

Benghazi University
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Software Quality

Part7 (Quality Standards)

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Quality standards

- Standards are the key to effective quality management
- They may be international, national, organizational or project standards
- **Product standards** define characteristics that all components should exhibit e.g. a common programming style
- **Process standards** define how the software process should be enacted

Importance of standards

- Encapsulation of best practice - avoids repetition of past mistakes
- Framework for quality assurance process – it involves checking standard compliance
- Provide continuity - new staff can understand the organisation by understanding the standards applied

Well known quality standards

- ISO 9000 (International Standards Organization)
 - Standards evolve and improve over time.
- CMM (Capability Maturity Model)
 - Developed by the SEI.

ISO 9000 standards

- International set of standards for quality management (ISO 9000:2000, ISO 9001:2000, ISO 9004:2000, etc.)
- Applicable to a range of organisations from manufacturing to service industries
- ISO 9001:2000 specifies requirements for a quality management system for any organization that needs to demonstrate its ability to consistently provide **product** that meets customer and applicable regulatory requirements and aims to enhance customer satisfaction, in all business sectors
 - ISO 9001 is a generic model that must be instantiated for each organisation
- ISO 9004:2000 provides guidance for continual improvement of a quality management system to benefit all parties (employees, owners, suppliers, society in general,...) through sustained customer satisfaction. It should be used to extend the benefits obtained from ISO 9001:2000 to all parties that are interested in or affected by the business operations.

ISO 9000 certification

- Quality standards and procedures should be documented in an organisational **quality manual**
- External body may certify that an organisation's quality manual conforms to ISO 9000 standards (namely ISO 9001)
- Customers are, increasingly, demanding that suppliers are ISO 9000 certified

ISO 9000 certification

- ISO 9000 standards are documentation based:
 - Every aspect of every step of every process must be backed up with formal document in a precisely defined format keeping records of how processes are applied.
- Standards are complex, detailed and stringent.
- ISO 9000-3 specifies 20 elements to be assessed.
- Most companies (60-70%) fail the ISO audit the first time.
- Most companies are deficient in corrective actions and document control.
- Companies take steps to meet the standards in these areas and get certified the second try.

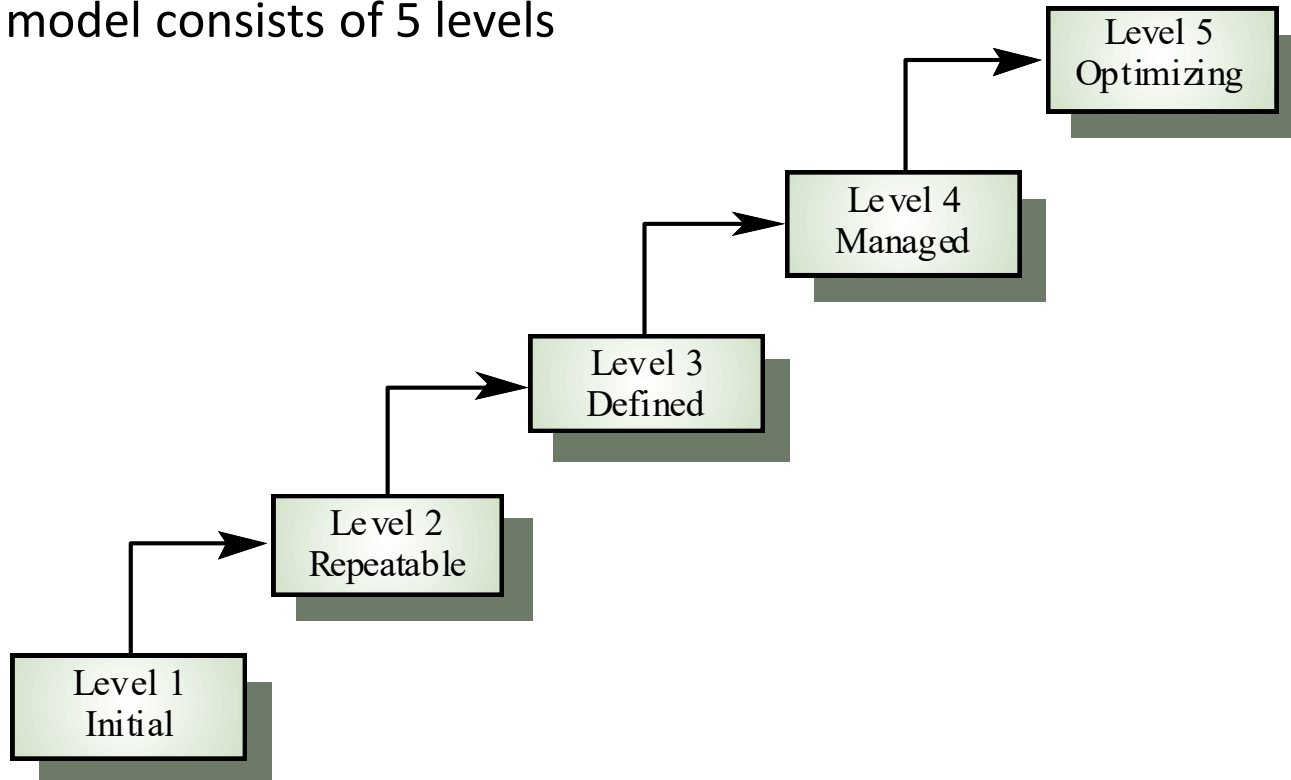
ISO 9000 and quality management

- An organization that have SQA tasks in place and a quality management process would have most of ISO elements
- Ideally quality management should be separate from project management
- This is to ensure quality considerations are not compromised by concerns of budget and schedule

CMM standard

Is a model for

- judging the maturity of the software processes of an organization.
- identifying the key practices that are required to increase the maturity of these processes.
- Assessment uses an 85 items questionnaire.
- The model consists of 5 levels



CMM levels

- **1) Initial.** The software process is characterized as ad hoc, and occasionally even chaotic. Few processes are defined, and success depends on individual effort and heroics.
- **2) Repeatable.** Basic project management processes are established to track cost, schedule, and functionality. The necessary process discipline is in place to repeat earlier successes on projects with similar applications.
- **3) Defined.** The software process for both management and engineering activities are documented, standardized, and integrated into a standard software process for the organization. All projects use an approved, tailored version of the organization's standard software process for developing and maintaining software.
- **4) Managed.** Detailed measures of the software process and product quality are collected. Both the software process and products are quantitatively understood and controlled.
- **5) Optimizing.** Continuous process improvement is enabled by quantitative feedback from the process and from piloting innovative ideas and technologies.

CMM & ISO 9000

- There is a clear correlation between the key processes in the CMM and the quality management processes in ISO 9000
- The CMM is more detailed and prescriptive and includes a more detailed framework for improvement
- Organisations rated as level 2 in the CMM are likely to be ISO 9000 compliant