

Software Quality Assurance



Dr. Mark C. Paulk

SE 4367 – Software Testing, Verification, Validation, and Quality Assurance

Quality Assurance

All the planned and systematic activities implemented within the quality system, and demonstrated as needed, to provide adequate confidence that an entity will fulfill requirements for quality. (ISO 12207)

Note 1 - There are both internal and external purposes for quality assurance: a) Internal quality assurance: within an organization, quality assurance provides confidence to management; b) External quality assurance: in contractual situations, quality assurance provides confidence to the customer or others.

Note 2 - Some quality control and quality assurance actions are interrelated.

Note 3 - Unless requirements for quality fully reflect the needs of the user, quality assurance may not provide adequate confidence.

Software CMM v1.1

Software Quality Assurance

The purpose of Software Quality Assurance is to provide management with appropriate visibility into the process being used by the software project and of the products being built.

Goals

- **Software quality assurance activities are planned.**
- **Adherence of software products and activities to the applicable standards, procedures, and requirements is verified objectively.**
- **Affected groups and individuals are informed of software quality assurance activities and results.**
- **Noncompliance issues that cannot be resolved within the software project are addressed by senior management.**

Process & Product Quality Assurance

Provide staff and management with objective insight into processes and associated work products.

Specific Goals

- 1) Objectively evaluate processes and work products.**
- 2) Provide objective insight.**

Note that product quality assurance, as described in PPQA, is against applicable process descriptions, standards, and procedures. It is not against requirements. Practices in the Verification process area ensure that specified requirements are satisfied.

Product and Process Assurance

High maturity organizations typically have an independent SQA group and embed the SQA function in the process

- **process assurance performed by an independent SQA group**
- **product assurance embedded in process (e.g., a defined role in peer reviews, prerequisite for baselining)**

R. Craig, “Software Quality Assurance in a CMM Level 5 Organization,” Crosstalk: The Journal of Defense Software Engineering, May 1999.

Project Quality Management

Includes the processes required to ensure that the project will satisfy the needs for which it was undertaken.

- PMBOK Guide 2000

- **quality planning**
- **quality assurance**
- **quality control**

Quality – the totality of characteristics of an entity that bear on its ability to satisfy stated or implied needs.

Grade – a category or rank given to entities having the same functional use but different technical characteristics.

Good enough software???

QA vs QC

A common misconception is that quality assurance and testing are equivalent.

In fact, testing is one of the tools of quality control, because the aim of testing is the detection and quantification of errors, which then results in defect reports.

- By assessing information from defect reports (as part of QA), EIT can determine whether it is meeting its quality objectives.**

Enterprise IT Body of Knowledge Wiki

Quality Control → developers; Quality Assurance → objective check

Resolving a Nonconformance

There are three possible ways for resolving a nonconformance issue

- **make the product or process satisfy the standard, procedure, or requirement**
- **change the standard or procedure to make it usable (correct)**
- **make an executive decision not to satisfy the standard, procedure, or requirement**
 - **grant a waiver**

Summary – Things to Remember

QA is not testing (even if frequently implemented that way)

process assurance vs product assurance

3 different ways to resolve a nonconformance

Questions and Answers

