Brief history

- Paul was my 2nd "promotor" in 1992
- In 1992 I started as assistant professor in his group at the UvA:
 - pretty printer generation
- In 1997 I moved to his group at CWI:
 - ASF+SDF Meta-Environment
 - ASF2C compiler
- In 2006 I left CWI and moved to Eindhoven University of Technology
 - Model Driven Software Engineering





Model Driven Engineering is gaining popularity



6/20/12

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Model transformations are software too



Design Methodology



Reuse



Maintenance









2. With modifications



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Maintenance

1. Corrective

2. Adaptive

3. Perfective



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Analysis techniques are required for model transformations





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Contributions

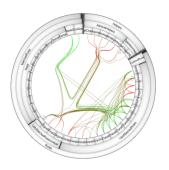
Metrics

 Names of subject status
 1

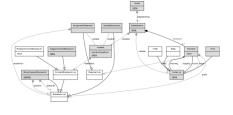
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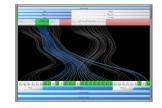
Structure and dependency analysis



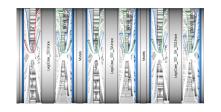


Meta-model coverage analysis





Model transformation traceability



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Metrics for Model Transformations

Number of Output Models	1
Number of Transformation Rules	93
Number of Number of Output Models	1
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Number C Number of Number of Output Models Number C Number C	93
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Number of Lazy Matched Rules (Excluding Unique)	92
Number of Lazy Matched Rules (Including Unique)	92
Number of Unique Lazy Matched Rules	0
Number of Number of Called Rules	0
Number of Number of Called Rules Number of Number of Unused Lazy Matched Rules Number of Sumber of INumber of Unused Called Rules	1
Number of Unused Called Rules	0
Number of Number of Rules with a Filter Condition on the Input P	attern 0
Number call and Number of Unused input Pattern Elements	68
Number of Number of Rules with a do Section Number of Number of Number of Direct Copies	0
Number c Number of Direct Copies	0
Number c Number of / Number of Abstract Transformation Rules Number c Number of I Number of Abstract Matched Rules	0
Number of Number of Abstract Matched Rules	0
Number of Number of Abstract Matched Rules Number of Number of Abstract Lazy Matched Rules	0
Number of Number of Abstract Lazy Matched Rules Number of Number of Abstract Unique Lazy Matched Rules	0
Number of Number of Abstract Unique Lazy Matched Rules Number of Number of Rule Inheritance Trees	93
Number of Number of Rule Inheritance Trees Number of Number of Rules with a Using Clause	57
Number of Number of Rules with a Using Clause Number of Number of Unused Variables Defined in Using Clauses	0
Number of Number of Unused Variables Defined in Using Clauses Number of Number of Helpers	28
Number of /Number of Helpers with Context	11
Number of Helpers without Context	17
Number of Number of Attribute Helpers	1
Number of Attribute Helpers with Context	0
Number of Attribute Helpers without Context	1
Number of Operation Helpers	27

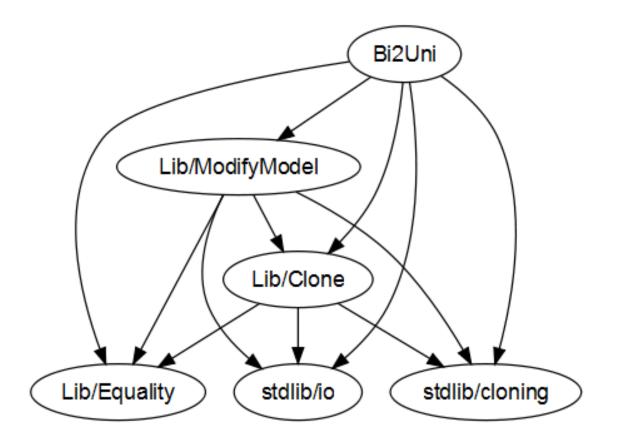
Using Metrics for Assessing the Quality of ASF+SDF Model Transformations

M.F. van Amstel, C.F.J. Lange, M.G.J. van den Brand

In Proceedings of the Second International Conference on Model Transformation (ICMT 2009)



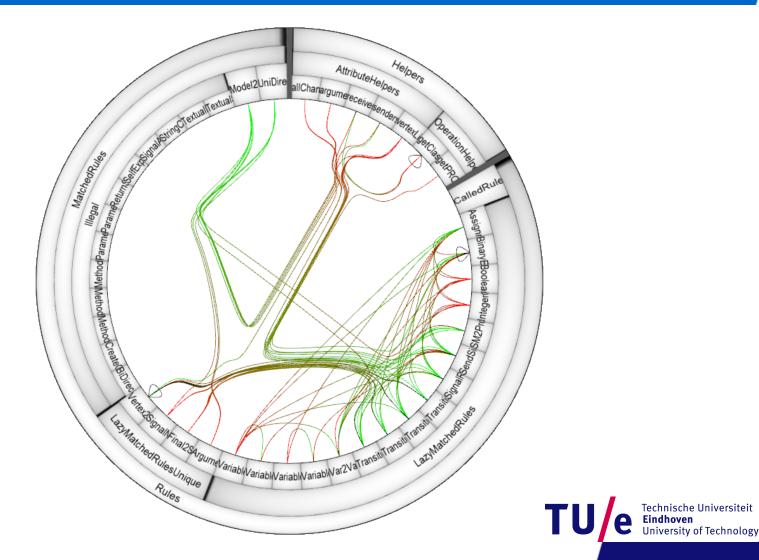
Structure Analysis



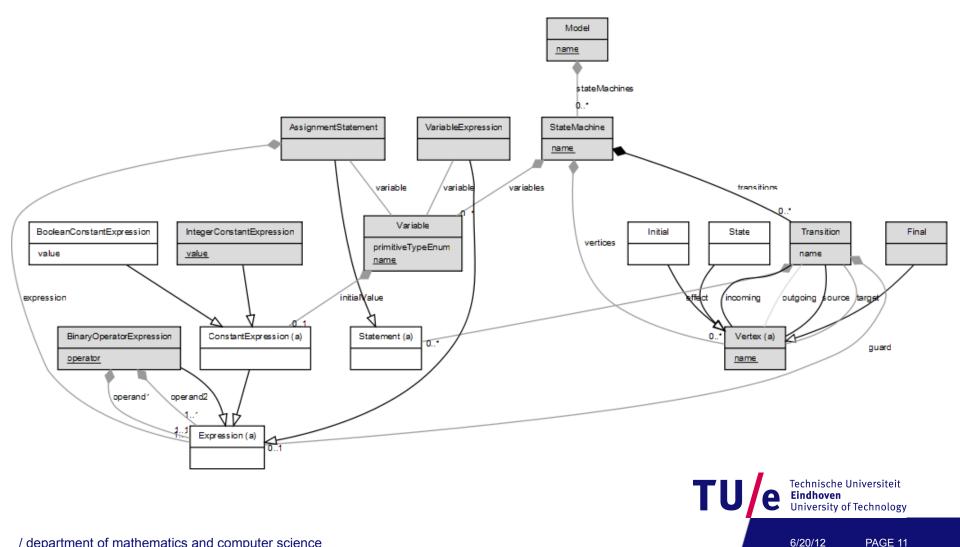
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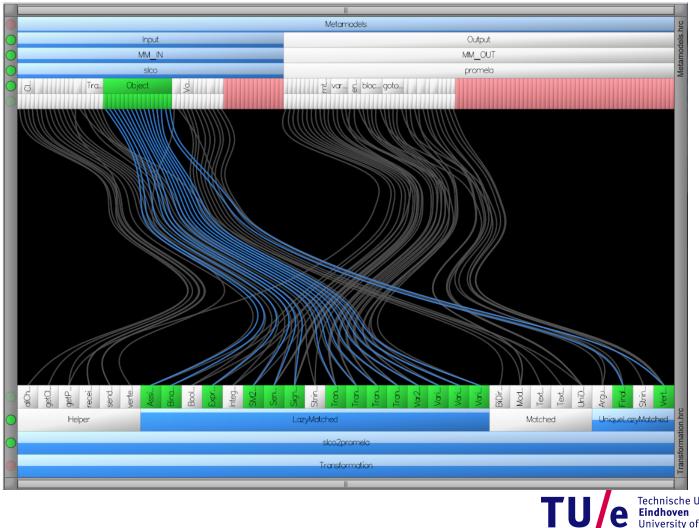
Structure and Dependency Analysis



Meta-model Coverage



Meta-model Coverage



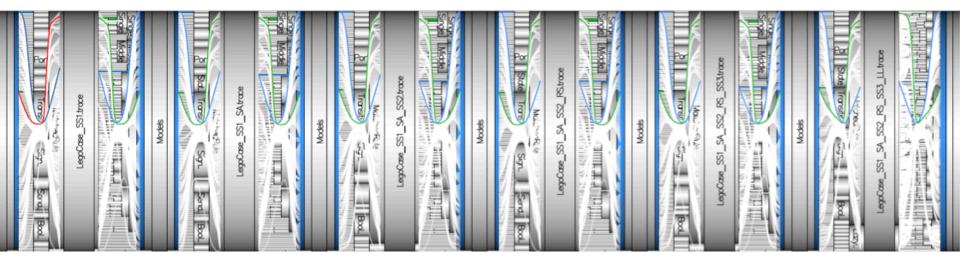


Model transformation traceability

- Origin tracking of model transformations:
 - Debugging domain-specific models
 - Analysis of domain-specific models
 - Determining the effect of a source model change



Model transformation traceability

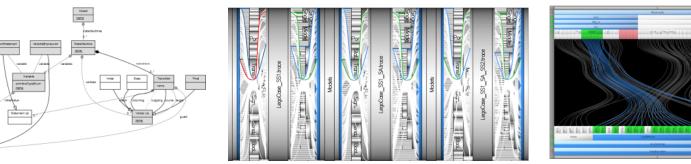




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Conclusions

Number of Output Models 1	1		
Number of Transformation Rules 93	3		
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Number of Unuser Number of Lazy Matched Rules (Including Unique)	92	/ C Lib/ModifyModel) /	3
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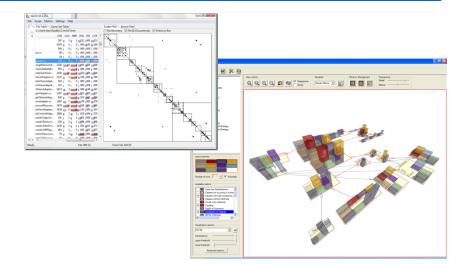




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Future Work

- More analysis techniques
 - Code clone detection
 - Visualization of metrics



- Improving current analysis techniques
 - Dynamic analysis

Coverage on model level



Acknowledgements

- Marcel van Amstel and Luc Engelen for participating in this research
- Danny Holten for the visualizations
- Paul Klint for providing the stimulating environment and his back to the basics question: "Is dat nu wel zo?"



Questions





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