Capability Maturity Model Integration

BACKGROUND

From *Capability Maturity Model for Software, Version 1.1*:

In November 1986, the Software Engineering Institute (SEI), with assistance from the Mitre Corporation, began developing a process maturity framework that would help organizations improve their software process. This effort was initiated in response to a request to provide the federal government with a method for assessing the capability of its software contractors.

The SEI released a brief description of the process maturity framework in September 1987, and Watts Humphrey provided a detailed description of the framework in *Managing the Software Process*.

The SEI then evolved the software process maturity framework into Version 1.0 of the Capability Maturity Model for Software in 1991; Version 1.1 of the CMM followed in 1993. After 1991, CMMs were developed for a number of other disciplines.


OVERVIEW

The software process maturity framework, the CMM, and the CMMI all assess the process maturity of a particular organization at one of 5 different levels, though the terminology for each of those levels has changed slightly. The 5 CMMI levels are:

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Software development organizations typically start at the Initial level (when they’re formed) and can move up through the maturity levels as their development processes mature.

LEVEL DESCRIPTIONS

Borrowing heavily from the CMMI, Version 1.1, the different maturity levels can be characterized as follows:
Maturity Level 1: Initial
Processes are usually ad hoc and chaotic. Maturity level 1 organizations are characterized by a tendency to over commit, abandon processes in time of crisis, and not be able to repeat their past successes.

Maturity Level 2: Managed
At this level, requirements are managed and processes are planned, performed, measured, and controlled. The status of the work products and the delivery of services are visible to management at defined points (for example, at major milestones and at the completion of major tasks).

Maturity Level 3: Defined
At this level, processes are well characterized and understood, and are described in standards, procedures, tools, and methods. Projects establish their defined processes by tailoring the organization’s set of standard processes according to tailoring guidelines. Processes performed across the organization are consistent except for the differences allowed by the tailoring guidelines.

Maturity Level 4: Quantitatively Managed
Quantitative objectives for quality and process performance are established and used as criteria in managing processes. Quality and process performance are understood in statistical terms and are managed throughout the life of the processes. At maturity level 4, the performance of processes is controlled using statistical and other quantitative techniques, and is quantitatively predictable.

Maturity Level 5: Optimizing
Processes are continually improved based on a quantitative understanding of the common causes of variation inherent in processes. Maturity level 5 focuses on continually improving process performance through both incremental and innovative technological improvements. The effects of deployed process improvements are measured and evaluated against quantitative process-improvement objectives.

PROCESS AREAS

Each of the maturity levels above maturity level 1 have Process Areas that contain goals and objectives that must be achieved for an organization to be at that level. Higher levels, by definition, achieve the goals and objectives of the process areas for the lower maturity levels as well as their own process area goals and objectives. The Process Areas for each of the maturity levels are as follows:

Maturity Level 2: Managed
• Requirements Management
• Project Planning
• Project Monitoring and Control
• Supplier Agreement Management
• Measurement and Analysis
• Process and Product Quality Assurance
• Configuration Management
Maturity Level 3: Defined
- Requirements Development
- Technical Solution
- Product Integration
- Verification
- Validation
- Organizational Process Focus
- Organizational Process Definition
- Organizational Training
- Integrated Project Management for IPPD
- Risk Management
- Integrated Teaming
- Integrated Supplier Management
- Decision Analysis and Resolution
- Organizational Environment for Integration

Maturity Level 4: Quantitatively Managed
- Organizational Process Performance
- Quantitative Project Management

Maturity Level 5: Optimizing
- Organizational Innovation and Deployment
- Causal Analysis and Resolution

REFERENCES

