Chapter XVII
Estimate of Effort in Software Implementation Projects

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ABSTRACT

This document contains a proposal for project estimation of software implementation to be used in a Mexican SME business (small and middle size companies). This method, named Ultrasist Use Case Points (UsistUCP), is based on the Use Case Point (UCP) estimation method, developed in 1993, along with the object-oriented methods, by Gustav Karner (1993). We start by explaining the use case point estimation method; then we will develop the UsistUCP proposal, specifying its differences with the original method (UCP). To make a comparative analysis between these two methods, we take one case under study to be estimated based on these two methods and then we will provide the corresponding conclusions.

INTRODUCTION

Ultrasist is a Mexican company with more than 10 years of experience integrating computing technology in the business process of its clients with consultancy and systems implementation. Ultrasist was the first SME in Mexico to achieve capability maturity model (CMM) level 4. Ultrasist has established as its quality policy the implementation of IT systems that meet their clients’ needs. For this, Ultrasist has developed a framework to implement systems based on the
best practices, leading-edge technologies, and international standards. This frame includes a series of processes that cover the whole software’s life cycle and support processes, including a process to review project’s feasibility and software estimation to quote the effort required. This process has been perfected for five years and is based on the historic database of real projects of 10 years.

The feasibility process takes into account three main aspects before making the decision to carry out a project. First, we seek a clear description of the objectives in order to choose the best solution option, for which we analyze feasibility in the following three main items:

1. **Operational feasibility:** In the operational feasibility, we establish if the proposed solution is within the business lines, that is, if it is aligned with the company’s strategic objectives.
2. **Technical feasibility:** In the technical feasibility, we analyze if the proposed solution can be implemented with the available human resources and if there is the necessary infrastructure.
3. **Economic feasibility:** This consists of estimating the effort needed to implement the project and be able to conclude if the project is profitable for the organization. The size and effort required to implement it are also estimated in this item, considering the scope being identified.

This document focuses on the third item referring to the economic feasibility.

We start by explaining the use case point estimation method; then we will develop the UsistUCP proposal, specifying its differences with the original method: use case point (UCP). To make a comparative analysis between these two methods, we take one case under study to be estimated based on these two methods and then we will provide the corresponding conclusions.

**BACKGROUND**

The size of software is one of the main factors to determine the effort needed to design any system. Several models have been proposed to estimate size; one of the most famous is the COCOMO model. However, one of the most widespread techniques to estimate size of systems is the function points analysis. This technique is based on the number of inputs, outputs, queries, files, and interfaces. To know all these attributes, we need to have enough information of the system and/or applications to be designed, but for new implementations, generally there is only an initial list of requisites that in most cases is quite general. Both models are identified as top-down estimate proposals.

Another type of estimate proposal is bottom-up, in which an estimate is made by dividing the software under implementation by the main applications or units. Each application is then classified as simple, average, and complex based on certain criteria. For each classification, a standard effort for coding and tests is defined, named designing effort. This standard designing effort can be based on data from previous similar projects, available internal guidelines, or a combination of both. Both proposals, top-down and bottom-up, require information on the project, size (top-down), and a list of tasks (bottom-up) (Jalote, 2002).

This document describes the UsistUCP method, developed by Ultrasist to estimate the effort in projects considering the use case analysis, which combines both proposals (top-down and bottom-up). Our method originated in the UCP original method and was gradually modified based on our experience. We share our experience so that it can be used by other organizations, specifically the SMEs, as their activities are dynamic and feasible to perform, and this is quite evident with the successful establishment of our company.
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