✔ Capability Maturity Model

Capability maturity model is the outcome of decades of research and study of successful and unsuccessful projects. The major philosophy of CMM is very similar to life itself. When a child is born it is at a very 'initial' level of maturity. The child grows up, learns and attains a higher level of maturity. This keeps on going until he/she becomes a fully mature adult, and even after that the learning goes on. According to CMM, a software company also goes through similar maturity evolutions.

The Software Engineering Institute (SEI) capability maturity model was proposed by the software engineering institute of Carnegic Mellon University, USA. The SEI CMM model was originally developed to

assits the US department of defence in acquisition of software. The SEI CMM model helped organizations to improve quality of their software and therefore adoption of the SEI CMM model has significant business benefits. After some time many commercial organizations began to adopt CMM as a framework for their aim-internal improvement initiatives.

Following are the main points for process improvement :

(1) The need to have a good and repeatable process if high-quality software products are to be developed. However, product quality is not just affected by the quality of the development process, the people involved, tools used and the development schedule are all significant.

(2) Most organizations can improve their software process, but process improvement takes a long time to have a real effects.

(3) If training is not a critical budget item, process improvements are unlikely to succeed.

(4) SEI's capability maturity model has been immensely influential in making the software engineering community think about process improvement. The model has a project management focus. So, it is most applicable to larger projects undertaken by large organizations.

(5) A great deal of software is developed in small projects by small companies and the CMM is not directly applicable to this type of work. CMM is a framework that describes an evolutionary improvement path for software organizations.

The capability maturity model (CMM) for software developed by the SEI is a framework that describes the key elements of an effective process. CMM has influenced the software engineering community to take process improvement seriously. CMM describes an evolutionary improvement path for software organizations from an adhoc immature process, to a mature disciplined one.

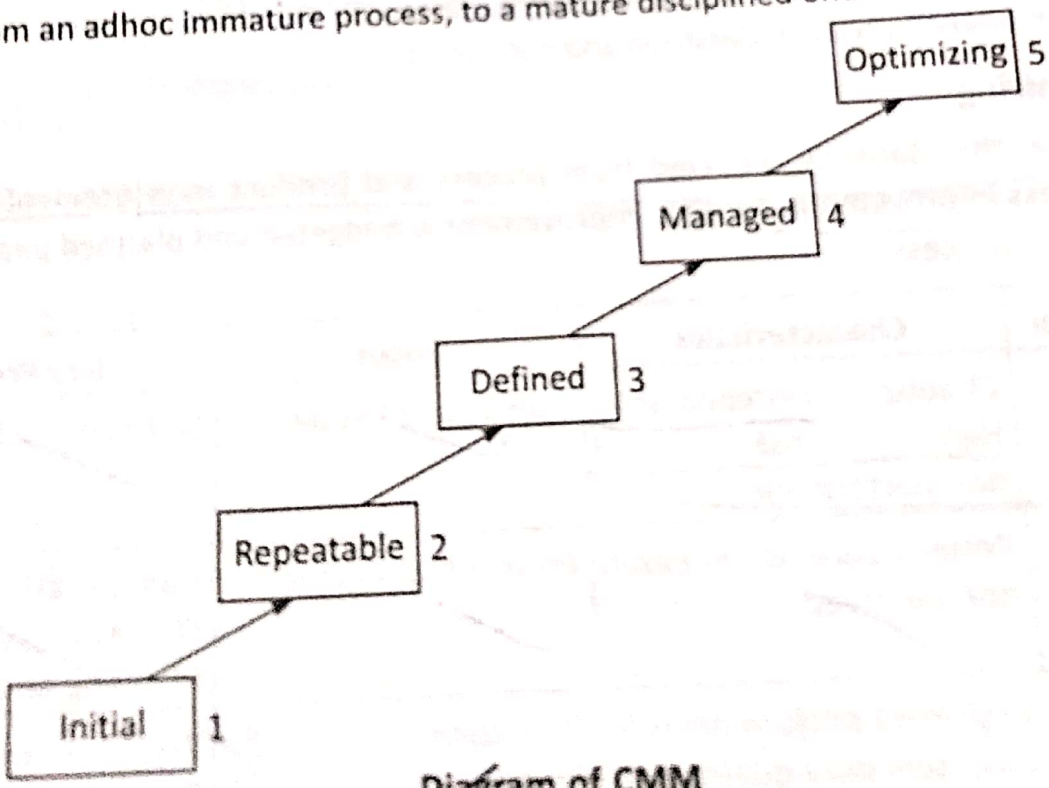

Diagram of CMM

Process of CMM

Level 1 : Initial

A software development organization at this level is characterized by action activities and very few production processes are defined. Since software production processes are not defined, engineers follow their own processes and as a result development effort become chaotic. The success of projects depends on individual efforts. All activities are 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.

Level 2 : Repeatable

At this level, the project management practices such as tracking cost, schedule and functionality are established. Size and cost estimation techiques like function point analysis, COCOMO etc. are used. The necessary process discipline is in place to repeat earlier successes on projects with similar applications. Detailed measures of the software process and product quality are collected. Both the software process and products are quantitatively understood and controlled.

Level 3 : Defined

At this level, the process for both management and development activities are defined and documented. All activities are standardized and integrated into a standard software process for the organization. All projects are using an approved tailored version of the organization's standard. Software process for developing and maintaing software.

Level 4 : Managed

At this level the quality of the software process and product are measured and then recorded. Detailed measures of the software process and produce quality are collected. Both the software process and products are quantitatively understood and controlled.

Level 5 : Optimizing

At this stage, the statistics collected from process and product measurements are analysed for continuous process improvement. Process improvement is budgeted and planned and is an integral part of the organization process.

	CMM Level	Characteristics	Focus	Key Process Areas
1.	Initial	Chaotic, Unrepeatable, High risk of non-performance	Competent People	Not applicable
2.	Repeatable	Performance is repeated not improved.	Project Management	Configuration Management, Quality assurance, Project Planning and Tracking
3.	Defined	Improved performance in cost, schedule quality and risk management.	Definition of Processes	Peer reviews, Inter-group Co-ordination, Training program, Integrated Software Management