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Information technology — Software measurement — Functional size measurement —

Part 6:
Guide for use of ISO/IEC 14143 series and related International Standards

Technologies de l'information — Mesurage du logiciel — Mesurage de la taille fonctionnelle —

Partie 6: Guide pour l'usage de la série ISO/CEI 14143 et des Normes internationales connexes

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Contents

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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 14143-6 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and system engineering*.

ISO/IEC 14143 consists of the following parts, under the general title *Information technology — Software measurement — Functional size measurement*:

— *Part 1: Definition of concepts*

— *Part 2: Conformity evaluation of software size measurement methods to ISO/IEC 14143-1:1998*

— *Part 3: Verification of functional size measurement methods* [Technical Report]

— *Part 4: Reference model* [Technical Report]

— *Part 5: Determination of functional domains for use with functional size measurement* [Technical Report]

— *Part 6: Guide for use of ISO/IEC 14143 series and related International Standards*

Annex A of this part of ISO/IEC 14143 is for information only.

Introduction

Functional Size Measurement (FSM) is a technique used to measure the size of software by quantifying the Functional User Requirements of the software. The first published method to embrace this concept was Function Point Analysis, developed by Allan J. Albrecht in the late 1970s. Since then, numerous extensions and variations of the original method have been developed. In the field of ISO/IEC International Standards, the following Functional Size Measurement-related International Standards and Technical Reports have been published:

— ISO/IEC 14143 series, parts 1 to 5,

— ISO/IEC 19761:2002,

— ISO/IEC 20926:2002,

— ISO/IEC 20968:2002, and

— ISO/IEC 24570:2004.

This part of ISO/IEC 14143 was established to provide FSM Method users and developers with a guide as to how these International Standards and Technical Reports relate to each other and how to use them.

The Functional Size (FS) obtained by measuring a piece of software contributes to a better understanding of the characteristics of the software, as well as the development, maintenance and support activities thereof. The three types of International Standards and Technical Reports related to the definition and use of FS and/or Functional Size Measurement (FSM) are:

a) Concept Standards: Describe concepts and provide definitions;

b) Supporting Standards: Supply information to assist in the evaluation of Functional Size Measurement Methods (FSMM) and examples of the software domains that they measure; and

c) Method Standards: Define instances of FSMMs.

Any FSMM, other than the Method Standards, can be used to measure FS as long as it conforms to ISO/IEC 14143-1. FSMMs can vary in their capability to measure software in different domains. Therefore, before deciding on which FSMM to use, it is advisable to assess the capability of the method to adequately size the software to be measured.

This part of ISO/IEC 14143 provides guidance on how to select a suitable FSMM using all FSM-related International Standards.

The FS results obtained from applying the selected FSMM can be used for a variety of purposes throughout the life cycle of the software. This part of ISO/IEC 14143 also provides illustrative examples of how to use FSM and functional size to manage aspects of software development and maintenance.

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Information technology — Software measurement — Functional size measurement —

Part 6:
Guide for use of ISO/IEC 14143 series and related International Standards

1 Scope

This part of ISO/IEC 14143 provides a summary of the FSM-related standards and the relationship between:

— the ISO/IEC 14143 series FSM framework International Standards that provide the definitions and concepts of FSM and conformance and verification of FSMMs, and

— the ISO/IEC standard FSMMs, i.e. ISO/IEC 19761, ISO/IEC 20926, ISO/IEC 20968 and ISO/IEC 24570.

This part of ISO/IEC 14143 also provides a process to assist users to select and develop an FSMM that meets their requirements as well as provides guidance on how to use FS. This part of ISO/IEC 14143 also gives guidance on how to use FS. FSMMs include, but are not limited to, ISO/IEC 19761, ISO/IEC 20926, ISO/IEC 20968 and ISO/IEC 24570.

NOTE   An FSMM is a software sizing method that conforms to the mandatory requirements of ISO/IEC 14143-1. Recommending a specific FSMM is outside the scope of this part of ISO/IEC 14143.

The audiences of this part of ISO/IEC 14143 are:

— users and potential users of FSM; and

— developers of an FSMM.

2 Abbreviated terms

BFC   Base Functional Component

FS   Functional Size

FSM   Functional Size Measurement

FSMM   Functional Size Measurement Method

FUR   Functional User Requirement

3   FSM related standards (ISO/IEC 14143 series), FSMM standards, and their interrelationships

3.1   Outlines of FSM related standards

3.1.1   Overview

Function Point Analysis was established in the late 1970's. It has subsequently been used worldwide. Over time alternative methods have been derived and devised. Although these methods vary in the rules they use to measure software, they all focus on measuring FURs of software.

ISO/IEC 14143-1 defines concepts of FSM and FSMM. Subsequent parts of ISO/IEC 14143 (ISO/IEC 14143 series) have been developed to evaluate FSMMs.

The following clauses outline these FSM related standards.

NOTE   For copies of the Scope clauses of the FSM related standards, refer to Annex A of this part of ISO/IEC 14143.

3.1.2   ISO/IEC 14143-1

ISO/IEC 14143-1 is a Concept Standard and is a basis for other International Standards and Technical Reports that are categorized as Supporting Standards and Method Standards.

This part of ISO/IEC 14143 is the foundation standard of the series and has the following contents:

a)   Definitions

b)   Characteristics of FSMMs

c)   Requirements for FSMMs

d)   Process for applying an FSMM

e)   FSMM labelling conventions

ISO/IEC 14143-1 is an International Standard.

3.1.3   ISO/IEC 14143-2

ISO/IEC 14143-2 is a Supporting Standard.

This part of ISO/IEC 14143 defines processes to check conformity of a Candidate FSMM with ISO/IEC 14143-1. Using ISO/IEC 14143-2 is recommended whilst the conformity assessment can be done without using ISO/IEC 14143-2.

ISO/IEC 14143-2 has the following contents:

a)   Evaluator characteristics

b)   Inputs to conformity evaluation

c)   Tasks and steps of the conformity evaluation procedure

d)   Conformity evaluation outputs

e)   Conformity evaluation result

In addition, there are the following annexes:

a) Evaluator capability (Informative)

b) Example of a conformity evaluation checklist (Informative)

c) Example of a conformity evaluation report (Informative)

ISO/IEC 14143-2 is an International Standard.

3.1.4   ISO/IEC TR 14143-3

ISO/IEC TR 14143-3 is a Supporting Standard.

For FSMM users wanting to evaluate the most suitable method for their needs or for developers who want to check their FSMM performance claims, this part of ISO/IEC 14143 provides a process to assess the performance properties of an FSMM. While there are many ways to do the verification, the use of ISO/IEC TR 14143-3 is recommended.

ISO/IEC TR 14143-3 has the following contents:

a) Verification team competency and responsibility

b) Verification inputs

c) Verification procedure

d) Verification outputs

In addition, it includes the following annexes;

a) Presentation of test requests (Normative)

b) Verification methods (Normative)

c) Example of a verification report (Informative)

ISO/IEC TR 14143-3 is a Type 2 Technical Report.

3.1.5   ISO/IEC TR 14143-4

ISO/IEC TR 14143-4 is a Supporting Standard.

This part of ISO/IEC 14143 provides a standard collection of Reference User Requirements, which are useful for comparing the FSM results among FSMMs. It also contains guidance on selecting Reference FSMMs. Together with ISO/IEC TR 14143-3, it enables the collection of normative, quantitative evidence of the performance of the FSMM.

ISO/IEC TR 14143-4 has the following requirements:

a) Reference User Requirements (RUR)

b) Reference FSMMs

In addition, it includes the following example Reference User Requirements in annexes;

a) Business application RUR (Normative)

b) Real time / Control RUR (Normative)

c) RUR reference list (Informative)

ISO/IEC TR 14143-4 is a Type 2 Technical Report.

3.1.6 ISO/IEC TR 14143-5

ISO/IEC TR 14143-5 is a Supporting Standard.

This part of ISO/IEC 14143 was developed to describe the Functional Domains ("software types") to which a piece of software belongs or to which an FSMM can declare its applicability (as required by ISO/IEC 14143-1). This part of ISO/IEC 14143 provides a means to determine Functional Domains by describing the characteristics of Functional Domains and the procedures by which characteristics of FUR can be used to determine Functional Domains. Two example methods for implementing these principles are provided in the Informative Annexes.

ISO/IEC TR 14143-5 provides a process by which to define Functional Domains.

ISO/IEC TR 14143-5 has the following contents:

a) General requirements for Functional Domains

b) General requirements for characteristics of Functional Domains

c) Determining the Functional Domain for a given set of FUR

d) Determining the applicability of an FSMM to a particular Functional Domain

e) Example Functional Domain categorization methods

In addition, it includes the following annexes:

a) CHAR Method to determine Functional Domains (Informative)

b) BFC type method to determine Functional Domains (Informative)

ISO/IEC TR 14143-5 is a Type 2 Technical Report.

3.2 Outlines of standardized FSMMs

3.2.1 Method Standards

ISO/IEC provides four standardized FSMMs. They are:

— ISO/IEC 19761 (COSMIC-FFP method),

— ISO/IEC 20926 (IFPUG method),

— ISO/IEC 20968 (MkII method), and

— ISO/IEC 24570 (NESMA method).

NOTE   FSMM is a generic acronym designating functional size measurement methods including "Function Point Analysis."

3.2.2 ISO/IEC 19761

ISO/IEC 19761 is the transposition of COSMIC Full Function Point (COSMIC-FFP) method. This FSMM assumes that software consists of functional processes that, in turn, consist of data movements, categorized

into Entry, or data input type (E), Exit, or data output type (X), Read, or data read type (R) and Write, or data write type (W). In the COSMIC-FFP method, the measurement unit is an instance of a data movement, of any of the four types recognized by the COSMIC-FFP method.

This FSMM claims applicability to both Management Information System (MIS) type software and Real time type software.

NOTE   The Common Software Measurement International Consortium (COSMIC) maintains the COSMIC-FFP method.

3.2.3   ISO/IEC 20926

ISO/IEC 20926 is the transposition of the IFPUG 4.1 Unadjusted functional size measurement method. This FSMM assumes that software consists of BFC types of External Input type (EI), External Output type (EO), External Inquiry type (EQ), Internal Logical File type (ILF), and External Interface File type (EIF).

These five elements are BFCs for the FSM.

This FSMM claims it is applicable to all types of software.

NOTE   The International Function Point Users Group (IFPUG) maintains IFPUG method.

3.2.4   ISO/IEC 20968

ISO/IEC 20968 is the transposition of MkII Function Point Analysis (Mk II method). This FSMM assumes that software consists of logical transactions and measures the number of input data element types (Ni), entity types referenced (Ne) and output data element types (No).

This FSMM claims applicability to any software type where logical transactions can be identified.

NOTE   The UK Software Metrics Association (UKSMA) maintains MkII method.

3.2.5   ISO/IEC 24750

ISO/IEC 24750 is the transposition of NESMA software sizing method. It is very similar to the IFPUG method except that it has the following extra methods of measuring software sizes;

a)   The estimated function point count

b)   The indicative function point count

The above two methods are provided for use in the early stages of software development.

This FSMM claims applicability to all software types.

NOTE   The Netherlands Software Metrics Users Association (NESMA) maintains the NESMA method.

3.3   Relationship between FSM related standards

This clause describes the relationship among the FSM related standards.

ISO/IEC 14143-1 defines FSM and describes the characteristics of an FSMM and the requirements that a software sizing method must exhibit in order to be recognized by ISO/IEC as an FSMM. ISO/IEC 14143-1 is the foundation standard for FSM related ISO/IEC standards.

FSMM users need to evaluate the most suitable method for their needs by first ensuring that it conforms to ISO/IEC 14143-1 and then verifying the match of the method's capabilities to the their performance needs.