Test Management Aspects in UTP

MBT User Conference 2011
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IT service provider
For more than 30 years
Current headcount: approx. 120

Safety relevant and regulated Environments
Medical, Pharma
Automotive, Embedded
...

Complex Domains
Workflows & Business Processes
Distributed Development
Products / Systems with many Subcomponents
Product Families, System Engineering
Agenda

- Motivation: Test Process and Test Management
- Improving UTP Test Management Coverage
- Future Developments
Test Process and Test Management

Processes and Tool Chain
- Use Cases
- Functional Requirements
- Change Requests

Test Management
- Customer Workflows
- Tester's Mindset
- Infrastructure & Training

- Test Design (e.g., UTP based)
- Manual Test Cases
- Test Automation

- Priorization, Safety Relevance...
- Configuration & Variant Management
- Test Data

Regulated Environment
- Regulations
- Efficiency
- Product Quality
- ...

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Test Management Aspects in UTP
Test Management and Test Documentation

Test Plan

- Test Design Specification
  - Test Case Specification
    - Test Log
      - Test Report
  - Test Case Specification
    - Test Log
      - Incident Logging

Test Execution
A Real World Test Process
A Pre-UTP Example around the TestCase
A Real World Test Process
A Pre-UTP Example around the TestSpec
Test Management: Steering and controlling the test process

- Resource planning and management
  - Tester
  - Test Environment
  - SuT

- Test case selection (-> essential!)
  - Time & resource constraints
  - Test topics, test quality and coverage
  - Priority, criticality

- Audit trail provision, review and release
  - Who?
  - When?
  - What?
Test Management in UTP

- In principle, everything required by TM can be covered

- But: explicite definitions and explicite specification
  - Leads the user
  - Forces common understanding
  - Forces common approach
  - Thus, makes it easier to apply TM with UTP based MBT concepts
Motivation: Test Process and Test Management

Improving UTP Test Management Coverage

Future Developments
RTF UTP Issue 15913: “Test Management should be supported”

- Idea:
  - Provide test management with the required information
  - Using UTP

- Goal:
  - Wider integration of UTP models into test management driven test process
  - For both manual and tool based test management processes

- Formal basis:
  - E.g. IEEE 829: Contents of test plans and designs
What does this mean? Examples:

- A test case attribute “priority” in the model can be used, to include the design of prioritized test sets within the model used for stakeholder review and later for test suite management in the test management tool used.

- Explicit tags for requirements as model attributes to test cases enable a traceable and efficient requirements based test design with UTP models and can be used as a basis for tool interfaces / synchronization tools between requirements engineering and test design.
Approaching the challenge:

- defined a common set of important attributes which are reusable for a lot of test management aspects (like version, description…)

- New stereotype called *ManagedElement*
  - Grouping the new attribute set

- Add test-specific attributes directly into existing concepts
  - Enable them for test management purposes
Test Management Concepts in UTP 1.1: ManagedElement

- Provide additional information:
  - Owner
  - Description
  - Version
  - Criticality

- Used with other stereotypes

- Expresses e.g. test context information
Extension of the `TestComponent`:
- timezone
- SUT version
- SUT variant

Used for listing compatible versions and variants (e.g. configs) of the system under test.
Describes the dependencies of the test with regard to

- SUT version and variant
- Level (type, goal) of the test a test case is executed in

```
«metaClass»
StructuredClassifier

TestContext

«metaClass»
BehavioredClassifier

« stereotype»
TestContext

- arbiter : Arbiter
- testLevel : String [0..1]
- compatibleSUTVersion : String [0..*]
- compatibleSUTVariant : String [0..*]
```
Fields are added allowing the definition of

- Compatible SUT versions and variants
- A value *(priority)* allowing the prioritization of a test case for
  - Review planning
  - Test execution
  - ...

Fields:
- `priority`: String `[0..1]`
- `compatibleSUTVersion`: String `[0..*]`
- `compatibleSUTVariant`: String `[0..*]`
The TestLog now has fields defining:

- The tester (ID) executing a test
- Time of execution
- Execution time (may be used for future test scheduling)
- Result of the arbiters decision and
- the rationale for it
- Identification of the used system under test
Test Management Concepts in UTP 1.1: TestObjective

- Extends the 1.0 `TestObjective` by adding a field `priority`.
  - Allows the comparison / ordering of objectives
  - May be used e.g. for prioritization in
    - Review planning
    - Test execution
    - ...

```
«metaclass»
Dependency

«stereotype»
TestObjective

-priority : String [0..1]
```
Test Management Concepts in UTP 1.1: *An Example*

TBD
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Next Steps: Explicit Test Scheduling

- Scheduling is an integral part of test management

- Based on:
  - Resource usage
  - “Special requirements”
  - Prioritization
  - Test case interdependencies
  - ...

- Current UTP specification allows model element assignment
- Rule set is missing (issue no. 15914)
Managing testing is essential in today’s complex development processes.

For the uptake of the UML Testing Profile the inclusion of test management aspects is essential.

Therefore we must continue to improve UTP to allow a seamless and beneficial integration of test models into current management processes and tooling environments!

UTP 1.1: In Principle we are one Step further now

But: there still is Room for Improvement

Conclusion and future developments

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