

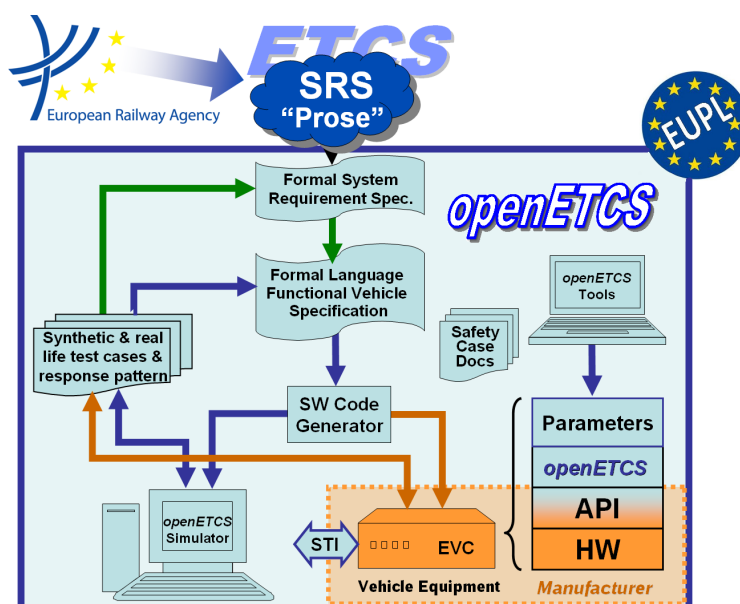
Work-Package 7: “Secondary tools - Management”

Evaluation of supporting tools and methods against the WP2 requirements and task 1

List of criteria on supporting tools and methods and results on the benchmark

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

October 2013



Funded by:



Federal Ministry of Education and Research



Ministère de l'Enseignement Supérieur et de la Recherche



Région de Bruxelles-Capitale



GOBIERNO DE ESPAÑA

MINISTERIO DE INDUSTRIA, ENERGÍA Y TURISMO

This page is intentionally left blank

Work-Package 7: “Secondary tools - Management”

**OETCS/WP7/O7.2.1 – 00/05
October 2013**

Evaluation of supporting tools and methods against the WP2 requirements and task 1

List of criteria on supporting tools and methods and results on the benchmark

Marielle Petit-Doche

Systerel

all participants of the benchmark

WP7 partners

all participants of VnV and Safety process

WP4 partners

Evaluation

Prepared for openETCS@ITEA2 Project

Abstract: This document gives elements to evaluate the tools and methods to complete the primary toolchain and to support verification and validation activities, safety activities, model transformation and data management for the whole project. Evaluation on the means and tools of benchmark is also described.

This document focusses on means and tools to support management of data, functions, requirements and all the artifact during the OpenETCS process.

Disclaimer: This work is licensed under the "openETCS Open License Terms" (oOLT) dual Licensing: European Union Public Licence (EUPL v.1.1+) AND Creative Commons Attribution-ShareAlike 3.0 – (cc by-sa 3.0)

THE WORK IS PROVIDED UNDER openETCS OPEN LICENSE TERMS (oOLT) WHICH IS A DUAL LICENSE AGREEMENT INCLUDING THE TERMS OF THE EUROPEAN UNION PUBLIC LICENSE (VERSION 1.1 OR ANY LATER VERSION) AND THE TERMS OF THE CREATIVE COMMONS PUBLIC LICENSE ("CCPL"). THE WORK IS PROTECTED BY COPYRIGHT AND/OR OTHER APPLICABLE LAW. ANY USE OF THE WORK OTHER THAN AS AUTHORIZED UNDER THIS OLT LICENSE OR COPYRIGHT LAW IS PROHIBITED.

BY EXERCISING ANY RIGHTS TO THE WORK PROVIDED HERE, YOU ACCEPT AND AGREE TO BE BOUND BY THE TERMS OF THIS LICENSE. TO THE EXTENT THIS LICENSE MAY BE CONSIDERED TO BE A CONTRACT, THE LICENSOR GRANTS YOU THE RIGHTS CONTAINED HERE IN CONSIDERATION OF YOUR ACCEPTANCE OF SUCH TERMS AND CONDITIONS.

<http://creativecommons.org/licenses/by-sa/3.0/>
<http://joinup.ec.europa.eu/software/page/eupl/licence-eupl>

Table of Contents

Figures and Tables.....	iv
1 Introduction.....	1
1.1 Organisation of the document	1
2 Template	2
2.1 Instructions	2
2.2 Presentation	2
2.3 Common criteria on secondary means and tools	3
2.3.1 Project and WP2 requirements	3
2.3.2 Qualification	4
2.3.3 Complementarity with primary toolchain	5
2.4 Means and tools for data, function and requirement management	6
2.4.1 Management activities	6
2.4.2 Input Artifacts	7
2.4.3 Output Artifacts	7
2.4.4 Other Criterias	7
2.5 Other comments	7
3 Conclusion.....	9
3.1 Main usage of the approach	9

Figures and Tables

Figures

Tables

Document information	
Work Package	WP7
Deliverable ID or doc. ref.	O7.2.1
Document title	Evaluation of supporting tools and methods against the WP2 requirements and task 1 - Management
Document version	00.05
Document authors (org.)	Marielle Petit-Doche (Systerel)

Review information	
Last version reviewed	00.04
Main reviewers	

Approbation			
	Name	Role	Date
Written by	Marielle Petit-Doche	WP7-T7.1 Sub-Task Leader	
Approved by	Michael Jastram	WP7 leader	

Document evolution			
Version	Date	Author(s)	Justification
00.01	19/07/2013	M. Petit-Doche	Document creation
00.02	09/09/2013	M. Petit-Doche	Major evolutions in all document
00.03	19/09/2013	M. Petit-Doche	Issues: 167, 168, 170
00.04	23/09/2013	M. Petit-Doche	Issues: 164, 169, 174, 175, 177, 178
00.05	01/10/2013	M. Petit-Doche	Split of document O7.2.1. Management part

1 Introduction

The aim of this document is to report the results of the evaluation of means and tools for the secondary means and tools, 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 [?], and the results of T7.1 on the primary toolchain [?], the aim of this task is to determine the best candidates to complete and support the primary toolchain for the following activities:

- verification and validation (WP4)
- safety activities support (WP4)
- data, function and requirement management (SSRS, WP3 and WP4)
- model transformation and code generation (WP3 and WP4)

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

1.1 Organisation of the document

The chapter 2 provides a template to describe the means and tools and a list of criteria according WP2 requirements on language, models and tools, and T7.1 primary tool chain decision. The objectives of this description and criteria are to allow to determine the best means of description and associated tool for a given activities.

The chapter 3 resumes the results of the evaluation at the end of the benchmark activities.

In Appendix, a chapter is dedicated to each models produced during the benchmark activities :

- Scade Suite
- Rodin and Pluggins
- Matelo
- Goal Structuring Notation (GSN)
- Eclipse ProR
- Eclipse EMF Store
- Eclipse EMF Client Platform

2 Template

2.1 Instructions

Author Author of the approaches description %%Name - Company%%

Assessor 1 First assessor of the approaches %%Name - Company%%

Assessor 2 Second assessor of the approaches %%Name - Company%%

In the sequel, main text is under the responsibilities of the author.

Author: Author can add comments using this format at any place.

Assessor 1: First assessor can add comments using this format at any place.

Assessor 2: Second assessor can add comments using this format at any place.

When a note is required, please follow this list :

- 0 not recommended, not adapted, rejected
- 1 weakly recommended, adapted after major improvements, weakly rejected
- 2 recommended, adapted (with light improvements if necessary) weakly accepted
- 3 highly recommended, well adapted, strongly accepted
- * difficult to evaluate with a note (please add a comment under the table)

All the notes can be commented under each table.

2.2 Presentation

This section gives a quick presentation of the approach and the tool.

Name %%Name of the approach and the tool%%

Web site %%if available, how to find information%%

Licence %%Kind of licence%%

Abstract

Short abstract on the approach and tool (10 lines max)

Publications

Short list of publications on the approach (5 max)

For which activities are dedicated the means or tools (give a note from 0 to 3) :

	Author	Assessor 1	Assessor 2	Total
Data Management				
Function Management				
Requirement Management				
Version Management				
Other (give details below)				

According the results of this table, some of the following sections can be skipped.

2.3 Common criteria on secondary means and tools

This section discusses the common criteria of the means and tools according to the project requirements on tools and the results of T7.1.

2.3.1 Project and WP2 requirements

The objectives of this list of criteria is to check if the proposed means and tools meet the main criteria of the project: open-source approaches, usability, modularity, coverage of the objectives,...

According WP2 requirements, give a note for characteristics of the use of the tool (from 0 to 3) :

	Author	Assessor 1	Assessor 2	Total
Open Source (D2.6-02-074)				
Portability to operating systems (D2.6-02-075)				
Cooperation of tools (D2.6-02-076)				
Robustness (D2.6-02-078)				
Modularity (D2.6-02-078.1)				
Documentation management (D2.6-02-078.02)				
Distributed software development (D2.6-02-078.03)				
Simultaneous multi-users (D2.6-02-078.04)				
Issue tracking (D2.6-02-078.05)				
Differences between models (D2.6-02-078.06)				
Version management (D2.6-02-078.07)				
Concurrent version development (D2.6-02-078.08)				
Model-based version control (D2.6-02-078.09)				
Role traceability (D2.6-02-078.10)				
Safety version traceability (D2.6-02-078.11)				
Model traceability (D2.6-02-079)				
Tool chain integration				
Scalability				
User Friendliness				

2.3.2 Qualification

This section discusses how the tool can be classified according EN50128 requirements (D2.6-02-085). Some qualification shall be mandatory if the tool is involved to design a SIL4 software.

	Author	Assessor 1	Assessor 2	Total
Tool manual (D.2.6-01-42.02)				
Proof of correctness (D.2.6-01-42.03)				
Existing industrial usage				
Model verification				
Test generation				
Simulation, execution, debugging				
Formal proof				

Which scope of qualification is expected according EN50128 (section 6.7) ?

Score :

3 already qualified for this level

2 qualification possible to this level, but some elements shall be provided

0 qualification not recommended for this level

	Author	Assessor 1	Assessor 2	Total
class T1				
class T2				
class T3				

Other elements for tool certification

2.3.3 Complementarity with primary toolchain

The objectives of this list of criteria is to check if the proposed means and tools can be easily integrated to the primary toolchain.

2.3.3.1 Language

According to the decisions and the propositions of T7.1, how the mean and approach can be adapted to or can complete the chosen language and methods:

	Author	Assessor 1	Assessor 2	Total
SysML				
Scade method				
EFS language				
B Method				
C language				

SysML

How the means or tools can complete SysML ?

Scade, EFS, Classical B

How the means or tools can complete the current proposals for formal modeling language ?

C language

How the means or tools can complete or be adapted to SIL4 software in C language ?

2.3.3.2 Tools and platforms

According to the decisions and the propositions of T7.1, how the mean and approach can be integrated to or can complete the chosen tools and platforms:

	Author	Assessor 1	Assessor 2	Total
Eclipse				
Papyrus				
Scade				
EFS tools				
B tools				

Eclipse

How the means or tools can be integrated to the Eclipse platform ?

Papyrus

How the means or tools can complete Papyrus ?

Scade, EFS, Classical B

How the means or tools can complete the current proposals for formal modeling tools ?

2.4 Means and tools for data, function and requirement management

This section defines the criteria for the means and tools dedicated to data, function and requirement management. These activities are shared by the work packages WP3, WP4 and the activities dedicated to SSRS. These means and tools shall integrate the primary toolchain to complete its gap and facilitate the integration of different activities. First of all, they allow the management of a common repository of data, functions and requirements, shared between the models (from SSRS informal specification to code) and the verification and validation activities. Then, they shall support traceability of requirements between models and activities, and facilitate the verification of the traceability. Besides they shall support the design of SIL4 software with model comparison or document production facilities, and version management.

2.4.1 Management activities

Which activities, linked to help the management of SSRS definition and whole process are covered by the mean or tool ?

	Author	Assessor 1	Assessor 2	Total
Requirement capturing				
Requirement management				
Data management				
Function management				
Requirement traceability				
Model traceability				
Function architecture				
Version management				
Model comparison				
Documentation production				
Others (give details)				

2.4.2 Input Artifacts

Which artifacts are used as input of the mean or tool ?

	Author	Assessor 1	Assessor 2	Total
Informal description				
Structured description				
Spread sheet				
EFS model				
DSL				
Others (give details)				

2.4.3 Output Artifacts

Which artifacts are used as output of the mean or tool ?

	Author	Assessor 1	Assessor 2	Total
Informal description				
Structured description				
Spread sheet				
EFS model				
DSL				
Others (give details)				

2.4.4 Other Criterias

Comment. MPD : Todo Ideas welcomed !

2.5 Other comments

Comment. This section is available for the author or the assessors to complete the description and criteria.

3 Conclusion

Comment. MPD : Todo

The sequel is let as an example is this early version.

Criteria to discuss here are those which concerns all the secondary tools as open-source issues, compatibility with primary tool-chain, compatibility with eclipse,...

This conclusion give a sum up of the evaluation results for each approach. The detailed results of each approach are given in the appendix.

Minus mark "-" means this criteria as not been evaluated for this approach.

Star mark "*" means this criteria has been difficult to evaluate for this approach.

The highest score is **9** and means that the criteria is fully respected, the lowest score is **0**.

3.1 Main usage of the approach

Comment. MPD : Todo

The sequel is let as an example in this early version.

Score and results shall be corrected latter.

This section discusses the main usage of the approach.

According to the figure ??, for which phases do you recommend the approach (give a note from 0 to 3) :

	GOPRR	ERTMSFormalSpecs	SysML with Papyrus	SysML with EA	SCADE	EventB	Classical B	System C	Petri Nets	GNATprove
Verification	5	1	7	9	3	9	3	2	6(9)	2 (3)
Validation	9	9	6	7	9	9	5	5	6(9)	3 (4)
Safety analysis	9	0	6	7	9	6	9	9	6(9)	6(9)
Data, function or requirement management	9	0	3	3	9	3	9	6	2 (3)	6(9)
Model or code transformation	9	0	3	3	9	3	9	6	2 (3)	6(9)