

Process Improvement

1 Approaches to improvement

The process maturity approach:

- Focuses on improving processes and project management and introducing good software engineering practice
- The level of process maturity reflects the extent to which good technical and management practice has been adopted in organizational software development processes

The agile approach:

- Focuses on iterative development and the reduction of overheads in the software process
- The primary characteristics of agile methods are rapid delivery of functionality and responsiveness to changing customer requirements

2 Factors affecting software product quality

- People quality
- Process quality
- Cost, time and schedule
- Developmental technology

3 Process improvement stages

Process measurement:

- Attributes of the current process are measured. These are a baseline for assessing improvements. Wherever possible, quantitative process data should be collected

Process analysis:

- The current process is assessed and bottlenecks and weaknesses are identified

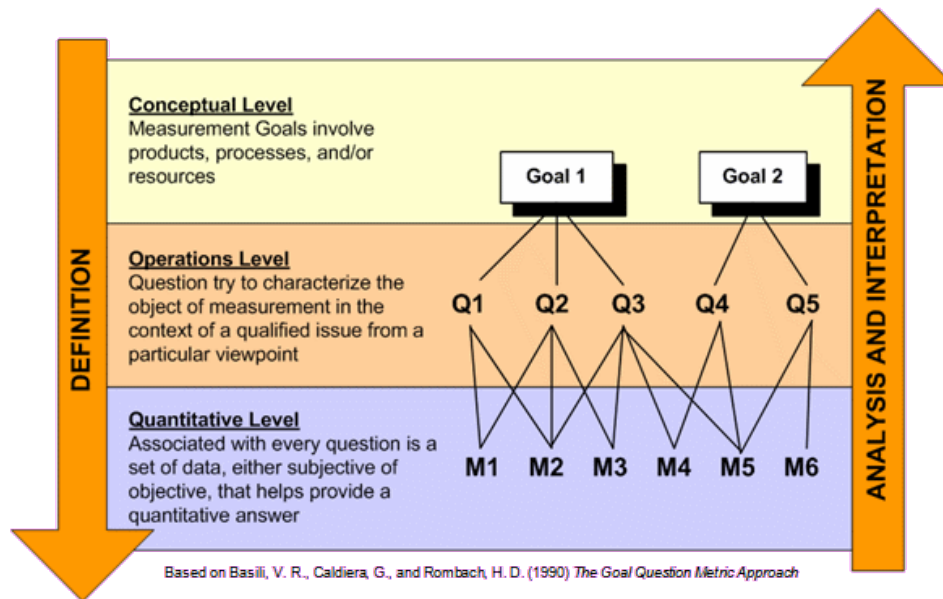
Process change:

- Changes to the process that have been identified during the analysis are introduced

4 Process measurement

This is done by the Goal Question Metric (GQM) paradigm

1. Why are we introducing process improvement
2. What info do we collect to help ID and assess improvement
3. What process and product measures will provide this information



5 Process change

Involves making modifications to existing processes

This may involve:

- Introducing new practices, methods or processes
- Changing the ordering of process activities
- Introducing or removing deliverables
- Introducing new roles or responsibilities

Change should be driven by measurable goals

6 Process capability assessment

Intended as a means to assess the extent to which an organisation's processes follow best practice

Processes are assigned a capability assessment level of 1-5 with 5 being the highest:

- Each level has an associated set of process areas and generic goals
- Lower levels achieved by using good practice whilst higher levels require a commitment to process measurement and improvement

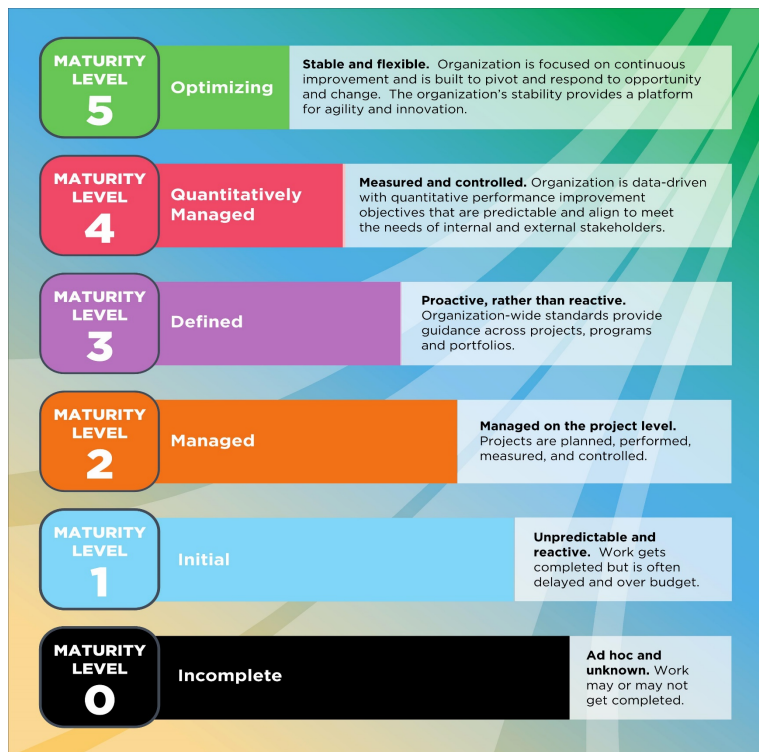
By providing a means for assessment, it is possible to identify areas of weakness for process improvement

There have been various process assessment and improvement models but the SEI work has been the most influential

7 CMMI

Definition: CMMI

Capability Maturity Model Integration, a framework made by the SEI for assessing the capabilities of software contractors



7.1 Level 1 - Initial

Describes a software development process that is ad hoc or even chaotic

It is difficult even to write down or depict the overall process

No key process areas at this level

Example questions to be at level 1:

- Is a mechanism used for controlling changes to the software requirements
- Does the software quality assurance function have a management reporting channel separate from the software development project management
- Is there a software configuration control function for each project that involves software development
- Is a formal process used in the management review of each software development prior to making contractual commitments
- Is a formal procedure used to make estimates of software size

7.2 Level 2 - Managed

Identifying the inputs and outputs of the process, the constraints and the resources used to produce final product

Requirements are managed and processes are planned, performed, monitored and controlled for individual projects

Is a level of discipline to stick to these processes

7.3 Level 3 - Defined

Management and engineering activities are documented, standardized and integrated into each other

7.4 Level 4 - Quantitatively managed

Definition: Quantitatively managed

Process directs its effort at product quality

Processes are measured by collecting detailed data on the process and their quality. Statistical and other quantitative techniques used and therefore quantitatively predictable.

These measures are used to support fact based decision making in the future

Quality and process performance is understood in statistical terms and is managed throughout the life of the process

7.5 Level 5 - Optimised

Quantitative feedback is incorporated in the process to produce continuous process improvement.

Focused on continually improving process performance through both incremental and innovative technological improvements

8 Immature vs Mature organisation

Characteristics of an immature organisation:

- Process improvised during project
- Approved processes being ignored
- Reactive, not proactive
- Unrealistic budget and schedule
- Quality sacrificed for schedule
- No objective measure of quality

Characteristics of a mature organisation:

- Inter group communication and coordination
- Work accomplished according to plan
- Practices consistent with processes
- Processes updated as necessary
- Well defined roles/responsibilities
- Management formally commits

9 MMMs

Management Maturity Model - CMMI is the de facto standard in software engineering

Others:

- ITSM/ITIL
- Agile
- DevOps
- MDM (Master Data Model)