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Software engineering — IFPUG 4.1 Unadjusted functional size measurement method — Counting practices manual

Ingénierie du logiciel — Méthode de mesure de la taille fonctionnelle non ajustée de IFPUG 4.1 — Manuel des pratiques de comptage

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Glossary

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 20926 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and system engineering*.

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Scope

This International Standard specifies the International Function Point Users Group (IFPUG) Release 4.1 unadjusted Functional Size Measurement Method. It provides:

- clear and detailed description of function point counting
- A foundation to ensure that counts are consistent
- Guidance to allow function point counting of Functional User Requirements from the deliverables of popular software development methodologies and techniques
- A framework to enable automated support for function point counting

The provisions of this International Standard can be applied by anyone using function point analysis for software measurement. It was designed for use by persons new to function point counting as well as those with intermediate and advanced experience.

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IFPUG Foreword

Function points are the leading metric of the software world. Although function points originated as a sizing mechanism for software projects, the power and utility of function points have expanded into new uses far beyond that basic purpose. As the twenty-first century approaches, function points are now being applied to all of these tasks:

- Benchmark studies
- Development cost estimating
- Litigation involving software contracts
- Litigation involving software taxation
- Maintenance cost estimating
- Outsource contracts
- Process improvement analysis
- Quality estimating
- Quality measurements
- Sizing all software deliverables (documents, source code, test materials)
- Year 2000 software cost estimating

As usage of function point metrics expands throughout the software world, more and more companies and government agencies are starting function point programs. This implies that the need for certified function point analysts is rising even faster than the demand for other software professionals. Certification would not be possible without a complete and stable set of counting rules for function point analysis.

A great deal of the credit for the rapid expansion of function point metrics should go to the International Function Point Users Group (IFPUG) and its officers, committees, and members. One of the committees that merits commendation is the Counting Practices Committee.

Although the basic principles of function point analysis are simple and straightforward, the real-life application of these principles across thousands of software projects is not simple at all.

If function point counts fluctuated by more than 150% when counted by different individuals (as do lines of code counts) then function points would have no claim to be considered a useful business metric. But thanks to the work of the Counting Practices Committee, the reliability of function point analysis is good enough to allow function points to serve as the basis for contracts, for carrying out scholarly research, for cost estimating, and for creating reliable benchmarks. So far as can be determined, the accuracy of function points is equal or superior to many other business metrics such as internal rate of return, net present value, or return on investment.

The move to version 4.0 of the IFPUG counting practices in January of 1994 was somewhat contentious and controversial. This is because the version 4.0 rules had the affect of reducing function point totals for some applications, by fairly significant amounts.

The move to the version 4.1 rules should be much smoother and less controversial. The reason that 4.1 was selected rather than 5.0 as the name of this release is because the numeric results of the new version are close enough to the version 4.0 rules that recounting will not be necessary.

The major changes in the version 4.1 rules are in the examples, the clarification of some complex counting situations, and improvements in the overall exposition of function point counting principles. Those learning to

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use function points should find the version 4.1 rules to be easier to understand and apply than the prior versions.

As software itself expands and changes, the rules for counting function points must also be expanded. When Allan Albrecht first introduced function points in October of 1979, many of the kinds of software projects being created in 1999 did not exist. For example, in 1979 software such as multi-tier client-server applications, web applets, and massive enterprise resource planning (ERP) systems were still in the future.

It is a tribute to Allan Albrecht's vision that function point metrics are as useful today as they were in 1979. But without the work of the IFPUG organization and the Counting Practices Committee, function point metrics would not be expanding in utility at the beginning of the twenty-first century. In fact, function points are now used for more business purposes than any other metric in the history of software.

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IFPUG Preface

Introduction

The use of function points, as a measure of the functional size of software, has grown in the past decade from a few interested organizations to an impressive list of companies worldwide. The IFPUG method is applicable to measuring all software

IBM CIS & A Guidelines 313

In the late 1970s, Allan Albrecht of IBM defined the concepts that enabled measuring the output of software development projects. These definitions were extended in *IBM CIS & A Guideline 313, AD/M Productivity Measurement and Estimate Validation*, dated November 1, 1984.

Release 2.0

With the growth in the use of function points, there was wider and wider application of the measure. This broadening of the application tested the original description of the measure and made it necessary to create guidelines to interpret the original rules in new environments. This was reflected in Release 2.0 of the *International Function Point Users Group (IFPUG) Function Point Counting Practices Manual.*

Release 3.0

Release 3.0 of the *IFPUG Function Point Counting Practices Manual* was a major milestone in the evolution of functional size measurement. For the first time, the IFPUG Counting Practices Committee made an effort to change the document from a collection of many interpretations of the rules to a truly coherent document that represented a consensus view of the rules of function point counting. In this sense, it was the first step to truly establishing standards for function point measurement which could be applied across organizations.

Release 4.0

Release 4.0 (January 1994) was the next milestone in the evolution of functional size measurement. This release reflected the use of function points early in project development to estimate project size using information engineering disciplines. The rapidly increasing number of graphical user interface (GUI) windows applications mandated that we include GUI counting in the release. Because more counting was occurring across a wider variety of situations, the release placed an emphasis on interpreting and practicing using the counting rules. Examples were included throughout the documentation and case studies supplemented the material. Finally, release 4.0 continued to clarify and increase the consistency of function point counting.

Release 4.1

Release 4.1 (January 1999) provides clarifications to existing rules, new or amended rules which address previously undocumented situations and new hints and examples to aid understanding. The IFPUG Counting Practices Committee has reviewed and processed requests from members, following the Manual Revision Process contained in Chapter 1 of this manual.

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The revisions included in 4.1 clarify:

- the identification of a user, an elementary process, and control information
- the differentiation between External Outputs (EOs) and External Inquiries (EQs)
- the identification of Data Element Types (DETs) and Record Element Types (RETs) for data functions
- the identification of Data Element Types (DETs) for transactional functions

Release 4.1 continues the process of clarifying and improving the consistency of function point counting.

Finally, with the exception of the 14 General Systems Characteristics, it was designed to be compliant with existing ISO standards if and when any compliance guide becomes a standard.

Future Releases

This document is meant to be a living one. We must recognize how to count new environments as they are introduced. We need to be able to do this in the context of maintaining the validity of the counts we have already made. This will not be an easy task, yet it is an essential one if we are to be able to measure the progress we are making in delivering value to the users and to the organizations they represent.

The Counting Practices Committee wishes to thank all those who have helped us in our research and in the production of this manual.

Mary S. Bradley
Chairperson, Counting Practices Committee

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1 Introduction

Introduction

This chapter defines the objectives of this International Standard and this International Standard revision process. It also describes publications that are related to this International Standard.

The IFPUG method is applicable to measuring all software.

Contents

This chapter includes the following sections:

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Objectives of this International Standard

The primary objectives of this International Standard ISO/IEC 20926 are to

- Provide a clear and detailed description of function point counting
- Ensure that counts are consistent with the counting practices of IFPUG affiliate members
- Provide guidance to allow function point counting from the deliverables of popular methodologies and techniques
- Provide a common understanding to allow tool vendors to provide automated support for function point counting

Guidelines for ISO/IEC 20926

The following guidelines were used to develop this release:

- This International Standard is based primarily on the *IFPUG Function Point Counting Practices Manual, Release 4.0.*
- Secondly, this International Standard is based on *IBM CIS & A Guideline 313, AD/M Productivity Measurement and Estimate Validation*, dated November 1, 1984. The function point counting methodology described in 313 is generally referred to as Albrecht 1984.
- Finally, issues not sufficiently covered in the sources listed above were decided by the IFPUG Counting Practices Committee and validated through impact studies.

With its release, this International Standard should be considered the IFPUG standard for function point counting. It is imperative that each IFPUG member takes an active role to ensure counting consistency. IFPUG member adherence to this standard will contribute greatly to counting consistency.

Intended Audience

The standards in this International Standard should be applied by anyone using function point analysis for software measurement. This International Standard was designed for use by persons new to function point counting as well as those with intermediate and advanced experience.

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Organization of this International Standard

There are three major parts in this International Standard:

- Preface and introduction
- Overview of function point analysis
- Explanation of the counting practices

Examples are used extensively throughout this International Standard to explain counting practices concepts, rules, and procedures. Detailed examples conclude chapters 6 and 7.

Note: A separate IFPUG Glossary includes definitions of terms used across IFPUG publications.

Preface and Introduction

The Preface and Introduction provide an overview of this International Standard and function point counting.

Overview of Function Point Analysis

The Overview introduces the function point counting procedures and includes a summary example of the procedures.

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Explanation of the Counting Practices

Chapter 3 explains the concept of user view.

Chapters 4 through 9 present details about each of the procedure steps introduced in the Overview.

For example, Chapter 4, Determine Type of Count, is the first step in the function point counting procedure. Chapter 9, Calculate Adjusted Function Point Count, is the last step.

Information within chapters 5 through 7 is presented in the following sequence:

- Definitions
- Rules
- Procedures
- Counting Hints
- Examples

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