Software and systems engineering processes — Software product Quality —

Part 3-2:

Product evaluation process

First Edition 2019

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In order to keep abreast of progress in industry, Kenya Standards shall be regularly reviewed. Suggestions for improvements to published standards, addressed to the Managing Director, Kenya Bureau of Standards, are welcome.

Software and Systems engineering Processes — Software Product Quality

Part 3

Product evaluation process

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Foreword

This Kenya tandard was prepared by the KEBS Technical Committee 94 on Software Engineering, IT Service Management, IT Governance and Artificial Intelligence, under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

It is important to identify and specify software quality requirements as part of specifying the requirements for a software product. Software is usually part of a larger system. System requirements and software requirements are closely related and software requirements can therefore not be considered in isolation. This Kenya Standard focuses on software quality requirements, but takes a system perspective. Software quality requirements can be categorized by use of a quality model, for example the quality model defined in KS ISO/IEC 25010]. Measures of attributes of these characteristics and their subcharacteristics can be used to specify software quality requirements and evaluate the quality of a software product.

Software quality requirements address important issues of quality for software products. Software product quality requirements are needed for:

– specification (including contractual agreement and call for tender);

– planning (including feasibility analysis and translation of external software quality requirements into internal software quality requirements);

– development (including early identification of potential quality problems during development); and

– evaluation (including objective assessment and certification of software product quality).

If software quality requirements are not stated clearly, they may be viewed, interpreted, implemented and evaluated differently by different people. This may result in software which is inconsistent with user expectations and of poor quality; users, clients and developers who are unsatisfied; and time and cost overruns to rework software.

This Kenya Standard aims to improve the quality of software quality requirements. It does this by

providing requirements and recommendations for quality requirements, and guidance for the processes used to define and analyse quality requirements. Application of this Kenya Standard should help ensure that software quality requirements are:

– in accordance with stakeholder needs;

– stated clearly and precisely;

– correct, complete, and consistent; and

– verifiable and measurable.

This Standard complies with the technical processes defined in KS 2896: 2019 - 1 related to quality requirements definition and analysis.

During the preparation of this standard, reference was made to the following documents:

i) ISO IEC 25010

ii) ISO IEC 25020

iii) ISO IEC 25030

iv) ISO IEC 25040

v) ISO/IEC/IEEEE 12207:2017

vi) ISO/IEC/IEC 15288:2015

Acknowledgement is hereby made for the assistance derived from these sources.

Software and systems engineering processes — Software product quality — Part 3-2: evaluation process

1 Scope and application

1.1 Scope

This standard contains requirements and recommendations for the evaluation of software product quality and clarifies the general concepts. It provides a process description for evaluating software product quality and states the requirements for the application of this process. The evaluation process can be used for different purposes and approaches. The process can be used for the evaluation of the quality of pre-developed software, commercial-off-the-shelf software or custom software and can be used during or after the development process.

1.2 Application

This Standard is intended for those responsible for software product evaluation and is appropriate for developers, acquirers and independent evaluators of software products. These three different approaches are detailed in KS ISO/IEC 14598-3, KS ISO/IEC 14598-4, and KS ISO/IEC 14598-5.

It is not intended for evaluation of other aspects of software products (such as functional requirements, process requirements, business requirements, etc.).

1.3 Conformance

Evaluation of software product quality conforms to this Kenya Standard if it complies with the requirements of Clause 5.

2 Normative References

KS 2896 Part 2-1 :2019, *Software and Systems Engineering Processes — Requirements and Evaluation, Part 2-1 — Technical processes*

KS 2896 Part 2-2 :2019, *Software and Systems Engineering Processes — Requirements and Evaluation, Part 2-2, — Technical evaluation*

KS 2896 Part 3-1 : 2019, *Software and Systems Engineering Processes — Software product Quality — Part 3-1: Requirements*

3 Terms, definitions Acronyms and Abbreviations

For the purpose of this standard, the definitions given in **Annex A** of this standard shall apply.

Additionally, 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

— IEEE Standards Dictionary Online: available at http://ieeexplore.ieee.org/xpls/dictionary.jsp

4 Reference model - evaluation processes

The software product quality evaluation process reference model describes the process and details the activities and tasks providing their purposes and complementary information that can be used to guide a software product quality evaluation (Figure 1)

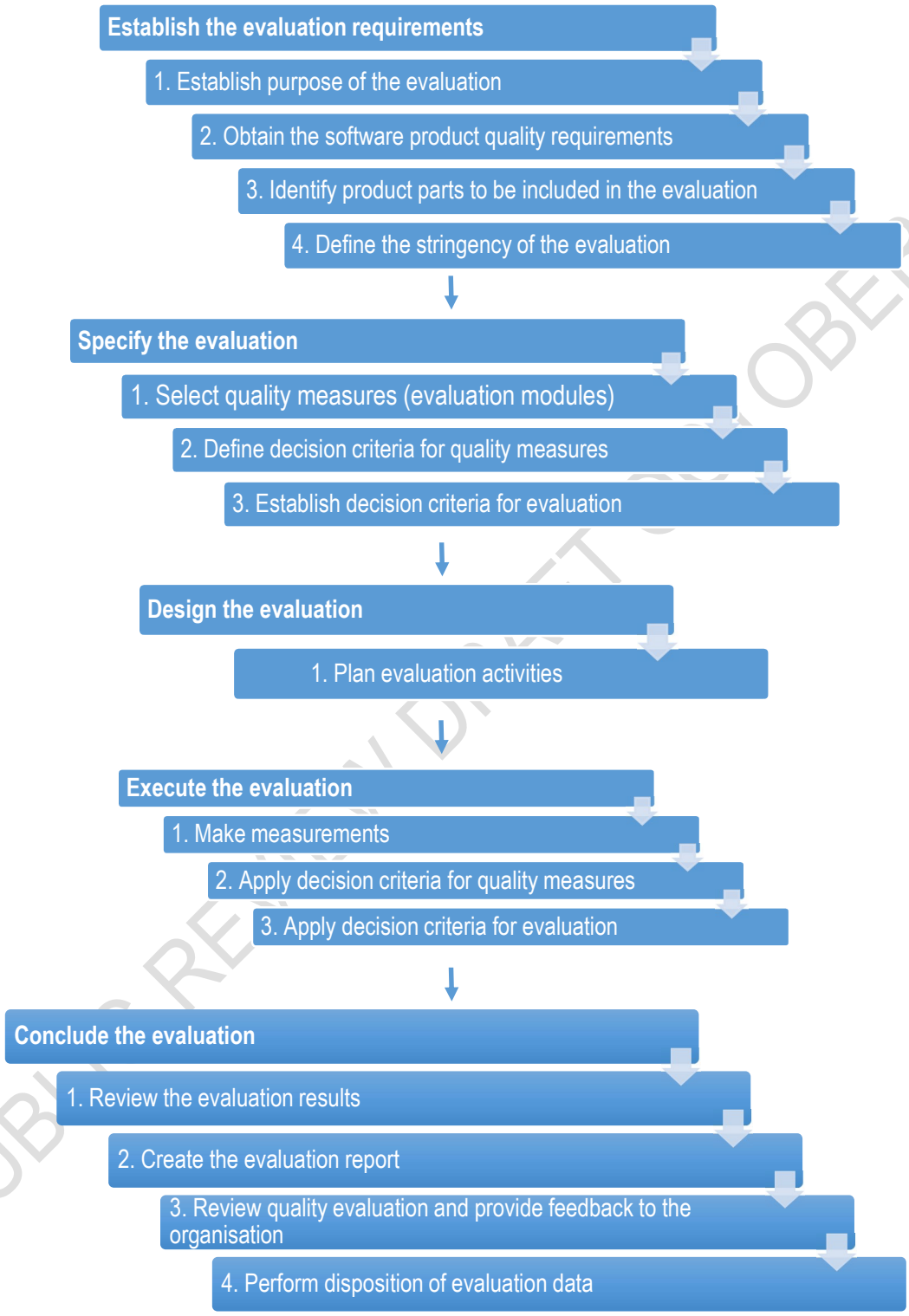

Figure 1 — Software Product Quality Evaluation Process

5 Software product quality evaluation requirements

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
Effective Rating	0	1	2	3		
5.1 General Requirements						
i) The evaluator shall implement the activities and tasks described in clause 5 in accordance with applicable organization policies and procedures with respect to the software product quality evaluation process (see Figure 1). NOTE Figure 1 is a simplified view and does not show all iterations relating to specific activities or between activities.						
ii) There shall be an infrastructure including tools and technology in the evaluator's organization suitable for carrying out software product quality evaluation.						
iii) There shall be an infrastructure that allows for data collection and process modifications based on data analysis.						
iv) The personnel involved in the evaluation shall have the necessary skills and training						
v) In order to ensure repeatability, reproducibility, impartiality and objectivity of the evaluation results, the evaluator shall act in an organisational context that provides all necessary assurance to obtain sufficient quality for its activities.						
5.2 Documentation						
i) Each activity in the software product quality evaluation shall be recorded						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
Effective Rating	0	1	2	3		
ii) The records shall include a detailed account of actions performed by the evaluator while executing the software product quality evaluation plan..						
iii) The records shall contain sufficient information required for the management of the software product quality evaluation..						
iv) The evaluation records shall include any intermediate data on which any interpretation is based. The decisions made during the interpretation process shall also be included in the evaluation records as specified in the evaluation plan..						
v) The records shall contain sufficient information for each activity for effective performance of subsequent activities of the software product quality evaluation..						
vi) The evaluation records shall include any intermediate data on which any interpretation is based. The decisions made during the interpretation process shall also be included in the evaluation records as specified in the evaluation plan.						
vii) The records shall contain sufficient information for each activity for effective performance of subsequent activities of the software product quality evaluation						
viii) The records shall be kept in order to document the software product quality evaluation and to allow reprocessing of the evaluation results.						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
Effective Rating	0	1	2	3		
ix) A software product quality evaluation report shall be prepared documenting evaluation activities and results of the evaluation.						
x) When a tool is used to perform an evaluation action, reference to the tool shall be included in the evaluation report. The reference shall consist of the identification of the tool and of its supplier and the version of the tool.						
xi) A more detailed reference to the tool used shall be included in the evaluation records. It shall include the detailed configuration of the tool and any pertinent information needed to be able to repeat the evaluation action in order to obtain the same intermediate result.						
5.3 Establish the evaluation requirements						
5.3.1 Establish the purpose of the evaluation						
i) The purpose of the software product quality evaluation shall be documented as a basis for the further evaluation activities and tasks..						
5.3.2 Obtain the software product quality requirements						
i) The stakeholders of the software product shall be identified.						
ii) The software product quality requirements specified using a quality model shall be provided.						
iii) The extent to which the quality evaluation covers the specified software quality requirements shall be defined, taking into account the software product quality						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
Effective Rating	0	1	2	3		
requirements, in order to produce the software product quality evaluation requirements. This decision should be based on constraints such as evaluation budget, target date for the evaluation, purpose of the evaluation and use criticality of the software product..						
iv) Implementation constraints relevant for the software quality requirements shall be documented						
5.3.3 Identify product parts to be included in the evaluation						
i) All product parts to be included in the evaluation shall be identified and documented.						
5.3.4 Define the stringency of the evaluation						
i) The evaluation stringency shall be defined..						
5.4 Specify the evaluation.						
5.4.1 Select quality measures (evaluation modules)						
i) The evaluator shall select quality measures (evaluation modules) to cover all software quality evaluation requirements.						
ii) Software product quality evaluation requirements should be allocated to the software product components to which they are related in such a way that it is possible to define each appropriate quality measure that are used to evaluate the software product quality.						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
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iii) The software product quality evaluation methods shall be documented, taking into account the actions to be performed in order to achieve the evaluation results.						
iv) When the evaluation method described is based on the use of a software tool, this tool shall be identified in the evaluation plan. Such identification shall include at least the name of the tool, its version identification and its origin (e.g. the supplier). The description of the evaluation methods shall be completed by the identification of product components on which the method is to be applied. When the evaluation specification is such that expert analysis of the measurements is required in order to interpret the results, the interpretation procedure shall be specified.						
v) The evaluation specification shall comprise:						
▪ the scope of the evaluation referring to the product components as identified in the product description;						
▪ a cross-reference between the information needed to perform the evaluation and the product						
▪ components and other related						
▪ documents listed in the product description;						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
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▪ a specification of measurements and verifications to be performed and the references to product						
▪ components on which they are to be performed;						
▪ mapping between the specification of measurements and verifications and the evaluation requirements together with the reference to standards or the justification for each measurement or verification listed.						
5.4.2 Define decision criteria for quality measures						
i) Decision criteria shall be defined for the selected individual measures.						
5.4.3 Define decision criteria for Evaluation						
i) The evaluator should prepare a procedure for further summarization, with separate criteria for different quality characteristics, each of which may be in terms of individual subcharacteristics and quality measures, or a weighted combination of subcharacteristics and quality measures. The summarization results should be used as a basis for the software product quality assessment.						
5.5 Design the evaluation						
5.5.1 Plan evaluation activities						
i) The identified software product quality evaluation activities shall be scheduled, taking into account the						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
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availability of resources such as personnel, software tools and computers.						
ii) The evaluation plan should have no duplicating tasks within the evaluation						
iii) The evaluation plan should define decision points in the evaluation process which determine when and why the evaluation is to be considered complete (i.e. acceptance or rejection criteria) and is to be stopped. This should be done in order to decrease the risk of errors and to reduce the planned evaluation effort, considering at least the following items:						
▪ The evaluation budget;						
▪ Evaluation methods and adapted standards;						
▪ Evaluation tools;						
▪ Evaluation activities, including the schedule and resources involved.						
iv) The evaluation plan should include the following:						
▪ Purpose of the software product quality evaluation;						
▪ The organisations involved in the evaluation, such as an independent evaluation organisation, software product developers and acquirers´ organizational units;						
▪ The evaluation budget;						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
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▪ Information products expected from the evaluation;						
▪ ▪ Schedule for the evaluation milestones; ▪ Responsibilities for the parties involved in the evaluation;						
▪ Environment for evaluation;						
▪ Evaluation methods and tools;						
▪ Decision criteria for software product quality measures;						
▪ Decision criteria for software product quality assessment;						
▪ Adopted standards;						
▪ Evaluation activities.						
v) During the early evaluation some of the items of the evaluation plan can only be defined at a high level. Therefore, the evaluation plan shall be revised as the evaluation activities evolve, providing additional information that allows the plan to be adjusted or detailed.						
5.6 Execute the evaluation						
5.6.1 Make measurements						
i) The selected software product quality measures shall be applied to the software product and components, according to the evaluation plan, resulting in values on the measurement scales.						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
Effective Rating	0	1	2	3		
5.6.2 Apply decision criteria for quality measures						
ii) The decision criteria for the software product quality measures shall be applied to the measured values						
5.6.3 Apply decision criteria for evaluation						
i) The set of decision criteria shall be summarised into subcharacteristics and characteristics, producing the assess results as a statement of the extent to which the software product meets quality requirements.						
ii) The evaluation results should: a) establish an appropriate degree of confidence that the software product is able to meet the evaluation requirements;						
b) identify any specific deficiencies with regard to the evaluation requirements and any additional evaluations needed to determine the scope of those deficiencies;						
c) identify any special limitations or conditions placed on the use of the software product;						
d) identify any weaknesses or omissions in the evaluation itself and any additional evaluation that is needed;						
e) identify any options for the use of the software product uncovered by the evaluation.						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
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5.7 Conclude the evaluation						
5.7.1 Review the evaluation result						
i) The evaluator and the requester shall carry out a joint review of the evaluation results.						
5.7.2 Create the evaluation report						
i) Depending on how the evaluation report is intended to be used, it should include the following items:						
a) the software product quality evaluation requirements;						
b) the software product quality requirements;						
c) the software product quality evaluation plan						
d) results from the measurements and analyses performed;						
e) intermediate results or interpretation decisions, when specified by the evaluation plan;						
f) any limitations, constraints, deficiencies, or exclusions in an evaluation activity, including their impact on the use, configuration, modification, or general maintenance of the software product over time;						
g) the evaluators and their qualifications;						
h) any differences between the product versions assessed and the corresponding evaluation						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
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inputs; i.e., documentation or courses						
i) resolutions or workarounds in the event of a deficiency;						
j) any other information necessary to be able to repeat or reproduce the evaluation;						
k) result of the evaluation.						
l) any other information necessary to be able to repeat or reproduce the evaluation;						
ii) As a result of the analysis of the evaluation activities the evaluation report should identify: a) each deficiency, any relevant analysis, and how each deficiency was resolved. Resolution of deficiencies may include the fact that:						
▪ one of the evaluation methods has provided assurance that the deficiency is not major;						
▪ a satisfactory "workaround" can be found to alleviate the impact of the deficiency; e.g., modification to the product, disable or remove unneeded functionality, regenerate missing design requirements using reverse engineering;						
▪ the original requirement is not mandatory and the deficiency can be accepted;						
▪ the deficiency is acceptable provided that the use of the software product will be controlled by specific conditions or limitations;						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
Effective Rating	0	1	2	3		
▪ additional evaluation work is required to resolve the deficiency or gaps in the evaluation;						
b) any additional evaluations performed to resolve any identified deficiencies:						
▪ to determine the scope or impact of a deficiency;						
▪ to establish confidence that there is no deficiency;						
▪ to verify that a workaround is technically feasible and/or suitable and acceptable;						
▪ to verify the correct and acceptable performance of the software once a design change or changes have been made to correct deficiency;						
c) in a case where it is necessary to limit or control the use of the software product, whether the limitation:						
▪ interferes with the software product meeting the mandatory requirements of the application;						
▪ impacts on the application's design, budget, and schedule;						
▪ requires additional evaluation work;						
▪ introduces any possibility of failure in the application;						
d) any exclusions from scope of evaluation and/or restrictions on the results for each evaluation, such as:						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
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▪ 'This evaluation does not include a detailed review of the functionality of the product.'; or						
i) This software product is deemed to be qualified to the required integrity level provided a full						
ii) the integrated results of all the evaluation activities to allow an overall conclusion for the evaluation of the software product to be made.						
5.7.3 Review quality evaluation and provide feedback to the organisation						
iii) The evaluator shall review the results of the evaluation and the validity of the evaluation process, indicators and measures applied.						
iv) Feedback from the review should be used in order to improve the evaluation process and evaluation techniques (evaluation modules).						
v) When it is necessary to improve the evaluation modules, the data collection for extra indicators should be included, in order to validate them for later use.						
5.7.4 Perform disposition of evaluation data						
i) When the evaluation is completed the data and evaluation items shall be disposed according to requirements of the requester.						
ii) This shall be done in the one of the following ways, depending on the type of data:						
▪ the documents submitted to the evaluation shall be either returned to the requester or						

Process	Not Performed	Partially/ Informally performed	Planned and tracked	Well Defined	Exemption/ Justification	Reference Standards
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archived for a specified duration or destroyed in a secure way,						
▪ the evaluation report and the evaluation records shall be archived for a specified duration,						
▪ all other data shall be either archived for a specified duration or destroyed in a secure way.						
iii) When the specified archiving duration expires for some data, it shall be either archived again for a specified duration or destroyed in a secure way.						

Annexes

(to be discussed by TC)

A.1

acquirer
individual or organisation that acquires or procures a system, software product or software service from a supplier

Note Based on the definition in ISO/IEC 12207:1995.

A.2

analysis model
algorithm or calculation combining one or more base and/or derived measures with associated decision criteria

A.3

attribute
inherent property or characteristic of an entity that can be distinguished quantitatively or qualitatively by human or automated means

Note 1 based on ISO/IEC 15939:2002.

Note 2 ISO 9000 distinguishes two types of attributes: a permanent characteristic existing inherently in something; and an assigned characteristic of a product, process or system (e.g. the price of a product, the owner of a product). The assigned characteristic is not an inherent quality characteristic of that product, process or system.

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A.4

attribute for quality measure
Attribute that relates to software product itself, to the use of the software product or to its development process

Note Attributes for quality measure are used in order to obtain measurement primitives.

A.5

base measure
measure defined in terms of an attribute and the method for quantifying it

Note A base measure is functionally independent of other measures.

[ISO/IEC 15939: 2002, based on the definition in International Vocabulary of Basic and General Terms in Metrology, 1993].

A.6

commercial-off-the-shelf software product
software product defined by a market-driven need, commercially available, and whose fitness for use has been demonstrated by a broad spectrum of commercial users

A.7

context of use
users, tasks, equipment (hardware, software and materials), and the physical and social environments in which a product is used

[ISO 9241-11:1998]

A.8

custom software
software product developed for a specific application from a user requirements specification

A.9

data
collection of values assigned to base measures, derived measures and/or indicators

[ISO/IEC 15939:2002]

A.10

decision criteria

thresholds, targets, or patterns used to determine the need for action or further investigation, or to describe the level of confidence in a given result.

[ISO/IEC 15939:2002]

A.11

derived measure

measure that is defined as a function of two or more values of base measures

[ISO/IEC 15939:2002, based on the definition in International Vocabulary of Basic and General Terms in Metrology, 1993].

Note A transformation of a base measure using a mathematical function can also be considered as a derived measure.

A.12

developer

individual or organisation that performs development activities (including requirements analysis, design, testing through acceptance) during the software life cycle process

Note Based on the definition in ISO/IEC 12207:1995

A.13

division of standards

division forms a family of standards serving complementary purposes

A.14

end user

individual person who ultimately benefits from the outcomes of the system

Note The end user may be a regular operator of the software product or a casual user such as a member of the public.

A.15

entity

object that is to be characterised by measuring its attributes

EXAMPLE An object can be a process, product, project, or resource.

[ISO/IEC 15939:2002]

A.16

evaluation

systematic determination of the extent to which an entity meets its specified criteria

[ISO/IEC 12207:2008]

A.17

evaluation coverage

degree to which the evaluation covers the specified software product quality requirements

A.18

evaluation level

rigour to be applied during the evaluation that defines the depth or thoroughness of the evaluation in terms of evaluation techniques to be applied and evaluation results to be achieved

A.19

evaluation method

procedure describing actions to be performed by the evaluator in order to obtain results for the specified measurement applied to the specified product components or on the product as a whole

A.20

evaluation module

package of evaluation technology for measuring software quality characteristics, subcharacteristics or attributes

Note The package includes evaluation methods and techniques, inputs to be evaluated, data to be measured and collected and supporting procedures and tools.

A.21

evaluation records

documented objective evidence of all activities performed and of all results achieved within the evaluation process

A.22

evaluation requester

person or organization that requests an evaluation

A.23

evaluation tool

instrument that can be used during evaluation to collect data, to perform interpretation of data or to automate part of the evaluation

NOTE Examples of such tools are source code analysers to compute code metrics, CASE tools to produce formalized models, test environments to run the executable programs, checklists to collect inspection data or spreadsheets to produce syntheses of measures.

A.24

evaluation stringency

degree required for the software product quality characteristics and subcharacteristics to fulfil the expected use criticality of the software product

A.25

evaluator

individual or organisation that performs an evaluation

A.26

failure

termination of the ability of a product to perform a required function or its inability to perform within previously specified limits

Note Based on the definition in IEEE 610.12-1990.

A.27

fault

incorrect step, process or data definition in a computer program

[IEEE 610.12-1990]

A.28

functional requirement

requirement that specifies a function that a system or system component must be able to perform

[IEEE 610.12-1990]

Note The quality characteristic functionality can be used to specify or evaluate the suitability, accuracy, interoperability, security and compliance of a function (see ISO/IEC 9126-1 [ISO/IEC 25010]).

A.29

implied needs

needs that may not have been stated but are actual needs

Note Some implied needs only become evident when the software product is used in particular conditions.

EXAMPLE Implied needs include: needs not stated but implied by other stated needs and needs not stated because they are considered to be evident or obvious.

A.30

independent evaluator

individual or organization that performs an evaluation independently from developers and acquirers

NOTE The individual or organization acting as developer or acquirer for the target system to be evaluated cannot become the independent evaluator for the system. The independent evaluator can be an organization. Independent evaluators can belong to the same organization as the developers as long as they are independent from developers and acquirers.

A.31

indicator

measure that provides an estimate or evaluation of specified attributes derived from a model with respect to defined information needs

[ISO/IEC 15939:2002]

Note In ISO/IEC 14598 this definition was: "a measure that can be used to estimate or predict another measure".

A.32

information need

insight necessary to manage objectives, goals, risks, and problems

[ISO/IEC 15939:2002]

A.33

information product

one or more indicators and their associated interpretations that address information need

EXAMPLE A comparison of a measured defect rate to planned defect rate along with an assessment of whether or not the difference indicates a problem.

[ISO/IEC 15939:2002]

A.34

information system needs

needs that can be specified as quality requirements by external measures and sometimes by internal measures

A.35

intermediate software product

product of the software development process that is used as input to another stage of the software development process

EXAMPLE Intermediate software products can include static and dynamic models, other documents and source code.

A.36

intermediate software product needs

needs that can be specified as quality requirements by internal measures

A.37

maintainer

individual or organization that performs maintenance activities

NOTE Adapted from ISO/IEC 12207:2008.

A.38

measure (noun)

variable to which a value is assigned as the result of measurement

Note The term “measures” is used to refer collectively to base measures, derived measures, and indicators.

[ISO/IEC 15939:2002]

A.39

measure (verb)

make a measurement

[ISO/IEC 14598-1:1999]

A.40

measurement

set of operations having the object of determining a value of a measure

[ISO/IEC 15939:2002, based on the definition in International Vocabulary of Basic and General Terms in Metrology, 1993]

Note Measurement can include assigning a qualitative category such as the language of a source program (ADA, C, COBOL, etc.).

A.41

measurement function

algorithm or calculation performed to combine two or more base measures

[ISO/IEC 15939:2002]

A.42

measurement method

logical sequence of operations, described generically, used in quantifying an attribute with respect to a specified scale

[ISO/IEC 15939:2002, based on the definition in International Vocabulary of Basic and General Terms in Metrology, 1993].

A.43

measurement procedure

set of operations, described specifically, used in the performance of a particular measurement according to a given method

[ISO/IEC 15939:2002, based on the definition in International Vocabulary of Basic and General Terms in Metrology, 1993]

A.44

measurement process

process for establishing, planning, performing and evaluating software measurement within an overall project or organisational measurement structure

[ISO/IEC 15939:2002]

A.45

observation

instance of applying a measurement procedure to produce a value for a base measure

[ISO/IEC 15939:2002]

A.46

operator

individual or organisation that operates the system

Note Based on the definition in ISO/IEC 12207:1995.

A.47

process

system of activities, which use resources to transform inputs into outputs

[ISO 9000:2000]

A.48

quality in use (measure)

the extent to which a product used by specific users meets their needs to achieve specific goal with effectiveness, productivity, safety and satisfaction in specific contexts of use

A.49

quality measure element

Measure, which is either a base measure or a derived measure that is used for constructing software quality measures

Note The software quality characteristic or subcharacteristic of the entity is derived afterwards by calculating a software quality measure.

A.50

quality model

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

A.51

rating

action of mapping the measured value to the appropriate rating level. Used to determine the rating

level associated with the software product for a specific quality characteristic

A.52

rating level

scale point on an ordinal scale, which is used to categorise a measurement scale

Note 1 The rating level enables software product to be classified (rated) in accordance with the stated or implied needs.

Note 2 Appropriate rating levels may be associated with the different views of quality i.e. Users', Managers' or Developers'.

A.53

requirements

expression of a perceived need that something be accomplished or realized

Note The requirements may be specified as part of a contract, or specified by the development organisation, as when a product is developed for unspecified users, such as consumer software, or the requirements may be more general, as when a user evaluates products for comparison and selection purpose.

A.54

scale

ordered set of values, continuous or discrete, or a set of categories to which the attribute is

mapped

[ISO/IEC 15939:2002, based on the definition in International Vocabulary of Basic and General Terms in Metrology, 1993]

EXAMPLE Types of scales are: a nominal scale which corresponds to a set of categories; an ordinal scale which corresponds to an ordered set of scale points; an interval scale which corresponds to an ordered scale with equidistant scale points; and a ratio scale which not only has equidistant scale point but also possesses an absolute zero. Measures using nominal or ordinal scales produce qualitative data, and measures using interval and ratio scales produce quantitative data.

A.55

software product

set of computer programs, procedures, and possibly associated documentation and data

[ISO/IEC 12207:1995]

Note 1 Products include intermediate products, and products intended for users such as developers and maintainers.

Note 2 In SQuaRE International Standards software quality has the same meaning as software product quality.

A.56

software product evaluation

technical operation that consists of producing an assessment of one or more characteristics of a software product according to a specified procedure

A.57

software quality

capability of software product to satisfy stated and implied needs when used under specified conditions

Note This definition differs from the ISO 9000:2000 quality definition mainly because the software quality definition refers to the satisfaction of stated and implied needs, while the ISO 9000 quality definition refers to the satisfaction of requirements.

A.58

software quality characteristic

category of software quality attributes that bears on software quality

Note Software quality characteristics may be refined into multiple levels of subcharacteristics and finally into software quality attributes.

A.59

software quality evaluation

systematic examination of the extent to which a software product is capable of satisfying stated and implied needs

A.60

software quality in use

capability of the software product to enable specific users to achieve specific goals with effectiveness, productivity, safety and satisfaction in specific contexts of use

Note Before the product is released, quality in use can be specified and measured in a test environment for the intended users, goals and contexts of use. Once in use, it can be measured for actual users, goals and contexts of use. The actual needs of users may not be the same as those anticipated in requirements, so actual quality in use may be different from quality in use measured earlier in a test environment.

A.61

Software quality measure

measure of internal software quality, external software quality or software quality in use

Note Internal software quality, external software quality and software quality in use are described in the quality model in ISO/IEC 9126-1 [ISO/IEC 25010].

A.62

stakeholder

a party having a right, share or claim in a system or in its possession of characteristics that meet that party's needs and expectations

[ISO/IEC 15288:2002]

Note Stakeholders include, but are not limited to, end users, end user organisations, supporters, developers, producers, trainers, maintainers, disposers, acquirers, supplier organisations and regulatory bodies

A.63

supplier

individual or organisation that enters into a contract with the acquirer for the supply of a system, software product or software service under the terms of the contract

[ISO/IEC 12207:1995]

A.64

system

a combination of interacting elements organised to achieve one or more stated purposes

Note 1 A system may be considered as a product or as the services it provides.

Note 2 In practice, the interpretation of its meaning is frequently clarified by the use of an associative noun, e.g. aircraft system. Alternatively, the word system may be substituted simply by a context dependent synonym, e.g. aircraft, though this may then obscure a system principles perspective.

[ISO/IEC 15288:2002]

A.65

target of process

software product or task executed by software product to which measurement or evaluation process is applied

A.66

unit of measurement

particular quantity defined and adopted by convention, with which other quantities of the same kind are compared in order to express their magnitude relative to that quantity

[ISO/IEC 15939:2002, based on the definition in International Vocabulary of Basic and General Terms in Metrology, 1993]

A.67

user

individual or organisation that uses the system to perform a specific function

Note Users may include operators, recipients of the results of the software, or developers or maintainers of software.

[ISO/IEC 15939:2002]

A.68

validation

confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled

Note 1 "Validated" is used to designate the corresponding status.

[ISO 9000:2000]

Note 2 In design and development, validation concerns the process of examining a product to determine conformity with user needs.

Note 3 Validation is normally performed on the final product under defined operating conditions. It may be necessary in earlier stages.

Note 4 Multiple validations may be carried out if there are different intended uses.

A.69

value

number or category assigned to an attribute of an entity by making a measurement

A.70

verification

confirmation, through the provision of objective evidence, that specified requirements have been fulfilled

Note 1 "Verified" is used to designate the corresponding status.

[ISO 9000:2000]

Note 2 In design and development, verification concerns the process of examining the result of a given activity to determine conformity with the stated requirement for that activity.