

COTS Software Quality Evaluation

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Outline

- ❑ What is COTS software and software quality?
- ❑ How we currently evaluate software quality?
- ❑ Standards for software product quality
- ❑ Software quality evaluation
- ❑ Evaluation process for COTS products
- ❑ Summary

What is COTS software?

- ❑ Commercial Off-The-Shelf software package
- ❑ is commercially available
- ❑ is defined by market need
- ❑ has significant functionality and complexity
- ❑ is self-contained

What is software quality?

Quality:

“The totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs.” (ISO/IEC 14598-1:1999)

External quality:

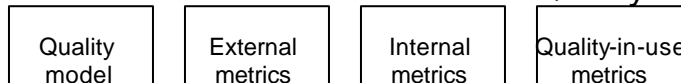
“The extent to which a product satisfies stated and implied needs when used under specific conditions.” (ISO/IEC 9126-1:2001)

How we currently evaluate quality?

- Process assessment
 - ISO 9001:2000, CMM, TickIT
- Product assessment
 - black-box
 - specific characteristic
 - security (ISO/IEC 15408 - Common Criteria)
 - safety (e.g., ISO/IEC 61508)
 - usability (e.g., IBM's standard for GUI)

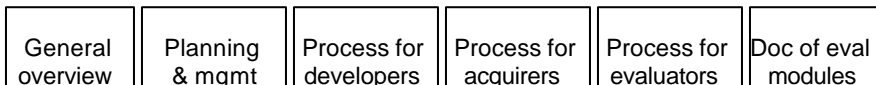
Standards for software product quality

- ISO/IEC 9126 Software Product Quality



- ISO/IEC 12119 Software Packages - Quality Requirements and Testing

- ISO/IEC 14598 Software Product Evaluation



Software quality evaluation

Systematic examination of the software capability to fulfill specified quality requirements.

- Quality model
- Method of evaluation
- Software measurement
- Supporting tools

ISO/IEC 9126 Quality Model

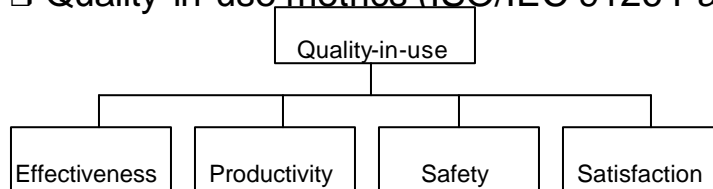
- Internal quality
 - software product during development
- External quality
 - executable software product
- Quality in use
 - user's view on software product when used in a specific environment and context
- Quality measurements
 - measurement of internal, external and quality-in-use attributes (e.g., reliability)

Quality characteristics

Characteristics	Sub-characteristics
Functionality	Suitability, Accuracy Interoperability, Security
Reliability	Maturity, Fault tolerance Recoverability
Usability	Understandability, Learnability Operability, Attractiveness
Efficiency	Time behaviour Resource utilisation
Maintainability	Analysability, Changeability Stability, Testability
Portability	Adaptability, Installability Co-existence, Replaceability

Relevant standards for COTS products

- External metrics (ISO/IEC 9126 Part 2)
- Quality-in-use metrics (ISO/IEC 9126 Part 4)

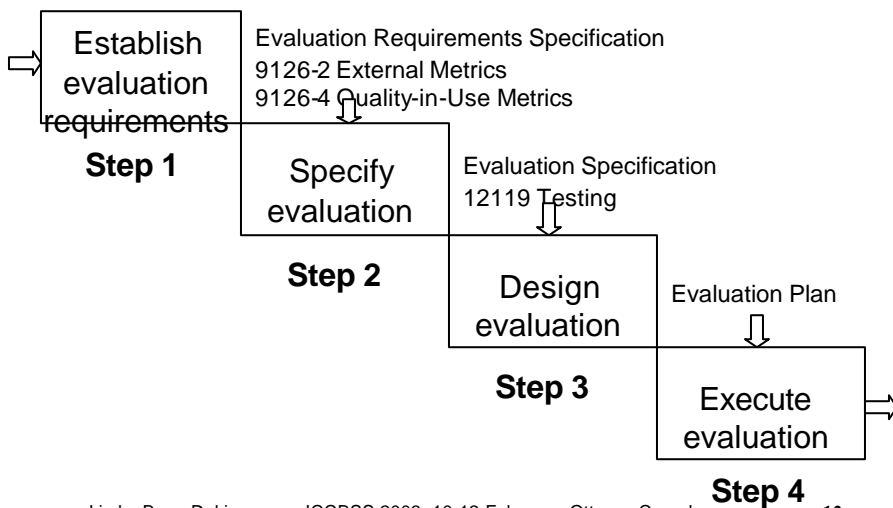


- Testing (ISO/IEC 12119)
 - instructions for product testing
 - test prerequisites, testing activities, test records, test report

Example: MicroScope

- DELTA's software product evaluation scheme
- based on ISO/IEC 9126 quality model and ISO/IEC 14598-5 evaluation procedure
- 6 quality characteristics evaluated
- 12 evaluation modules with 1800 questions
- safety-critical applications
 - offshore systems, fire alarms, medical systems

Evaluation process for COTS products



COTS product evaluation: inputs

Step 1

- System/software requirements
- Software quality characteristics (9126-1)

Step 2

- Evaluation Requirements Specification
- External metrics (9126-2), Quality-in-use metrics (9126-4)

Step 3

- Evaluation Specification
- Testing (12119)

Step 4

- Evaluation plan

COTS product evaluation: outputs

Step 1: Evaluation Requirements Specification

- users, software quality requirements, supplier services

Step 2: Evaluation Specification

- selected product characteristics and metrics
- evaluation methods used

Step 3: Evaluation Plan

- access to the supplier's information, required schedule, resources, decision points, tools, costs

Step 4: Evaluation Records and Results

Summary

- ❑ The framework for evaluation of COTS software packages already exists
- ❑ Standards for quality of software products currently not sufficiently utilised in practice
- ❑ Evaluation of COTS software products can be done using the process based on the available standards

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