OETCS/WP7/D7.3

openETCS

ITEA2 Project
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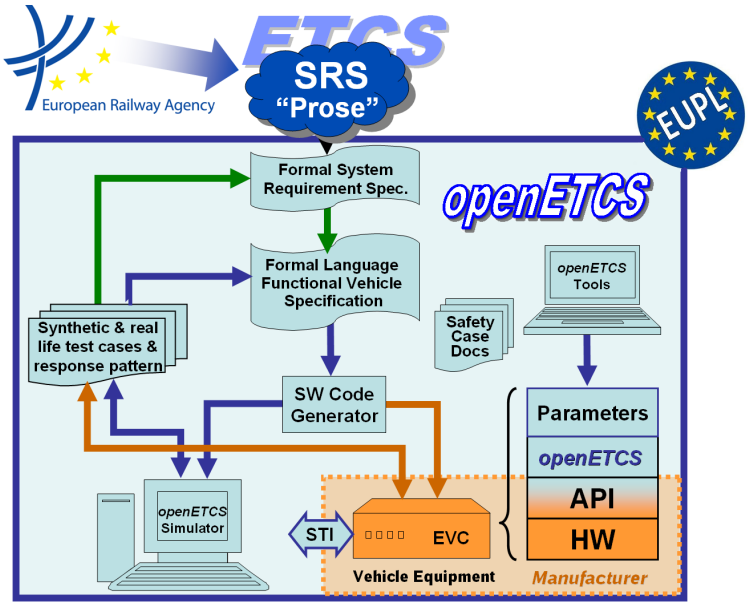
Work-Package 7: “Toolchain”

Toolchain Test Plan

Amaia Martija

August 2014



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

Toolchain Test Plan

Document approbation

Lead author:	Technical assessor:	Quality assessor:	Project lead:
location / date	location / date	location / date	location / date
signature Amaia Martija (SQS)	signature xxxx (xxx)	signature xxxx (xxx)	signature Klaus-Rüdiger Hase (DB Netz)

Amaia Martija
SQS

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.

Table of Contents

Document Information

Document information	
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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 Approach

The validation has to demonstrate that the platform covers all the functionality:

- Unit testing: The main objective of unit testing is to test the separate pluggings, or independent software areas.
- Integration testing: The main objective will be to validate that the OpenETCS platform and the pluggings are correctly installed, and their interoperability is correctly working.The integration testing will be developed in Botton–up strategy: The bottom-up strategy will be started with unit testing and finished with testing general workflows.
- System testing: The main objective of system testing is to check non-functional requirements, During the System testing will be checked: the speed, the security, The reliability. . . etc.
- 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.
- Acceptance testing: The acceptance testing objective is to check that designed use cases had the correct results.

2.2 Test Items

The OpenETCS tool chain consists of components. A Component is what the user perceives as an atomic tool aspect of openETCS. Some special Components satisfy infrastructure needs and are called Cross-Cutting Concerns. All the components are hosted by the tool platform (eclipse MDT). The OpenETCS tool page lists all the available component. A guidelines to follow the defined life-cycle for OBU development will complete the tool chain.

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: https://github.com/openETCS/toolchain/wiki/Documentation
- openETCS DataDictionary Plugin: https://github.com/openETCS/toolchain/wiki/Data-Dictionary-Plugin

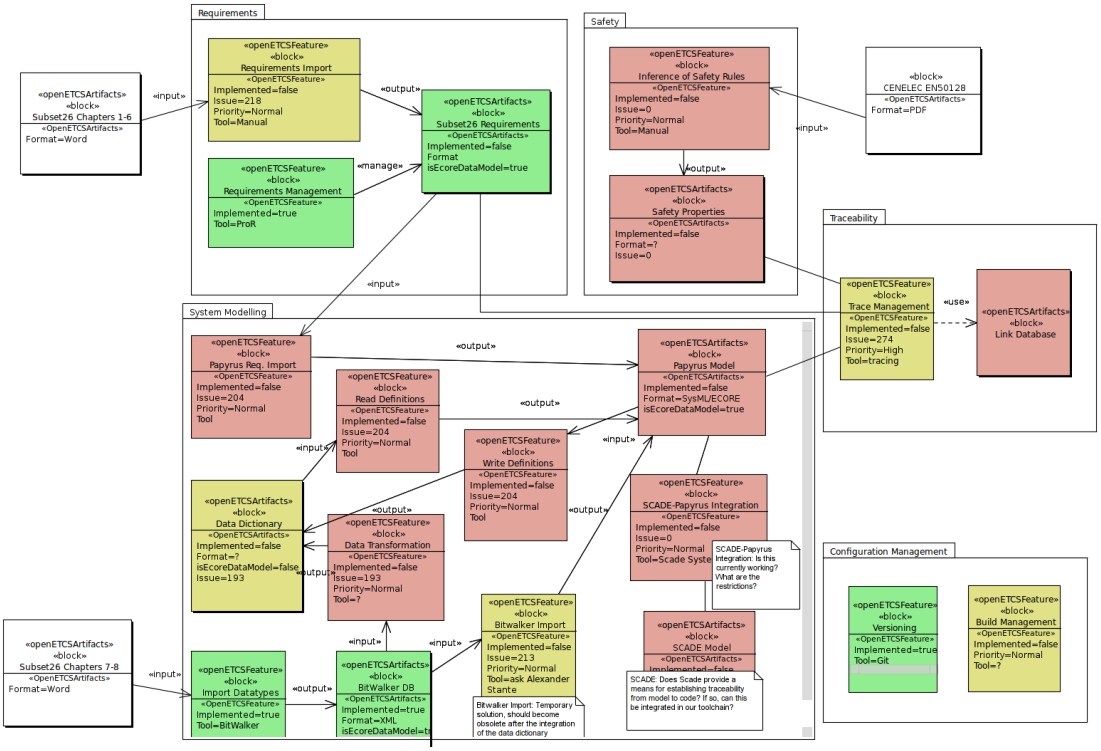

Figure 1. Tool Chain overview (20.02.14) –
Green Block: Implemented
Yellow Block: Work in Progress
Red Block: Not started
White Block: External Artifacts

- openETCS tracing Plugin

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	Eclipse is a development tool and will be used for test, in functional testing, in an easy and agile way the Open ETCS pluggins.

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 Apendices .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 shoud be under configuration management tool.
- **Test Incident Report**: This document will contain the list of errors found during the execution on test cases. For each error will appear the record of the ticket live.
- **Test Logs**: This document will contain the logs of the system during the OpenETCS platform testing.

2.7 Schedule

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

Also will be performing some specific task detailed below:

- The unit testing will be developed by two developers, writing and executing the test cases. This unit testing will be a continuous activity during the toolchain test.
- The functional testing will be executed each three months in a deeply way by the testing team that will be created for the toolchain test. The functional testing will be a continuous activity also.

2.8 Responsabilities

Role	Responsabilities	Person in charge

WP7 Leader	• Review and approval of the toolchain testing strategy, approach, and plans • Review of testing results report and defects to determine the impact to overall tool chain and plugins development and implementation schedule	Michael Jastram
Testing Manager	• Develop Test Strategy and Test Plan • Coordinate the development of testing deliverables • Review and approve testing deliverables • Monitor and report on the status of testing activities • Coordinate testing activities • Defect management	
SW Development Team	• Design Unit Test Cases • Execute Unit Test Cases • Review test cases and results for completeness	Plugin or Feature Owner
Tool chain Validation and Verification Team	• Design Test Cases • Execute Test Cases • Elaborate Test Reports	

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		
Regression testing		

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 Responsabilities

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

.2 Test Specification Template

Test Case Identifier:	
Test Objective	*Describe the purpose of the test case. Provide a brief description*
Test Items	*Describe the items or features (e.g., requirements, code, ...) to be tested by the test case*
Input Specifications	*Identify all inputs required to execute the test case.*
Test Steps	*Describe the series of individually numbered steps that are to be completed in sequential order to execute the test.*
Expected Test Results (Output Specifications)	*Identify all outputs required to verify the test case. Describe what the system should look like after the test case is run.*
Environmental needs	*Identify any environment requirement (e.g. operating system, tools,*
Inter-case Dependencies	*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.*

.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

This section provides an overall evaluation of the testing process