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Systems and software engineering—Systems and software Quality Requirements and Evaluation (SQuaRE)—System and software quality models

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We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR AS/NZS ISO/IEC 25010.

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Systems and software engineering—Systems and software Quality Requirements and Evaluation (SQuaRE)—System and software quality models

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee IT-015, Software and Systems Engineering.

The objective of this Standard is to define a quality in use model composed of five characteristics (some of which are further subdivided into subcharacteristics) that relate to the outcome of interaction when a product is used in a particular context of use. This system model is applicable to the complete human-computer system, including both computer systems in use and software products in use. It also defines a product quality model composed of eight characteristics (which are further subdivided into subcharacteristics) that relate to static properties of software and dynamic properties of the computer system. This model is also applicable to both computer systems and software products.

This Standard is identical with, and has been reproduced from ISO/IEC 25010:2011, *Systems and software engineering—Systems and software Quality Requirements and Evaluation (SQuaRE)— System and software quality models*.

As this Standard is reproduced from an International Standard, the following applies:

(a)   In the source text 'this International Standard' should read 'this Australian/New Zealand Standard'.

(b)   A full point substitutes for a comma when referring to a decimal marker.

The term 'informative' has been used in this Standard to define the application of the annex to which it applies. An 'informative' annex is only for information and guidance.

CONTENTS

INTRODUCTION

Software products and software-intensive computer systems are increasingly used to perform a wide variety of business and personal functions. Realization of goals and objectives for personal satisfaction, business success and/or human safety relies on high-quality software and systems. High-quality software products and software-intensive computer systems are essential to provide value, and avoid potential negative consequences, for the stakeholders.

Software products and software-intensive computer systems have many stakeholders including those who develop, acquire, use, or who are customers of businesses using software-intensive computer systems. Comprehensive specification and evaluation of the quality of software and software-intensive computer systems is a key factor in ensuring value to stakeholders. This can be achieved by defining the necessary and desired quality characteristics associated with the stakeholders' goals and objectives for the system. This includes quality characteristics related to the software system and data as well as the impact the system has on its stakeholders. It is important that the quality characteristics are specified, measured, and evaluated whenever possible using validated or widely accepted measures and measurement methods. The quality models in this International Standard can be used to identify relevant quality characteristics that can be further used to establish requirements, their criteria for satisfaction and the corresponding measures.

This International Standard is derived from ISO/IEC 9126:1991, *Software engineering — Product quality*, which was developed to support these needs. It defined six quality characteristics and described a software product evaluation process model.

ISO/IEC 9126:1991 was replaced by two related multipart standards: ISO/IEC 9126, *Software engineering — Product quality* and ISO/IEC 14598, *Software engineering — Product evaluation*.

This International Standard revises ISO/IEC 9126-1:2001, and incorporates the same software quality characteristics with some amendments.

- The scope of the quality models has been extended to include computer systems, and quality in use from a system perspective.

- Context coverage has been added as a quality in use characteristic, with subcharacteristics *context completeness* and *flexibility*.

- *Security* has been added as a characteristic, rather than a subcharacteristic of functionality, with subcharacteristics *confidentiality*, *integrity*, *non-repudiation*, *accountability* and *authenticity*.

- C*ompatibility* (including *interoperability* and *co-existence)* has been added as a characteristic.

- The following subcharacteristics have been added: *functional completeness, capacity, user error protection, accessibility, availability, modularity* and *reusability*.

- The compliance subcharacteristics have been removed, as compliance with laws and regulations is part of overall system requirements, rather than specifically part of quality.

- The internal and external quality models have been combined as the product quality model.

- When appropriate, generic definitions have been adopted, rather than using software-specific definitions.

- Several characteristics and subcharacteristics have been given more accurate names.

Full details of the changes are in Annex A.

This International Standard is intended to be used in conjunction with the other parts of the SQuaRE series of International Standards (ISO/IEC 25000 to ISO/IEC 25099), and with ISO/IEC 14598 until superseded by the ISO/IEC 2504n series of International Standards.

Figure 1 (adapted from ISO/IEC 25000) illustrates the organization of the SQuaRE series representing families of standards, further called divisions.
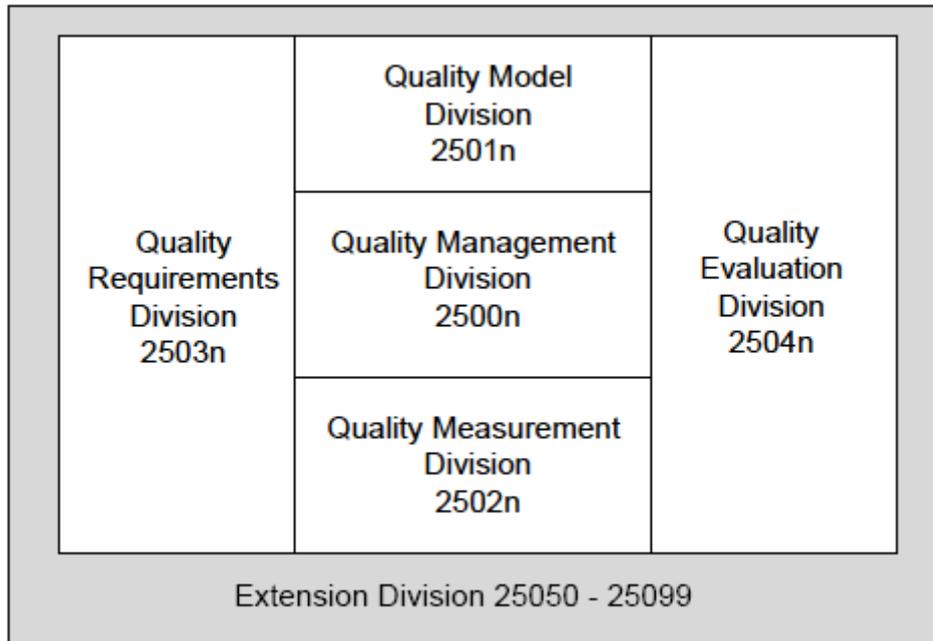

Figure 1 — Organization of SQuaRE series of International Standards

The divisions within the SQuaRE series are:

- **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 International Standards from the SQuaRE series. The 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.

- **ISO/IEC 2501n - Quality Model Division**. The International Standards that form this division present detailed quality models for computer systems and software products, quality in use, and data. 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 quality measurement reference model, mathematical definitions of quality measures, and practical guidance for their application. Examples are given of internal and external measures for software quality, and measures for quality in use. Quality Measure Elements (QME) forming foundations for these measures are defined and presented.

- **ISO/IEC 2503n - 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 quality requirements elicitation for a software product to be developed or as input for an evaluation process.

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

- **ISO/IEC 25050 – 25099 SQuaRE Extension Division**. These International Standards currently include requirements for quality of Commercial Off-The-Shelf software and Common Industry Formats for usability reports.

The quality models in this International Standard can be used in conjunction with ISO/IEC 12207 and ISO/IEC 15288, particularly the processes associated with requirements definition, verification and validation with a specific focus on the specification and evaluation of quality requirements. ISO/IEC 25030 describes how the quality models can be used for software quality requirements, and ISO/IEC 25040 describes how the quality models can be used for the software quality evaluation process.

This International Standard can also be used in conjunction with ISO/IEC 15504 (which is concerned with software process assessment) to provide:

- a framework for software product quality definition in the customer-supplier process;

- support for review, verification and validation, and a framework for quantitative quality evaluation, in the support process;

- support for setting organizational quality goals in the management process.

This International Standard can be used in conjunction with ISO 9001 (which is concerned with quality assurance processes) to provide:

- support for setting quality goals;

- support for design review, verification and validation.

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