OETCS/WP7/D7.2 – 00/01

ITEA2 Project
Call 6 11025
2012 – 2015

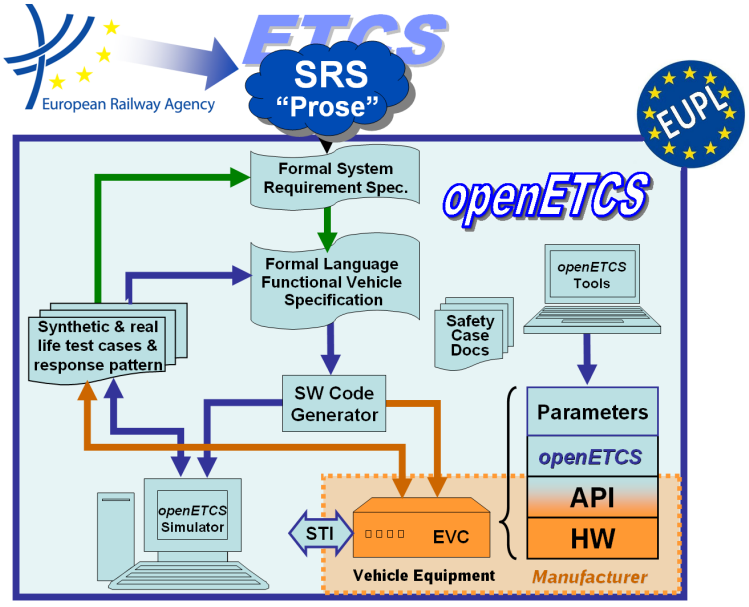
Work-Package 7: “Secondary tools”

Report on all aspects of secondary tooling

Results of T7.2

Marielle Petit-Doche, all participants of the benchmark and all participants of VnV and Safety process

December 2013



Funded by:

Federal Ministry of Education and Research
Région de Bruxelles-Capitale
GOBIERNO DE ESPAÑA
MINISTERIO DE INDUSTRIA, ENERGÍA Y TURISMO

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Deliverable

Prepared for openETCS@ITEA2 Project

Abstract: This document gives results of the evaluation and selection of the tools and methods to complete the secondary toolchain and to support verification and validation activities, safety activities, model transformation and data management for the whole project.

Table of Contents

Figures and Tables

Figures

Tables

Document information	
Work Package	WP7
Deliverable ID or doc. ref.	D7.2
Document title	Report on all aspects of secondary tooling
Document version	00.01
Document authors (org.)	Marielle Petit-Doche (Systerel)

Review information	
Last version reviewed	00.01
Main reviewers	

Approbation			
	Name	Role	Date
Written by	Marielle Petit-Doche	WP7-T7.2 Sub-Task Leader	
Approved by	Michael Jastram	WP7 leader	

Document evolution			
Version	Date	Author(s)	Justification
00.01	19/12/2013	M. Petit-Doche	Document creation

1 Introduction

The aim of this document is to report the results of the evaluation of means and tools for the secondary toolchain, i.e. the means and tools which complete the primary tool chain dedicated to formal model and software design.

This evaluation task is part of work package WP7, task 2 "Secondary tools analyses and recommendations". According to the results of WP2, especially the OpenETCS process and the requirements on language and tools [1], and the results of T7.1 on the primary toolchain [2], the aim of this task is to determine the best candidates to complete and support the primary toolchain for the following activities:

- data, function and requirement management (SSRS, WP3 and WP4), in chapter 2;
- verification and validation (WP4), in chapter 3;
- safety activities support (WP4), in chapter 4;
- model transformation and code generation (WP3 and WP4), in chapter 5.

1.1 Approach

(mj) Content to be discussed in https://github.com/openETCS/toolchain/issues/236

2 Data and Requirements Management

This section is dedicated to tools and means to support management of data, functions requirements and other artifacts along the openETCS process.

In total, seven tools have been proposed. Out of these, only one has been evaluated in detail (ProR). What follows is a qualitative description of the seven tools. A quantitative evaluation of ProR is included as well.

2.1 Candidates

The list of initial candidates is:

Scade Suite. Scade includes Reqtify as the requirements traceability solution. It allows to create traceability directly to Word, thereby making traceability to Subset-26 easy. However, there is no clear solution for authoring additional requirements (except using Word). Further, it is not clear how traceability to model artifacts should be realized. Last, this is a closed source solution and therefore only a last resort.

Rodin and Pluggin.

Matelo.

Goal Structuring Notation (GSN).

Eclipse ProR.

Eclipse EMF Store.

Eclipse EMF Client Platform.

2.2 ProR Evaluation

TODO the details of the ProR evaluation, corresponding to the primary toolchain evaluations.

2.3 Challenges

During the evaluation phase, a number of challenges were identified that were not clearly defined before.

2.3.1 Traceability

TODO

2.3.2 How to Deal with Subset-26

TODO

2.3.3 Other Challenges

The list of challengers discussed during the evaluation is:

- Ecore model + XML files
- UML library
- ReqCity

2.4 Selected means and tools

Comment. To complete after decision meeting with a section for each tool with the following contents:

- *description of the means or tools, references and links*
- *added value for openETCS*
- *for which tasks and how (input/output/actions) is the mean or tools used.*

3 Verification and Validation

This section is dedicated to tools and means for verification and validation.

The list of initial candidates is:

- Scade Suite
- System C
- UPPAAL
- Rodin and Pluggins
- Tools around Classical B (ProB, SMT solver,...)
- CPN tools
- Matelo
- RT-Tester
- Fiacre and Tina
- Frama-C
- Diversity
- SPIN

3.1 Selected means and tools

Comment. To complete after decision meeting with a section for each tool with the following contents:

- *description of the means or tools, references and links*
- *added value for openETCS*
- *for which tasks and how (input/output/actions) is the mean or tools used.*

4 Safety support

This section is dedicated to tools and means to support safety analyses.

The list of initial candidates is:

- Rodin and Pluggins
- CPN tools
- Goal Structuring Notation (GSN)
- Safety Architect

4.1 Selected means and tools

Comment. To complete after decision meeting with a section for each tool with the following contents:

- *description of the means or tools, references and links*
- *added value for openETCS*
- *for which tasks and how (input/output/actions) is the mean or tools used.*

5 Model transformation and Code generation

This section is dedicated to tools and means for model transformation and code generation.

The list of initial candidates is:

- Scade Suite
- Rodin and Pluggins
- Acceleo
- ATL
- QVTO and SmartQVT
- Xtend

5.1 Selected means and tools

Comment. To complete after decision meeting with a section for each tool with the following contents:

- *description of the means or tools, references and links*
- *added value for openETCS*
- *for which tasks and how (input/output/actions) is the mean or tools used.*

6 Conclusion

Comment. MPD : Todo

To complete after Munich meeting in January 2014.

Appendix: References

[1] Sylvain Baro and Jan Welte. Requirements for openETCS. Technical Report D2.6, OpenETCS, 2013.

[2] Marielle Petit-Doche and WP7 Participants. D7.1: Report on the final choice of the primary toolchain. Primary Toolchain OETCS/WP7/D7.1, openETCS, July 2013.