ISO/IEC SQuaRE: The second generation of standards for software product quality

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IASTED
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Presentation Topics

- Who develops the software related standards in ISO
- What is the current software product standard of ISO
- Overview of ISO9126
- What are the components and where do they apply
- Is it used (results of the web-based survey)
- The next generation SQuaRE design
Software International Standards

ISO

IEC

TC 176

JTC 1

SC 1

SC 7

SC 22

SC1-AFNOR
SC2-BSI
SC3-NNI
SC7 Components

SC 7

WG2
DOCUMENTATION

WG4
TOOLS & ENV.

WG6-12
MEASUREMENT

WG7
LIFE-CYCLE MANAGEMENT

WG8
LIFE-CYCLE SUPPORT

WG9
CLASSIFICATIONS

WG10
PROCESS EVALUATION

WG11
DATA DEFINITIONS & REPRESENTATIONS
SC7/WG6 Current documents

ISO/IEC 9126-1 --- Part 1 Quality Model (Japan + England)
ISO/IEC 9126-2 --- Part 2 External Metrics (Japan+Canada)
ISO/IEC 9126-3 --- Part 3 Internal Metrics (Japan+Netherland)
ISO/IEC 9126-4 --- Part 4 Quality in Use (USA)

Product Evaluation guides (perspectives)

ISO/IEC 14598-1 --- Part 1 Overview (Japan+England+USA)
ISO/IEC 14598-3 --- Part 3 Developer’s Guide (USA+Denmark)
ISO/IEC 14598-4 --- Part 4 Acquirer’s Guide (Canada)
ISO/IEC 14598-5 --- Part 5 Evaluator’s Guide (France)
ISO/IEC 14598-6 --- Part 6 Evaluation modules (Denmark)
Model includes many perspectives

- Planning of the Quality evaluation
- Building Software that meets I/E Quality Requirements
- Evaluate Solutions, compare offerings

2. Planning and Management
3. Process for Developers
4. Process for Acquirers
5. Process for Evaluators
6. Evaluation Modules

Independent Software Product Quality guide
Common to all the perspectives

1. Quality Characteristics

2. External Metrics

3. Internal Metrics

6. Evaluation Modules

Measured Quality Attribute

- EXCELLENT
- GOOD
- AVERAGE
- UNACCEPTABLE
Quality Model of ISO9126
Relationship model metrics/attributes

Measures of actual usage → Quality in use

External measures of software

Internal measures of software

External attributes of computer system

Internal attributes of software

measures
indirectly measure
indicate
measures
indirectly measure
indicate
measures
Definitions

• *internal measure*: A measure derived from the product itself. It is not derived from measures of the behavior of the system of which it is a part.

• *external measure*: A measure of a product derived from measures of the behavior of the system of which it is a part.
Characteristics of ISO9126

MAINTAINABILITY
Effort and activities associated with the identification of the causes of failure and the ease of identifying components that should be modified

FUNCTIONALITY
Suitability, interoperability, accuracy, security and completeness of the functionality that satisfies the expressed and implied needs of the customer

USABILITY
Effort required to learn, operate, understand a software and its interfaces and the ease of use by its users

RELIABILITY
Characteristics describing the ratio between the level of service of a software and the associated resource consumption, in set conditions.

EFFICIENCY
Ratio between the level of service of the software and the amount of resources consumed to sustain stated response time.

PORTABILITY
Adaptability and ease of installing a software on a different platform, operating system and compiler.
Where does it apply

ISO/IEC SC7 Standards for Software Product Quality Measurement and Evaluation

Product Definition. (including Software Product Quality) Requirements

Product Development

Product in Use

Applicability of ISO/IEC 2003 standards

ETS Montréal
It is also mapped with ISO14598
WG6 Survey of users of ISO9126

• 2001-2002
• Feedback from practitioners & academia
• 60 companies from 12 countries
• Completeness issues
• Consistency issues
• Scope of applicability issues
Completeness: Missing mappings

• There is a need for a standard to tackle the software quality requirements specifications
• A need for verification of the quality measures
Consistency: Missing mappings

Also missing mapping with the emerging ISO/IEC 15939 Measurement Model
Applicability: More guidance

- Enhancements to better address quality needs in life-cycle phases
- End-User guidance
- Workflow to support the documentation to guide the users
Next Generation SQuaRE

- Includes a Quality requirements standard;
- 14 documents grouped in 5 Topics:
  - Quality Management
  - Quality Model
  - Quality Measures
  - Quality Requirements
  - Quality Evaluation
SQuaRE : Quality Management

• Guide to SQuaRE – overview of the structure and terminology;
• Planning & Management – to provide guidance for planning & managing software product evaluations.
SQuaRE : Quality Model

• Quality Model and guide – describes the model for internal/external quality and quality in use. Presents the characteristics and subcharacteristics.
SQuaRE : Quality Measures

• Measurement reference model and guide;
• Measurement primitives;
• Measures for internal quality;
• Measures for external quality;
• Measures for quality in use.
SQuaRE : Quality Requirements

• Quality Requirements and Guide – to enable software product quality to be specified in terms of quality requirements all along the life-cycle of a software project or acquisition, maintenance and operation.
SQuaRE : Quality Evaluation

- Quality Evaluation and guide
- Process for Developers
- Process for acquirers
- Process for evaluators
- Documentation for the evaluation module
Hyper–Media Guide to SQuaRE

- **General Guidance**
  - *Learn & Navigate*
  - **Particular Guidance**
    - *Choose*
  - *Quality Engineering*
    - **Execute**

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<th>Requirements Specification</th>
<th>Planning</th>
<th>Measurement</th>
<th>Evaluation</th>
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**PROCESS**

- **TARGET OF PROCESS**
  - *Software Product or User Task*