



UNIVERSITÄT PADERBORN
Die Universität der Informationsgesellschaft

Web Engineering

Winter Term 2008/09

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Chapter III: Modeling of Web Applications
– Part 1 –

Acknowledgements

- Dr. Nora Koch, LMU München

<http://www.pst.informatik.uni-muenchen.de/~kochn/index.html>



- W. Schwinger, N. Koch: Modeling Web Applications. In G. Kappel, B. Pröll, S. Reich, W. Retschitzegger (Ed.): Web Engineering – The Discipline of Systematic Development of Web Applications. John Wiley & Sons, 2006



Acknowledgements

- Prof. Dr. Gerti Kappel, TU Wien

http://www.big.tuwien.ac.at/teaching/offer/ss05/we_vo/



- G. Kappel, B. Pröll, S. Reich, W. Retschitzegger (Ed.): Web Engineering – The Discipline of Systematic Development of Web Applications. John Wiley & Sons, 2006
- In German: Web Engineering – systematische Entwicklung von Web-Anwendungen, dpunkt Verlag, 2004



Outline

III. Modeling of Web Applications



III.1 MDA, MDE, MDD

III.2 Modeling Dimensions

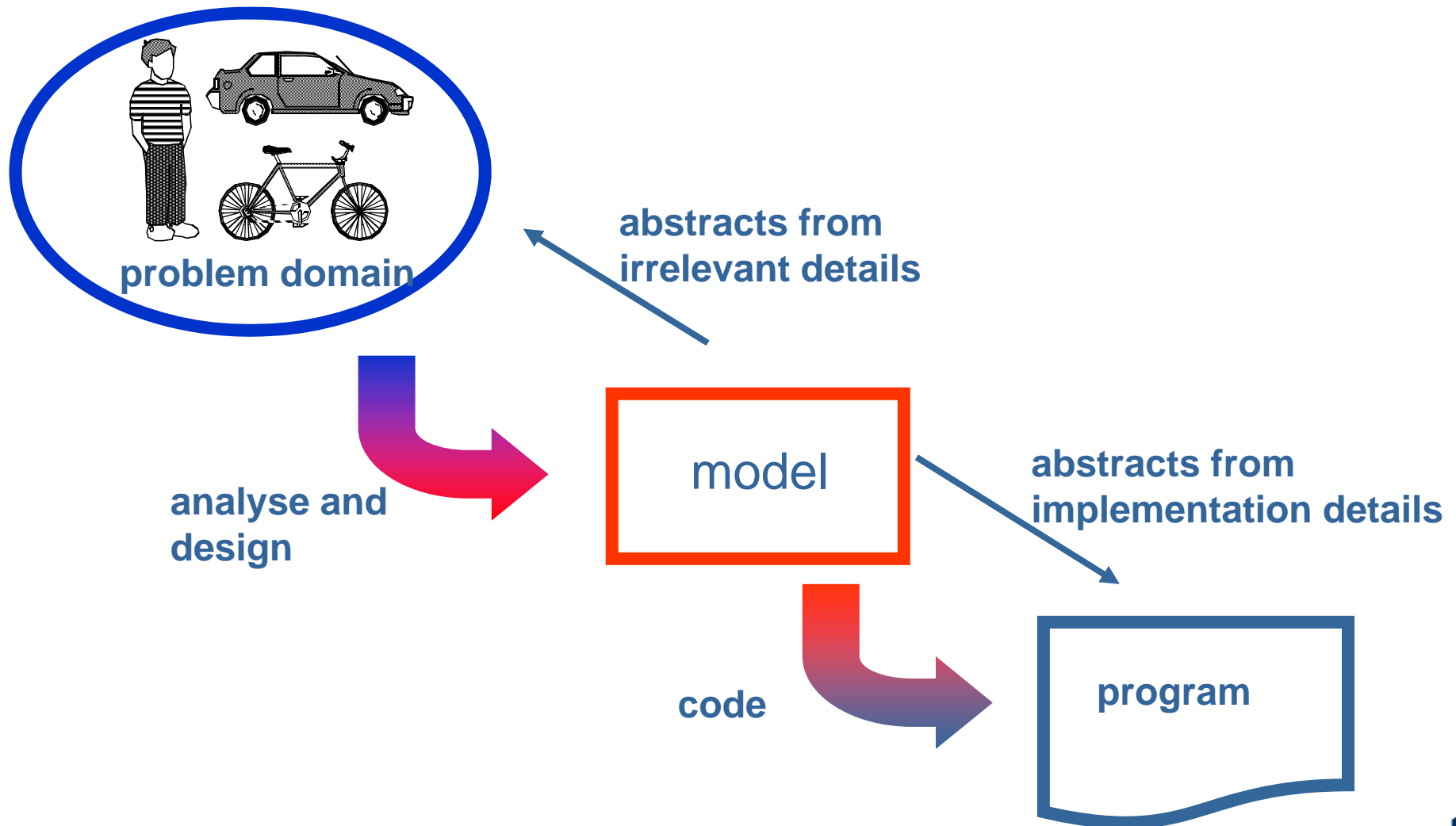
III.3 UWE

III.4 WebML

III.5 Related and Future Work



Model-Driven Development (MDD) Model-Driven Engineering (MDE)



Literature

- G. Kappel, B. Pröll, S. Reich, W. Retschitzegger (Ed.): Web Engineering – The Discipline of Systematic Development of Web Applications. John Wiley & Sons, 2006
- G. Kappel, B. Pröll, S. Reich, W. Retschitzegger (Hrsg.): Web Engineering – Systematische Entwicklung von Web-Anwendungen. dpunkt.verlag 2004
- G. Alonso, F. Casati, H. Kuno, V. Machiraju: Web Services – Concepts, Architectures and Applications. Springer 2004
- H. Wöhr: Web-Technologien – Konzepte, Programmiermodelle, Architekturen. dpunkt.verlag 2004
- R. Pressman: Software Engineering – A Practitioner’s Approach, 6th Edition. McGraw-Hill Higher Education 2005
- A. Eberhart, St. Fischer: Java-Bausteine für E-Commerce-Anwendungen. Hanser 2001
- J. Conallen: Building Web Applications with UML. Addison-Wesley 1999
- M. P. Singh, M. N. Huhns: Service-Oriented Computing – Semantics, Processes, Agents. Wiley 2005
- N. Koch, A. Kraus: The Expressive Power of UML-based Web Engineering, Proc. of the 2nd International Workshop on Web-Oriented Software Technology (IWWOST 2002). Malaga, Spain, June 2002
- to be continued ...



Modeling Objectives

- **detailed specification**
 - as base for automatic model transformation
 - as input for realization / coding
- **reducing the complexity**
- **documentation of design decisions**
- **readable description of system structure and functionality**
- **visualization of relevant system aspects**



Technological obsolescence

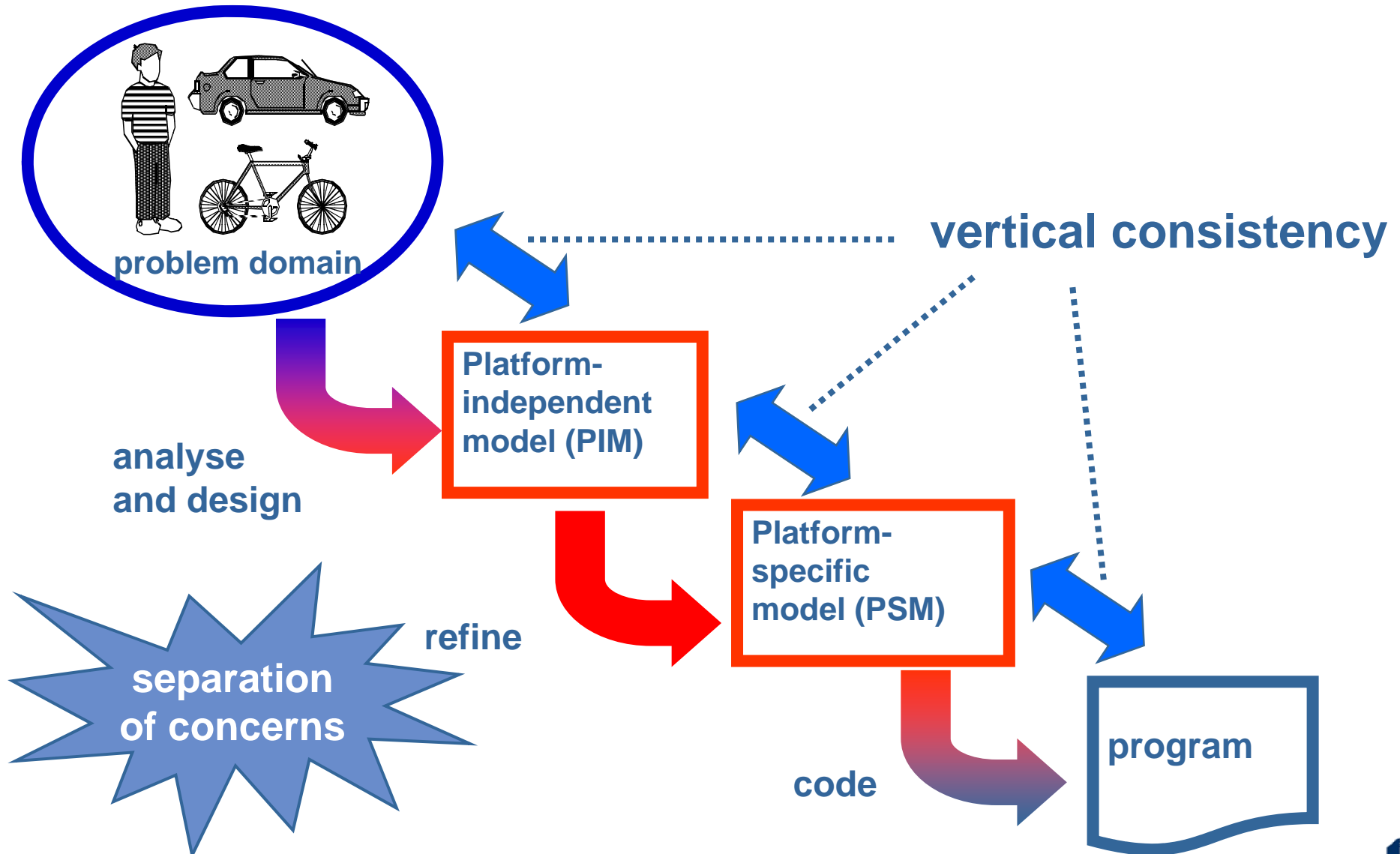
We don't want anymore to pay such a high price for simply moving our information system to a new middleware platform (COM, CORBA, Java, HTML, XML, DotNet, etc.) when our business system stays stable.

We are prepared to pay a last price for building the abstract models of our business and services that will guarantee us against technological obsolescence.

From there, any platform provider will also have to provide the mapping solutions from standard business models before we buy.

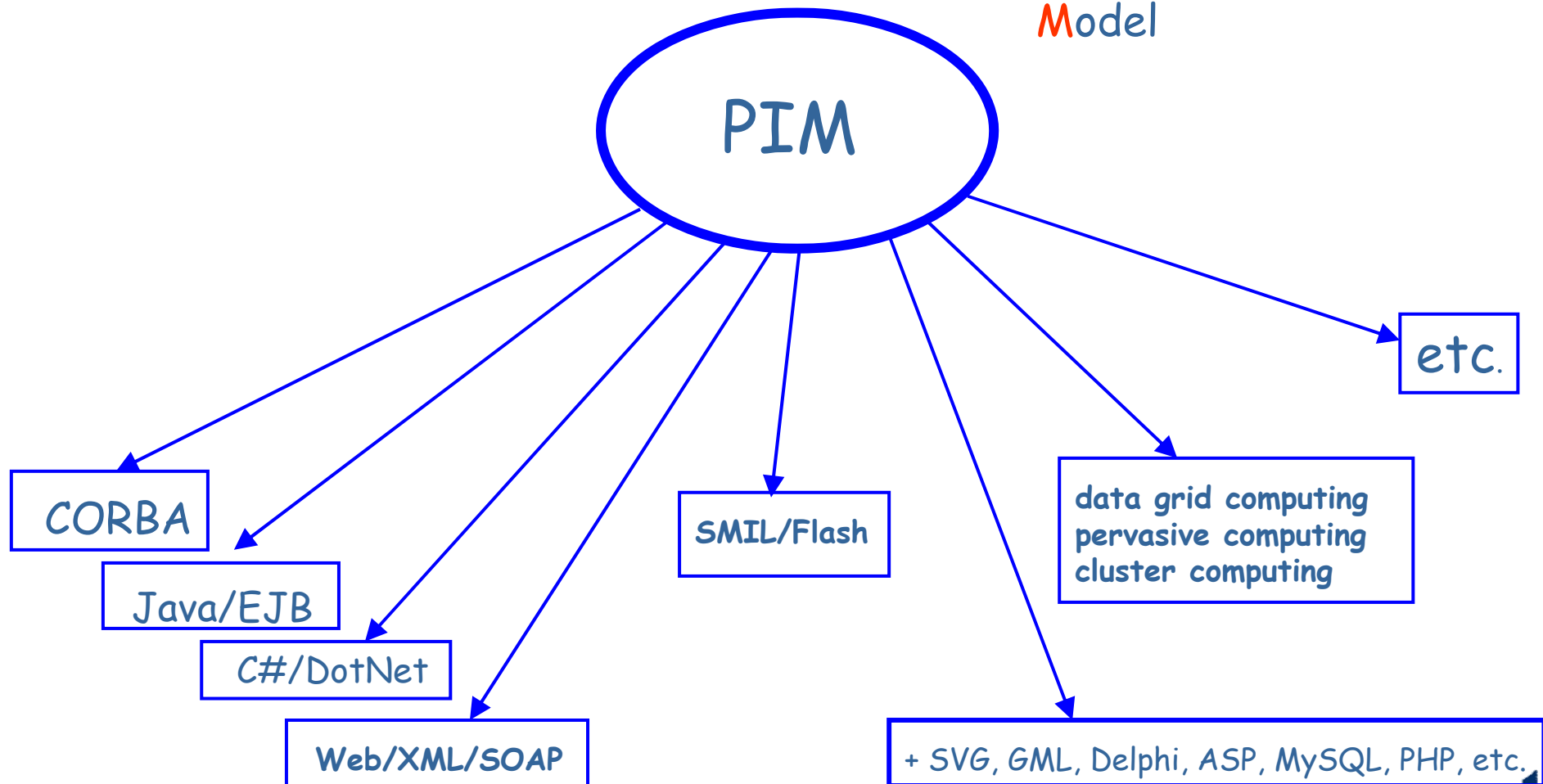


Model-Driven Architecture (MDA)



Multi-target code generation

Platform-**I**ndependent
Model



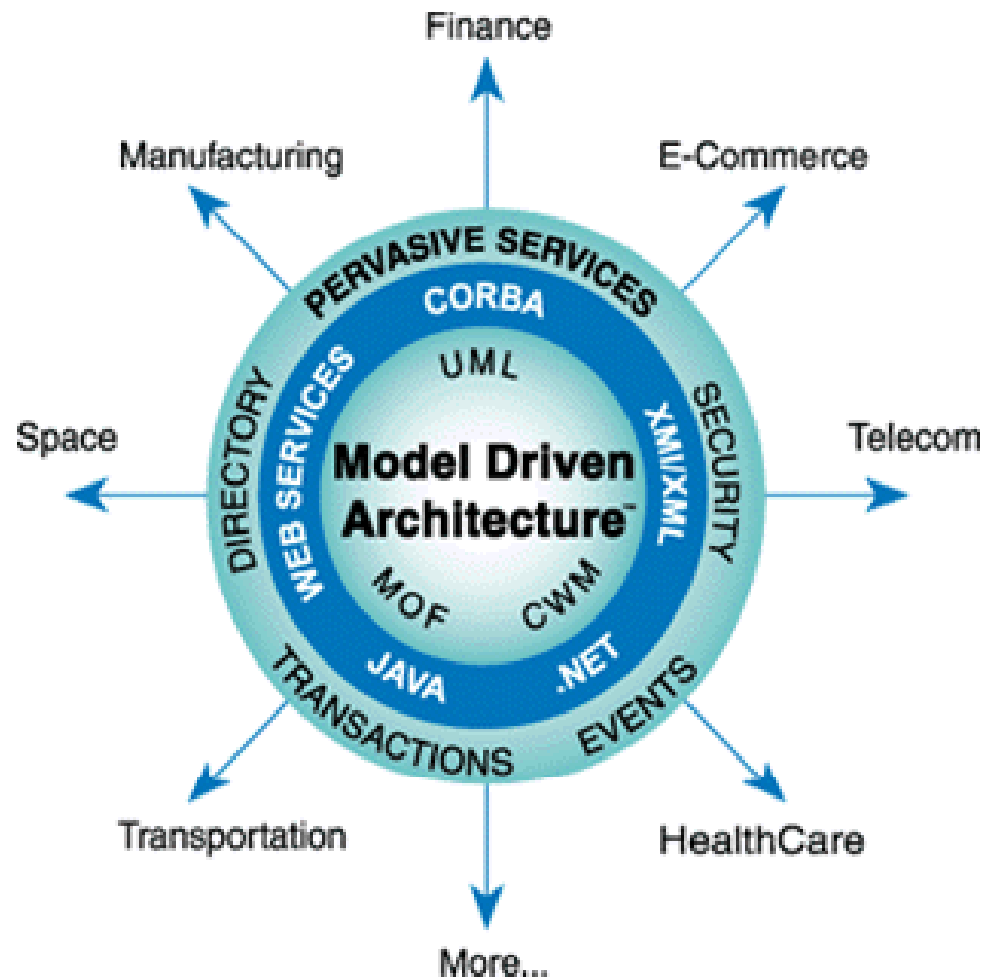
MDA™: OMG vision

The OMG (Object Management Group) is in the ideal position to **provide the model-based standards** that are necessary to **extend integration beyond the middleware approach...** Now is the time to put this plan into effect. **Now is the time for the Model Driven Architecture.**

*Richard Soley and the OMG staff,
MDA Whitepaper. November 27, 2000*



MDA™ Logo



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III.2 Modeling Dimensions

III.3 UWE

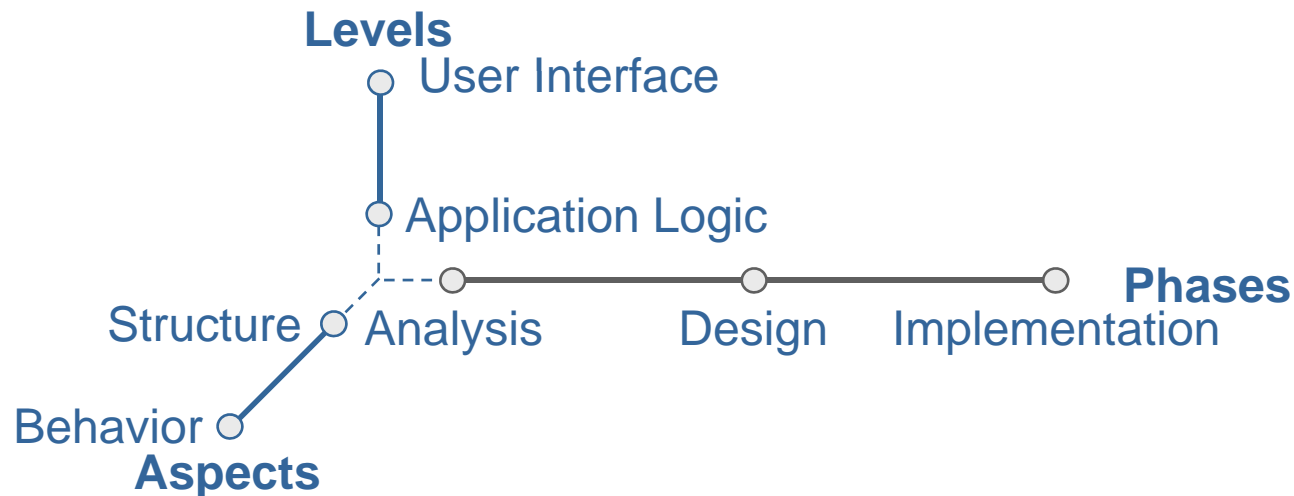
III.4 WebML

III.5 Related and Future Work



Modeling Dimensions (1)

Software systems in general



3 orthogonal dimensions

- **Levels:** inside, outside
- **Aspects:** structure, behaviour
- **Phases:** refinement steps



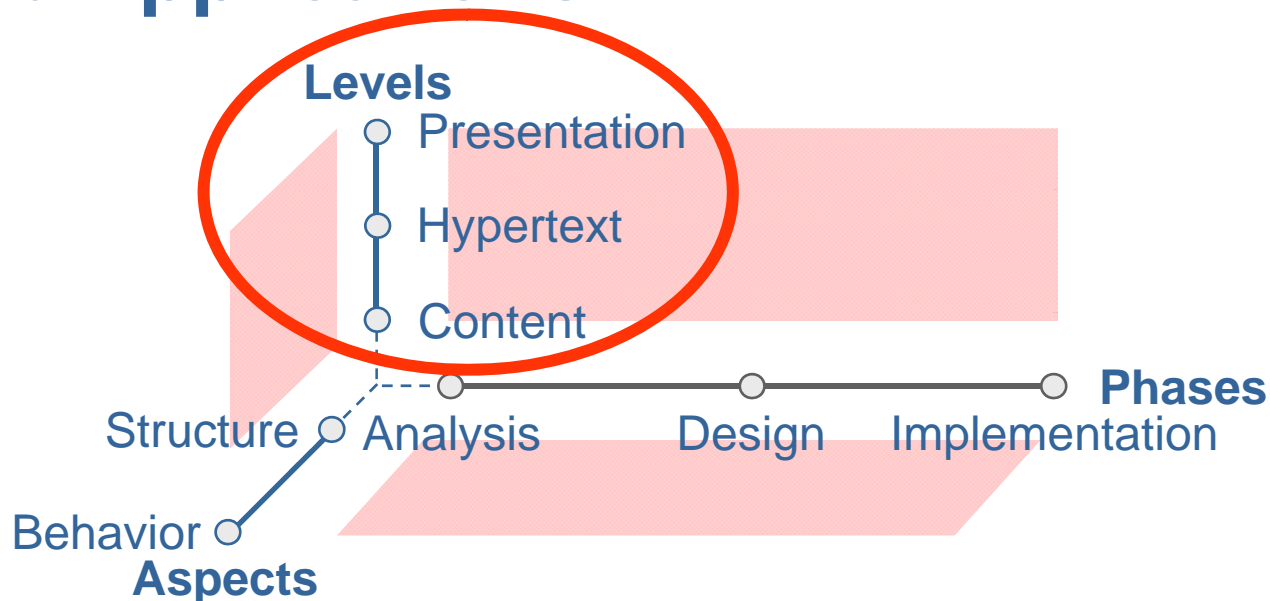
Standard Development Approaches

- Modeling Language
 - Unified Modeling Language (UML 2.0)
- Implementation Language
 - Java, C++, C#, ...
 - GUI Builder
- Development Process
 - RUP (Rational Unified Process)
 - Agile Process, eXtreme Programming



Modeling Dimensions (2)

Web Applications



3 Levels

- **Content:** information structure and application logic
- **Hypertext:** nodes and links
- **Presentation:** user interface design



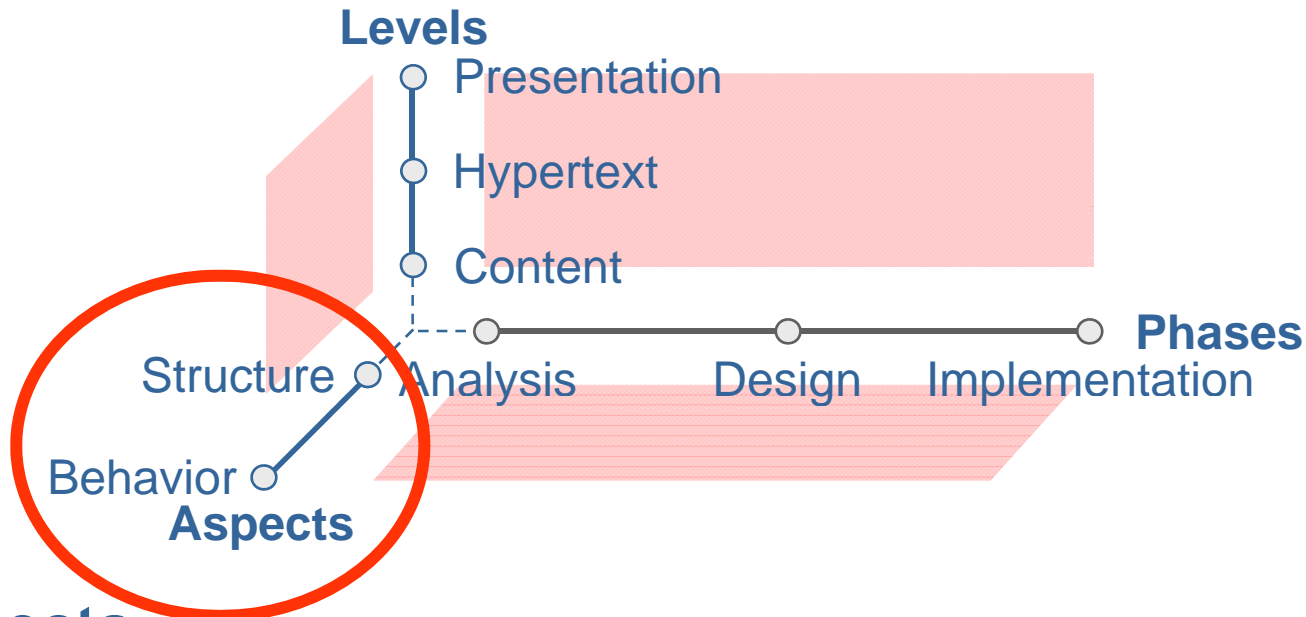
Benefits of Level Separation

- model evolution
- layered model stack
 - different hypertext structure on top of the same content
 - different presentation models on top of the same hypertext model
- different modeling objectives
 - content: no redundancy vs.
 - hypertext: planned redundancy, i.e., information may be retrieved via different navigation paths



Modeling Dimensions (3)

Web Applications



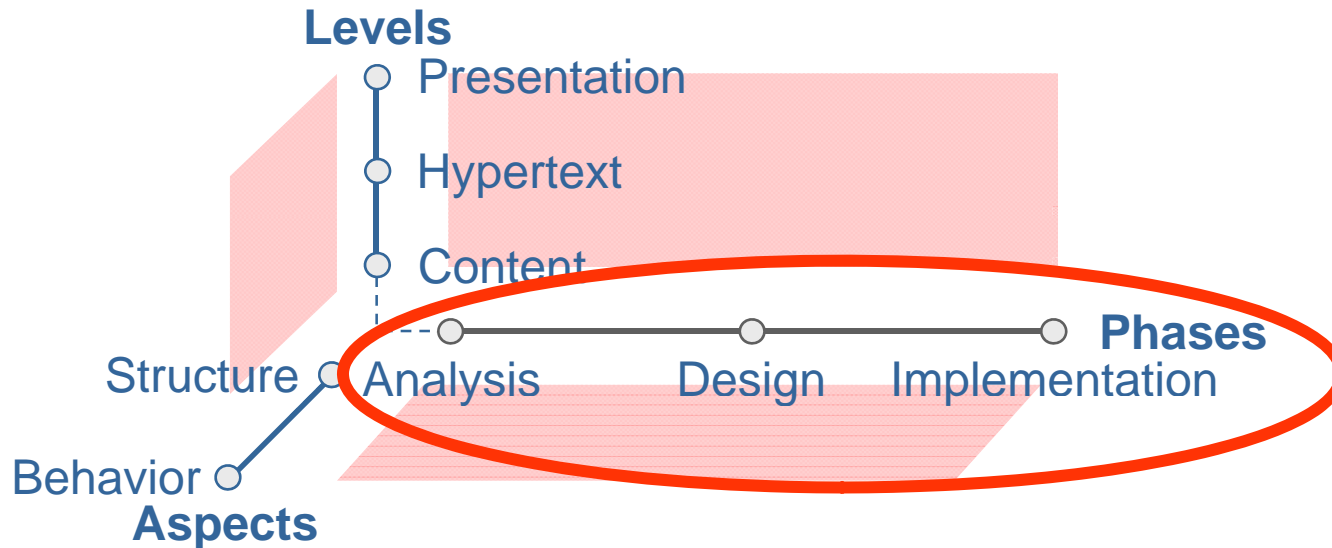
Aspects

- **different amount of structure and behavior**
 - less behaviour in static website applications
 - focus on behaviour in highly interactive applications
- **unified modeling approach recommendable**



Modeling Dimensions (4)

Web Applications



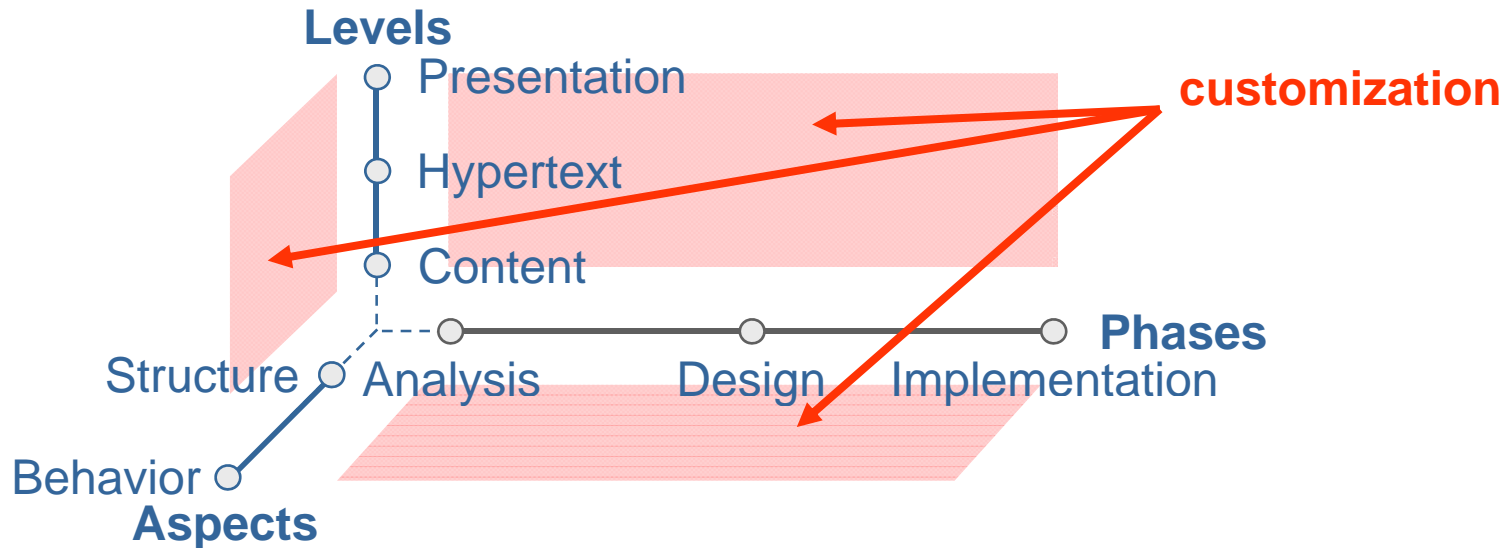
Phases

- **no general agreed process for web applications yet**
- **different approaches**
 - information-driven (“content first”)
 - presentation-driven (“layout first”)
 - prototype-driven, agile (“test first”)



Modeling Dimensions (5)

Web Applications



adaption (customization), evolution

- on all levels
- of all aspects
- during all phases

to be taken into account!

