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INTERNATIONAL ISO/IEC

Second edition
2019-08

# Systems and software engineering — Systems and software quality requirements and evaluation (SQuaRE) — Quality requirements framework

Reference number
ISO/IEC 25030:2019(E)

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Published in Switzerland

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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.

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) or the IEC list of patent declarations received (see http://patents.iec.ch).

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.

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

This second edition cancels and replaces the first edition (ISO/IEC 25030:2007), which has been technically revised.

The main changes compared to the previous edition are as follows:

— extension of the view from software to system;

— enhancement and deployment of quality requirements;

— clarification of quality requirements definition steps:

  — stating them exhaustively by using the quality models;

  — specifying them with the quality measures with criteria for evaluation;

— clarification of how to use quality 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.

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# Introduction

It is important to identify and specify quality requirements as part of system, software and data requirements, because finding the right balance of quality requirements, in addition to well-specified functional requirements, is a critical success factor to meet the stakeholders' objectives. Quality requirements are needed for:

— specifying the system, including contractual agreements and call for tender;

— planning the project, including feasibility analysis;

— developing the system, including identification of architecture drivers or potential quality problems during development; and

— evaluating the system, including objective assessment and certification of quality.

This document focuses on defining, using and governing quality requirements. If not clearly defined, they can be viewed, interpreted, implemented and evaluated differently by the relevant stakeholders. This can result in systems that are inconsistent with user expectations and of poor quality; and time and cost overruns to rework the system. Therefore quality requirements for the system need to be specified clearly at the earliest stage of the development or acquiring process as possible, to provide a critical input to the development or acquisition.

This document can be used to improve the quality of quality requirements, by providing requirements and recommendations for them, and provides guidance for the steps used to define and use them.

Quality requirements can be categorized into characteristics/subcharacteristics by using the quality models defined in the ISO/IEC 2501n family of standards. Measures of these characteristics/subcharacteristics, which are defined in the ISO/IEC 2502n family of standards, can be used to specify quality requirements and evaluate the quality of the target system or data. After ISO/IEC 25030:2007 was published, several international standards which define these models and measures have been published and so the previous edition has become inconsistent with these standards.

Furthermore many systems are now deeply embedded into social infrastructures used in daily life. This requires the systems to achieve much higher quality; e.g., connected systems need to be interoperable and secure, reliable, maintainable and usable.

This revision updates the quality requirements division of SQuaRE series, aligning it with the other divisions, and furthermore providing more practical guidelines for defining and using quality requirements.

Figure 1 illustrates the organization of the SQuaRE series representing families of standards, further called divisions. The SQuaRE series consists of five main divisions and on extension division. The divisions within the SQuaRE series are:

— **ISO/IEC 2500n — Quality Management Division**. The standards that form this division define all common models, terms and definitions used by all other standards in the SQuaRE series. The division also provides requirements and guidance for the planning and management of a project.

— **ISO/IEC 2501n — Quality Model Division**. The standards that form this division provide quality models for system/software products, quality in use (QIU), data, and IT services. Practical guidance on the use of the quality model is also provided.

— **ISO/IEC 2502n — Quality Measurement Division**. The standards that form this division include a system/software product quality measurement reference model, definitions of quality measures, and practical guidance for their application. This division presents internal measures of software quality, external measures of software quality, QIU measures and data quality measures. Quality measure elements forming foundations for the quality measures are defined and presented.

— **ISO/IEC 2503n — Quality Requirements Division**. The standard that forms this division helps specifying quality requirements. These quality requirements can be used in the process of quality

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requirements elicitation for a system/software product to be developed, designing a process for achieving necessary quality, or as inputs for an evaluation process.

— **ISO/IEC 2504n — Quality Evaluation Division**. The standards that form this division provide requirements, recommendations and guidelines for system/software product evaluation, whether performed by independent evaluators, acquirers or developers. 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, which currently include in ISO/IEC 25051 requirements for quality of Ready to Use Software Products (RUSP) and instructions for testing, and in ISO/IEC TR 25060 to ISO/IEC 25069 common industry format for usability.

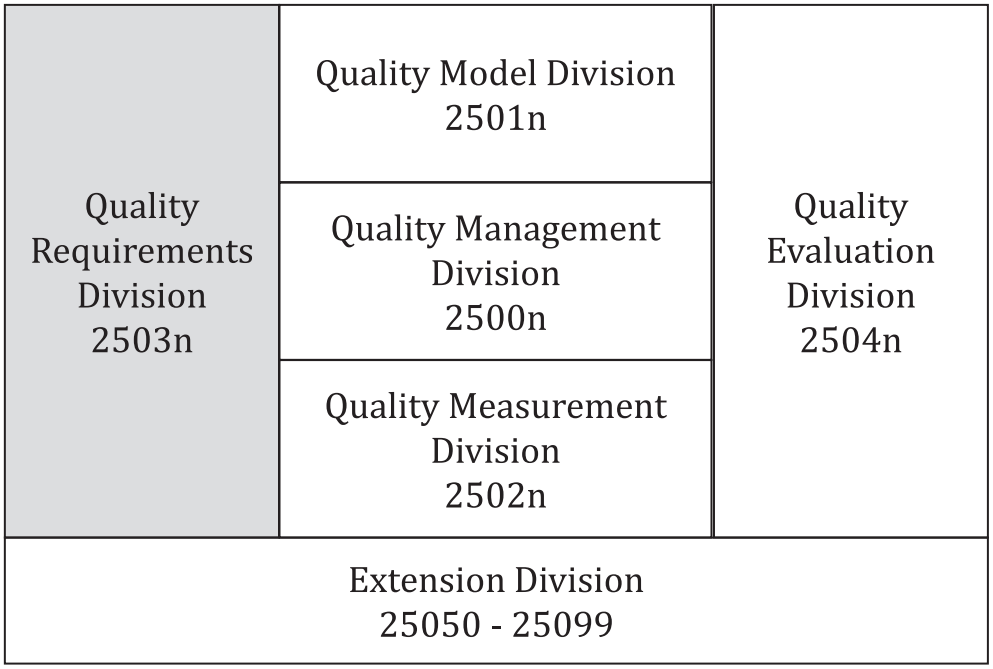


**Figure 1 — Organization of the SQuaRE series of International Standards**

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