Tool Qualification By Need
Content

- Eclipse Tool Qualification Roadmap 2012
- Tool Qualification By Need
  - Standard Needs
  - Tool Needs
  - Qualification Tools
- Summary
wiki.eclipse.org/Auto_IWG_WP5

1. Goals: satisfy DO-330 (TQL 1-5)
2. Concept: model-based tool qualification
3. EMF Tool Qualification Model (TQL 1-5)
4. Demonstrate & implement with an Eclipse Project: QPP (Qualifiable Plugin Projects)
5. Qualify (selected) plugins
Currently Eclipse does not support qualification.

Extended meta-model (and documentation) covers 100% (~450 Requirements) of DO-330.
QPP Architecture

SW Developer / User

RM
CM
IDE
Bugs
Test
Review

Qualification Model

Interface / API

Gen
Roadmap Vision 2012

- Highway for TQL-1 with 5 lines
- High invest for Eclipse tooling and research?
- Do we need big highways to get to nice places?

Still a future option for those requiring a highway (and still in business discussions)
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The verification objectives of the tool operational verification and validation process consist of the detection and reporting of errors that may have been introduced during the tool development processes.
Standard Needs

- Eclipse highway satisfies relevant standards
  - DO-330 compliance
  - Potential tool error analysis & detection
  - Validation
- TQL 1 is only needed in avionics for constructive tools without output verification
- TQL 2-4 is cheaper
- For TQL 5 Validas has tool support
  - No need to invest in infrastructure
  - Pay only per creation of qualification kit
- We can start with Validas tools (TQL-5) and
  build the Eclipse highway (TQL-1) line by line when needed
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Minimizing Tool Qualification Needs

TQL

Risks
(Tool Errors)

No Errors

No Critical Errors

No un-mitigatable Errors

Input Data / Models

All Inputs Values

All Inputs Combinations

Relevant Input Combinations

Relevant Input Values

Relevant Features

All Features

Tool Features
Model Projection

- “Model Projection” shows the content of all selected (and contained) elements

Modeling Tool

Projection View

Projected element(s)

Classes
Example Projection

Artifact 1: Executable

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Executable</td>
</tr>
<tr>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>Format</td>
<td></td>
</tr>
<tr>
<td>Created By</td>
<td>Use Case Target Compiler</td>
</tr>
<tr>
<td>Used By</td>
<td>Use Case Debugger:Flash</td>
</tr>
<tr>
<td>Modified By</td>
<td></td>
</tr>
<tr>
<td>Is A</td>
<td></td>
</tr>
<tr>
<td>Occurrences</td>
<td></td>
</tr>
<tr>
<td>Is Assumption</td>
<td>false</td>
</tr>
<tr>
<td>Long Description</td>
<td></td>
</tr>
<tr>
<td>Created By Tool</td>
<td></td>
</tr>
<tr>
<td>Used By Tool</td>
<td></td>
</tr>
<tr>
<td>Modified By Tool</td>
<td></td>
</tr>
<tr>
<td>Deactivated</td>
<td>false</td>
</tr>
<tr>
<td>Artifact Attributes</td>
<td></td>
</tr>
<tr>
<td>Variant</td>
<td></td>
</tr>
<tr>
<td>Comment</td>
<td></td>
</tr>
<tr>
<td>Is Part Of Product</td>
<td>true</td>
</tr>
<tr>
<td>ID</td>
<td></td>
</tr>
<tr>
<td>Internal Reference</td>
<td></td>
</tr>
</tbody>
</table>

Artifact 2: Test Report

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Test Report</td>
</tr>
<tr>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>Format</td>
<td></td>
</tr>
<tr>
<td>Created By</td>
<td>Feature Modeling Tool:Test 1</td>
</tr>
<tr>
<td>Used By</td>
<td></td>
</tr>
<tr>
<td>Modified By</td>
<td></td>
</tr>
<tr>
<td>Is A</td>
<td></td>
</tr>
<tr>
<td>Occurrences</td>
<td></td>
</tr>
<tr>
<td>Is Assumption</td>
<td>true</td>
</tr>
<tr>
<td>Long Description</td>
<td></td>
</tr>
<tr>
<td>Created By Tool</td>
<td></td>
</tr>
<tr>
<td>Used By Tool</td>
<td></td>
</tr>
<tr>
<td>Modified By Tool</td>
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</tr>
<tr>
<td>Deactivated</td>
<td>false</td>
</tr>
<tr>
<td>Artifact Attributes</td>
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<td>Variant</td>
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<td>true</td>
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<tr>
<td>ID</td>
<td></td>
</tr>
<tr>
<td>Internal Reference</td>
<td></td>
</tr>
</tbody>
</table>

Artifact 3: Test Stimuli

Projected element: Artifact

Projection:

- 3: metamodel.de.validas.iso26262.toolchainalyzer.Artifact
  - Properties of selected metamodel.de.validas.iso26262.toolchainalyzer.Artifact
    - 3: deactivated
      - Values
        - 3: false
          - Artifact: Executable
          - Artifact: Test Report
          - Artifact: Test Stimuli
    - 3: isAssumption
      - Values
        - 2: false
          - Artifact: Executable
          - Artifact: Test Stimuli
    - 3: isPartOfProduct
      - Values
        - 2: true
          - Artifact: Executable
          - Artifact: Test Stimuli
    - 3: name
      - Values
        - 3: reference ToolChain to ToolChain
        - 2: Reference UsedBy to Feature
        - 2: Reference UsedBy to UseCase
        - 1: id
        - 1: Reference CreatedBy to Feature
        - 1: Reference CreatedBy to UseCase

Validas AG
Model Projector for Input Data

- Can be used for every EMF modeling tool
- Has difference view
- Allows filtering
- Allows properties & combinations
- Works also for big models (AUTOSAR) models

**Difference View**

- **Uncovered Value**
  - Mixed Class
  - Covered Property
- **Unused Value**
  - Mixed Property
  - Covered Value

- **Projection of 3 elements (3)**
  - 1 Packages of 3 elements (3)
  - 1 Classes of 3 elements (3)
  - 7 Properties of Artifact (3)
    - deactivated (3)
    - IsAssumption (3)
    - IsPartOfProduct (3)
    - Name (3)
  - 3 Values of Name of Artifact (3)
    - A1 (1)
    - A2 (1)
    - ArtifactName (1)
    - C-Code (1)
    - Reference ToolChain to ToolChain (1)
    - Reference UsedBy to Feature (1)
    - Reference UsedBy to UseCase (1)
Example: AUTOSAR Overview
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Validas Tools & Generated Artifacts

QKit-Developer

TCA: Tool Chain Analyzer

Tool Model

Configurer Tool Model

QST: Qualification Support Tool

Test Plan

Tester

TAU: Test Automation Unit

Test Report

V&V Plan

TCR TQP TSQ

QKit - Developer

Qualifier

Tester

Test Report
Qualification Support Tool

- Guides you through the qualification process
- Select standards and variants of the tools (1)
- Helps select tool features (2) & versions (3)
- Shows mitigations for known & potential errors (4)
- Supports qualification planning (5)
- Generates validation test list for TAU
- Generates documents based on selections (6)
Summary

- Eclipse Tool Qualification Roadmap 2012 is a costly TQL-1 highway
- Eclipse Tool Qualification 2013 is no invest TQL-5 path: Ready to use
- Validas can qualify (Eclipse-based) tools for
  - ISO 26262, IEC 61508, EN 50128
  - DO-178C, DO-278A, DO-330 (TQL-5)
- Validas uses generic qualification model & tools (also for Eclipse)
Second Tool Qualification Symposium

- Presentations
  - Tool user & tool provider
  - Qualification requirements & qualification kits
  - Experiences from different domains & different industries
  - Practical experiences & practical support
- Tutorials

- Location: Munich City
- Registration: [http://toolqualification2014.eventbrite.com](http://toolqualification2014.eventbrite.com)
- Deadline for presentation submission: 10th November 2013
- Organization: Validas AG, tqs@validas.de

Over 70 participants on First TQS from 8 countries

2014: Second TQS 9th – 10th April 2014

New:
- Tool Exhibition
- Call for Presentations 10th November 2013
- Location: Munich City
Thank You!