

TDA 594/DIT 593 - Assignment 1 - Case Study on a Reuse-Driven System

Due Date: Sunday, November 14, 23:59

Submission: Via Canvas (one PDF document per team)

Overview

In this assignment, you will create a case study examining the development of a Software Product Line (or another complex system that makes extensive use of reusable assets or external libraries, where alternative options could be chosen and configured).

Many examples of SPL development are included in the following book: Van der Linden, F. J., Schmid, K., & Rommes, E.. *Software product lines in action: the best industrial practice in product line engineering*. This book is freely available in digital form from the Chalmers library.

Note that you are not restricted to this book (which is somewhat old), and that some case studies are less detailed than others (we recommend avoiding the Nokia studies). You may also feel free to find other SPLs or complex systems that make extensive use of reusable assets and external libraries, and create a case study on the development of those systems¹.

For example, many companies blog extensively about their products (e.g., Netflix - <https://netflixtechblog.com/> - Facebook - <https://engineering.fb.com/> - or Spotify - <https://engineering.atspotify.com/>). Others have written white papers and participated in research studies (Danfoss, for example - <https://dl.acm.org/doi/10.1145/2934466.2934491> - as well as Bosch and pure::variants). You are encouraged to do some preliminary research before you choose a system and may choose any company and system as long as sufficient information exists to analyze the engineering choices made in the development of that system.

Approval

You must ensure that sufficient information is available on the chosen system to write this report before you begin the project.

Before beginning your case study, you **must** obtain approval from your supervisor on your choice of system to study. A supervisor will be assigned following completion of Assignment 0 (Team Formation), so it is in your interest to form a team as quickly as possible.

¹ We recommend that you search specifically for companies that produce software product lines, but you may focus on any system that was clearly engineered to manage variability of some kind (e.g., a system that can be customized by a user or for a particular customer, a system where there are many configuration options, or a system designed to be plugged into an existing framework)

When requesting approval, include your primary sources of information on the chosen system. If you are unsure whether enough information is publicly available on a system you are interested in, discuss this with your supervisor.

Deliverable

You will create a case study on the system of your choice. To guide your analysis, we present the following aspects regarding the system that you should consider:

- **Context:** What kind of organization adopted/applied SPL or reuse-driven engineering?
- **Motivation:** What motivated the transition to, or adoption of, a product line or reuse-driven approach?
- **System Type:** For what kind of system did they apply SPL or reuse-driven engineering?
- **Approach:** How did they adopt SPL or reuse-driven engineering? What practices were employed? What processes were affected, and how?
- **Challenges:** What were the key technical or process challenges encountered when implementing SPL or reuse-driven engineering?
- **Results:** What are the important results with regard to business, architecture, process, and organization?
- **Conclusions:** What did they learn from implementing SPL or reuse-driven engineering?

We recognize that information may not be available on some portion of these aspects, but you should attempt to find information regarding each of the above aspects. State explicitly if information is not available for an aspect. In such situations, you may speculate on aspects of the development of the system, but must make clear what you are assuming or speculating. You may also write about other aspects of the system that you feel are relevant.

In addition to documenting information found about these systems, you **must** reflect on the choices made by the engineers building these systems and **provide your own commentary and opinions** on those choices. Do you feel these were reasonable decisions? Do you see potential weaknesses in the decisions made? Are there alternatives you feel should have been considered? We do not expect you to design a perfect system, but you should discuss the work performed by these companies in the context of your own experiences or in the context of other systems that you have read about.

There is not a minimum page length for this document. Quality is more important than quantity. It is important that you cover as many of the criteria as possible in detail, and provide your own reflections on the development of the chosen system.

Submit your case study in **PDF form** via the submission link on Canvas. You will submit one document per team.

GitLab Signup

For Assignments 3-5, we will use the Chalmers GitLab as a version control system for code development. If you have not yet, you must sign up at <https://git.chalmers.se/>. Log in with your Chalmers account. **Please include both the Chalmers CID and the Chalmers GitLab IDs for all students in your group in your submission.**

Grading Guidelines

Note, these guidelines are intended to give some guidance, but are not exhaustive. Each supervisor will assign a grade based on the correctness and quality of your work.

Grade	Guidelines
5	<ul style="list-style-type: none">• Covers the full set of stated aspects above, as well as additional aspects regarding the development of the system that you have found interesting.• Each aspect is covered in detail, and includes your original commentary and creative reflection (i.e., not just a summary of public information on the system).• If some aspects cannot be covered, informed speculation and discussion is still provided.• All team members have had a role in writing and editing the document (it is not obvious that different sections were written by different authors).• Document is written in clear English, without major spelling or grammar errors.
4	<ul style="list-style-type: none">• All aspects covered.• Most aspects are covered in detail, and include your original commentary and creative reflection.• If some aspects cannot be covered, informed speculation and discussion is still provided.• Document is written in clear English, with few spelling or grammar errors.
3	<ul style="list-style-type: none">• Most aspects covered.• Some aspects covered in detail, with original commentary and creative reflection.• If some aspects cannot be covered, some speculation and discussion is still provided.• Document has some spelling or grammar errors, but is still understandable.
U	<ul style="list-style-type: none">• Several aspects missing from the above list.• Included aspects not covered in sufficient detail.• No original commentary or reflection.• Document has major spelling or grammar errors.