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Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality evaluation framework

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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 25040:2011), which has been technically revised.

The main changes are as follows:

— alignment with the other SQuaRE divisions: quality management, model, measurement, and requirements;

— alignment with other standards for system/software life cycle processes and requirements engineering processes;

— expansion of its target entities from software to ICT products, data, and IT services;

— expansion of types of quality evaluation from only requirements conformity to four types: quality evaluation for suitability to a specific use, for qualification to quality standard, for conformity checking to requirements, and for suitability to the market;

— clarification of concepts relating to quality evaluation;

— provision of more practical guidelines for planning a quality evaluation.

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 and www.iec.ch/national-committees.

Many systems and services are now deeply embedded into social infrastructures used in daily life. This requires them to achieve much higher quality; for example, connected systems need to be interoperable, secure, reliable, maintainable, and usable. Therefore, quality evaluation becomes ever more important.

The result of quality evaluation is used to objectively judge the value of the target entity in various business situations, including:

— outsourcers judging whether the target entity satisfies their quality requirements, in the case of outsourcing it;

— consumers or acquirers determining which product or service to be selected for their application, in the case of acquisition.

This document provides requirements and recommendations for quality evaluation, as well as guidance for its tasks.

Target entities for quality evaluation include ICT (information and communication technology) products (systems, software products, etc.), data, and IT services. The quality model defined by ISO/IEC 2501n provides comprehensive quality characteristics and subcharacteristics according to the types of target entities. ISO/IEC 2502n defines quality measures corresponding to those quality models.

This document is one of the standards on SQuaRE developed by ISO/IEC JTC 1/SC 7 (ISO/IEC 25000 to ISO/IEC 25099). Figure 1 (adapted from ISO/IEC 25000) 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.

— ISO/IEC 2500n - quality management division. The International Standards that form this division define all common models, terms, and definitions referred to by all other International 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 2501n - 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 2502n - 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 internal and external property of product, data, IT services and quality-in-use. Quality measure elements (QME) forming foundations for quality measures for internal and external property of product 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 eliciting quality requirements for information systems and IT services 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 quality evaluation for information systems and IT services.

— 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.

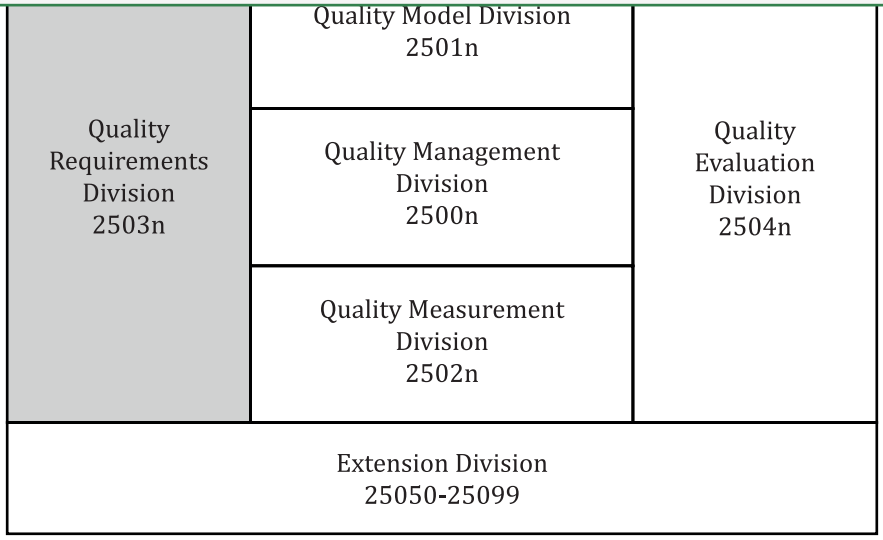

Figure 1 — Organization of standards on SQuaRE developed by ISO/IEC JTC 1/SC 7

The SQuaRE standards can be used in conjunction with ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15288, particularly the processes for the specification and evaluation of quality requirements. ISO/IEC 25030 describes how quality models and measures can be used for systems and software quality requirements, and ISO/IEC 25040 describes how the quality models and measures can be used for systems and software quality evaluation.

The SQuaRE standards can also be used in conjunction with standards on software process assessment developed by ISO/IEC JTC 1/SC 7, which provide:

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

— support for quality review, verification, and validation, as well as a framework for establishing quantitative quality characteristics;

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

The SQuaRE standards can be used in conjunction with ISO 9001 (which is concerned with quality management system) to provide:

— support for setting quality goals;

— support for design review, verification, and validation.