Chapter 20
Commonality Analysis
Implications Over a Successful Product Line

Sathya Ganeshan
Leeds Metropolitan University, UK

Muthu Ramachandran
Leeds Metropolitan University, UK

ABSTRACT

The success of initiating a software product line based approach on an organization depends on a few critical factors. Among them is a thoroughly performed commonality analysis process. This can be imagined as a collecting the supplies and road map required to reach a particular destination. This chapter analyses this critical process and presents our own views and methods of conducting commonality analysis.

INTRODUCTION

Software Product Line engineering has emerged as a successful faction of producing quality products in a rapid pace. Underlying the success of software product lines is the concept of high level use applied in a structured fashion with constant stress on improvement and adaption. This is all based on the idea that all development process is reuse of existing artefacts (Hoey, 2006). Software Product lines are just a clever way of reusing existing assets, given that most organisations develop products in a single domain constantly releasing new products with new variations. The ultimate goal of software product lines is to improve the productivity of product development and the quality of products. Over the years, a wide array of techniques and models (Eriksson, 2006) has been invented to systematically install this approach. We use the abbreviation SPL to denote Software Product Lines in this chapter.

The global agenda towards software development is taking a marked shift towards family based approaches which have proven to be more efficient and trustworthy. Many global players are already using SPL or family based approaches. Even concerns which are not fully involved into product line based techniques are using some of the SPL processes within their development approach and
have come to understand the justification behind those approaches.

The success of any product line based approach depends on how accurately the product line engineers can predict the members of the family (Weiss, 1998). This crucial stage of predicting family members also falls within the boundary of Commonality Analysis process. Commonality analysis can be considered the one most important stage of any product line based approach along with architecture, cost analysis etc. We try to understand how crucial this stage is when it comes to product line, what is achieved and what more could be done to tune this process to deliver an efficient software product line family. We shall use the acronym CA to denote Commonality Analysis and SPL to denote Software Product Lines throughout this chapter.

FIRST STEP TOWARDS
PRODUCT LINE: THE
COMMONALITY ANALYSIS

Commonality analysis is a sort of confidence building measure to first and foremost find out if it is worth the trouble of building a family of products.

Figure 1 shows the list of outcomes which could be used to decide if venturing into SPL approach for a given product within the selected domain could be feasible or not. If all the intended family products share many things in common such as architecture, code, test cases, components etc as shown in figure 1, then it can be said with confidence that SPL approach is worth a try. Following are some of the questions for which a clear answer is required before beginning to apply SPL methods for the given project.

- Are there enough common characteristics present among the intended family of

---

**Figure 1. Justification for applying SPL through commonality analysis**

- Commonality Analysis
- Domain and Scope
- Architecture
- Code
- Test cases
- Tools
- Components
- Best practices
- Common terminology

Decision to Continue with SPL based development Approach