
**Information technology — Software
measurement — Functional size
measurement**

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

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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 part of 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 systems 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* [ISO/IEC 14143-6:2012](https://standards.iteh.ai/catalog/standards/sist/8855cd38-bf93-4715-bb14-448177e9b540/iso-iec-14143-6-2012)
- *Part 2: Conformity evaluation of software size measurement methods to ISO/IEC 14143-1*
- *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*

This second edition cancels and replaces the first edition (ISO/IEC 14143-6:2006), which has been technically revised.

Introduction

Functional Size Measurement (FSM) is a technique used to measure 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 (COSMIC method),
- ISO/IEC 20926 (IFPUG method)
- ISO/IEC 20968 (Mk II method),
- ISO/IEC 24570 (NESMA method), and
- ISO/IEC 29881 (FiSMA method).

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 standards.

The FS results obtained from applying the selected FSMM can be used for a variety of purposes throughout the lifecycle 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;

- a) the ISO/IEC 14143 series FSM framework International Standards that provide the definitions and concepts of FSM, and conformity and verification of FSMMs, and
- b) the ISO/IEC standard FSMMs, i.e. ISO/IEC 19761, ISO/IEC 20926, ISO/IEC 20968, ISO/IEC 24570 and ISO/IEC 29881.

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 providing guidance on how to use FS. FSMMs include, but are not limited to, ISO/IEC 19761, ISO/IEC 20926, ISO/IEC 20968, ISO/IEC 24570 and ISO/IEC 29881.

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 Requirements
RUR	Reference User Requirements

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

3.1 Outlines of FSM related standards

3.1.1 Overview

FSM is an approach used to measure software size by quantifying the FUR of the software. Over time numerous methods have been devised to do this of which five of them conform to ISO/IEC 14143-1 became the International Standards. Although these methods vary in the rules they use to measure software, they all focus on measuring FUR 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.

ISO/IEC 14143-1 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 labeling conventions
- f) Conformity evidence

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ISO/IEC 14143-1 is an International Standard.

3.1.3 ISO/IEC 14143-2

ISO/IEC 14143-2 is a Supporting Standard.

ISO/IEC 14143-2 defines processes to check conformity of a Candidate FSMM with ISO/IEC 14143-1.

NOTE While conformity can be assessed in another method, using ISO/IEC 14143-2 is recommended.

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, ISO/IEC TR 14143-3 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

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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.

ISO/IEC TR 14143-4 provides a collection of Reference User Requirements (RUR), 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
- b) Reference FSMMs

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

- a) Business application RUR (Normative)

ISO/IEC 14143-6:2012(E)

- 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.

ISO/IEC TR 14143-5 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). ISO/IEC TR 14143-5 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 characteristics and procedures 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

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<https://standards.iteh.ai/catalog/standards/sist/8855cd38-bf93-4715-bb14-4143-6-2012>

In addition, it includes the following informative 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 five standardized FSMMs. They are;

- ISO/IEC 19761 (COSMIC method),
- ISO/IEC 20926 (IFPUG method),
- ISO/IEC 20968 (Mk II method),
- ISO/IEC 24570 (NESMA method), and
- ISO/IEC 29881 (FiSMA method).

NOTE For ease of readability, the current collection of five ISO FSMMs as outlined above will be referred to as “existing ISO/IEC-standardized FSMMs” from this point forward except where a single FSMM is referred.

3.2.2 ISO/IEC 19761

ISO/IEC 19761 is the transposition of COSMIC 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 method, the measurement unit is an instance of a data movement, of any of the four types recognized by the COSMIC method.

This FSMM is applicable to both application software, real time software, and hybrids of those.

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

3.2.3 ISO/IEC 20926

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

These five elements are BFCs for the FSMM.

This FSMM is applicable to all functional domains.

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

3.2.4 ISO/IEC 20968

ISO/IEC 20968 is the transposition of Mk II 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 is applicable to any software type where logical transactions can be identified.

NOTE The UK Software Metrics Association (UKSMA) maintains the Mk II method.

3.2.5 ISO/IEC 24570

ISO/IEC 24570 is the transposition of NESMA software sizing method. This FSMM assumes that software consists of BFC types of External Input (EI), External Output (EO), External Inquiry (EQ), Internal Logical File (ILF), and External Interface File (EIF).

The NESMA FSMM provides two extra methods of measuring software sizes for use in the early stages of software development:

- a) The estimated function point count,
- b) The indicative function point count.

NESMA FSMM is in principle applicable to all functional domains.

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

3.2.6 ISO/IEC 29881

ISO/IEC 29881 is the transposition of FiSMA Functional Size Measurement Method Version 1.1. This FSMM assumes that software consists of seven distinct BFC classes of Interactive end-user navigation and query services (q), Interactive end-user input services (i), Non-interactive end-user output services (o), Interface services to other application (t), Interface services from other applications (f), Data storage services (d), and Algorithmic and manipulation services (a).