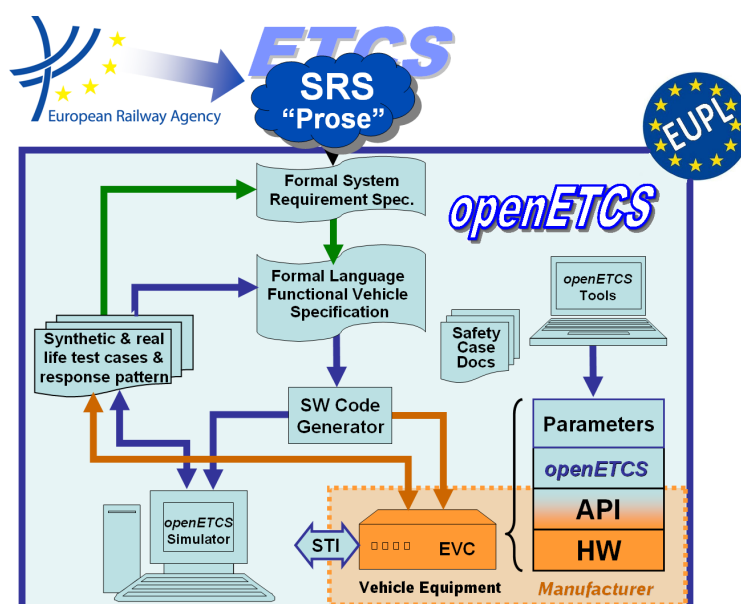


## Work-Package 7: "Toolchain"

## Toolchain Test Plan

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August 2014



## Funded by:



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**Work-Package 7: “Toolchain”****OETCS/WP7/D7.3  
August 2014**

# Toolchain Test Plan

**Document approbation**

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Tool chain Test Plan

Prepared for openETCS@ITEA2 Project

**Abstract:** This document describes the way in which the Open ETCS tool chain will be tested in the validation stage, the test strategy covers, the OpenETCS interface and the plugins it works with.

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# 1 Introduction to Toolchain Test Plan

## 1.1 Introduction

This document describes the way in which the Open ETCS platform will be tested in the validation stage, the test strategy covers, the OpenETCS interface and the plugins it works with.

## 1.2 Executive Summary

The main objective is to ensure the requirements of the toolchain, are properly provided, such the user functionality and the interoperability between the different plugins involved in the platform. The current document describes the strategy and objectives of the OpenETCS toolchain validation and details the validation test cases to be executed to the platform. The test cases have been design based on the functional specification and user's guides provided into github.

## 1.3 Intended Audience

The Tool chain Test Plan addresses all the stakeholders who are in the position to interact with OpenETCS tool chain.

- Project Manager
- QA Manager
- Tool chain WP Leader
- Tool chain Development Team
- Tool chain V&V team

## 1.4 Evolution

This document will be updated regularly with the evolution of the OpenETCS tool chain. The methods and tools to be applied during the development of the OpenETCS toolchain products will be decided based upon the results of the research activities carried out and the needed of the rest of WPs.

The Tool Chain Test Plan document shall be updated whenever:

- tests or the approach for conducting them are changed
- strategies or methodologies used in the Verification and Validation processes are modified
- a new tool is added to the toolchain
- a new tool or technique is incorporated in any of the tasks

## 1.5 References, Guidelines and Standards

References	
Name	Version/ Edition/ Date
Tool chain Development Plan	
Tool chain Qualification Process	

**Table 1. References**



## 2 OpenETCS Toolchain Test Plan

### 2.1 Test Strategy

The validation has to demonstrate that the openETCS tool chain covers all the functionality. This test strategy will be divided in four sides, the building test, installation test, functional test and performance test:

- Building testing: The main objective is to check the correct building of the toolchain.
- Installation test objective: The main objective will be to validate that the OpenETCS platform and the plugins, are correctly installed, and their interoperability is correctly working.
- Functional test objective: The main objective will be validating that the user's workflows are correctly created and to provide clear evidence that the platform performs as it should in every possible environment.
- Performance testing: The main objective is to verify the performance of the tool chain.

### 2.2 Test Items

IT: Brief introduction to the figure. Explanation about how it will grow -according to new feature requests and the needs of openETCS participants-

The features may be implemented by one or more tools and may also be implemented as plugins.

Currently, openETCS tool chain consists of the following components:

- Eclipse Kepler
- Eclipse Modeling Tools
- Eclipse Papyrus
- Eclipse RMF
- Eclipse EGit
- openETCS documentation Plugin
- openETCS DataDictionary Plugin
- openETCS tracing Plugin

The plugins that are going to be part of the first release of the test plan will be:

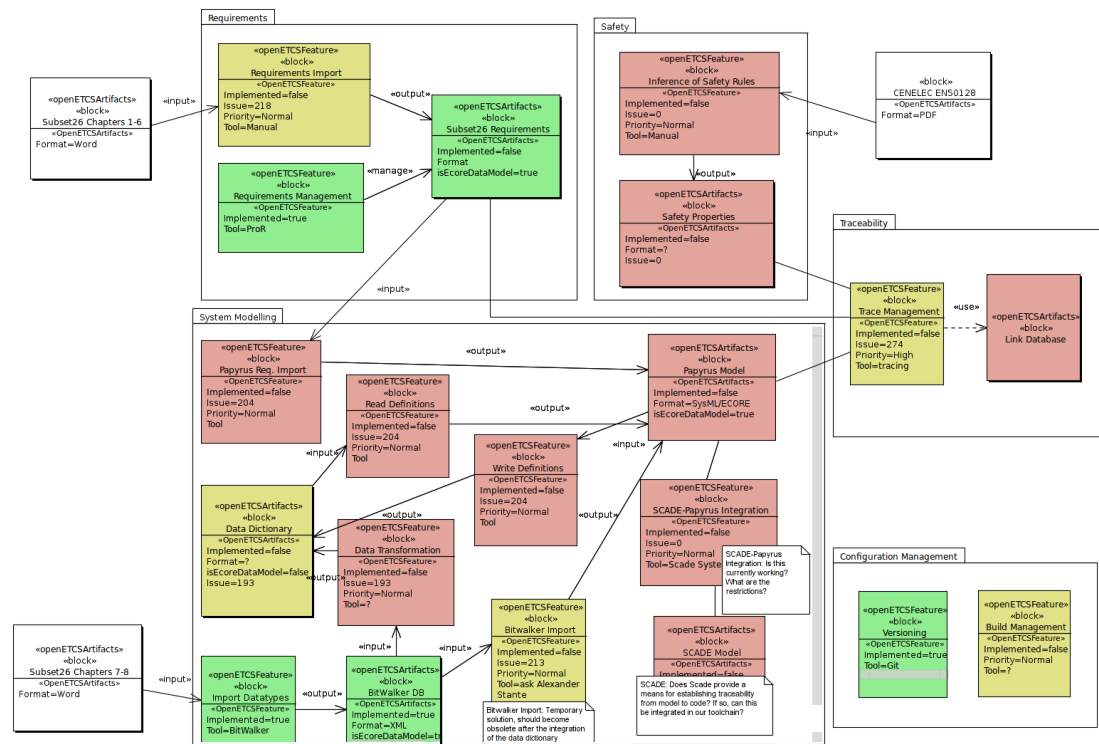


Figure 1. Tool Chain overview (20.02.14) –

Green Block: Implemented  
 Yellow Block: Work in Progress  
 Red Block: Not started  
 White Block: External Artifacts

- Data Dictionary:** This plugin contains the data dictionary plugin which contains data structures, variables, messages, etc. from the ETCS System Requirements Specification (SRS). The plugin registers a UML model, which contains the information from the SRS. After registration, the UML model is available as a UML library.
- Tracing:** The Tracing Features allow the linking of \*ProR Requirements\* and \*SysML Model Elements\*. This is realized within the requirements model by using the internal links (SpecRelations) and requirements that act as proxies to the SysML Model element. Note that both, links and proxies, can be extended with additional attributes.
- Documentation:** The documentation plug-in generates Eclipse Help documentation (a hierarchy of HTML files) and PDF documentation from toolchain wiki pages saved as mediawiki.

Test Items	Type of Test	Person in charge
openETCS documentation Plugin	Unit Testing	
	Integration Testing	
	Functional Testing	
	Acceptance Testing	
openETCS DataDictionary Plugin	Unit Testing	
	Integration Testing	
	Functional Testing	
	Acceptance Testing	

openETCS tracing Plugin	Unit Testing	
	Integration Testing	
	Functional Testing	
	Acceptance Testing	

### 2.3 Features to be tested

ProR	
1	Check if the RMF documentation is on Eclipse Help
2	Check if is possible to import a ProR requirements model
3	Check if it is possible to import a SysML requirements model
4	Check if it is possible to create a link between ProR and SysML
5	Check if it is possible to add extended attributes to the created links
6	Check how are created the required type of data.
7	Check if it is possible to delete required type of data
8	Check the plugin configuration
9	...
Documentation	
1	Check if the documentation is on the eclipse help
2	Check if the links are correct in Eclipse Help
3	Check if the links are correct in the github wiki pages
4	Check if the links are correct in the PDF file
5	...
Data Dictionary	
1	

### 2.4 Item Pass / Fail Criteria

A test is considered passed when the results obtained are the expected results shown in the Test Case. If any of the expected results are not met, the test is considered failed.

## 2.5 Test Environment

The environments where is going to be tested the toolchain are based on different operating systems:

- Windows 64
- Windows 32
- Linux 64
- Linux 32
- MacOS 64
- MacOS 32

To perform the testing activities of the toolchain the following tools will be used:

Tool	Functionality
GitHub	Configuration Management tool. This tool will be used to maintain under control all the selected configuration items (code, documentation,...), their versions and historial.
Issue Tracker	Tool for the Bug Management and Tracking. The errors found during testing activities will be reported in this tool
Jenkis	Open source continuous integration tool. This tool will be used to execute Unit tests.
Maven	Build automation tool. This tool will be used to execute some integration tests.
Eclipse	

## 2.6 Test Deliverables

Throughout the tool chain testing process a set of documents is created in order to keep track of the activities:

- **Test Plans:** A master test plan and sub-test plans for each plugin or feature will be developed. These documents will contain information about the scope, approach, objectives, features to be tested, resources, tools and schedule of testing activities. These documents must be prepared in accordance with the EN50128 Standard. A Test Plan Template is provided in Appendices .1
- **Test Specifications:** This document will contain all the information about the tests. For each of them, the ID, name, description and the requirements which the cases validate will

be included. In addition, each Test Case will include information about the Entry and Exit specification, a Description of the Event to be performed and other information such as type or Needs Test Environment for conducting the test. The Test Specification Template is provided in the Appendices .2

- **Test Results Reports:** The results obtained after the Test Cases execution will be collected in a Summary Test Report. For each test performed their unique identifier, the date and time which has been successfully executed or not and whether it is passed or failed state shall be indicated. A Test Results Report Template is provided in the Appendices .3. In case the tests are executed automatically by a tool that creates its own report, this will also be used as Test Result Report. An example of this last condition is the unit test result report which can be found in [Test Report folder].
- **Test Data:** All necessary data identified for use in test should be under configuration management tool.
- **Test Incident Report:**
- **Test Logs:**

## 2.7 Schedule

The plan of tasks related to the activities of the toolchain tests is detailed below:

Activity	Start Date	End Date
Test Plan Elaboration	14/08/2014	05/09/2014
Test Plan Review	08/09/2014	12/09/2014
Test Plan Corrections	15/09/2014	18/09/2014
Test Plan Approval	19/09/2014	19/09/2014
Test Cases Specifications		
Documentation Plugin Test Cases Specifications	01/09/2014	03/09/2014
Tracing Plugin Test Cases Specifications		
Data Dictionary Plugin Test Cases Specifications		
Test Cases Review		
Documentation Plugin Test Cases Review		
Tracing Plugin Test Cases Review		
Data Dictionary Plugin Test Cases Review		
Test Cases Execution		
Documentation Plugin Test Cases Execution		
Tracing Plugin Test Cases Execution		
Documentation Plugin Test Cases Execution		
Test Results Report		
Documentation Plugin Test Results Report		
Tracing Plugin Test Results Report		
Data Dictionary Plugin Test Results Report		

## 2.8 Responsibilities

Role	Responsibilities	Person in charge
WP7 Leader	<ul style="list-style-type: none"> <li>• Review and approval of the toolchain testing strategy, approach, and plans</li> <li>• Review of testing results report and defects to determine the impact to overall tool chain and plugins development and implementation schedule</li> </ul>	Michael Jastram
Testing Manager	<ul style="list-style-type: none"> <li>• Develop Test Strategy and Test Plan</li> <li>• Coordinate the development of testing deliverables</li> <li>• Review and approve testing deliverables</li> <li>• Monitor and report on the status of testing activities</li> <li>• Coordinate testing activities</li> <li>• Defect management</li> </ul>	
SW Development Team	<ul style="list-style-type: none"> <li>• Design Unit Test Cases</li> <li>• Execute Unit Test Cases</li> <li>• Review test cases and results for completeness</li> </ul>	Plugin or Feature Owner
Tool chain Validation and Verification Team	<ul style="list-style-type: none"> <li>• Design Test Cases</li> <li>• Execute Test Cases</li> <li>• Elaborate Test Reports</li> </ul>	

# **Appendices**

## **.1 Test Plan Template**

### **.1.1 Introduction**

#### **.1.1.1 Executive Summary**

#### **.1.1.2 Intended Audience**

*This section of the Test Plan should list the audience for which the document has been written. Also mention distribution restrictions and levels of confidentiality*

#### **.1.1.3 Evolution**

#### **.1.1.4 References, Guidelines and Standards**

*Provide a complete list of all documents and other sources referenced in the Software Test Plan*

#### **.1.1.5 Definitions and Abbreviations**

*Specify definitions of all terms and acronyms required to properly interpret the Test Results Report*

### **.1.2 Toolchain/Plugin Test Plan**

#### **.1.2.1 Test Approach**

*Identify the types of testing to be performed along with the methods and criteria to be used in performing test activities. Describe the specific methods and procedures for each type of testing.*

#### **.1.2.2 Test Items**

*Describe the items/features to be tested that are within the scope of the test plan*

#### **.1.2.3 Features to be Tested**

*Identify all toolchain features and combinations of features to be tested*

#### **.1.2.4 Item Pass / Fail Criteria**

*Specify the criteria to be used to determine whether each item has passed or failed testing*

#### **.1.2.5 Test Environment**

*Describe the tools and high level environment used for the testing activities*

#### **.1.2.6 Test Deliverables**

*Identify the deliverable documents from the test process*

#### **.1.2.7 Schedule**



*Identify the high level schedule for each testing task. Establish specific milestones for initiating and completing each type of test activity. Summarize when the testing activities will be done*

#### **.1.2.8 Responsibilities**

*Identify the groups responsible for managing, designing, preparing, executing, witnessing, checking, and resolving test activities*

## .2 Test Specification Template

<b>Test Case Identifier:</b>	
Test Objective	<i>Describe the purpose of the test case. Provide a brief description</i>
Test Items	<i>Describe the items or features (e.g., requirements, code, ...) to be tested by the test case</i>
Input Specifications	<i>Identify all inputs required to execute the test case.</i>
Test Steps	<i>Describe the series of individually numbered steps that are to be completed in sequential order to execute the test.</i>
Expected Test Results (Output Specifications)	<i>Identify all outputs required to verify the test case. Describe what the system should look like after the test case is run.</i>
Environmental needs	<i>Identify any environment requirement (e.g. operating system, tools,</i>
Inter-case Dependencies	<i>List any prerequisite test cases that would create the test environment or input data in order to run this test case. Also, list any post-requisite test cases for which the running of this test case would create the test environment or input data.</i>

### **.3 Test Results Template**

#### **.3.1 Introduction**

##### **.3.1.1 Purpose**

*Provide the purpose of the Test Result Document*

##### **.3.1.2 Audience**

*This section of the Test Results Report should list the audience for which the document has been written. Also mention distribution restrictions and levels of confidentiality*

##### **.3.1.3 References**

*Provide a complete list of all documents and other sources referenced in the Software Test Plan*

##### **.3.1.4 Definitions and Abbreviations**

*Specify definitions of all terms and acronyms required to properly interpret the Test Results Report*

#### **.3.2 Toolchain or plugins Test Summary**

##### **.3.2.1 Objectives, Scope**

*In the next section the objectives of the testing activities of the specific iteration are explained*

##### **.3.2.2 Methodology**

*In this section in which way the toolchain, and plugins requirements or features have been proven, the technique and tools that have been used, etc. will be explained*

##### **.3.2.3 Results**

*This section provides a summary of the results of the specific iteration testing of the toolchain and identifies all resolved issues. A list of requirements, test cases and the state, if passed or failed, will be created. In failed case the error number reported shall be identified*

Test Identifier	State	Release version	Execution Date	Requirement covered Identifier

##### **.3.2.4 Evaluation**

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*This section provides an overall evaluation of the testing process*