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| **D5.1.1 The CMS Use Case Definition**  Galaxy use case definition |

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ACRONYMS AND DEFINITIONS

Except if explicitly stated otherwise the definition of all terms and acronyms provided in [R1] is applicable in this document. If any, additional and/or specific definitions applicable only in this document are listed in the two tables below.

Acronymes

|  |  |
| --- | --- |
| Acronym | DESCRIPTION |
| CMS |  |
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Definitions

|  |  |
| --- | --- |
| TERMS | DESCRIPTION |
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# Introduction

The goal of the Galaxy project is to work on the technical hard points related to the fragmentation and to the distributiveness of huge models, and to their synchronization in regards of the communication means classically used by development teams. Galaxy partners believe that a set of technical solution integrated in a common platform of service (called: “the Galaxy platform”) may greatly help in dealing with these hard points.

Based on a selected subset of candidate technologies, the architecture of the platform has been specified. As planned in the project proposal this platform is assessed using use cases where scalability issues can be identified and characterized.

## Goal of this document

A specific task of the Galaxy project (T5.1) is dedicated to the definition of the use cases. This document is a product of this task which describes the CMS study case.

## Document organization

The chapter 2 describes the context of the test case, including an overview of the domain and a focus on the scope on which of particular interest for the study.

Chapter 3 explains how the approach we have selected to verify and validate the added value of the services provided by the Galaxy platform.

Chapter 4 presents the partners involved on this study case and the way they have contributed to it.

Chapter 5 specifies the scenarios which are used to assess the performance offered by the Galaxy platform.

Chapter 6 describes the models involved in validation scenarios are played: viewpoints, views, sizes and organizations.

Last, Chapter 7 is about the tools software tools used for the validation scenarios.

# SCope

## Description of the CMS system

Describe here the context of the domain of the study case and specific concepts of interest which helps in getting a better understanding of it.

## Scope of the study

Focus here on the perimeter directly involved in the study case. Describe the scalability issues which are used to assess the added value of the platform

Usage of the framework to support either time consuming and/or collaborative tasks the development teams have to face during the development or the maintenance of a CMS system.

# Validation method

Explain the approach and the process applied on this study case.

The validation is carried out in a two phases process. First, the validation scenarios are played on the CMS with a “standard” TOPCASED v5.1 development platform, producing the reference data. Then the Galaxy platform is used and the results are compared. Alternatively the reference data could come from existing real cases, as long as they can be clearly characterized. Both objectives and subjective performance data are assessed. Objectives data include measured execution time, memory consumption and CPU usage. Subjective ones include users’ feedback.

The advantage of this approach is to allow an early start of the validation activities since the first part, used to provide reference data does not require the Galaxy platform.

# Involved PARTNERS

All partner directly involved in this study case are listed here with their respective contribution.

Airbus (+ATOS), Akka

# Validation ScenariOS

Describe the validation scenarios here:

* Involved service of the Galaxy platform
* procedure,
* assessed metrics and corresponding objectives

## Loading of models

This scenario is directly related to the issues raised by the size of the models.

To be assessed:

* Ability to open a model depending on its size
* Time to load the model in a case of a regular and common use (i.e. day-to-day work)
* Time to access randomly a given part of the model (restricted to realistic scenarios only)

**Process with the initial framework:**

Today we are able to load a subset but not the entire model (limit is the 32bits JVM). Model (whole) file size in Papyrus format is around 170Mb. To be loaded more than 1.3Gb of RAM is required (limit of the JVM 32).

**Process with the Galaxy framework.**

It is expected that the Galaxy framework prevent allow to deal with such big model without special care on the user side.

## Team work management

This scenario addresses the issues directly related to several individual collaborating in parallel to the definition of the same product and sharing the corresponding model.

To be assessed:

* Capability of parallelized work on distinct parts of the model:
  + modification of parts,
  + workspaces update,
  + edition conflicts avoidance, etc…

**Process with the initial framework:**

The framework used during the development phase of the CMS system was based on a shared directory which stored all the model files. Developers had no individual workspace and synchronization between their works on the model was purely “manual”. Special care was required to avoid overwriting between them.

The following scenarios have been created issues with the framework used during the development phase:

* …

**Process with the Galaxy framework.**

It is expected that the Galaxy framework prevent such issues to appear.

## Specification Modification: impact analysis

This scenario deals with the way a modification of the upstream specification is managed. The global model is modified by iteration. For each iteration, the whole model is modified and exchanged between the Customer and the supplier.

To be assessed:

* The ability to point out the modification made in the new version
* The ability to detect impacted element downstream
* The accuracy of the analysis

**Process with the initial framework:**

The impact analysis is a manual process based on human review of the textual requirements linked to the model.

**Process with the Galaxy framework.**

Using the Galaxy framework, it is expected to be able to perform an automated impact analysis on the whole model with minimal manual operations.

## Publish a modification made on a low level layer’s element

This scenario is similar to the previous one except that in this case the modification is not made on the upstream specification but on an integrated component (i.e. downstream). In case where parts of models are reused between product or subparts, the shared model component will generally have their own lifecycle.

To be assessed:

* The ability to point out the modification made in the new version
* The ability to detect impacted (“client”) element
* The accuracy of the analysis

**Process with the initial framework:**

With the initial framework if a modification is made on the database component a manual impact analysis is required on all the potential clients of this component.

**Process with the Galaxy framework.**

Using the Galaxy framework, it is expected:

* to be able to perform an automated impact analysis on all the clients with minimal manual operations.
* To notify all team members working on these client component that a modified version is available.

## Traceability between specification and conception models

This scenario deals with the traceability analysis as required by the avionics development process.

To be assessed:

* The ability to generate a downstream traceability analysis of the specifying elements
* The ability to generate an upstream traceability analysis of the design
* The ability to retrieve elements linked to design choices

**Process with the initial framework:**

The traceability analysis is performed on documents generated from the model which has been manually annotated with all the traceability information.

**Process with the Galaxy framework.**

The traceability analysis is performed directly on the model and is able to use both the implicit traceability information provided in the model “by construction” and the explicit traceability information added manually by the developers in the model.

## Batch ATL transformations (e.g. RSA-> Papyrus conversion)

The purpose of this scenario is to check in which extend the Galaxy framework can improve the performance of batch model transformations. The test case is provided by the conversion from one tool (Rational Rose) to another (MDT Papyrus) which are not based on the same technology and then required a migration of the model file.

To be assessed:

* Time and memory consumption required by the transformation versus models size.

## Modification management process

In the frame of an industrial development modification made on the product definition is realized according to a controlled process, driven by a tool which has to be configured according to the project specificities.

To be assessed:

* Ability to generate a complete and correct configuration file from the model of the process.

**Process with the initial framework:**

The configuration file for the modification management tools is coded “by hand“.

**Process with the Galaxy framework.**

Assuming the modification process has been modeled, it is possible to generate this configuration file.

# Involved models

List and describe the kind of models (view, viewpoint) involved in the study case and the way they are organized (relationships)

# tools used

List the tools used in this study case with their corresponding version and purpose.

* Topcased 5.1
  + MDT Papyrus model editor (v0.81)
  + GenDoc2 (vx.x)
  + EMF compare
  + Script
  + OCL Rules Checker
  + TOPCASED Req
  + Tamore (vx.x)
* ATL vxx