The Capability Maturity Model: A Summary

Continuous process improvement is based on many small, evolutionary steps rather than revolutionary innovations. The Capability Maturity Model® (CMM®) provides a framework for organizing these evolutionary steps into five maturity levels that lay successive foundations for continuous process improvement. These five maturity levels define an ordinal scale for measuring the maturity of an organization's software process and for evaluating its software process capability. They also help an organization prioritize its improvement efforts.

A *maturity level* is a well-defined evolutionary plateau toward achieving a mature software process. Each maturity level comprises a set of process goals that, when satisfied, stabilize an important component of the process. Achieving each level of maturity framework establishes a different component in the software process, resulting in an increase in the process capability of the organization.

Organizing the CMM into the five levels shown in Figure 1 prioritizes improvement actions for increasing software process maturity. … The five levels can be briefly described as

Level	Focus	Key Process Areas
1 Initial	Heroics	
2 Repeatable	Project Management	Software Project Planning Software Project Planning and Oversight Software Subcontract Management Software Quality Assurance Software Configuration Management Requirements Management
3 Defined	Engineering Process	Organization Process Focus Organization Process Definition Peer Reviews Training Program Intergroup Coordination Software Product Engineering Integrated Software Management
4 Managed	Product and Process Quality	Software Quality Management Quantitative Process Management
5 Optimizing	Continuous Improvement	Process Change Management Technology Change Management Defect Prevention

Figure 1. *The five levels of the CMM and their key process areas.*

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 is 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.

These five levels reflect the fact that the CMM is a model for improving the capability of software organizations. The priorities in the CMM, as expressed by these levels, are not directed at individual projects. A troubled project might well prioritize its problems differently from the taxonomy given by the CMM. Its solutions might be of limited value to the rest of the organization, because other projects might have different problems or be unable to take advantage of its solutions because they lack the necessary foundation to implement the solutions. The CMM focuses on processes that are of value across the organization.

Extracted from Paulk, Mark C., et al., The Capability Maturity Model: Guidelines for Improving the Software Process, *Version 1.1, Addison-Wesley, Reading, Mass., pp. 15-17.*

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