
Software engineering — Product quality —

**Part 1:
Quality model**

Génie du logiciel — Qualité des produits —

Partie 1: Modèle de qualité

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 9126 may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 9126-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software engineering*.

This first edition of ISO/IEC 9126-1, together with the other parts of ISO/IEC 9126, cancels and replaces ISO/IEC 9126:1991, which has been technically revised.

ISO/IEC 9126 consists of the following parts, under the general title *Software engineering — Product quality*:

- *Part 1: Quality model*
- *Part 2: External metrics*
- *Part 3: Internal metrics*
- *Part 4: Quality in use metrics*

Annex A forms a normative part of this part of ISO/IEC 9126-1. Annexes B and C are for information only.

Introduction

Computers are being used in an increasingly wide variety of application areas, and their correct operation is often critical for business success and/or human safety. Developing or selecting high quality software products is therefore of prime importance. Comprehensive specification and evaluation of software product quality is a key factor in ensuring adequate quality. This can be achieved by defining appropriate quality characteristics, taking account of the purpose of usage of the software product. It is important that every relevant software product quality characteristic is specified and evaluated, whenever possible using validated or widely accepted metrics.

ISO/IEC 9126 (1991): Software product evaluation - Quality characteristics and guidelines for their use, which was developed to support these needs, defined six quality characteristics and described a software product evaluation process model.

As quality characteristics and associated metrics can be useful not only for evaluating a software product but also for defining quality requirements and other usage, ISO/IEC 9126 (1991) has been replaced by two related multipart standards: ISO/IEC 9126 (Software product quality) and ISO/IEC 14598 (Software product evaluation). The software product quality characteristics defined in this part of ISO/IEC 9126 can be used to specify both functional and non-functional customer and user requirements.

This part of ISO/IEC 9126 is a revision of ISO/IEC 9126 (1991), and retains the same software quality characteristics. The major differences are:

- the introduction of normative subcharacteristics, most of which are based on the informative subcharacteristics in ISO/IEC 9126 (1991);
- the specification of a quality model;
- the introduction of quality in use;
- removal of the evaluation process (which is now specified in the ISO/IEC 14598 standards);
- co-ordination of the content with ISO/IEC 14598-1.

The relationship between the standards in the ISO/IEC 9126 and ISO/IEC 14598 series (see Annex D) is illustrated in Figure 1.

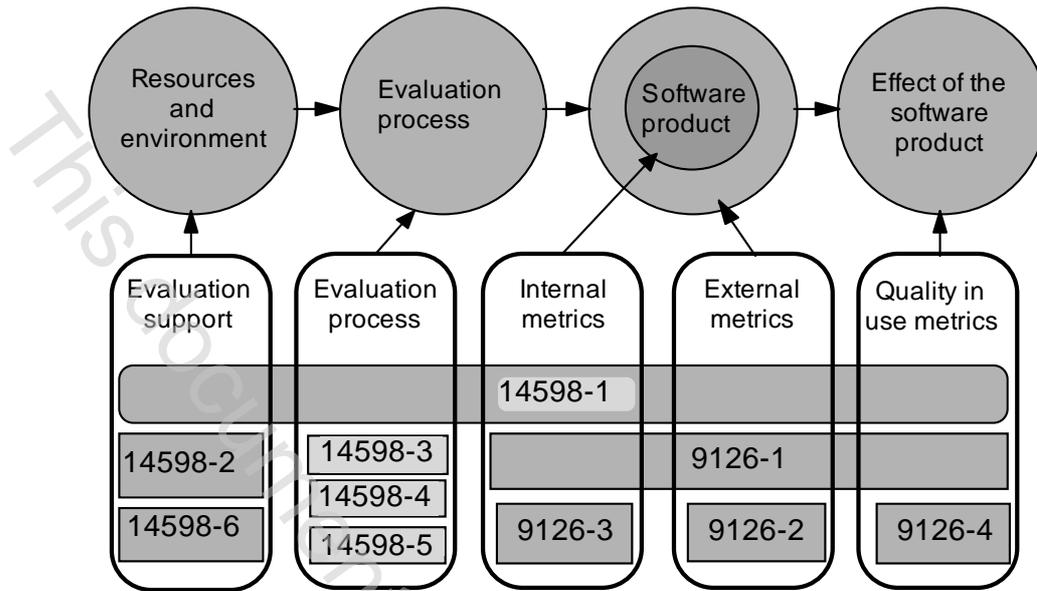


Figure 1 - Relationship between ISO/IEC 9126 and ISO/IEC 14598 standards

Software engineering — Product quality —

Part 1: Quality model

1 Scope

This part of ISO/IEC 9126 describes a two-part model for software product quality: a) internal quality and external quality, and b) quality in use. The first part of the model specifies six characteristics for internal and external quality, which are further subdivided into subcharacteristics. These subcharacteristics are manifested externally when the software is used as a part of a computer system, and are a result of internal software attributes. This part of ISO/IEC 9126 does not elaborate the model for internal and external quality below the level of subcharacteristics.

The second part of the model specifies four quality in use characteristics, but does not elaborate the model for quality in use below the level of characteristics. Quality in use is the combined effect for the user of the six software product quality characteristics.

The characteristics defined are applicable to every kind of software, including computer programs and data contained in firmware. The characteristics and subcharacteristics provide consistent terminology for software product quality. They also provide a framework for specifying quality requirements for software, and making trade-offs between software product capabilities.

Normative Annex A provides recommendations and requirements for software product metrics and quality in use metrics. Examples of these metrics are contained in other parts of ISO/IEC 9126. These metrics are applicable when specifying the quality requirements and the design goals for software products, including intermediate products. An explanation of how this quality model can be applied in software product evaluation is contained in ISO/IEC 14598-1.

This part of ISO/IEC 9126 enables software product quality to be specified and evaluated from different perspectives by those associated with acquisition, requirements, development, use, evaluation, support, maintenance, quality assurance and audit of software. It can for example be used by developers, acquirers, quality assurance staff and independent evaluators, particularly those responsible for specifying and evaluating software product quality. Examples of uses of the quality model defined in this part of ISO/IEC 9126 are to:

- validate the completeness of a requirements definition;
- identify software requirements;
- identify software design objectives;
- identify software testing objectives;
- identify quality assurance criteria;
- identify acceptance criteria for a completed software product.

NOTE 1 This part of ISO/IEC 9126 can be used in conjunction with ISO/IEC 15504 (which is concerned with the software process assessment) to provide:

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

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- support for review, verification and validation, and a framework for quantitative quality evaluation, in the support process;
- support for setting organisational quality goals in the management process.

NOTE 2 This part of ISO/IEC 9126 can be used in conjunction with ISO/IEC 12207 (which is concerned with the software lifecycle) to provide:

- a framework for software product quality requirements definition in the primary lifecycle process;
- support for review, verification and validation in supporting lifecycle processes.

NOTE 3 This part of ISO/IEC 9126 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.

2 Conformance

Any software product quality requirement, specification or evaluation that conforms to this part of ISO/IEC 9126 shall either use the characteristics and subcharacteristics from clauses 6 and 7, giving the reasons for any exclusions, or describe its own categorisation of software product quality attributes and provide a mapping to the characteristics and subcharacteristics in clauses 6 and 7.

A software product quality requirement or specification that contains metrics used for comparison shall state whether the metrics have the properties specified in A.4.

3 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 9126. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 9126 are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 14598-1:1999, *Information technology — Software product evaluation — Part 1: General overview*.

4 Terms and definitions

For the purposes of all parts of ISO/IEC 9126, the following definition and the definitions contained in ISO/IEC 14598-1 apply.

NOTE The definitions contained in ISO/IEC 14598-1 are reproduced in informative annex B.

4.1

level of performance

the degree to which the needs are satisfied, represented by a specific set of values for the quality characteristics