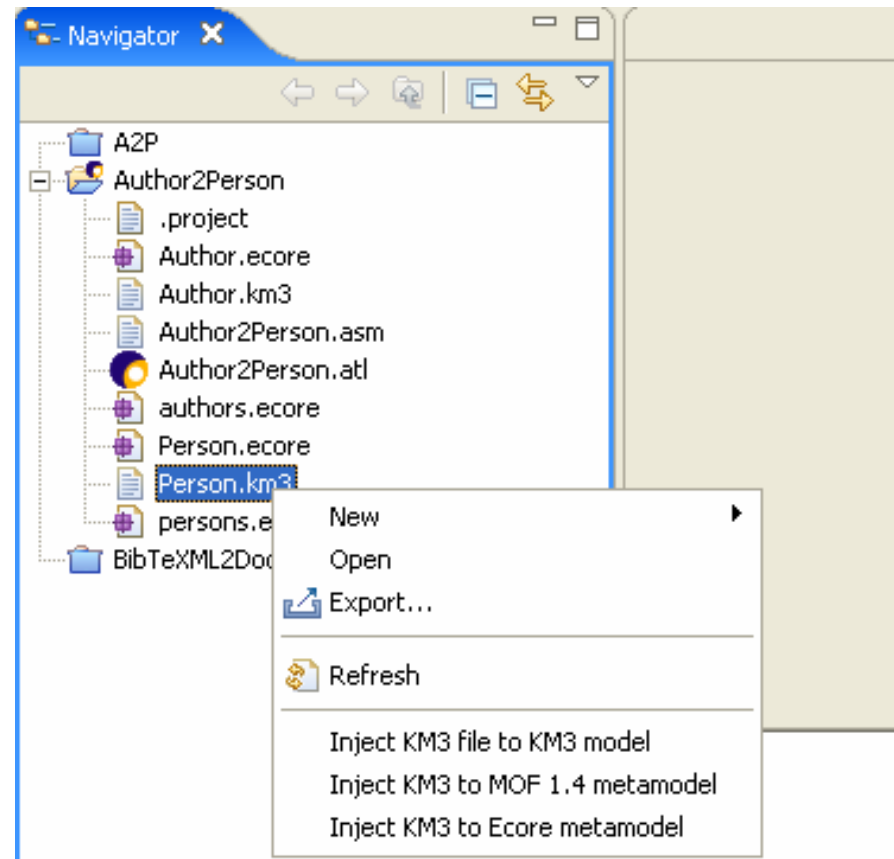
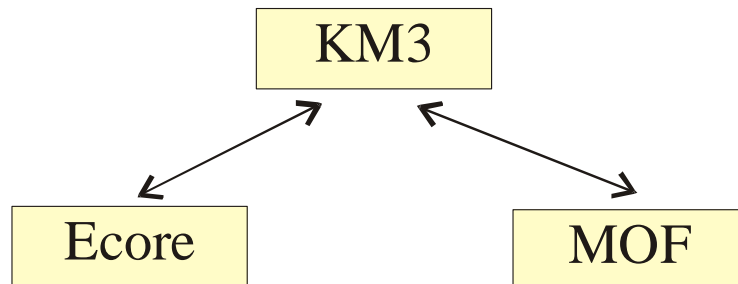
Hierarchie	Packages
Relationen	Reference (oppositeOf)
Constraints	OCL über ATL einsetzbar
Datentypen	String, Boolean, Integer, Double, Enumerations

Kernel MetaMetaModel (KM3)



Kernel MetaMetaModel (KM3)

- Erstellung mit Text-Editor
- Umwandlung zwischen Ecore und MOF 1.4 möglich

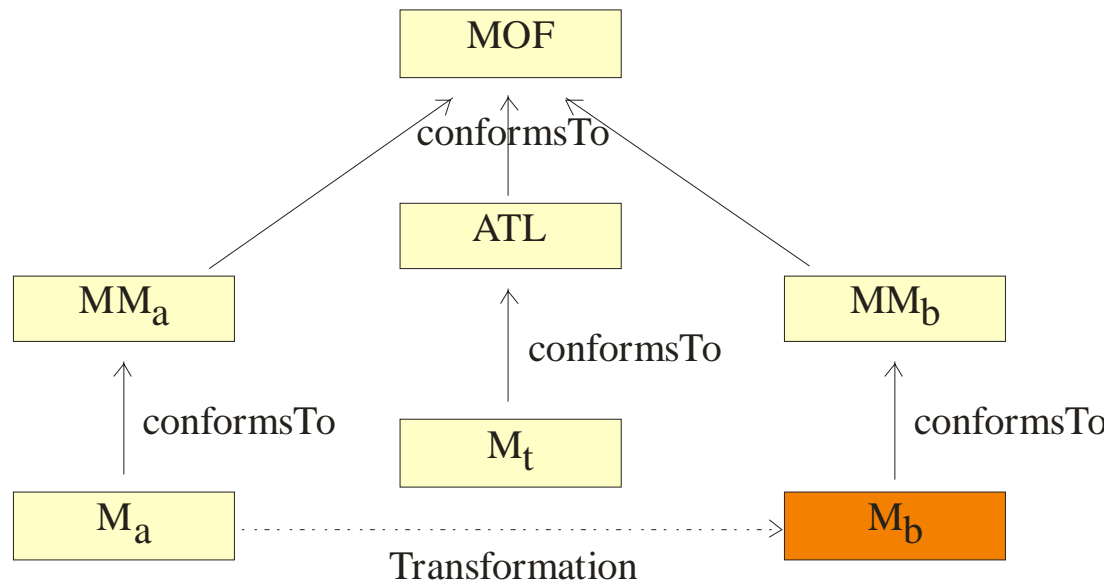


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ATLAS Transformation Language

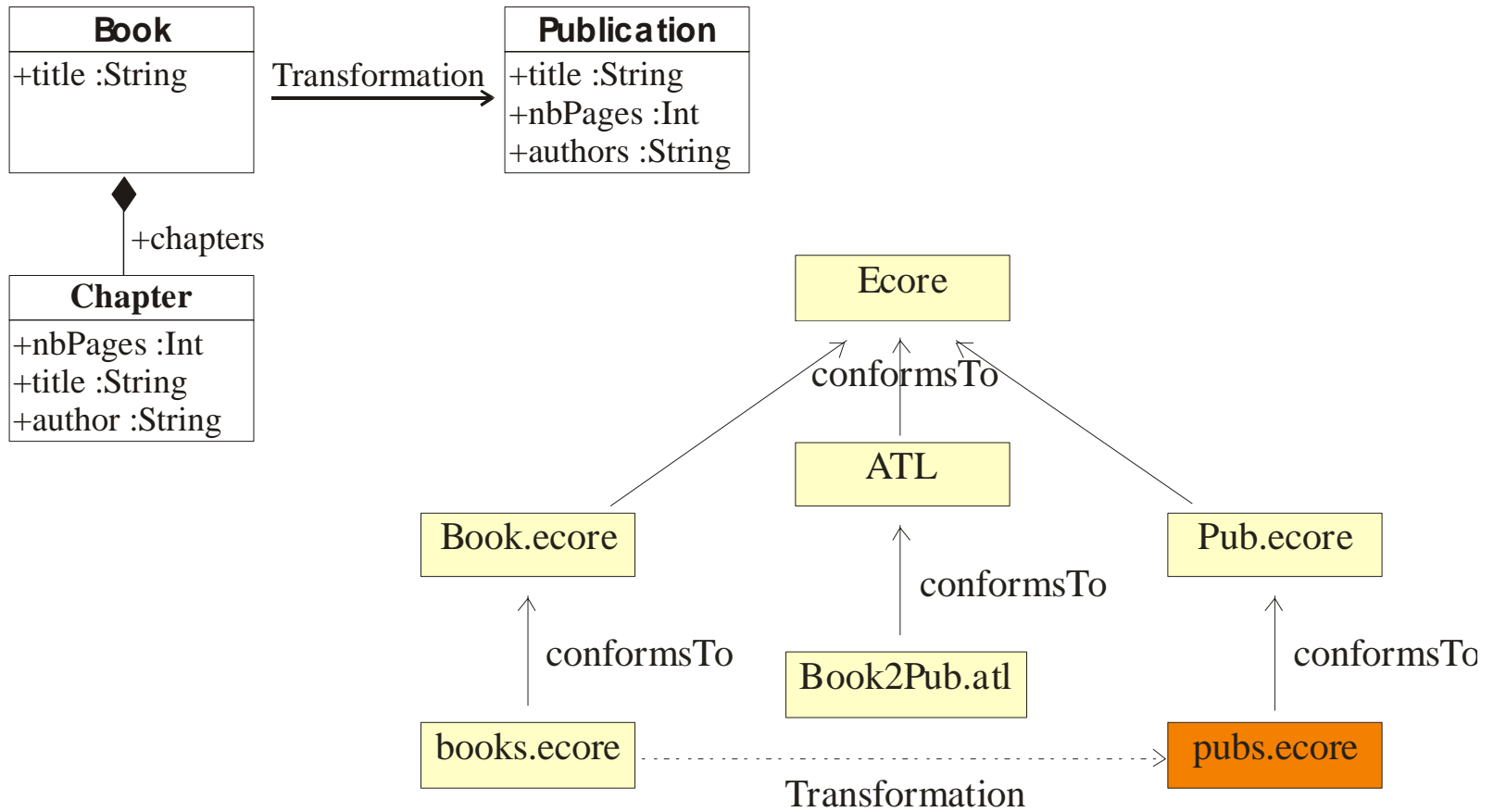
- Zusammenstellung von Deklarations- und Befehlskonstrukten basierend auf OCL 2.0
- Ausgangspunkt:
 - ein oder mehrere Input-Modelle für das Output-Modell
 - alle Metamodelle müssen vorliegen



- Transformations-Modell M_t :
 - Header
 - Import-Section
 - Hilfsfunktionen
 - Regeln

ATLAS Transformation Language

- Beispiel:



ATLAS Transformation Language

- Header: module, library, query

```
module Book2Publication;  
create OUT : Publication from IN : Book;
```

- Import-Section:

```
uses strings;
```

ATLAS Transformation Language

- Hilfsfunktionen:

```
helper context Book!Book def : getAuthors() : String =  
self.chapters->collect(e | e.author)->asSet()  
->iterate(authorName; acc : String = '' |  
    Acc+  
    if acc = ''  
        then authorName  
        else ' and ' + authorName  
    endif  
);
```

ATLAS Transformation Language

- Regeln:

```
rule Book2Publication {  
  from  
    b : Book!Book ( b.getNbPages() > 2)  
  to  
    out : Publication!Publication (  
      title <- b.title,  
      authors <- b.getAuthors(),  
      nbPages <- b.getNbPages()  
    )  
}
```

- Ausführung:

Name:

ATL Configuration | Model Choice | Common

IN

Model : Meta Model :

Model	Meta model	
IN	Book	

Add
Remove

OUT

Model : Meta Model :

Model	Meta model	
OUT	Publication	

Add
Remove

Path Editor

Model	Path	Model Ha...	
IN			MDR
Book		EMF	EMF
OUT			
Publication		EMF	

Libs

Lib : Add

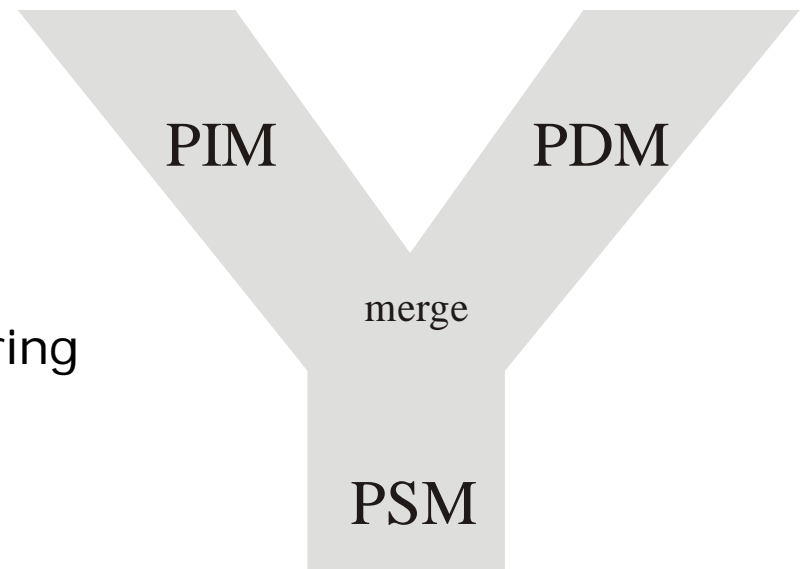
Libs	Path	

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ATLAS Model Weaver

- Y – Organisation:
 - PIM: Platform Independent Model
 - PDM: Platform Definition Model
 - PSM: Platform Specific Model



- Beispiele:
 - class book (title) und class string
 - 2 Adressbücher:
 - Vor- und Nachname
 - Nachname

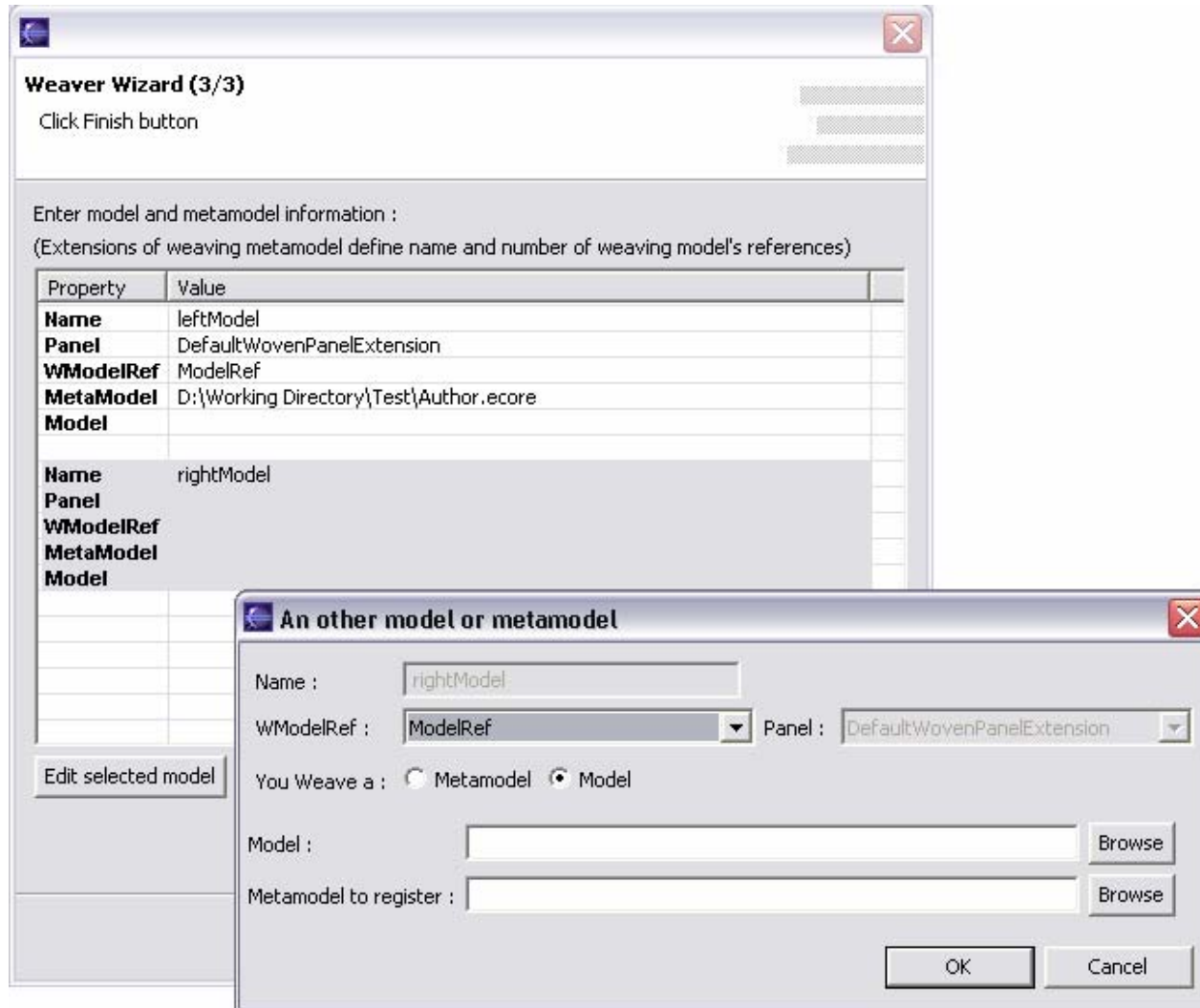
ATLAS Model Weaver

- Gründe für Weaving
 - Automatische Generierung der Links bisher nicht möglich
 - Archivierung der Links als Modell
 - Nutzung des Modells als Input für automatische Tools
- Weaving vs. Transformation

	Transformation	Weaving
Input	1..n Input-Modelle	2 Input-Modelle
Output	1 Output-Modell	1 Weaving-Modell
Ablauf	Automatisch	Manuell
Metamodell	ATL-Metamodell	Generisch erstellt

ATLAS Model Weaver

- Ansatz: Automatische Generierung von Metamodell und GUI



ATLAS Model Weaver

The screenshot displays the ATLAS Model Weaver interface with three models open: leftModel, Weaving model, and rightModel.

- leftModel (platform:/resource/Test/Author.ecore):**
 - EPackage PrimitiveTypes
 - EDataType String
 - EPackage Author
 - EClass Author
 - EAttribute name
 - EAttribute surname

- Weaving model (platform:/resource/Test/Test.ecore):**
- Model
 - Link Weaving
 - Link Identification
 - <left> LinkEnd Author - Name
 - <right> LinkEnd Person - Name
 - Link Extension
 - <left> LinkEnd Author Surname
- rightModel (platform:/resource/Test/Person.ecore):**
- EPackage Person
 - EClass Person
 - EAttribute name
- EPackage PrimitiveTypes
 - EDataType String

The Properties window at the bottom shows the following table:

Property	Value
_Link	
description	
model	Model
name	Weaving
parent	
Misc	
child	Link Identification, Link Extension
end	

- Prototyp für Weaving Modelle
- Automatische Fortsetzung mit ATL in Arbeit

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- [1] ATLAS group: *ATL : Atlas Transformation Language*. Installation Guide 0.1, November 2006
- [2] ATLAS group : *ATL : Atlas Transformation Language*. User Manual 0.6, August 2005
- [3] ATLAS group : *ATL : Atlas Transformation Language*. Specification of the ATL VM 0.1, 2005
- [4] ATLAS group : *ATL : Atlas Transformation Language*. Starter's Guide 0.1, Dezember 2005
- [5] ATLAS group : *KM3 : Kernel Metametamodel*. User Manual 0.3, August 2005
- [6] Bézivin, J, Jouault, F, and Touzet, D : *An Introduction to the ATLAS Model Management Architecture*. Research Report LINA, Februar 2005
- [7] Bézivin, J, Jouault, F, and Touzet, D : *Principles, Standards and Tools for Model Engineering*. In: Proceedings of the Using metamodels to support MDD Workshop, 10th IEEE International Conference on Engineering of Complex Computer Systems, 2005

Quellenverzeichnis

- [8] Didonet Del Fabro, M, Bézivin, J, Jouault, F, Breton, E, and Gueltas, G : *AMW: A Generic Model Weaver*. In: Proceedings of the 1ère Journée sur l'Ingénierie Dirigée par les Modèles, 2005
- [7] Jouault, F, and Kurtev, I : *Transforming Models with ATL*. In: Proceedings of the Model Transformations in Practice Workshop at MoDELS, 2005