



## Requirement-Based model-centric Testing

Dr. Andreas Birk, Software.Process.Management  
Florian Prester, sepp.med

ReVVerT 2011, Berlin  
Friday, 25.03.2011

# Who are we?

- ■ Service Provider
  - QS & Test
  - Development
  - Consulting
- Tool vendor
  - .getmore
  - .mzT
- HP & MS Partner
- Trainings Provider



**sepp.train**



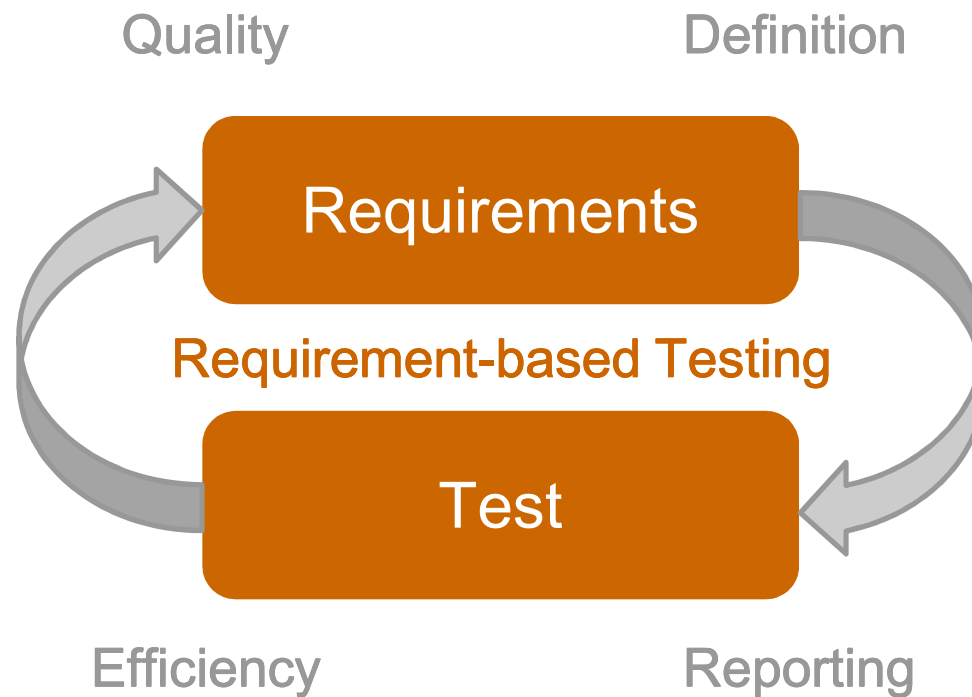
- ■ Tailoring Software-Processes to Business Goals - optimally:
  - Requirements-Management
  - Test & Test Management
  - Software-Product Variants
  - Product Management
- Consulting – Training – Coaching
- Networks and Communities
  - Vivit TQA – Vendor independent  
User Community of HP Software  
[www.vivit-tqa.org](http://www.vivit-tqa.org)



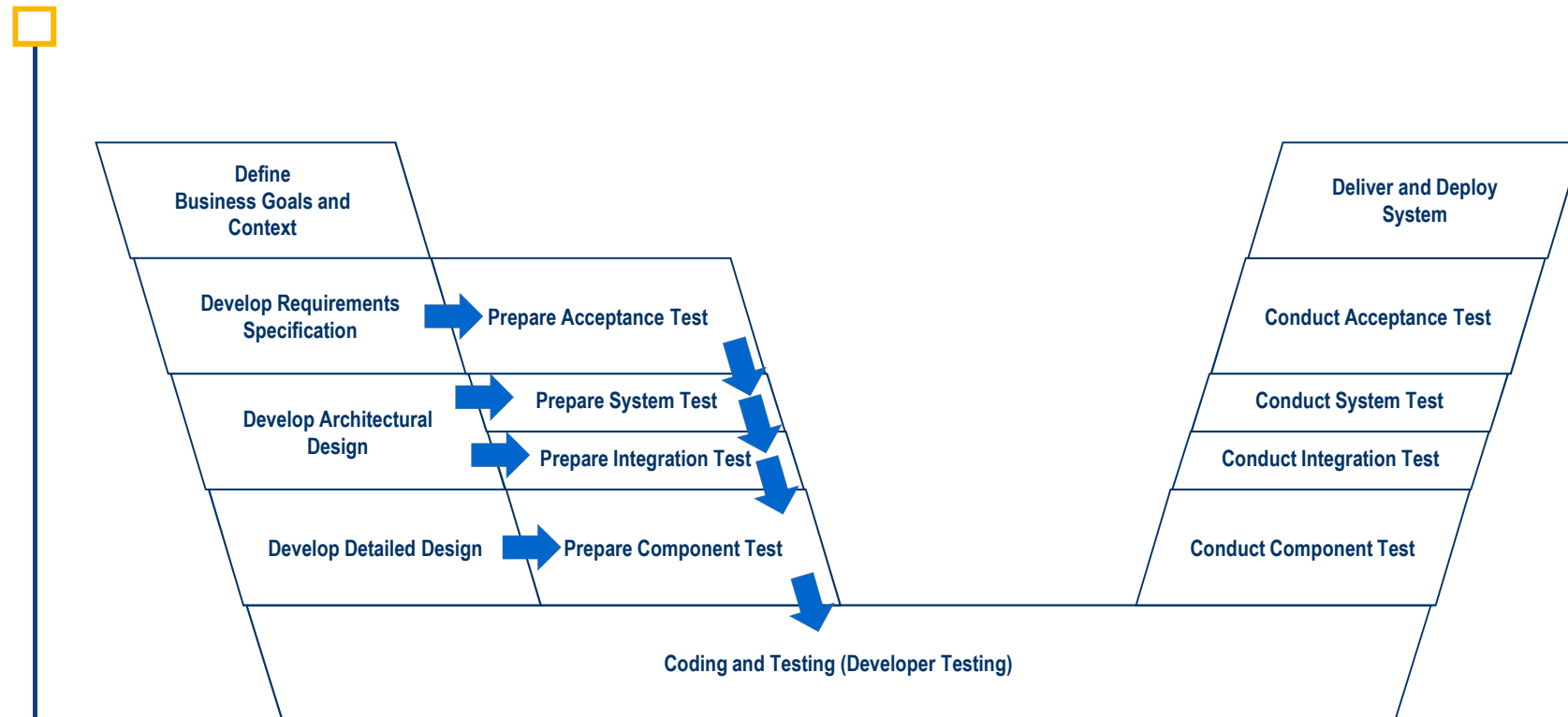
# Agenda

- ■ Requirement-based Testing
- Model-based Testing (MBT)
  - .mzT
  - .getmore
- Requirement and Test Management in a Box
- Conclusion

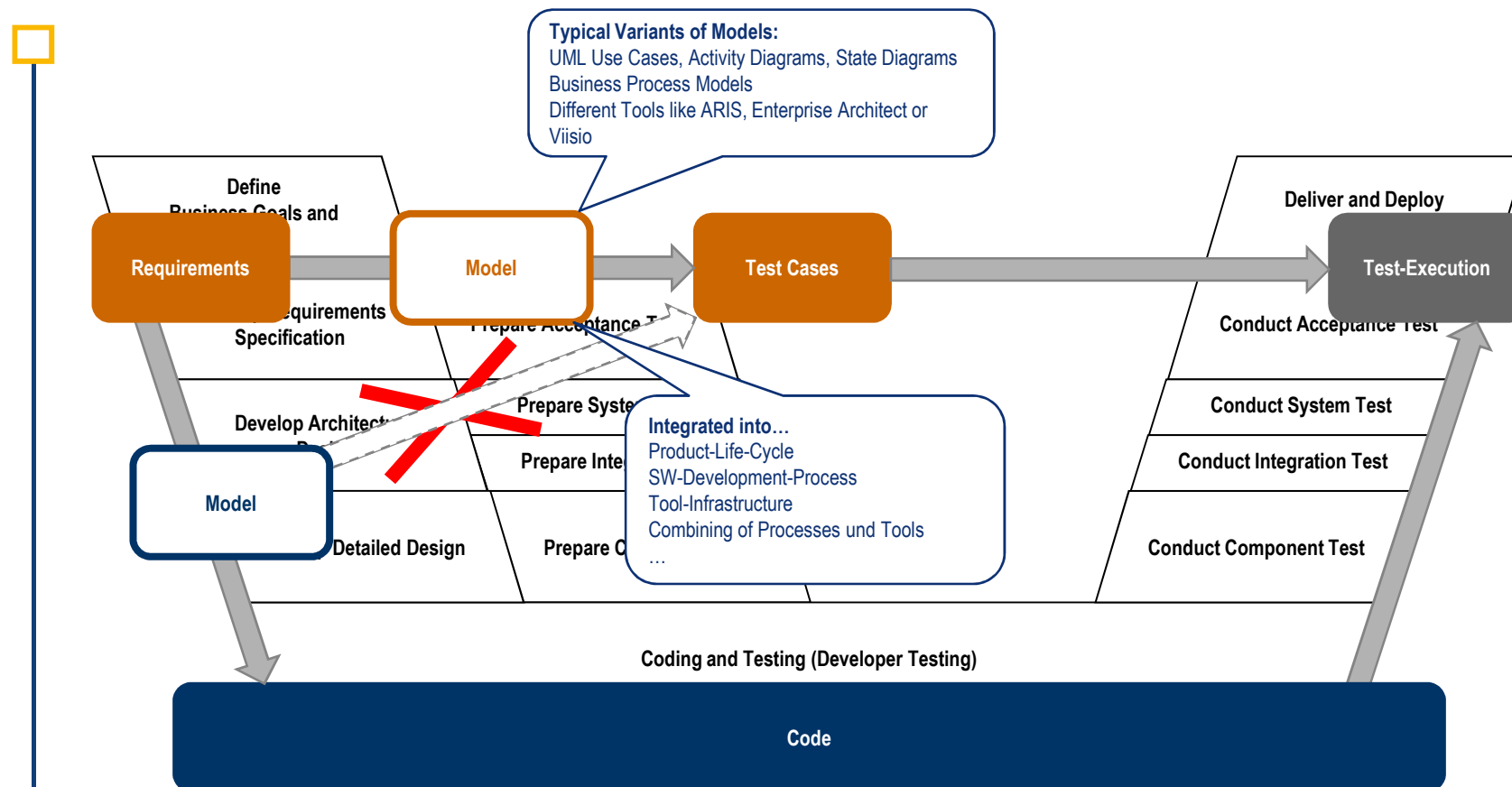
## IT & Software-Development improve your Business



# Requirement-based Testing



# Model-based Testing




## Requirement-based Testing

- ■ Each System State must be defined, as
    - Requirement (ideally ☺)
  - Each Test State must be defined, as
    - Requirement
- Modelling helps to find missing requirements



## Model-based Testing

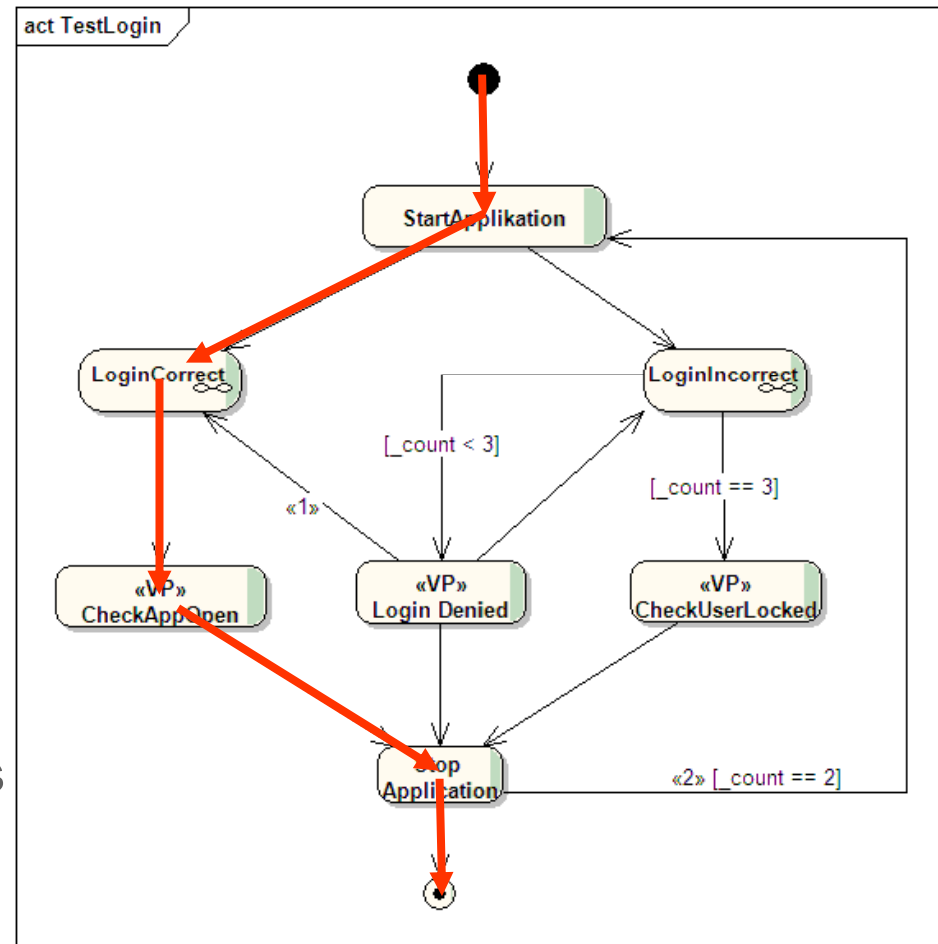
- ■ Modelling means using abstraction
  - Abstraction means reducing details
  - Concentrating on the important facts
- Our test, system, SUT, etc. is too complicated to be modelled ☹
- Write all test cases manually?



If you cannot model your Test,  
You cannot run the test  
Because you do not understand your SUT!

# What is MBT?

- Using a Model!
- .. describing the SUT, Behaviour, ...
- What is a Test Case?  
Every valid path through the graph
- Where do I get those paths?  
Many different strategies and tools ☺



## MBT – Steps of Evolution

- ■ Model-Oriented Testing
  - Using a Model
- Model-Driven Testing
  - Generate Test Cases
- Model-Centric Testing
  - Generate Test Cases
  - Re-Integrate Results in Test Model

## ■ .mzT – Das modellzentrierte Testen

- SUT-Definition: model type independent
- Test management within the model
- communication and review
- Structure and priority
- Visualisation of test-run results or test suites
- Integration in development process

■ mzT  
modellzentriertes Testen

## Model - what Art?

- ■ UML
  - Activity - Diagram
  - State - Diagram
- BPMN
- ARIS
- MSCs
  
- Visio
  - Circle
  - Arrows

**SPARX**  
SYSTEMS

**MID**  
the modeling company

 **atego**<sup>TM</sup>

 eclipse

■ **mzT**  
modellzentriertes Testen

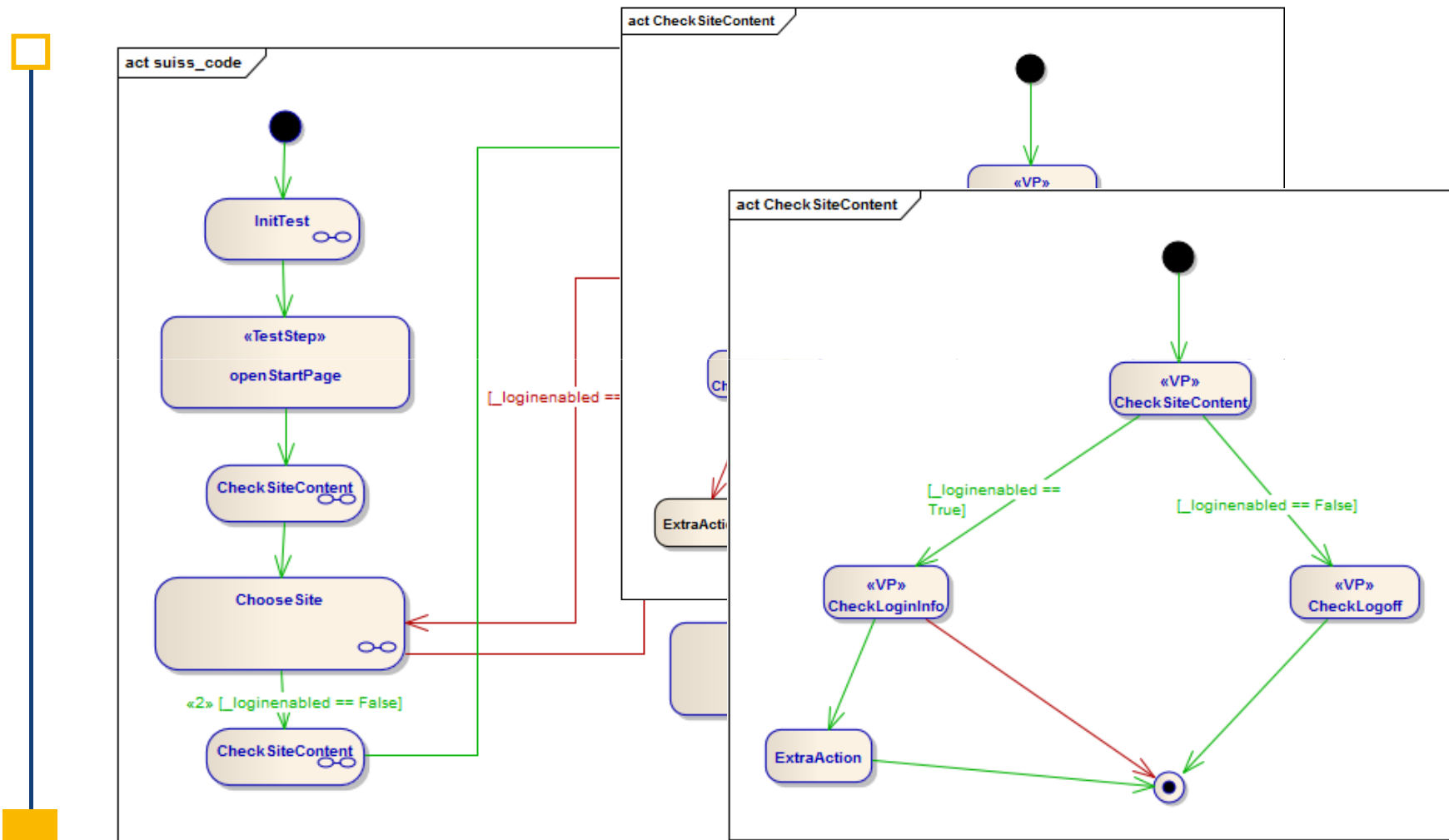
## .getmore – The Test Case Generator

### .getmore

- ☐ Many modelling tools
- ☐ Many strategies
- ☐ Systematic reduction of test cases
- ☐ Metrics/statistics
- ☐ Prioritise and active generating of TCs
- ☐ Many tool links
  - Test Management
  - Test Execution
  - Test Visualisation

 **getmore**  
der Testfallgenerator

# .getmore: Visualisation

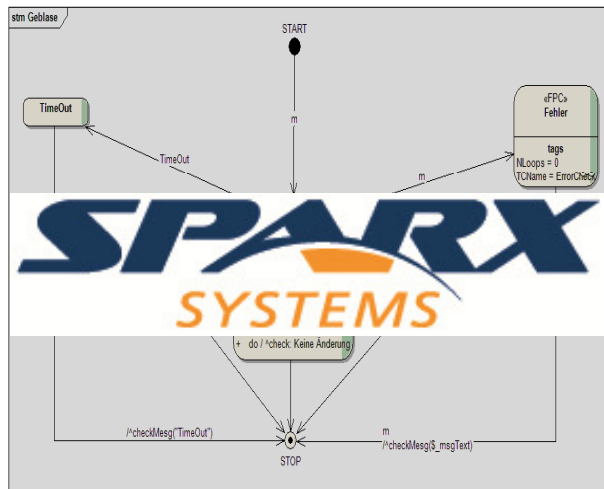




# Requirement and Test Management in one Box



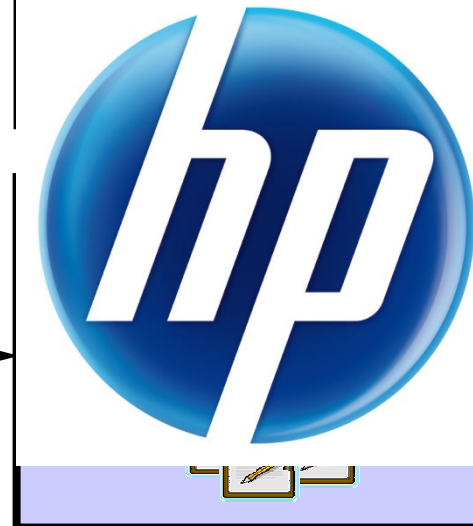
## Modelling



## Generator

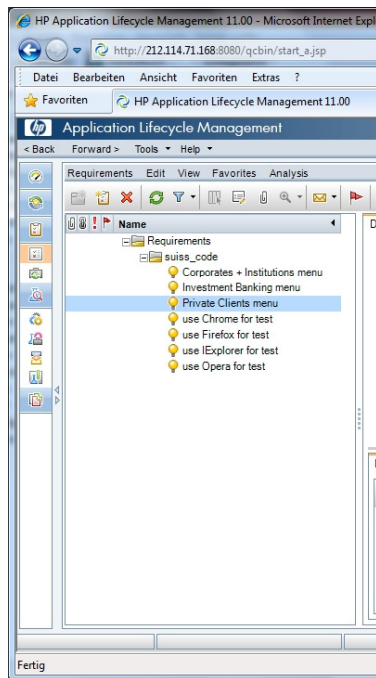


## Req. & Test-Mgmt Requirement



# Requirement-based MBT

## Req. Mgmt in QC → Req. Mgmt in Model

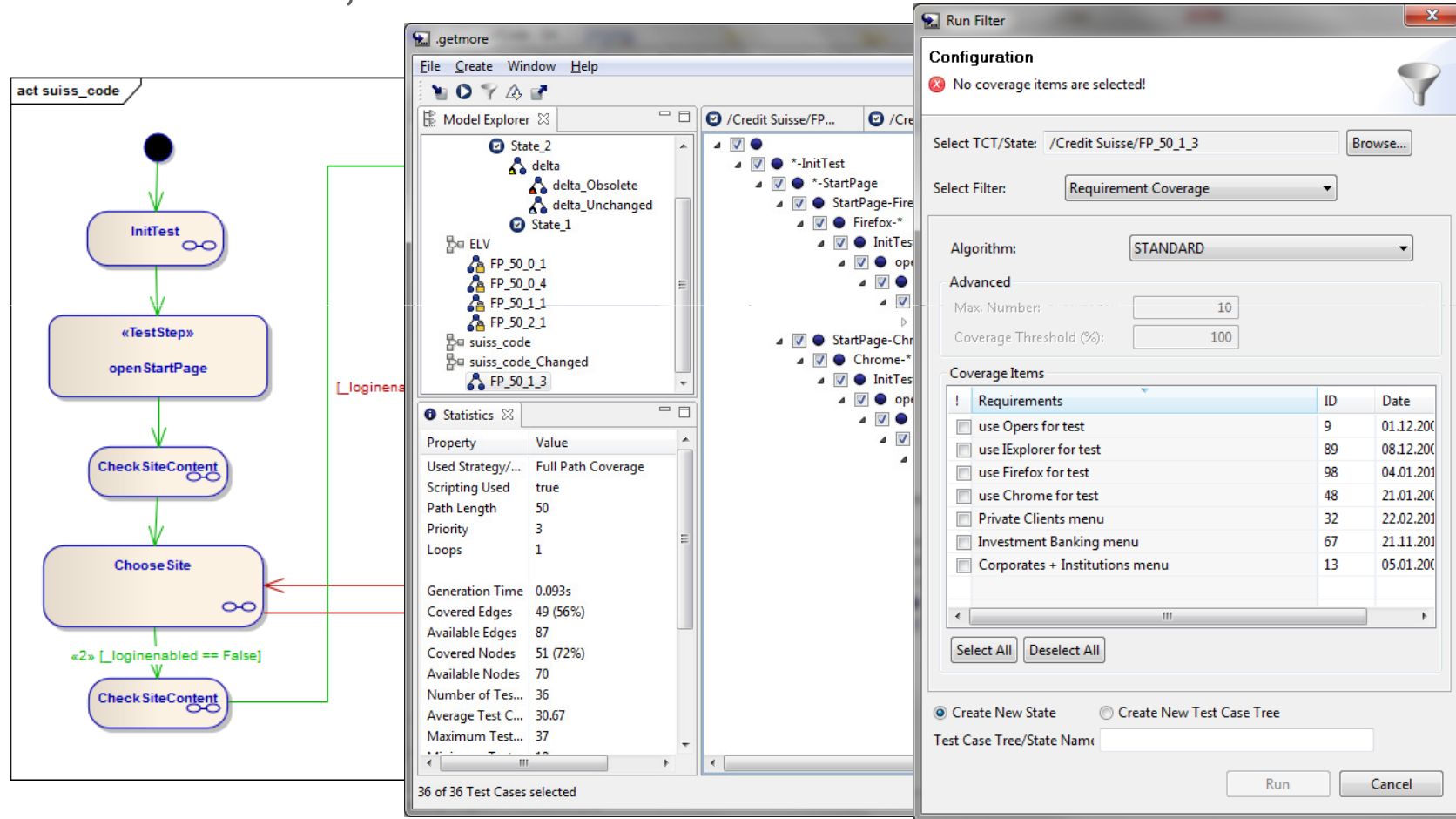


The screenshot shows the Credit Suisse website. The navigation menu includes: Privatkunden, Unternehmen & Institutionen, Investment Banking, Asset Management, Karriere, Wir über uns, Login Direct Net, and Marktdaten & Research. The main content area features a large image of a woman and a child playing soccer, with the text 'Eine Bank, die mitfiebert'. Below the image, there are three news items: 'Ein Land. Ein Team. Eine Bank.', 'Die Stars von Morgen', and 'Online Forum'. The footer contains links for 'Barrierefreiheit', 'Sitemap', 'Index A-Z', and a copyright notice for 1997-2010 Credit Suisse Group AG.



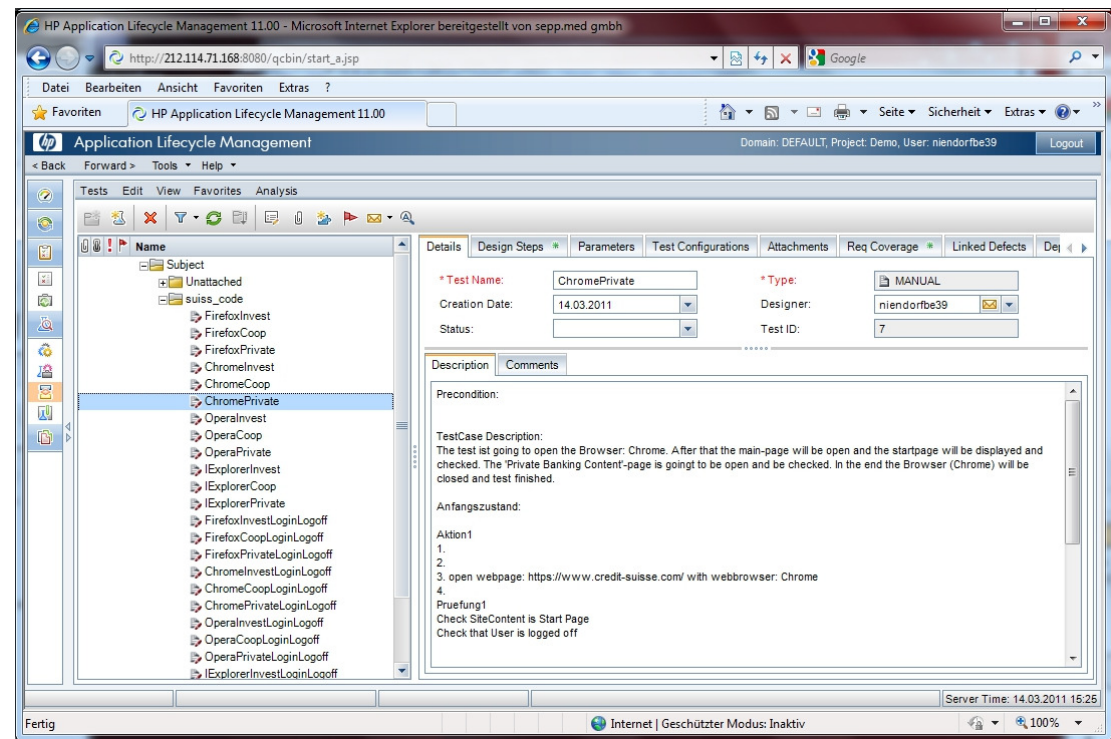
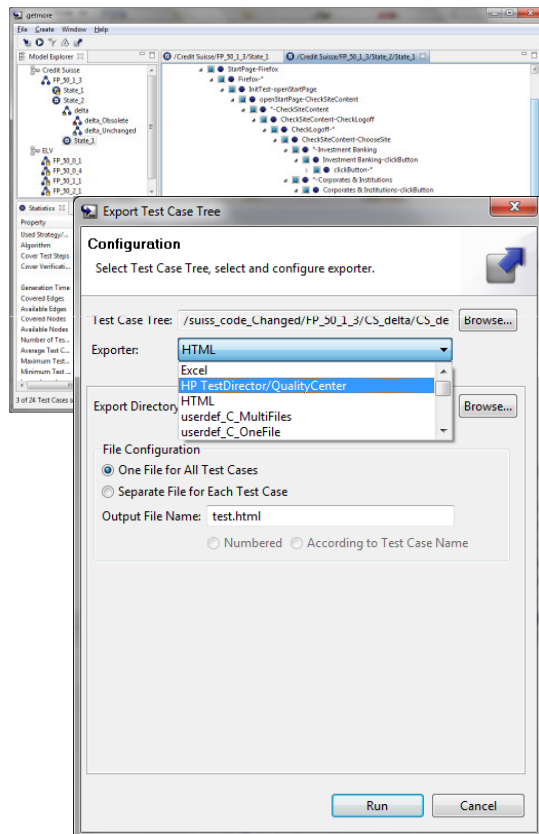
# Requirement-based MBT

## Test Model, Test Case Generation & Reduction



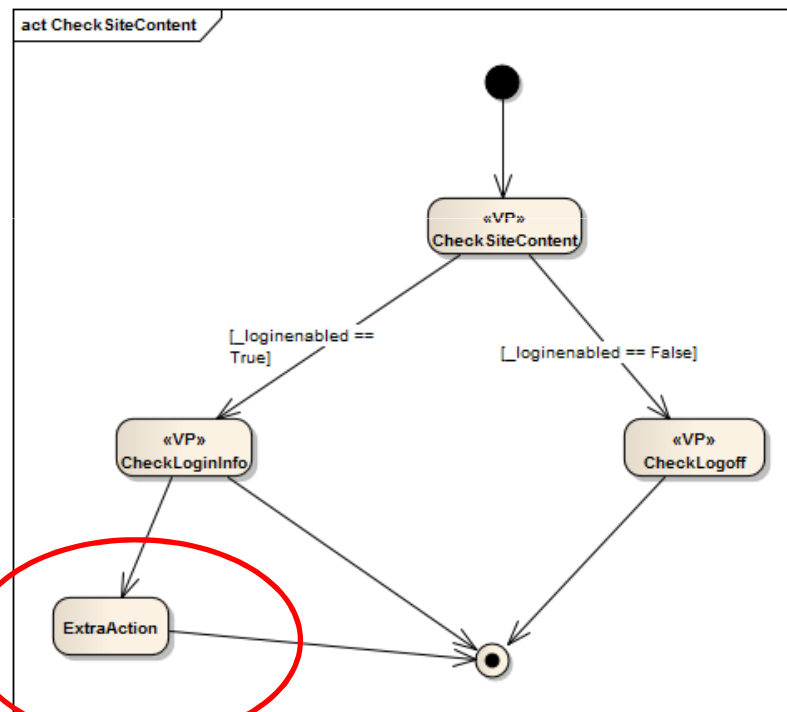
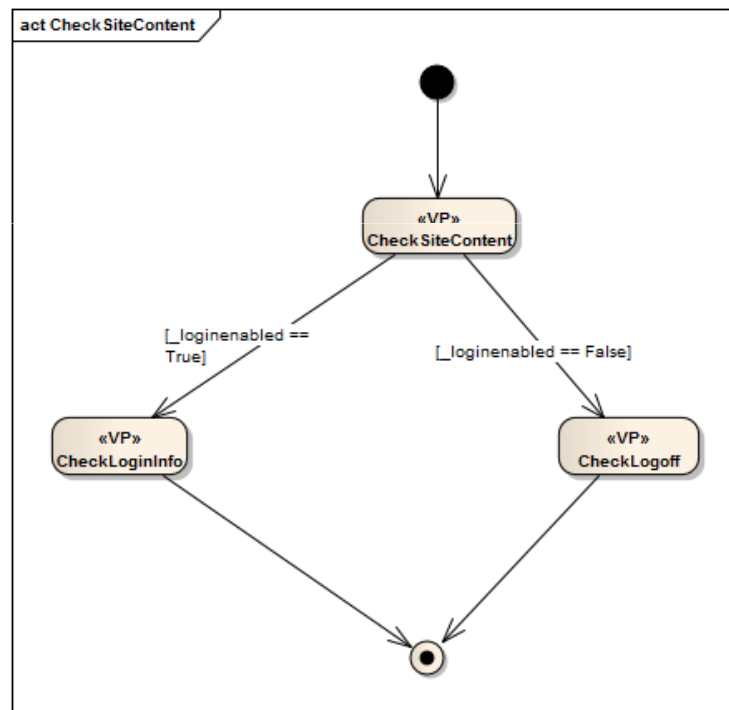
# Requirement-based MBT

## Export to QC; Connecting Req. + Test Cases



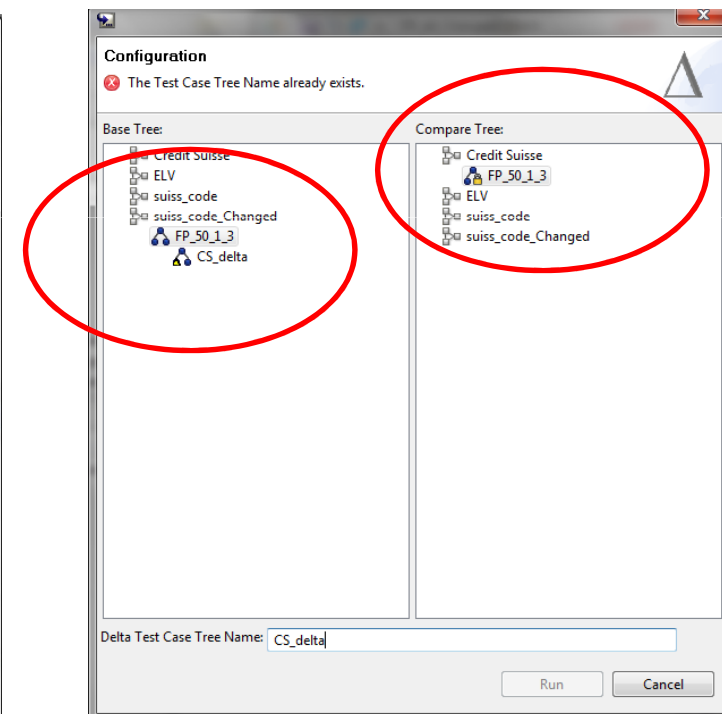
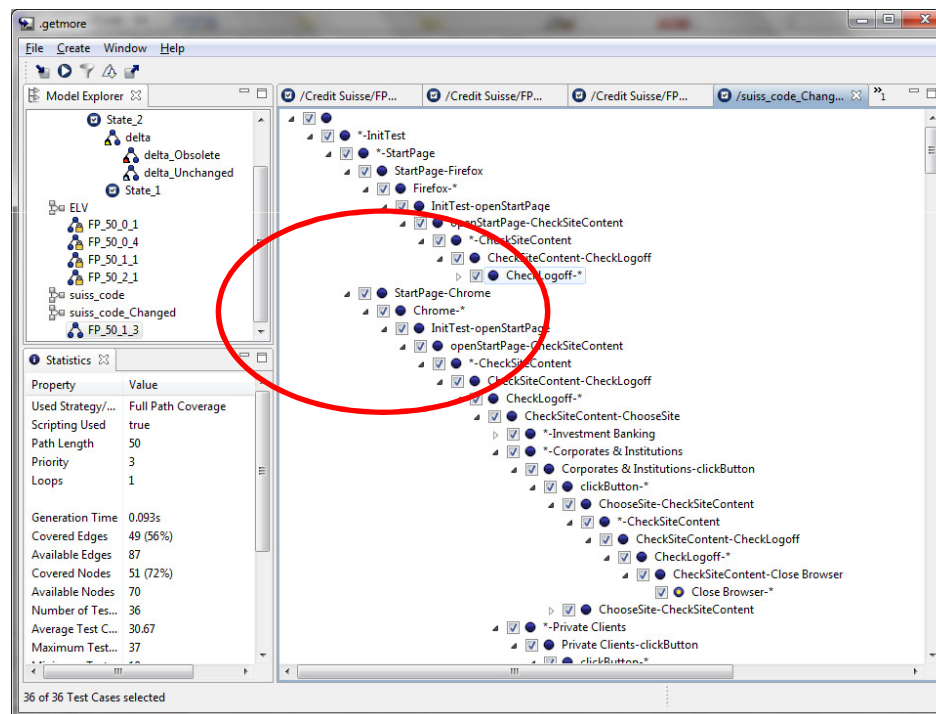
# Requirement-based MBT

## Req./Model Life-Cycle → Delta-Generation



# Requirement-based MBT

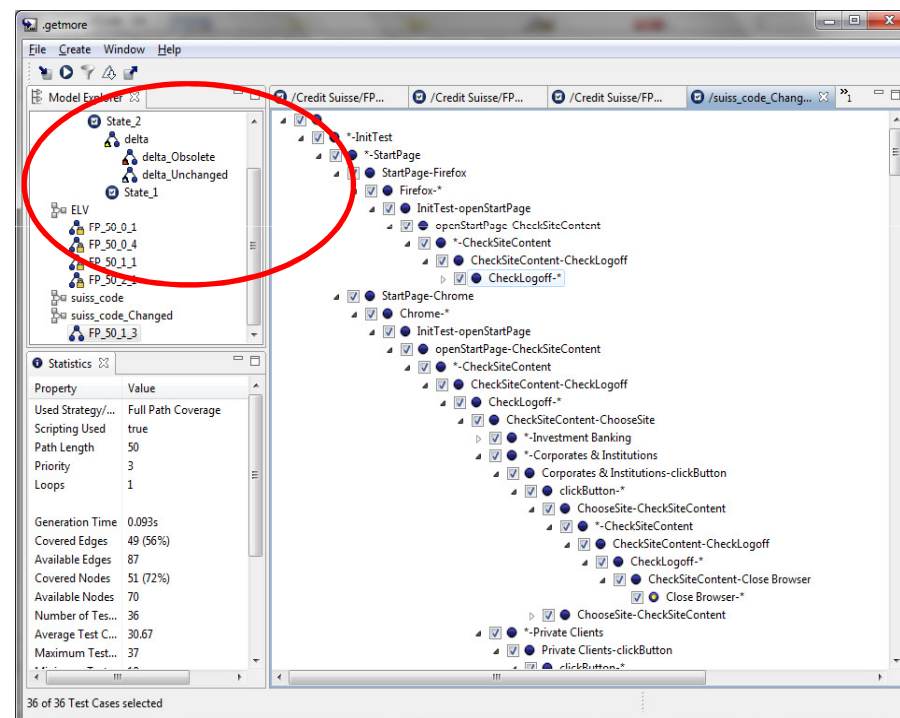
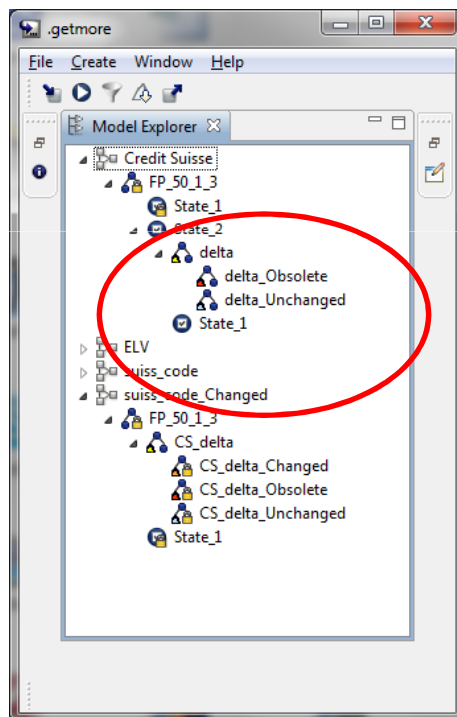
## Req./Model Life-Cycle → Delta-Generation





# Requirement-based MBT

## Req./Model Life-Cycle → Delta-Generation



## Why MBT?

- ☐
  - Overview and transparency
  - Change of requirements
  - Active test case generation and selection
  - Regression testing on a model base
  - Increasing efficiency
  - Generating test cases:
    - ☐ Cheap
    - ☐ Quick
    - ☐ Reliable



# The Black Box

- 
- Integrated Requirement and Test Management

# Req. Management using HP QC



**Req. Management using HP QC**

**Left Panel (Tree View):**

- Requirements
  - Product A
    - 01 Scope
      - Release A.01.02
        - Key Business Dr...
        - Key Business Dr...
        - Key Customer Dr...
        - Key Customer Dr...
      - Release A.02.00
    - 03 Personas
    - 04 Constraints
      - Hardware operating
    - 05 Conventions
      - Glossary
      - Requirements proces...
      - Test process
    - 09 Functional and data r...
    - Functional group A
      - f1
      - f2
    - Functional group B
    - Functional group C
    - 10 Product Qualities
    - 26 Unclassified

**Requirement Details Dialog:**

**Req ID:** 54 **\* Name:** f1 **\* Requirement Type:** Functional

**Details Tab:**

**Author:** gina\_p **Creation Date:** 3/3/2011

**Direct Cover Status:** Passed **Modified:** 3/3/2011 8:37:33 PM

**Priority:** 1 - High **Rationale:** We need it, because D

**Source:** Helle Hansen **Status:** 04 Implemented

**Target Release:** A 01.02 **Testability:** OK

**Description Tab:**

**Description:** We need a solution that is able to provide us up-to-date information about the energy level.

**Buttons:** OK, Cancel, Help

4/4/2011

Re



# Test Case Coverage of Requirements

**Requirement Details**

Req ID: 54 \* Name: f1 \* Requirement Type: Functional

Select Status Filter: All

Entity Name	Entity Status	Plan: Status	Plan: Subject
f1_t3	✓ Passed	Ready	Functional group A
f1_t1	✓ Passed	Design	Functional group A
f1_t2	✓ Passed	Design	Functional group A

**Coverage Chart**

3 Passed 100 %

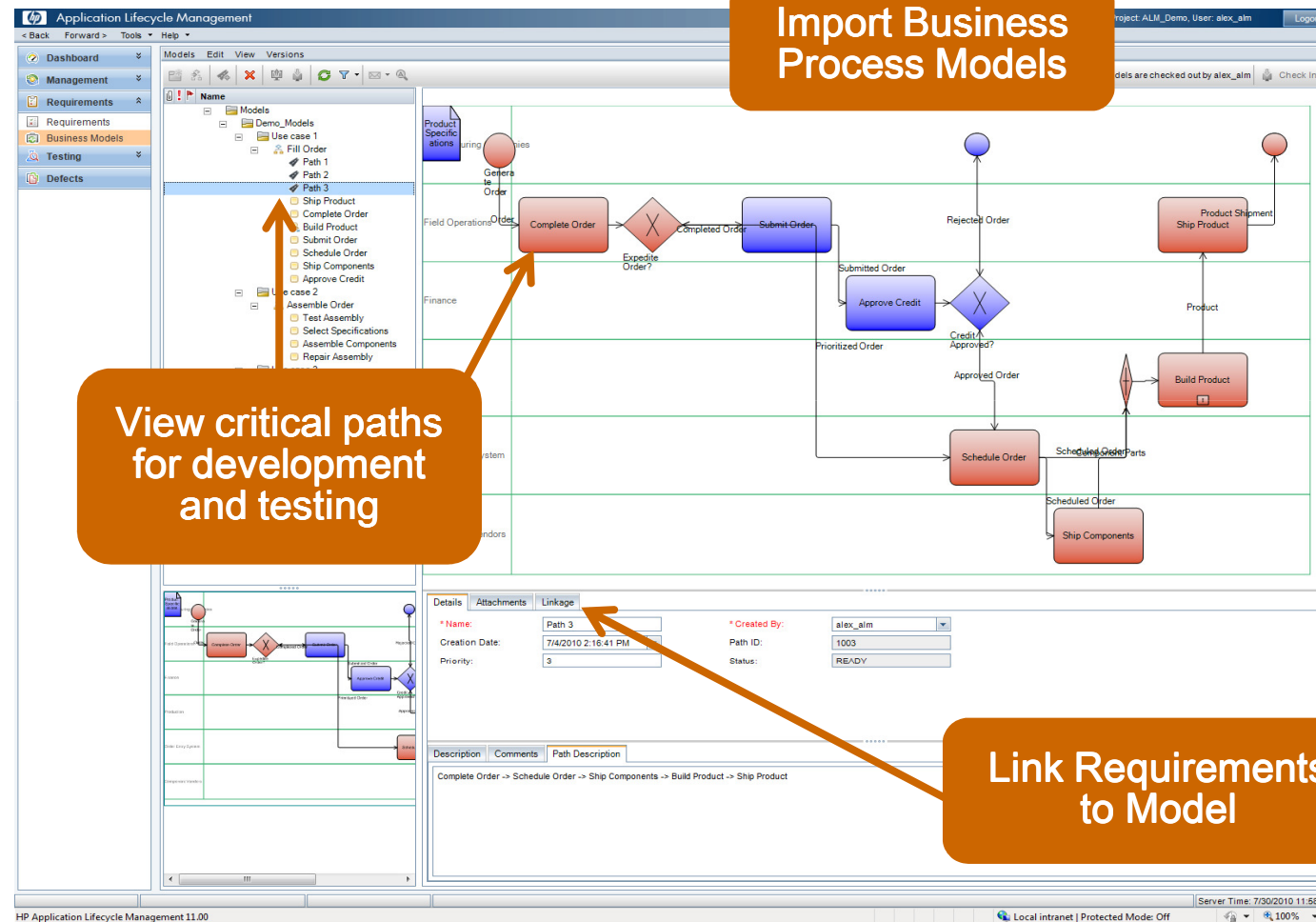
3 Passed

**Test Plan Tree**

- Subject
  - Unattached
  - Functional group A
    - f1\_t1
    - f1\_t2
    - f1\_t3
    - f2\_t1
  - Functional group B
  - Functional group C

OK Cancel Help

# Future: BPM integrated in HP Quality Centre ALM



## Conclusion

- Requirement-based Testing increases YOUR Business
- MBT increases Transparency and Efficiency of Test Case Development and Selection
- .mzT & .getmore empower you to use MBT in an Industrial Environment
- Together with e.g. HP Quality Centre you are able to do Requirement-Based Model-Centric Testing

Thank you for your attention! – Any Questions?



Dr. Andreas Birk  
Software.Process.Management  
Fon: +49 (0) 711 – 6645 324  
E-Mail: [info@swpm.de](mailto:info@swpm.de)  
Webauftritt: [www.swpm.de](http://www.swpm.de)

Florian Prester  
sepp.med  
Fon: +49 (0) 91 95 - 9 31 - 0  
Fax: +49 (0) 91 95 - 9 31 - 300  
E-Mail: [info@seppmed.de](mailto:info@seppmed.de)  
Webauftritt: [www.seppmed.de](http://www.seppmed.de)