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Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE): cloud services —

Part 2: Quality measurement

Ingénierie des systèmes et du logiciel — Exigences de qualité et évaluation des systèmes et du logiciel (SQuaRE): services en nuage —

Partie 2: Mesure de la qualité

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Foreword

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A list of all parts in the ISO/IEC 25052 series can be found on the ISO and IEC websites.

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Introduction

In the standards on SQuaRE developed by ISO/IEC JTC 1/SC 7, there are well-defined quality models for measuring and evaluating system and software products, IT services, data, etc. Although the standards on SQuaRE developed by ISO/IEC JTC 1/SC 7 provide practical quality models, they do not fit new technologies well. To support the evaluation of new technologies, ISO/IEC TS 25052-1 defines the quality model of cloud services, which is an extension of the quality models defined in ISO/IEC 25010 to ISO/IEC 25019. To support the practical measurement of cloud services, this document provides quality measures based on the quality model defined in ISO/IEC TS 25052-1.

Compared to information and communication technology (ICT) systems, cloud computing has different characteristics. This document reflects the characteristics of cloud computing. The following are the key characteristics of cloud computing described in ISO/IEC 22123-2.

— Broad network access: physical and virtual resources are available over a network and accessed through standard mechanisms that promote the use of cloud service customers (CSC).

— Measured service: characteristic in which the metered delivery of cloud services is such that usage can be monitored, controlled, reported, and billed.

— Multi-tenancy: characteristic in which physical or virtual resources are allocated in such a way that multiple tenants and their computations and data are isolated from and inaccessible to one another.

— On-demand self-service: characteristic in which a CSC can provision cloud services, as needed, automatically or with minimal interaction with cloud service providers(CSP).

— Rapid elasticity and scalability: resources can be rapidly and elastically adjusted, in some cases automatically, to quickly increase or decrease capacity.

— Resource pooling: characteristic in which a CSP's physical or virtual resources can be aggregated to serve one or more CSCs.

The quality model in this document is to support the non-functional specification and evaluation of cloud services from different perspectives by those associated with cloud service selection, requirements analysis, development, use, evaluation, support, maintenance, quality assurance and control, and audit.

For example, activities during cloud service selection that can benefit from the use of the quality model include:

— identifying cloud services requirements;

— establishing cloud service selection criteria;

— defining service coverage and service objectives;

— establishing service level agreements;

— establishing measures of quality characteristics in support of these activities.

Activities during cloud service development that can benefit from the use of the quality model include:

— identifying cloud service requirements;

— validating comprehensiveness of requirement definitions;

— identifying cloud service design objectives;

— identifying cloud service testing objectives;

— identifying quality control criteria as part of quality assurance;

— identifying acceptance criteria for a cloud service;

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— establishing measures of quality characteristics in support of these activities.

Figure 1 illustrates the organization of the standards on SQuaRE developed by ISO/IEC JTC 1/SC 7. Similar standards are grouped into divisions. Each division provides guidance and resources for performing a different function in ensuring system and software product quality. This document belongs to extension division 25050 to 25099.

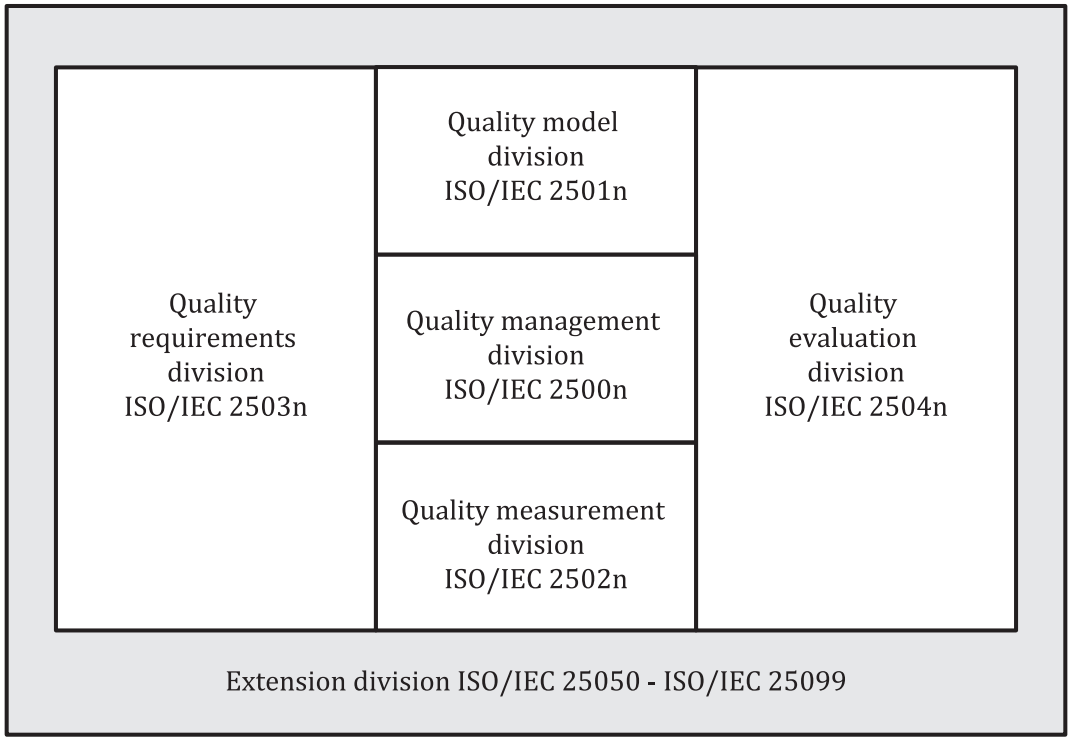


Figure 1 — Organization of the standards on SQuaRE developed by ISO/IEC JTC 1/SC 7

The divisions within standards on SQuaRE are:

— ISO/IEC 25000 to ISO/IEC 25009 - Quality management division. The International Standards that form this division define all common models, terms, and definitions referred to by all other standards on SQuaRE developed by ISO/IEC JTC 1/SC 7. This division also provides requirements and guidance for a supporting function that is responsible for the management of the requirements, specification, and evaluation of software product quality. Practical guidance on the use of the quality models is also provided.

— ISO/IEC 25010 to ISO/IEC 25019 - Quality model division. The International Standards that form this division present detailed quality models for computer systems and software products, data, IT services, and quality-in-use.

— ISO/IEC 25020 to ISO/IEC 25029 - Quality measurement division. The International Standards that form this division include a quality measurement framework, mathematical definitions of quality measures, and practical guidance for their application. Examples are given of quality measures for the internal and external properties of products, data, IT services, and quality-in-use. Quality measure elements (QME) forming foundations for quality measures for the internal and external properties of products are defined and presented.

— ISO/IEC 25030 to ISO/IEC 25039- Quality requirements division. The International Standards that form this division help specify quality requirements based on quality models and quality measures. These quality requirements can be used in the process of eliciting quality requirements for information systems and IT services to be developed or as input for an evaluation process.

— ISO/IEC 25040 to ISO/IEC 25049 - Quality evaluation division. The International Standards that form this division provide requirements, recommendations, and guidelines for software product evaluation,

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whether performed by evaluators, acquirers, or developers. The guideline for documenting a measure as an evaluation module is also provided.

— ISO/IEC 25050 to ISO/IEC 25099 - SQuaRE extension division. These International Standards currently include requirements for quality of ready-to-use software product (RUSP), Common Industry Formats for usability reports, and quality models and measures for new technologies such as cloud services and artificial intelligence.

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Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE): cloud services —

Part 2: Quality measurement

1 Scope

This document defines quality measures for quantitatively evaluating cloud services quality in terms of characteristics and sub-characteristics defined in ISO/IEC TS 25052-1 and is intended to be used together with ISO/IEC TS 25052-1.

This document contains the following:

— a basic set of quality measures for each characteristic and sub-characteristics;

— an explanation of how to apply quality measures to cloud services.

Since the quality model defined in ISO/IEC TS 25052-1 is the extension to the existing quality models defined in ISO/IEC 25010 to ISO/IEC 25019, it can be used with the product quality model, IT service quality model, data quality model, and quality-in-use model according to evaluation purposes. For the same reason, the quality measures defined in this document can also be used with the quality measures for software ICT products, IT services, data, and quality-in-use.

As there are several cloud service categories, this document focuses on the quality model of SaaS (software as a service). This document does not address PaaS (platform as a service) and IaaS (infrastructure as a service).

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 25000, *Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Guide to SQuaRE*

ISO/IEC 22123-1, *Information technology — Cloud computing — Part 1: Vocabulary*

3 Terms and definitions

For this document, the terms and definitions given in ISO/IEC 25000, ISO/IEC 22123-1 and the following apply.

ISO and IEC 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/

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