The UML 2.0 Testing Profile

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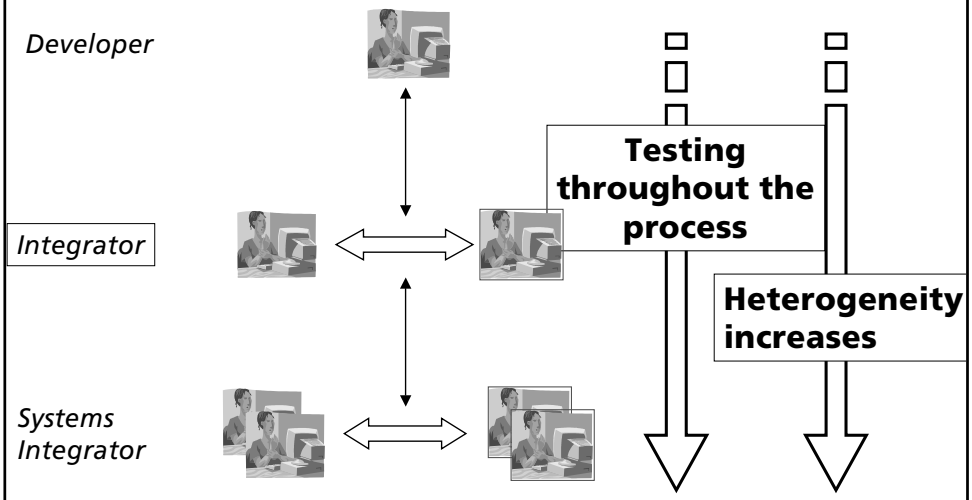
TAV 20, 16.-17. Oktober 2003

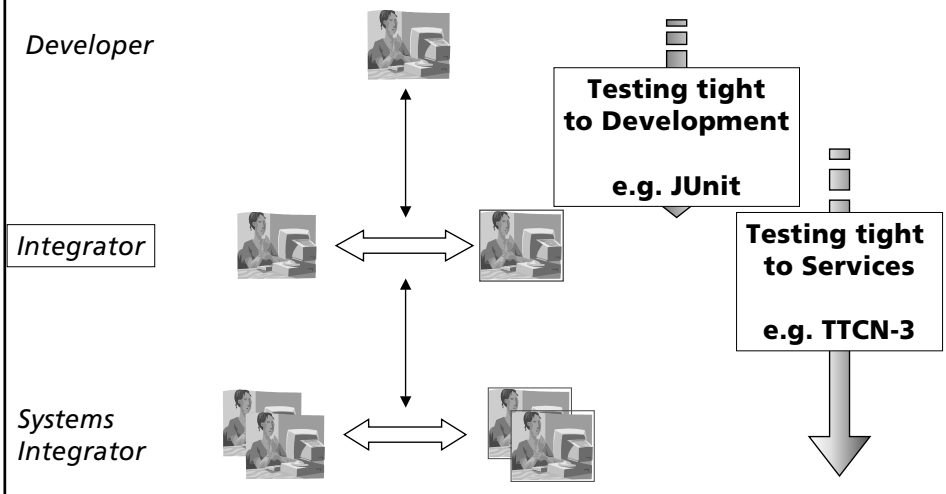
Outline

- Introduction
- The Testing Profile Concepts
- An Example
- The Definition of U2TP
- Outlook

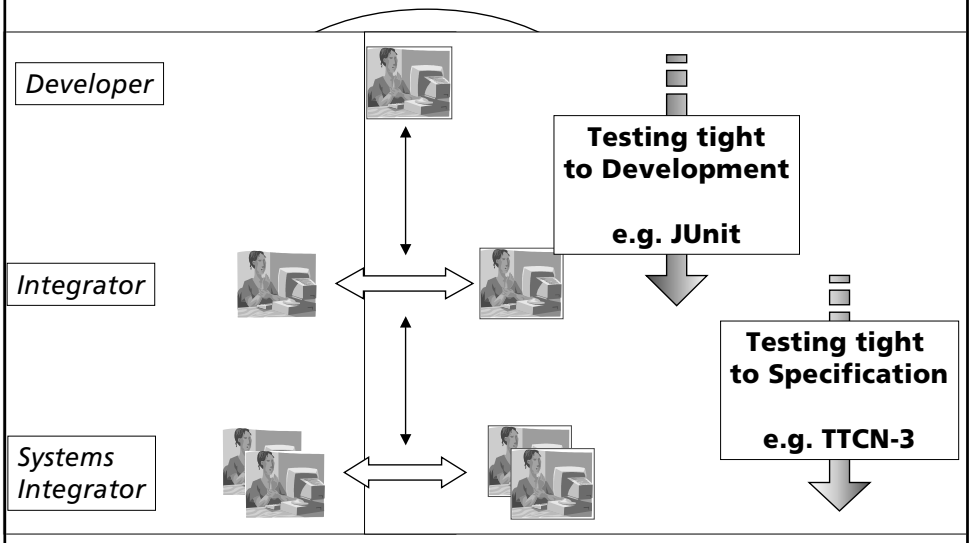
Introduction



Introduction: Balanced View



An Answer: Modell-Based View



UML and Testing

- UML-based test generation, e.g.
  - Integration testing, Siemens, 2000
  - Component test framework (TINA), FOKUS, 2000
  - Component testing (COTE), INRIA, 2001
- UML-based test notation, e.g.
  - Agedis, EC IST project
  - TeLa, COTE project
  - UML Testing Profile, OMG

UML and Testing

- Model Driven Architecture as new OMG strategy
  - One objective of UML 2.0 is executable UML meaning
    - code generation
    - simulation
    - validation
    - test generation
  - "..., the expanded role of the OMG must be built on rock-solid testing, certification and branding. …"

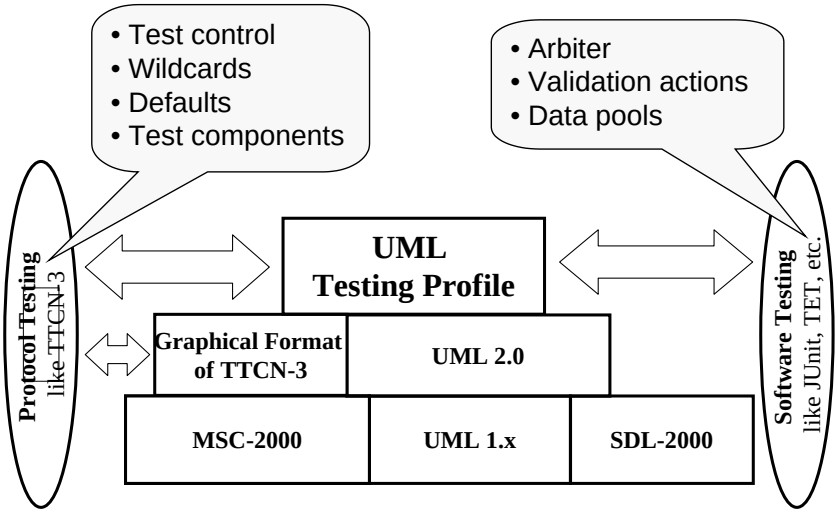
Goals of the UML Testing Profile

- Definition of a testing profile to capture all information that would be needed by different test processes
  - To allow black-box testing (i.e. at UML interfaces) of computational models in UML
- A testing profile based upon UML 2.0
  - That enables the test definition and generation of structural (static) and behavioral (dynamic) aspects of UML models in an implementation independent manner, and
  - that is capable of inter-operation with existing test technologies for black-box testing

U2TP Partners

- A consortium of testers, UML vendors and users dedicated to make UML applicable for software testing
- Submitters
  - Ericsson
  - IBM
  - FOKUS
  - Motorola
  - Rational
  - Softeam
  - Telelogic
  - University of Lübeck
- Supporters
  - iLogix
  - ScapaTechnologies
  - IRISA

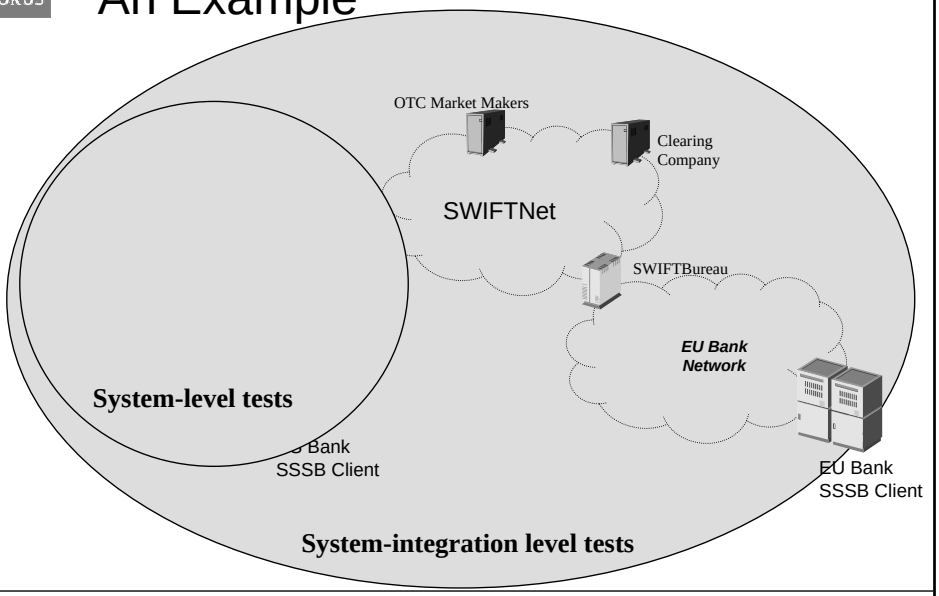
The Testing Profile Roots



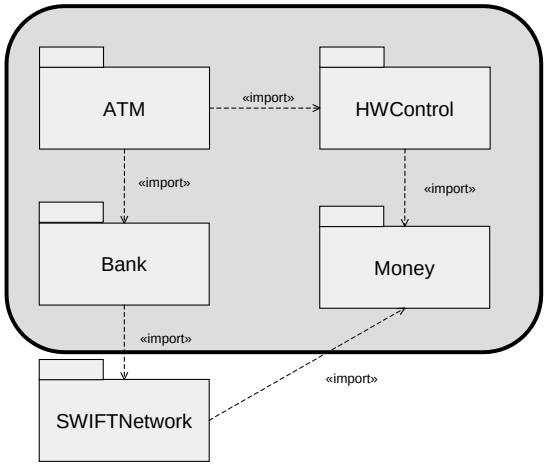
Concepts of the Testing Profile

- Test architecture
  - Test structure, test components and test configuration
- Test data
  - Test data and templates used in test procedures
- Test behavior
  - Dynamic aspects of test procedures
- Test time
  - Time quantified definition of test procedures

An Example

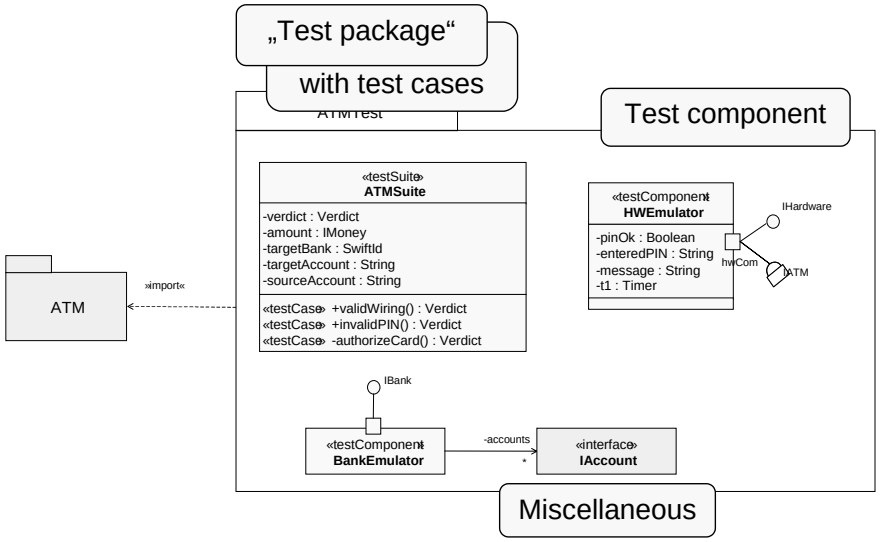


An Example

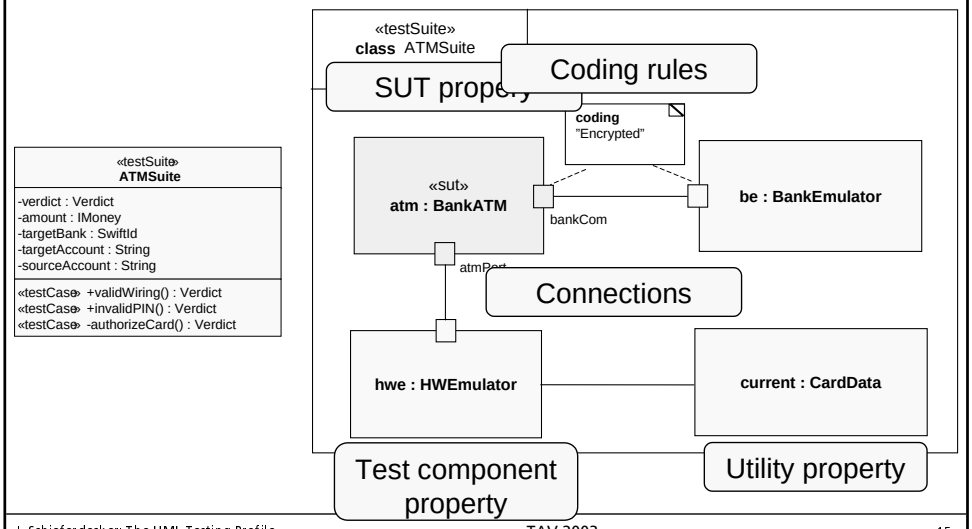


System Test

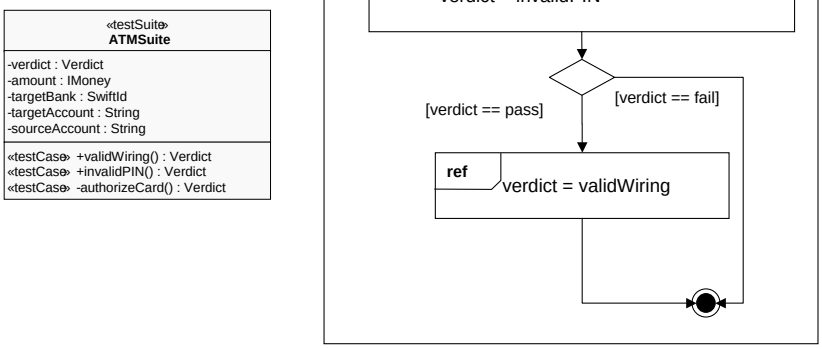
System Level Test



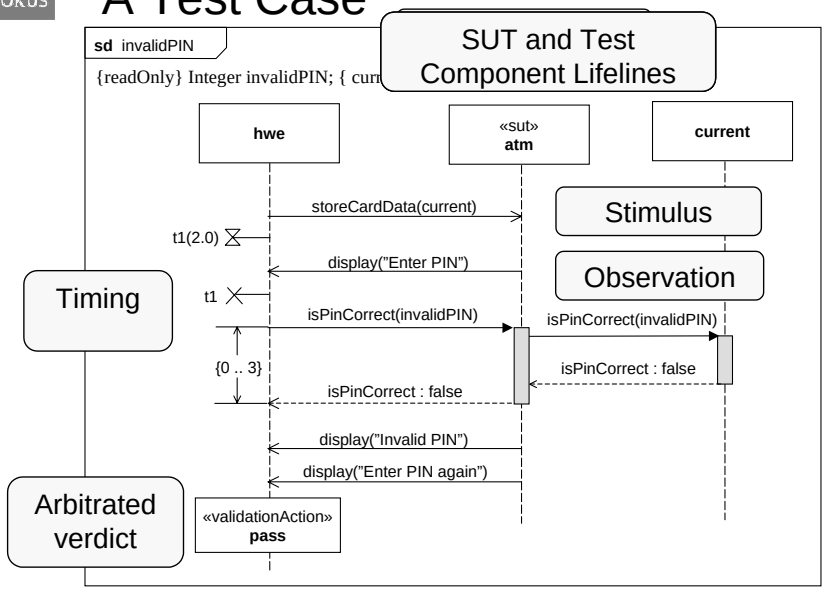
Test Configuration



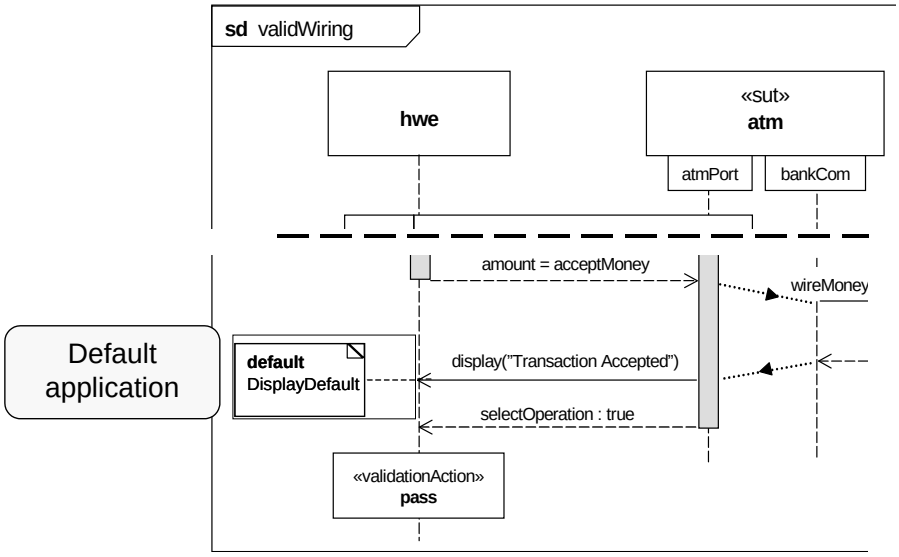
Test Control (Execution of Test Suite)



A Test Case

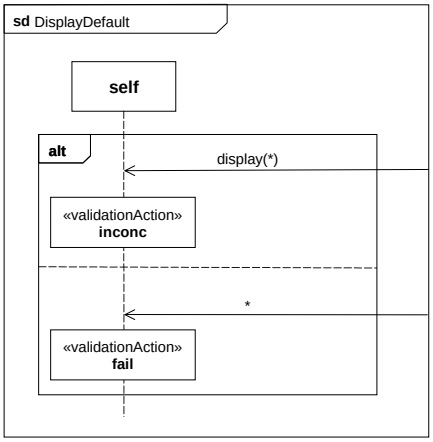


A Test Case with Default (Extract)

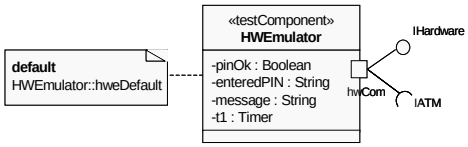


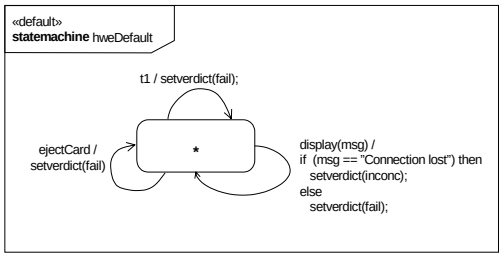
Defaults

Defining an event-specific default



Applying a component-specific default





Defining a component-specific default

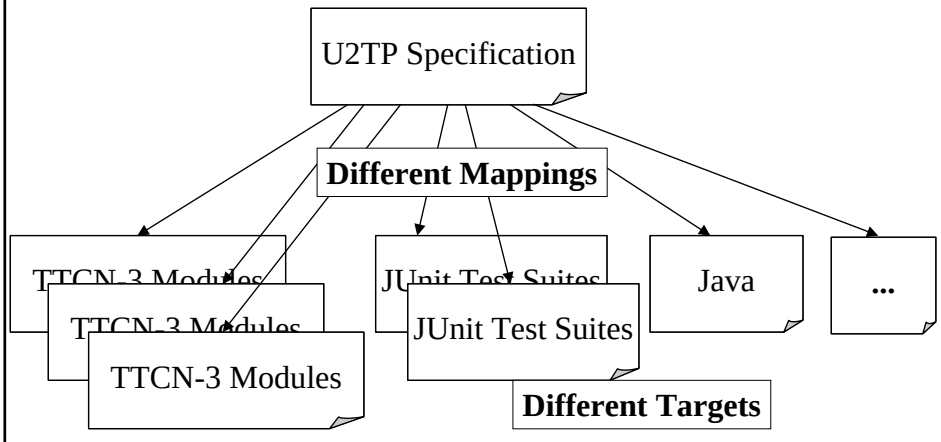
The U2TP Definition: Metamodels

- The UML-based profile
  - Used by UML tools to provide test specification via profiled UML elements
- The MOF-based standalone metamodel
  - Used by MOF-based tools and repositories to manage and manipulate artifacts created using the profile

The U2TP Definition: Mappings

- To enable the direct execution of U2TP specifications by reusing existing test infrastructures
- Mappings to
  - The JUnit test framework
    - An open source test technology for Java
    - Black-box tests on unit level
    - ➢Only selected concepts of U2TP can be mapped
  - The Testing and Test Control Notation TTCN-3
    - A generic test technology by ETSI/ITU-T
    - Black-box/grey-box tests on unit, component, integration and system level
    - ➢Almost all concepts can be mapped

The U2TP Definition: Mappings



➢The mappings define possible, but not the only mappings

Summary

- UML Testing Profile provides specification means for test artifacts of systems from various domains
- Enhances UML with concepts like test configuration, test components, SUT, verdict and default
- Seamlessly integrates into UML: being based on UML metamodel, using UML syntax

➢Direct support for test design
➢Integration with the system development process
➢Being realized by IBM/Rational, Telelogic, and others

Thank you for your attention!

→ www.fokus.fraunhofer.de/u2tp

Questions?