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Information technology — Systems and software Quality Requirements and Evaluation (SQuaRE) — Service quality models

Technologies de l'information — Exigences de qualité et évaluation des systèmes et du logiciel (SQuaRE) — Modèle de qualité du service

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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.

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

A list of all parts in the ISO/IEC 25000 series is available on the ISO website.

This corrected version of ISO/IEC TS 25011:2017 incorporates the following corrections:

— headers have been corrected and now read “ISO/IEC TS” instead of “ISO/TS”.

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Introduction

Information technology (IT) services are increasingly used to perform a wide variety of business and personal functions. IT service quality reflects how well an IT service conforms to its given design or how it compares to competitors in the marketplace.

Specification and evaluation of the quality of an IT service is critical for the IT services to meet the stakeholders' goals and objectives and this can be achieved by comprehensively defining the quality characteristics associated with the stakeholders' goals and objectives for the IT services.

An IT service is provided by an IT service provider using components like people, processes, technology, facilities and information, and can be orchestrated using an IT service provision system; these components interact with each other to support the service as a whole. Existing software and data quality models are not suitable to measure quality of IT service. IT service quality should be defined and measured by using an IT service quality model and quality measures that take account of these five components interacting.

This document provides quality models to support the specification and evaluation of the quality of IT services that makes use of IT systems as tools to provide value to an individual user or a business by facilitating results the user or business wants to achieve.

The quality models in this document include both objective measures of service quality and measures of the users' perceptions of quality. That is, the IT service quality is using objective measurement as far as possible to qualify the service characteristics, and other methods (such as assessment) can be used to collect objective evidence and qualify intangible features or characteristics of the IT service.

This document is a part of the Quality Model Division (ISO/IEC 2501n) of the SQuaRE series. The IT service quality models defined in this document are intended to be used in conjunction with the other SQuaRE series International Standards, which are represented in Figure 1 (adapted from ISO/IEC 25000).

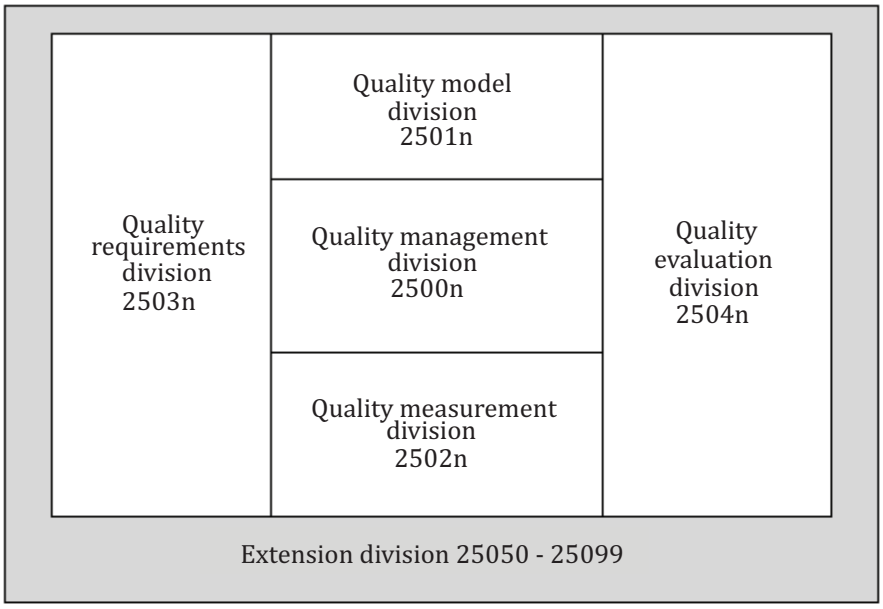


Figure 1 — Organization of SQuaRE series of International Standards

The divisions within the SQuaRE series are as follows.

— **ISO/IEC 2500n — Quality Management Division.** The International Standards that form this division define all common models, terms and definitions further referred to by all other

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International Standards from the SQuaRE series. The division also provides requirements and guidance for a supporting function that is responsible for a supporting function which is responsible for the management of the requirements, specifications and evaluations of software products and service quality.

— **ISO/IEC 2501n — Quality Model Division.** The International Standards or Technical Specifications that form this division present detailed quality models for software, data and service. Furthermore, in the software and IT service quality model, the internal and external quality characteristics are decomposed into sub-characteristics. Practical guidance on the use of the quality models is also provided.

— **ISO/IEC 2502n — Quality Measurement Division.** The International Standards that form this division include a software product and service quality measurement reference model, mathematical definitions of quality measures, and practical guidance for their application. Presented measures apply to internal software quality, external software quality, data quality, service quality and quality in use. Quality Measure Elements forming foundations for the latter measures are defined and presented.

— **ISO/IEC 2503n — Quality Requirements Division.** The International Standard that forms this division helps to specify quality requirements. These quality requirements can be used in the process of quality requirements elicitation for a software product to be developed or as input for an evaluation process and also used in the process of quality requirements elicitation for a service to be provided. The requirements definition process is mapped to technical processes defined in ISO/IEC 15288.

— **ISO/IEC 2504n — Quality Evaluation Division.** The International Standards that form this division provide requirements, recommendations and guidelines for software product and service evaluation, whether performed by evaluators, acquirers/customers or developers/providers. The support for documenting a measure as an Evaluation Module is also presented.

— **ISO/IEC 25050 to ISO/IEC 25099** are reserved for SQuaRE extension International Standards, Technical Specifications, Publicly Available Specifications (PAS) and/or Technical Reports.

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Information technology — Systems and software Quality Requirements and Evaluation (SQuaRE) — Service quality models

1 Scope

This document is applicable to IT services that support the needs of an individual user or a business. IT services can be delivered personally or remotely by people, or by an IT application that could be in a local or remote location (see Annex A).

These include two types of IT services:

a) services completely automated provided by an IT system;

b) services provided by a human using an IT system.

This document describes the use of two quality models for IT services.

a) This document defines an IT service quality model composed of eight characteristics (which are further subdivided into sub-characteristics) that relate to properties of the IT service made up from a combination of elements including people, processes, technology, facilities and information.

b) This document describes how the quality in use model in ISO/IEC 25010 which is composed of five characteristics (some of them are further subdivided into sub-characteristics) can be applied to the outcome when an IT service is used in a particular context of use. This model is applicable to the complete service provision system composed of people, processes, technology, facilities and information.

The characteristics and sub-characteristics provide consistent terminologies and check lists for specifying, measuring and evaluating IT service quality.

The use of the IT service quality models can help:

— IT service providers to identify service quality requirements, and evaluate and improve the quality of the service provided;

— customers to specify their requirements for the quality of service, define the acceptance criteria for service, and evaluate the quality of an IT service; and

— a third party to evaluate the quality of an IT 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 25010, *Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — System and software quality models*

ISO/IEC 25012, *Software engineering — Software product Quality Requirements and Evaluation (SQuaRE) — Data quality model*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 25010, ISO/IEC 25012 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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

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

3.1 Quality in use model

The characteristics and their related sub-characteristics are listed in Table 1.

Table 1 — Quality in use characteristics and subcharacteristics

Effectiveness
Efficiency
Satisfaction
Usefulness
Trust
Pleasure
Comfort

Freedom from risk
Economic risk mitigation
Health and safety risk mitigation
Environmental risk mitigation
Context coverage
Context completeness
Flexibility

These quality in use characteristics and sub-characteristics are defined in ISO/IEC 25010 and the specific definitions are provided in Annex D.

When this model is applied to an IT service:

a) context completeness includes SLA coverage: the degree to which an IT service can be used with effectiveness, efficiency, freedom from risk and satisfaction in the context specified by the SLA;

b) health and safety risk mitigation includes mitigation of risks to security, confidentiality and privacy.

3.2 IT service quality model

The characteristics and their related sub-characteristics are listed in Table 2.

Table 2 — IT service quality characteristics and subcharacteristics

Suitability
Completeness
Correctness
Appropriateness
Consistency
Usability
Appropriateness recognizability
Learnability
Operability
User error protection
Accessibility
Courtesy
Security

IT service reliability
Continuity
IT service recoverability
Availability
Tangibility
Visibility
Professionalism
IT service interface appearance
Responsiveness
Timeliness
Reactiveness
IT service adaptability
Customizability

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Table 2 *(continued)*

Confidentiality
Integrity
Traceability

Initiative
IT service maintainability
Analysability
Modifiability
Testability

3.2.1
suitability
degree to which an *IT service* (3.3.2) meets stated and implied needs when used in a specified context of use

[SOURCE: ISO/IEC 25010:2011, 4.2.1, modified — "a product or system" has been replaced by "an IT service" and "provides functions" has been deleted.]

3.2.1.1
completeness
degree to which an *IT service* (3.3.2) supports all the specified goals, objectives and data specified by the *user* (3.3.4)

3.2.1.2
correctness
degree to which an *IT service* (3.3.2) uses the correct process and produces the correct results with accurate data

3.2.1.3
appropriateness
degree to which an *IT service* (3.3.2) provides results that are appropriate for the *user* (3.3.4) needs

3.2.1.4
consistency
degree to which repeated or similar related *IT services* (3.3.2) provided consistent quality

3.2.2
usability
degree to which an *IT service* (3.3.2) can be used by specified *users* (3.3.4) to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use

[SOURCE: ISO/IEC 25010:2011, 4.2.4, modified — "a product or system" has been replaced by "an IT service".]

3.2.2.1
appropriateness recognizability
degree to which *users* (3.3.4) can recognize whether an *IT service* (3.3.2) is appropriate for their needs

Note 1 to entry: Appropriateness recognizability will depend on the ability to recognize the *appropriateness* (3.2.1.3) of the service from initial impressions of these services and/or any associated documentation.

Note 2 to entry: The details of the service could be explained to potential means such as documentation, presentation or promotional materials.

[SOURCE: ISO/IEC 25010:2011, 4.2.4.1, modified — "a product or system" has been replaced by "an IT service".]

3.2.2.2
learnability
degree to which an *IT service* (3.3.2) can be learned by *users* (3.3.4) to achieve a specified level of effectiveness, efficiency, freedom from risk and satisfaction within a specified amount of time and context of use

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3.2.2.3
operability
degree to which an *IT service* (3.3.2) has attributes that make it easy to operate and control

[SOURCE: ISO/IEC 25010:2011, 4.2.4.2, modified — "a product or system" has been replaced by "an IT service".]

3.2.2.4
user error protection
degree to which an *IT service* (3.3.2) protects *users* (3.3.4) against making errors

3.2.2.5
accessibility
degree to which an *IT service* (3.3.2) can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use

Note 1 to entry: The range of capabilities includes disabilities such as those associated with age, sight, hearing and physical mobility.

Note 2 to entry: Accessibility for people with disabilities can be specified or measured either as the extent to which an IT service can be used by *users* (3.3.4) with specified disabilities to achieve specified goals with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use, or by the presence of product properties that support accessibility.

[SOURCE: ISO/IEC 25010:2011, 4.2.4.6, modified — "a product or system" has been replaced by "an IT service".]

3.2.2.6
courtesy
degree to which the *IT service* (3.3.2) is provided in a polite, respectful and friendly way

3.2.3
security
degree to which an *IT service* (3.3.2) protects both *user's* (3.3.4) assets and access to their information so that users have the degree of information access appropriate to their levels of authorization

3.2.3.1
confidentiality
degree to which an *IT service* (3.3.2) ensures that data are accessible only to those authorized to have access

[SOURCE: ISO/IEC 25010:2011, 4.2.6.1, modified — "a product or system" has been replaced by "an IT service".]

3.2.3.2
integrity
degree to which an *IT service* (3.3.2) prevents unauthorized access to or modification of data whether accidently or intentionally

[SOURCE: ISO/IEC 25010:2011, 4.2.6.2, modified —"a system, product or component" has been replaced by "IT service" and "whether accidently or intentionally" has been added.]

3.2.3.3
traceability
degree to which the *IT service* (3.3.2) outcomes can be traced to or from the *user* (3.3.4) needs

EXAMPLE 1 The *customer* (3.3.3) of the online-order room wants to know the progress about the reservation. In this situation, it expresses "from the customer's needs".

EXAMPLE 2 The hotel wants to know the progress of payment about the reservation of the customer. In this situation, it expresses "to the customer's needs".

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3.2.4
IT service reliability
degree to which an *IT service* (3.3.2) provides consistent and stable IT service outcomes

3.2.4.1
continuity
degree to which the *IT service* (3.3.2) is provided under all foreseeable circumstances, including mitigating the risks resulting from interruption to an acceptable level

3.2.4.2
IT service recoverability
degree to which, in the event of an interruption or a failure or disaster, the original *IT service* (3.3.2) and its functions and data can be re-established and made accessible

3.2.4.3
availability
degree to which an *IT service* (3.3.2) is available to *users* (3.3.4) when needed

3.2.5
tangibility
degree to which the tangible aspects of the *IT service* (3.3.2) effectively communicate and support the service

Note 1 to entry: Tangibility aspects typically include website and explanatory material, personnel image, service facilities, service processes, service tools and service deliverables, etc.

3.2.5.1
visibility
degree to which *users* (3.3.4) have insight into the capabilities of the *IT service* (3.3.2), how they will be delivered, and progress toward their completion during delivery

3.2.5.2
professionalism
degree to which the content of the *IT service* (3.3.2) is based on appropriate education, skill, expertise and qualification

Note 1 to entry: Professionalism can be communicated to the potential users as part of *tangibility* (3.2.5) but is also a prerequisite for *suitability* (3.2.1).

3.2.5.3
IT service interface appearance
degree to which the interface of the service has an appearance or other physical properties that are pleasing and satisfying for the *user* (3.3.4)

3.2.6
responsiveness
degree to which an *IT service* (3.3.2) responds and provides outcomes in a prompt and timely way

3.2.6.1
timeliness
degree to which an *IT service* (3.3.2) delivers outcomes within time limits

Note 1 to entry: In some cases, service timeliness is affected by a combination of multiple services provided by different *service providers* (3.3.7). For example, online shopping service is expected to provide not only timely retrieval of newly added products on sale, but also timely delivery to the *user* (3.3.4) by the parcel-delivery service provider.

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3.2.6.2
reactiveness
degree to which the *IT service* (3.3.2) promptly responds to *user* (3.3.4) requests

Note 1 to entry: The extent to provide emergency services is also addressed in this quality sub-characteristic. For example, an emergency rescue request from a patient is expected to be immediately accepted and appropriately treated through a medical IT service in a hospital.

3.2.7
IT service adaptability
degree to which an *IT service* (3.3.2) can configure itself or be modified to meet new needs

3.2.7.1
customizability
degree to which the *IT service* (3.3.2) can be customized at the request of *users* (3.3.4)

3.2.7.2
initiative
degree to which the *IT service* (3.3.2) recognizes *users'* (3.3.4) goals and service suggests changes to meet users' needs

3.2.8
IT service maintainability
degree of effectiveness and efficiency with which the *IT service* (3.3.2) can be modified by the *service provider* (3.3.7)

3.2.8.1
analysability
degree of effectiveness and efficiency with which an *IT service* (3.3.2) can be analysed for deficiencies, gaps and failures

3.2.8.2
modifiability
degree to which an *IT service* (3.3.2) can be effectively and efficiently modified without introducing defects or degrading existing *IT service quality* (3.3.10)

[SOURCE: ISO/IEC 25010:2011, 4.2.7.4, modified — "a product or system" has been replaced by "an IT service".]

3.2.8.3
testability
degree of effectiveness and efficiency with which test criteria can be established for an *IT service* (3.3.2) and tests can be performed to determine whether those criteria have been met

[SOURCE: ISO/IEC 25010:2011, 4.2.7.5, modified — "a system, product or component" has been replaced by "an IT service".]

3.3 General

3.3.1
service
means of delivering value for the *user* (3.3.4) by facilitating results the user wants to achieve

[SOURCE: ISO/IEC 20000-1:2011 modified — "customer" has been changed to "user".]

Note 1 to entry: Service is generally intangible.

Note 2 to entry: A service can also be delivered to the *service provider* (3.3.7) by another supplier, which may be an internal group or a user acting as a supplier.

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3.3.2
information technology service
IT service
service that makes use of *IT systems* (3.3.5) as tools to provide value to an individual *user* (3.3.4) or a business by facilitating results the user or business wants to achieve

Note 1 to entry: IT services can be delivered remotely by people, or by an IT application that could be in a local or remote location.

3.3.3
customer
organization or part of an organization that receives a service or services

Note 1 to entry: A customer can be an indirect *user* (3.3.4).

[SOURCE: ISO/IEC 20000-1:2011, 3.7, modified — Note 1 to entry has been added.]

3.3.4
user
person or an organization that uses an *IT service* (3.3.2)

3.3.5
information technology system
IT system
set of one or more computers, associated software, peripherals, terminals, human operations, physical processes, information transfer means, that form an autonomous whole, capable of performing information processing and/or information transfer

[SOURCE: ISO/IEC 14662:2010, 3.13]

3.3.6
service provision system
system to provide *IT service* (3.3.2) to *users* (3.3.4), including people, processes, technology, facilities and information

3.3.7
service provider
organization or part of an organization that manages and delivers a service or services to the *customer* (3.3.3)

Note 1 to entry: A customer can be internal or external to the service provider's organization.

[SOURCE: ISO/IEC 20000-1:2011, 3.32]

3.3.8
service level agreement
SLA
documented agreement between the *service provider* (3.3.7) and *user* (3.3.4) that identifies services and service targets

Note 1 to entry: A SLA can also be established between the service provider and a supplier or an internal group acting as a supplier.

Note 2 to entry: A SLA can be included in a contract or another type of documented agreement.

[SOURCE: ISO/IEC 20000-1:2011, 3.29]

3.3.9
SLA compliance
degree to which the service complies with the *SLA* (3.3.8) requirements

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3.3.10
IT service quality
degree to which an *IT service* (3.3.2) satisfies stated and implied needs when used under specified conditions

[SOURCE: ISO/IEC 25010:2011, 4.3.13, modified — "a software product" has been replaced by "an IT service".]

3.3.11
quality model
defined set of characteristics, and of relationships between them, which provides a framework for specifying quality requirements and evaluating quality

[SOURCE: ISO/IEC 25000:2014, 4.27]

4 Conformance

Any quality requirement, quality specification, or evaluation of quality that conforms to this document shall either

a) use the quality models defined in 5.1.2 and 5.1.3, or

b) tailor the quality model giving the rationale for any changes and provide a mapping between the tailored model and the standard model.

5 Quality models framework

5.1 Overview

5.1.1 General

There are four quality models in the SQuaRE series:

a) the quality in use model in ISO/IEC 25010 that can be applied to products, systems and services;

b) the product quality model in ISO/IEC 25010;

c) the IT service quality model defined in this document; and

d) the data quality model in ISO/IEC 25012.

These models provide a set of quality characteristics and sub-characteristics, as well as their definitions. The relationship among different quality models from SQuaRE series is shown in Figure 2.

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