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IEEE Trial-Use Standard for Software Non-Functional Sizing Measurements

Developed by the

Software & Systems Engineering Standards Committee (C/S2ESC)
of the
IEEE Computer Society

Approved 13 June 2019

IEEE-SA Standards Board

Abstract: A method for the sizing of nonfunctional software requirements is defined in this standard. It complements ISO/IEC 20926:2009, which defines a method for the sizing of functional user requirements. Non-functional categories for data operations, interface design, technical environment, and architecture software are included in this standard.Steps to determine and calculate the non-functional size are also included. Handling requirements involving both functional and non-functional requirements are explained in this standard, which also covers how to apply non-functional sizing estimates in terms of cost, project duration and quality, and considerations of software performance in terms of productivity and quality. The combination of functional and non-functional size should correspond to the total size necessary to produce the software. The functional size and non-functional size are orthogonal, and both are needed when sizing the software. The complementarity of the functional and the non-functional sizes, to avoid overlaps or gaps between the two size methods, are described in this standard. Calculating the implementation work effort and duration of the non-functional requirements is outside the scope of this standard.

Keywords: IEEE 2430™, IFPUG, non-functional size measurements, non-functional requirements, SNAP

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At the time this IEEE trial-use standard was completed, the P2430 Working Group had the following membership:

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Introduction

This introduction is not part of IEEE Std 2430-2019, IEEE Trial-Use Standard for Software Non-Functional Sizing Measurements.

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 good measure of the functional project/application size. Providing a quantifiable measure for the non-functional requirements (NFR) allows organizations to build historical data repositories that can be referenced to assist in decision making for the technical and/or quality aspects of applications.

Non-functional sizing assists organization in multiple ways (see Annex A). It provides insight into projects and applications to assist in effort and cost estimating and in the analysis of quality and productivity. Used in conjunction with function-point analysis, non-functional sizing provides information that can identify additional software size, which may impact quality and productivity in a positive or negative way. Having this information enables software professionals to:

— Better plan, schedule, and estimate projects.

— Identify areas of process improvement.

— Assist in determining future technical strategies.

— Quantify the impacts of the current technical strategies.

— Improve quality. Analyzing non-functional size may assist in identifying implicit requirement and may assist in analyzing the components of the solution to meet the NFR by looking at the sizing attributes.

By learning the methodology as described in this standard and by performing the non-functional sizing together with functional sizing, the added time and effort to size the NFR is small.

Acknowledgments

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Contents

IEEE Trial-Use Standard for Software Non-Functional Sizing Measurements

1. Overview

1.1 Scope

This standard defines a method for the sizing of non-functional software requirements. It complements ISO/IEC 20926:2009, which defines a method for the sizing of functional user requirements (FUR).[1]

This standard also describes the complementarity of functional and non-functional sizes, so that sizing both functional and non-functional requirements (NFR) do not overlap. It also describes how non-functional size, together with functional size, should be used for measuring the performance of software projects, setting benchmarks, and estimating the cost and duration of software projects.

In general, there are many types of non-functional software requirements. Moreover, non-functional aspects evolve over time and may include additional aspects in the as technology advances. This standard does not intend to define the type of NFR for a given context. Users may choose ISO 25010:2011 or any other standard for the definition of NFR. It is assumed that users will size the NFR based on the definitions they use.

This standard covers a subset of non-functional types. It is expected that, with time, the state of the art can improve and that potential future versions of this standard can define an extended coverage. The ultimate goal is a version that, together with ISO/IEC 20926:2009, covers every aspect that may 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 size would then correspond to the total size necessary to bring the software into existence.

Calculating the effort and duration of the implementation of the NFR is outside the scope of this standard.

1.2 Purpose

The purpose of this standard is to define the method of sizing of NFR and describe how to use this size, alongside with the functional size.

[1]Information on references can be found in Clause 2.

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).[2,3]

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2. Normative references

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ISO/IEC 14143-1:2007, Information Technology—Software measurement—Functional size measurement.[4,5]

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

ISO/IEC 25010:2011, Systems and software engineering—Systems and software Quality Requirements and Evaluation (SQuaRE)—System and software quality models.

ISO/IEC TR 14143-5:2004 Information technology—Software measurement—Functional size measurement—Part 5: Determination of functional domains for use with functional size measurement.

ISO/IEC/IEEE 24765:2017, Systems and software engineering—Vocabulary.[6,7]

[2]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.
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