Convertibility Between IFPUG and COSMIC Functional Size Measurements

J.J. Cuadrado-Gallego[1], D.Rodríguez[1], F. Machado[2], and A. Abran[3]

[1] Department of Computer Science
University of Alcalá
28805 Alcalá de Henares Madrid, Spain
{jjcg,daniel.rodriguezg}@uah.es
[2] Universidad Catlica del Uruguay
Av. 8 de Octubre 2738
11600 Montevideo, Uruguay
fmachado@ucu.edu.uy
[3] École de Technologie Supérieure
1100, rue Notre-Dame Ouest
Montral, Qubec
Canada H3C 1K3
alain.abran@ele.etsmtl.ca

Abstract. Since 1984 the International Function Point Users Group (IFPUG) has produced and maintained a set of standards and technical documents about a functional size measurement methods, known as IFPUG, based on Albrecht Fuction Points. On the other hand, in 1998, the Common Software Measurement International Consortium (COSMIC) proposed an improved measurement method known as Full Function Points (FFP). Both the IFPUG and the COSMIC methods both measure functional size of software, but produce different results. In this paper, we propose a model to convert functional size measures obtained with the IFPUG method to the corresponding COSMIC measures. We also present the validation of the model using 33 software projects measured with both methods. This approach may be beneficial to companies using both methods or migrating to COSMIC such that past data in IFPUG can be considered for future estimates using COSMIC and as a validation procedure.

Keywords: Functional Size measurement, IFPUG, COSMIC, Software Estimation.

1 Introduction

Function Point Analysis or FPA is one the oldest and most widely used software functional size measurement method. It was proposed by Albrecht and his colleagues at IBM in 1979. Since 1984 this method is promoted by the International Function Point Users Group (IFPUG) [7]. In 1994, the International Organization for Standardization (ISO) set up a working group to establish an

J. Münch and P. Abrahamsson (Eds.): PROFES 2007, LNCS 4589, pp. 273–283, 2007.

international standard for functional size measurement. This group did not produce a measurement standard, but a set of standards and technical documents about functional size measurement methods, known as the ISO/IEC 14143 series [1,2,3,4,5]. The FPA method became the standard ISO/IEC 20926 [11] in 2003, its unadjusted portion being compliant with the ISO/IEC 14143 [1]. Starting in 1998, a set of experts in software measurement created the Common Software Measurement International Consortium or COSMIC, and proposed an improved measurement method known as Full Function Points (COSMIC FFP) [6]. This method became the standard ISO/IEC 19761 in 2003 and is also ISO/IEC 14143 compliant. Both IFPUG and the COSMIC-FPP methods measure functional size of software, but produce different results. For this work, we briefly compare IFPUG and COSMIC definitions and propose a model to convert functional size measures obtained with the IFPUG method to the corresponding COSMIC FFP measures. To do so, we have used a repository of 33 projects measured using both methods.

The organisation of the paper is as follows. Section 2 provides a high level view of the mapping between both methods. Section 3 presents and analyses our approach and its empirical validation. Finally, Section 4 concludes the paper and future work is outlined.

2 Analysis of Correspondence Between Definitions

This section presents a very high level view of the components and relationships for IFPUG and COSMIC measurement methods needed to obtain correspondences between the concepts defined by such components and relationships to determine under which conditions it would make sense to compare the measurements obtained with both methods.

There are three initial concepts in the measurement of software functionality size shared for both methods: the purpose of a measurement, the scope of a measurement and the application boundary. Such concepts define what is measured and what it is measured for. In it possible to have a mapping between both methods for the key terms: (i) the *purpose of a measurement*; (ii) the *scope of a measurement* and (iii) the definition of *boundary*. The same happens with other key concepts in the software functional size measurement that must be considered; three are related to data (the *object of interest* or *entity*, the *data group* or *file* and the *data attribute* or *data elements*) and two to its transformation processes (the *functional process* or *transactional function*). Table 1 summarizes the correspondence of concepts between COSMIC and IFPUG.

After analyzing both methods, it can be concluded that: (i) the software functional size measures obtained shall be comparable when the purpose and the scope of the measurement coincide, as well as the application boundary; obviously, the application to be measured also has to be the same. These concepts are practically identical in both methods; (ii) both methods coincide when they divide the user data processing requirements into units, using practically the