International Standard

ISO/IEC/IEEE 32430

Software engineering — Software non-functional size measurement

Ingénierie du logiciel — Norme pour la quantification des caractéristiques non fonctionnelles des logiciels

Second edition
2025-02

Reference number
ISO/IEC/IEEE 32430:2025(en)

© IEEE 2025



COPYRIGHT PROTECTED DOCUMENT

© IEEE 2025

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO or IEEE at the respective address below or ISO's member body in the country of the requester.

Institute of Electrical and Electronics Engineers, Inc
3 Park Avenue, New York
NY 10016-5997, USA

Email: stds.ipr@ieee.org
Website: www.ieee.org

Published in Switzerland

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**
1.1 Overview 1
1.2 Purpose 1
1.3 Word usage 1

2 Normative references **2**

3 Terms, definitions and abbreviated terms **2**
3.1 Terms and definitions 2
3.2 Abbreviated terms 8

4 Introductory information **8**
4.1 User requirements for a system 8
4.2 Non-Functional Size Measurement (NFSM) introduction 9
4.3 Software-intensive system and software product 10
4.4 Software domains 10
4.5 The relations between non-functional requirements (NFR) and functional user requirements (FUR) 10
4.5.1 Non-functional requirements 10
4.5.2 The relations between NFR and SNAP sub-categories 10
4.6 Current classification and Future evolution of NFR 13
4.6.1 The challenge 13
4.6.2 Current classification of NFR 13
4.6.3 Sizing quality-in-use requirements 13
4.7 Objectives and benefits 14
4.7.1 Objectives 14
4.7.2 Benefits 14

5 Non-functional size: Categories and sub-categories **15**
5.1 Category 1: Data operations 15
5.1.1 Sub-category 1.1: Data entry validation 15
5.1.2 Sub-category 1.2: Logical and mathematical operations 16
5.1.3 Sub-category 1.3: Data formatting 18
5.1.4 Sub-category 1.4: Internal data movements 19
5.1.5 Sub-category 1.5: Delivering added value to users by data configuration 21
5.2 Category 2: Interface design 23
5.2.1 Sub-category 2.1—User interfaces 23
5.2.2 Sub-category 2.2—Help methods 25
5.2.3 Sub-category 2.3—Multiple input methods 28
5.2.4 Sub-category 2.4—Multiple output methods 29
5.3 Category 3: Technical environment 31
5.3.1 Sub-category 3.1: Multiple platforms 31
5.3.2 Sub-category 3.2: Database technology 33
5.3.3 Sub-category 3.3: Batch processes 35
5.4 Category 4: Architecture 36
5.4.1 Sub-category 4.1: Component-based software 36
5.4.2 Sub-category 4.2—Multiple input/output interfaces 37
5.5 Sizing code data 41
5.5.1 Code data characteristics 41
5.5.2 Handling code data from non-functional sizing perspective 42
5.5.3 How code data is sized using SNAP 42

6 The sizing process **43**
6.1 Introduction 43
6.2 The timing of the non-functional sizing 44
6.3 Non-functional sizing and FSM 44

© IEEE 2025 – All rights reserved

6.4 Steps to determine the non-functional size 45
6.4.1 Step 1: Gather available documentation 45
6.4.2 Step 2: Determine the sizing purpose, type, scope, boundary, and partition 45
6.4.3 Step 3: Identify the NFR 48
6.4.4 Step 4: Associate NFR with sub-categories and identify the SCU 49
6.4.5 Step 5: Determine the SNAP size for each sub-category 49
6.4.6 Step 6: Calculate the non-functional size 49
6.4.7 Step 7: Document and report 49
6.5 Calculating the non-functional size 50
6.5.1 Formula approach 50
6.5.2 Determine the non-functional size of each sub-category 50
6.5.3 Determine the non-functional size of a development project 50
6.5.4 Determine the non-functional size of an enhancement project 50

7 Complementarity of the functional and the non-functional sizes 53
7.1 General 53
7.2 Requirements involving functional and non-functional requirements 53
7.2.1 Sub-category 1.1 data entry validation 53
7.2.2 Sub-category 1.2 logical and mathematical operations 54
7.2.3 Sub-category 1.3 data formatting 55
7.2.4 Sub-category 1.4 internal data movements 56
7.2.5 Sub-category 1.5 delivering added value to users by data configuration 56
7.2.6 Sub-category 2.1 user interfaces 57
7.2.7 Sub-category 2.2 help methods 58
7.2.8 Sub-category 2.3 multiple input methods 58
7.2.9 Sub-category 2.4 multiple output methods 59
7.2.10 Sub-category 3.1 multiple platforms 59
7.2.11 Sub-category 3.2 database technology 60
7.2.12 Sub-category 3.3 batch processes 60
7.2.13 Sub-category 4.1 component-based software 60
7.2.14 Sub-category 4.2 multiple input/output interfaces 61

Annex A (informative) **NFSM strengths 62**

Annex B (informative) **Use of non-functional size 63**

Bibliography 70

IEEE Notices and Abstract 72

© IEEE 2025 – All rights reserved

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

IEEE Standards documents are developed within IEEE Societies and subcommittees of IEEE Standards Association (IEEE SA) Board of Governors. IEEE develops its standards through an accredited consensus development process, which brings together volunteers representing varied viewpoints and interests to achieve the final product. IEEE standards are documents developed by volunteers with scientific, academic, and industry-based expertise in technical working groups. Volunteers are not necessarily members of IEEE or IEEE SA and participate without compensation from IEEE. While IEEE administers the process and establishes rules to promote fairness in the consensus development process, IEEE does not independently evaluate, test, or verify the accuracy of any of the information or the soundness of any judgments contained in its standards.

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO and IEC had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents and https://patents.iec.ch. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC/JTC 1, *Information technology,* Subcommittee SC 7, *Software and systems engineering,* in cooperation with the Systems and Software Engineering Standards Committee of the IEEE Computer Society, under the Partner Standards Development Organization cooperation agreement between ISO and IEEE.

This second edition cancels and replaces the first edition (ISO/IEC/IEEE 32430:2021), which has been technically revised.

The main changes are as follows:

— clarifications of terminology regarding software size and software non-functional requirements.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

© IEEE 2025 – All rights reserved

Introduction

Used in conjunction with functional size measurement (FSM), non-functional size measurement (NFSM) assists organizations in multiple ways. It provides insight into the delivery of software projects and maintenance of software and assists in estimating the effort and in the analysis of key performance indicators, such as quality and productivity.

Having both software functional size and non-functional size provides significant information for the management of software product development. The functional size is quantifiable and represents a standardized measure of the functional project/application size. Providing a quantifiable measure derived from the non-functional requirements (NFR) for the software allows organizations to build historical data repositories that can be referenced to assist in decision making for the technical or quality aspects of applications.

By learning the method as described in this document and by performing the non-functional sizing together with functional sizing, users avoid duplication of measurement effort.

Having this information enables software professionals to do the following:

a) plan and estimate projects;

b) compare projects and compare the project to benchmarks;

c) identify areas of improvement and analyze trends of improvement;

d) quantify the impacts of the current non-functional strategies;

e) assist in determining future non-functional strategies;

f) provide specific data when communicating non-functional issues to various audiences;

g) communicate the impact of non-functional requirements (NFR) on the project with users and customers;

h) help users determine the benefit of an application package to their organization by assessing portions or categories that specifically match their requirements;

i) determine the non-functional size of a purchased application package.

NFSM is independent of the way NFR are defined. Analyzing the requirements to measure the non-functional size can assist in identifying implicit requirements.

This document contains rules on how to use ISO/IEC 20926:2009 (IFPUG FSM) and NFSM together, so that there are no gaps and no overlaps between the functional size and the non-functional size. A software requirement that contains both functional and non-functional aspects can be sized using ISO/IEC 20926:2009 for its functional aspects and this document for its non-functional aspects.

FSM and NFSM together can provide a broader view of the size of the software product.

© IEEE 2025 – All rights reserved

Software engineering — Software non-functional size measurement

1 Scope

1.1 Overview

This document defines a method for measuring the non-functional size of the software. It complements ISO/IEC 20926:2009, which defines a method for measuring the functional size of the software.

This document also describes the complementarity of functional and non-functional sizes, so that deriving the sizes from the functional and the non-functional requirements does not result in duplication in the distinct functional and non-functional sizes.

In general, there are many types of non-functional requirements. Moreover, non-functional requirements and their classification evolve over time as the technology advances. This document does not intend to define the type of NFR for a given context. Users can choose ISO 25010 or any other standard for the definition of NFR. It is assumed that users size the NFR based on the definitions they use.

This document covers a subset of non-functional requirements. It is expected that, with time, the state of the art can improve and that potential future versions of this document can define an extended coverage. The ultimate goal is a version that, together with ISO/IEC 20926:2009, covers every aspect that can be required of any prospective piece of software, including aspects such as process and project directives that are hard or impossible to trace to the software's algorithm or data. The combination of functional and non-functional sizes would then correspond to the total size necessary to bring the software into existence.

Estimating the cost, effort and duration of the implementation of the NFR is outside the scope of this document.

1.2 Purpose

The purpose of this document is to define a method for measuring the non-functional size of the software.

1.3 Word usage

The word *"shall"* indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted *("shall"* equals is required to).[1),2)]

The word *"should"* indicates that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required (*"should"* equals is recommended that).

The word *"may"* is used to indicate a course of action permissible within the limits of the standard (*"may"* equals is permitted to).

The word *"can"* is used for statements of possibility and capability, whether material, physical, or causal ("can" equals is able to).

---

1) The use of the word *"must"* is deprecated and shall not be used when stating mandatory requirements, *must* is used only to describe unavoidable situations.

2) The use of *"will"* is deprecated and shall not be used when stating mandatory requirements, "will" is only used in statements of fact.

© IEEE 2025 – All rights reserved

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 14143-1:2007, *Information technology — Software measurement — Functional size measurement — Part 1: Definition of concepts*

ISO/IEC 20926:2009, *Software and systems engineering — Software measurement — IFPUG functional size measurement method 2009*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO, IEC and IEEE maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

— IEEE Standards Dictionary Online: available at: http://dictionary.ieee.org

NOTE For additional terms and definitions in the field of systems and software engineering, see ISO/IEC/IEEE 24765, which is published periodically as a "snapshot" of the SEVOCAB (Systems and Software Engineering Vocabulary) database and is publicly accessible at www.computer.org/sevocab.

3.1.1
algorithm
finite ordered set of well-defined rules for the *solution* (3.1.41) of a problem

[SOURCE: ISO/IEC 2382:2015, 2121376, modified — Notes to entry have been removed.]

3.1.2
application
cohesive collection of automated procedures and data supporting a business objective, consisting of one or more components, modules, or subsystems

EXAMPLE Accounts payable, accounts receivable, payroll, procurement, shop production, assembly line control, air search radar, target tracking, weapons firing, flight line scheduling, and passenger reservations.

[SOURCE: ISO/IEC 20926:2009, 3.2]

3.1.3
boundary
conceptual interface between the software under study and its *users* (3.1.42)

Note 1 to entry: In this document, "application boundary" is used.

[SOURCE: ISO/IEC 14143-1:2007, 3.3, modified — Note 1 to entry has been added.]

3.1.4
code data
list data
translation data
substitutable data, which provide a list of valid values that a descriptive attribute may have

EXAMPLE Examples of code data include:

© IEEE 2025 – All rights reserved