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Universität Paderborn

Conceptual Modelling of Styles for Mobile Systems

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International Graduate School
Dynamic Intelligent Systems

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Motivation

- Unlike distribution, **mobility is hardly transparent** to application developers
- Various "kinds" of mobile systems
 - with different **network organizations** (nomadic, ad-hoc, ...)
 - based on different **platforms** (Wireless Corba, J2ME, ...)
 provide different functionality to applications
- We need to understand *what* can be done, and *how*,
 - for building applications: **What happens if I do XYZ** ...
 - for designing middleware: **How do I add QOS support** ...
 - ... in this network / on this platform?

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Example

- What will happen if new QOS requirements arise from client application?

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Requirements

Styles of Mobile Systems should capture the **structure and operation** of a class of mobile systems

- precisely (with formal, executable models)
- understandably (to software engineers)
- at a high level of abstraction (to relate to application requirements)

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Outline

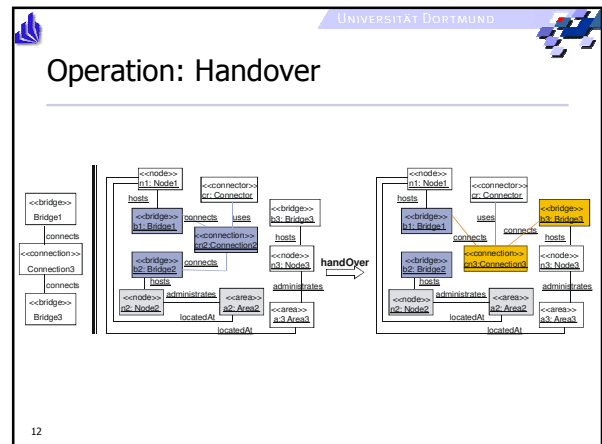
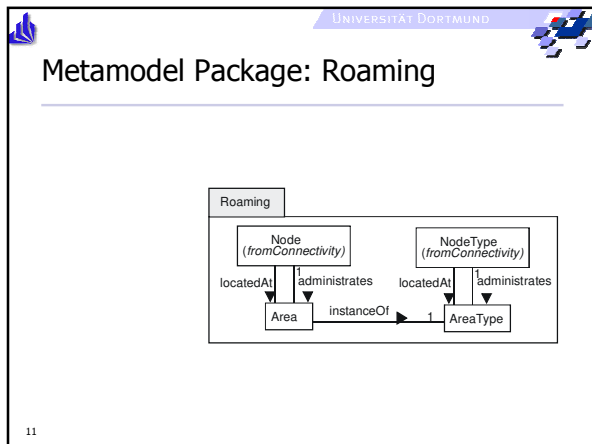
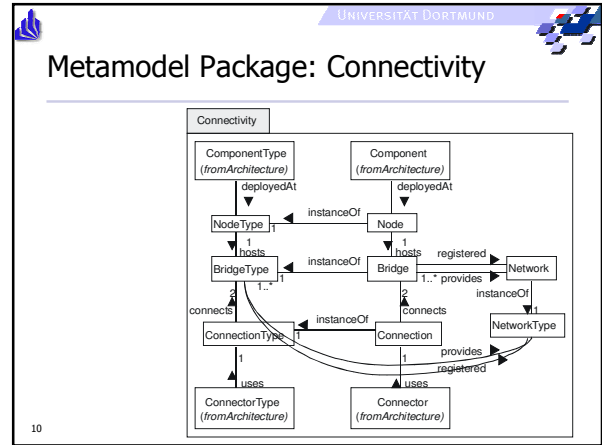
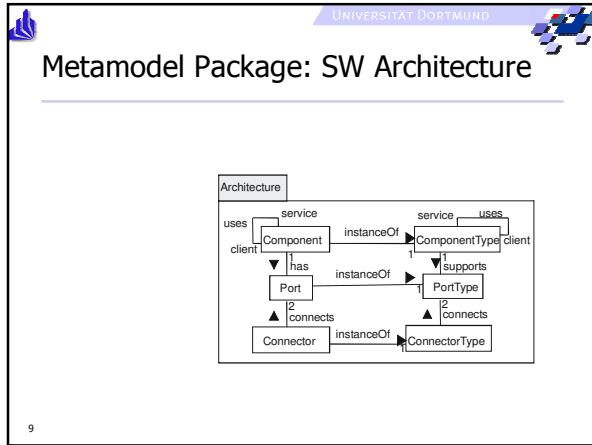
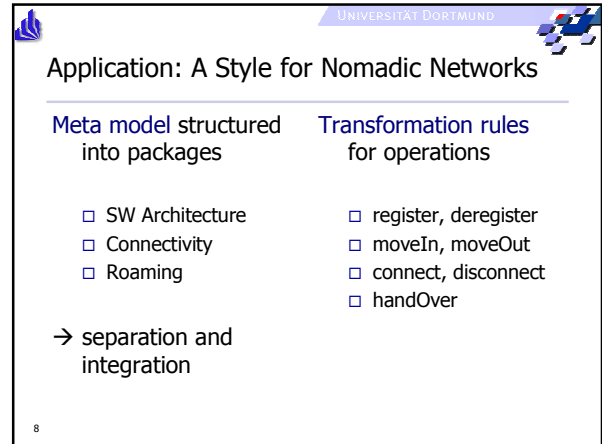
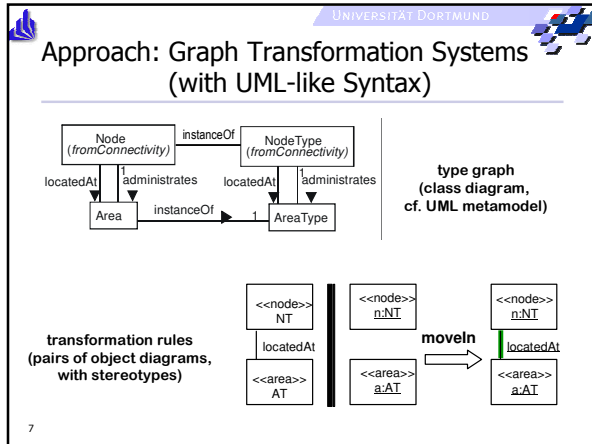
- Approach: Graph Transformation and UML
- Application: A Style for Nomadic Networks
- Adding QOS-awareness
- Example (revisited)
- (Potential) Benefits

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Approach: Graph Transformation Systems

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Adding QoS-awareness

- monitor properties of resources (like bandwidth of network connection)
- match requirements against properties
- negotiate contract if requirements are not satisfied

Handover with QoS

Example (revisited)

- What will happen if new QoS requirements arise from client application?

Configuration before Handover

Configuration after Handover

(Potential) Benefits

What can we do now?

- classifying mobile systems by modelling styles (and comparing the models)
- use models for analysis, simulation and testing (of applications or middleware)
- study refinement relations between styles different levels (Nomadic → Wireless Corba)

