Release 4.3.1, January 2010

This release replaces Release 4.2.1, which is now obsolete. Changes are made periodically to the information within.

Counting Practices Committee

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The IFPUG FSM method as reflected in this manual finds its origin in CPM 4.0, released in 1990. Many individuals have served as members on the CPC over the years, and they sharpened each other’s vision and insight through numerous and complex discussions about the methodology. Thanks to the contribution of all of the current and past members, the method has evolved to the current ISO FSM standard. The CPM is an accumulation of the contributions of all who have served on the CPC. The CPC has been blessed as well by the support and contribution of our Counting Standards Directors, including Carol Dekkers, Bruce Rogora and Mary Bradley, and the effort by Carol Dekkers in advancing both ISO documents through the process to gain approval. IFPUG extends our appreciation to all current and past CPC members, Counting Standards Directors and ISO Representatives.

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Terry Vogt (CPM 4.2)
Gary Walker (CPM 4.0, CPM 4.1)
Ewa Wasylkowski (CPM 4.0, CPM 4.1)
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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 organizations worldwide.

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 (April 1988) of the International Function Point Users Group (IFPUG) Function Point Counting Practices Manual.

Release 3.0 Release 3.0 (April 1990) 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) provided 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.

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.

Release 4.1.1  Release 4.1.1 (April 2000) corrected a small number of typos and errors.
Release 4.2  Release 4.2 (January 2004) does not modify any previously promulgated rules, but it provides clarification and enhanced interpretations for existing rules that will further increase inter-counter consistency.

The IFPUG function point analysis (FPA) process and rules are concise and easy to use. To reflect that, and to make the Counting Practices Manual (CPM) even more attractive as a reference manual, the Counting Practices Committee (CPC) decided to restructure CPM 4.2 into four parts:

1. Process and Rules
2. Counting Practices
3. Examples
4. Appendices

To assist worldwide practitioners of FPA in a timely manner, the CPC initially published the results of its research as separate publications, addendums to the CPM:

- Counting Logical Files (September 2001)
- FPA in an Enhancement Environment (April 2002)
- Counting Code Data (September 2003)
- Counting Shared Data (September 2003)

These documents have now been incorporated as chapters in Part 2 of the CPM.

The CPC believes that CPM 4.2, with its added guidelines and examples will ensure more consistent results between Certified Function Point Specialists.

Release 4.2.1  Release 4.2.1 (January 2005) Corrected a small number of typographical errors.

Release 4.3  Release 4.3 (January 2010) The IFPUG function point analysis (FPA) process and rules are concise and easy to use. To reflect that, and to make the Counting Practices Manual (CPM) even more attractive as a reference manual, the Counting Practices Committee (CPC) restructured CPM 4.3 to comply with ISO formatting Standards. Besides that, release 4.3 contains minor modifications and provides new examples, clarification and enhanced interpretations for existing rules that will further increase inter-counter consistency.

The CPC believes that CPM 4.3, with its new format and examples will ensure more consistent results among Certified Function Point Specialists.

Release 4.3.1  Release 4.3.1 (January 2010) Corrected a number of printing errors and incorporated ISO editorial revisions.
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.

Adri Timp
Chairperson, Counting Practices Committee
Introduction to the Counting Practices Manual

Introduction

This introduction defines the objectives of the manual and the revision process. It also describes publications that are related to this manual.

Contents

This chapter includes the following sections:

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<th>See Page</th>
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The primary objectives of the *IFPUG Counting Practices Manual, Release 4.3*, are to

- Comply with ISO/IEC 14143-1:2007 *Information technology – Software measurement – Functional size measurement – Definition of concepts*
- 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

Documents Used for Release 4.3

The following documentation was used to develop this release:

- The IFPUG FPA method 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.
- The current version of the manual, CPM 4.3, is based primarily on the *IFPUG Function Point Counting Practices Manual, Release 4.2.1.*
- CPM 4.3 is designed to be compliant with ISO/IEC 14143-1:2007 *Information technology – Software measurement – Functional size measurement – Definition of concepts.*
- Issues not sufficiently covered in the sources listed above were decided by the IFPUG Counting Practices Committee based on variants of existing counting practices and validated through impact studies.

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

The standard in this manual should be applied by anyone using function point analysis for functional size measurement. The manual was designed for use by persons new to functional size measurement as well as those with intermediate and advanced experience.

There are five major parts in the Counting Practices Manual (CPM):

• Part 1: FSM-IFPUG functional size measurement method
• Part 2 The Bridge - Applying the IFPUG Functional Size Measurement Method
• Part 3: Counting Practices
• Part 4: Examples
• Part 5 Appendices and Glossary

Part 1 – FSM

Part 1 is the IFPUG functional size measurement method which contains the rules. To speak a language as a native, learning the grammar and the words alone are not sufficient. They just provide a framework. You need language experience to understand how the language is spoken in practice, how the grammar rules should be applied, what idiomatic expressions are common, and so on. The same is true for FPA. The knowledge of process and rules: as reflected in Part 1, is a necessity, but the knowledge alone is not a sufficient condition to apply FPA correctly. That’s why the CPM contains the parts below.

Part 2 – The Bridge

Part 2 provides guidance for sizing software following the IFPUG functional size measurement (FSM) Method, included as Part 1 of this IFPUG Function Point Counting Practices Manual.

Part 3 – Counting Practices and Part 4 -Examples.

Part 3 and 4 provide detailed examples to explain counting practices concepts and rules. Each example should be considered on its own merits. Since each example is intended to illustrate a specific scenario, variations may exist between examples. Although the examples throughout the manual deal with similar subject matter, they are not intended to represent a single set of user requirements.

Part 5 – Appendices and Glossary

Part 5 contains valuable additional information, such as ready to use calculation templates, the transition from CPM 4.2 (and CPM 4.2.1) to CPM 4.3, the General Systems Characteristics and the glossary.

In principle, each part stands on its own.
Manual Revision Process

This section explains the frequency of changes to the Counting Practices Manual and defines the change process.

Frequency of Changes

During January of each year, a new version of the Counting Practices Manual may become effective. It will include any new or changed definitions, rules, or counting practices that have been finalized by the Counting Practices Committee (CPC) since the previous version.

Change Process

The following activities outline the process for adding or changing information in the Counting Practices Manual. Explanations of each activity follow the table.

<table>
<thead>
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<th>Step</th>
<th>Action</th>
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<td>1</td>
<td>The issue is submitted to the CPC.</td>
</tr>
<tr>
<td>2</td>
<td>The issue is assigned for research.</td>
</tr>
<tr>
<td>3</td>
<td>The CPC reviews and discusses the issue.</td>
</tr>
<tr>
<td>4</td>
<td>The CPC presents a proposed solution to the IFPUG membership.</td>
</tr>
<tr>
<td>5</td>
<td>An impact study is initiated if the proposed change would have any impact on existing counts.</td>
</tr>
<tr>
<td>6</td>
<td>The final decision is made.</td>
</tr>
<tr>
<td>7</td>
<td>The IFPUG membership is informed of the decision.</td>
</tr>
<tr>
<td>8</td>
<td>Changes become effective with, and are reflected in, the next release of the Counting Practices Manual.</td>
</tr>
</tbody>
</table>

Issue Submitted

The reader submits ideas, changes, or issues to the Counting Practices Committee by sending email to ifpug@ifpug.org or cpc@ifpug.org

Research Assigned

A member of the CPC is assigned the responsibility for identifying all alternatives, the rationale, and the potential impact of each alternative if it is implemented. Thorough examination of existing counting standards and historical papers is completed while compiling alternatives. In addition, an effort is made to determine what is thought to be common practice.
### CPC Review
The CPC reviews and discusses the rationale for each alternative, and its potential impact. The review and discussion may result in a proposal for change or the review may lead the committee to reject the change request.

### Solution Proposed
A proposed solution is made to the IFPUG membership and written comments are solicited.

A copy of the proposed changes is mailed to IFPUG contacts at member organizations. The proposal also may be announced and distributed during an IFPUG conference. The latter depends on the timing of the committee meeting rather than the conference schedule.

### Impact Study Initiated
The CPC has adopted a conservative stance on initiating impact studies. If it is possible that common practice must change, or several organizations or types of applications will be impacted by the change, an impact study is initiated.

The success of the impact study is the responsibility of every IFPUG member. If the CPC receives written feedback indicating there is little or no impact, the study is discontinued.

### Final Decision Made
The committee makes a final decision using results from research, written comments from members, and the impact study.

The committee can complete more than one iteration of Steps 2 through 5 (research through impact study) before making a final decision. The final decision can result in a change or the committee may decide that a change is not warranted.

### Decision Communicated
The final decision is communicated in writing to IFPUG members via the IFPUG contact at the various organizations.

If any impact study results contributed to making a decision, the results and a recommendation on how to minimize the impact of the change will also be communicated.

### Decision Effective Date
The Counting Practices Manual is updated to reflect the decisions. The effective date of the decisions is the date of the next January release of the manual.
Related IFPUG Documentation

This Counting Practices Manual is one module in the IFPUG documentation. All documents complement each other.

The following table describes the other publications.

<table>
<thead>
<tr>
<th>Document</th>
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<tr>
<td>IFPUG Brochure</td>
<td>This publication is an introduction to the International Function Point Users Group. It includes a brief history of the organization, introduces function point analysis, and defines the purpose of IFPUG. The brochure also includes a membership application.</td>
</tr>
<tr>
<td>(Available)</td>
<td>Audience: This publication is for anyone who wants an overview of IFPUG or an application for membership.</td>
</tr>
<tr>
<td>IFPUG: Organizational Structure and Services</td>
<td>This publication describes IFPUG services, and lists the board of directors, committees, and affiliate members worldwide.</td>
</tr>
<tr>
<td>(Available)</td>
<td>Audience: This publication is for anyone who wants background information about IFPUG.</td>
</tr>
<tr>
<td>Guidelines to Software Measurement</td>
<td>This manual provides an overview of software metrics for organizations working to create or improve software measurement programs. The manual addresses both system and customer management, provides high-level justifications for software measurement, and examines the components of effective measurement programs.</td>
</tr>
<tr>
<td>(Release Date: August 2004)</td>
<td>Audience: This manual is intended for IFPUG members, Function Point Coordinators, persons who prepare the reports to management, and other persons knowledgeable about and working directly with function points.</td>
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<tr>
<td>Quick Reference Counting Guide</td>
<td>This quick reference guide is a summary of function point counting rules and procedures.</td>
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<tr>
<td>(Release Date: 2010)</td>
<td>Audience: This summary information is intended for anyone applying function point analysis.</td>
</tr>
<tr>
<td>(Release Date: 2010)</td>
<td>Audience: This is intended for anyone using the optional General Systems Characteristics.</td>
</tr>
<tr>
<td><strong>Document</strong></td>
<td><strong>Description</strong></td>
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<td><strong>Function Point Analysis</strong></td>
<td>The case studies illustrate the major counting techniques that comprise the Function Point Counting Practices Manual. The cases illustrate function point counts for a sample application. The cases include the counting that occurs at the end of the analysis phase of software development and after system construction.</td>
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<tr>
<td><strong>Case Studies</strong></td>
<td>Audience: The case studies are intended for persons new to function point analysis as well as those with intermediate and advanced experience.</td>
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<td>(Release Dates:</td>
<td></td>
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<td>Case Study 4 Release 2.0 September 2005 (CPM 4.2)</td>
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<td><strong>IFPUG Glossary</strong></td>
<td>This is a comprehensive glossary that defines terms used across IFPUG publications.</td>
</tr>
<tr>
<td>(Available with <em>CPM and Guidelines for Software Measurement</em>)</td>
<td>Audience: The glossary is recommended for anyone who receives any of the other IFPUG documents or anyone who needs definitions of IFPUG terms.</td>
</tr>
<tr>
<td><strong>“IT Measurement: Practical Advice from the Experts”, Addison-Wesley, April 2002</strong></td>
<td>This book is an excellent compilation of articles written by experts in the field of Information Technology. It was compiled by IFPUG to include recent insights in the application of software metrics in practice.</td>
</tr>
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</table>
Training Requirements

Usability evaluations of this publication have verified that reading the Counting Practices Manual alone is not sufficient training to apply function point counting at the optimum level. Training is recommended, particularly for those new to function point counting.

Note: For function point training, be sure you are trained using IFPUG certified materials. Call the IFPUG Executive Office at 609-799-4900 for a list of instructors with certified training courses.

In addition to the function point specific information, this manual includes the use of structured analysis and design terms, such as business systems and entity. The glossary includes definitions of these terms, but the Counting Practices Manual does not include detailed explanations of structured analysis and design techniques. Therefore, all of the material will not apply or be helpful if you have not been trained in structured analysis and design techniques.