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Research Article

CMMI- ITS NEED IN THE INDUSTRY

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ABSTRACT

Capability Maturity Model Integration is a basic framework designed for collaborative efforts to provide the best practice for the managing, measuring and monitoring the various software development processes. The requirement to build the CMM Integration is to get the product improved and in order to do so, the process of development to be improved. By improving the various processes during the development of the product, the emphasis will be to reduce the redundancy in the code during the development, the complexity in the development process during the design and the development phase and to see the overall reduction in the development cost. This paper gives the brief overview of the industry requirements and its need to have CMMI, its specification and the various levels.

INTRODUCTION

CMMI is the successor to CMM (Capability Maturity Model). Both CMM and CMMI were developed at the Software Engineering Institute (SEI) at Carnegie Mellon University in Pittsburgh, Pa. CMM was developed in the late 1980s, and retired a decade later when CMMI was developed. CMMI v1.02 was released in 2000.[1]

CMM was developed as a result of a study financed by the U.S. Air Force as a way to objectively evaluate the work of software subcontractors. The Department of Defense concerned over escalating software development costs and issues with quality, established the SEI in the early 1980s, and work on the CMM began in 1988.

The Cmmi Model [4]

- The generic process framework gives significance emphasis on “process maturity”.
- The Software Engineering Institute (SEI) has developed predictive set of capabilities that should be present as organization s reaches different levels of process maturity.
- The grading scheme determines compliance with a capability maturity model (CMM) that defines key activities required at different levels of process maturity.

The five levels of CMMI are described below

Level 1 Initial. The software process is characterized as ad hoc and occasionally even chaotic. Few processes are defined, and success depends on individual effort.

Level 2 Managed. An organization has achieved all the specific and generic goals of the maturity level 2 process areas. In other words, the projects of the organization have ensured that requirements are managed and that processes are planned, performed, measured, and controlled.

Level 3 defined. The software process for both management and engineering activities is documented, standardized, and integrated into an organization wide software process. All projects use a documented and approved version of the organization's process for developing and supporting software. This level includes all characteristics defined for level 2.

Level 4 quantitatively managed. Quantitative objectives for quality and process performance are established and used as criteria in managing processes. Quantitative objectives are based on the needs of the customer, end users, organization, and process implementers. Quality and process performances are understood in statistical terms and are managed throughout the life of the processes.

Level 5 Optimizing. Continuous process improvement is enabled by quantitative feedback from the process and from testing innovative ideas and technologies. This level includes all characteristics defined for level 4

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Table 1 CMMI Levels Details

Level	Focus	Key Process Area	Result
5 Optimizing	Continuous Process Improvement	Organizational Innovation and Deployment Causal Analysis and Resolution	Highest Quality /Lowest Risk
4 Quantitatively Managed	Quantitatively Managed	Organizational Process Performance Quantitative Project Management	Higher Quality /Lower Risk
3 Defined	Process Standardization	Requirements Development Technical Solution Product Integration Verification Validation Organizational Process Focus Organizational Process Definition Organizational Training Integrated Project Mgmt. (with IPPD extras) Risk Management Decision Analysis and Resolution	Medium Quality / Medium Risk
2 Managed	Basic Project Management	Requirements Management Project Planning Project Monitoring and Control Supplier Agreement Management Measurement and Analysis Process and Product Quality Assurance Configuration Management	Low Quality / High Risk
1 Initial	Process is informal and Adhoc		Lowest Quality / Highest Risk

Table 2 Continuous and Staged Representation

Continuous Representation	Staged Representation
Process areas are organized by process area categories. Improvement is measured using capability levels. Capability levels: Measure maturity of a particular process across an organization. Range from 0 through 5.	Process areas are organized by maturity level. Improvement is measured using maturity levels. Maturity levels Measure maturity of a set of processes across an organization Range from 1 through 5.
There are two types of specific practices: base and advanced. All specific practices appear in the continuous representation.	There is only one type of specific practice. The concept of base and advanced practices is not used. All specific practices appear in the staged representation except when a related base-advanced pair of practices appears in the continuous representation, in which case only the advanced practice appears in the staged representation.
Capability levels are used to organize the generic practices. All generic practices are included in each process area.	Common features are used to organize generic practices. Only the level 2 and level 3 generic practices are included.
Equivalent staging allows determination of a maturity level from an organization's achievement profile.	There is no need for an equivalence mechanism back to the continuous representation because each organization can choose what to improve and how much to improve it using the staged representation.

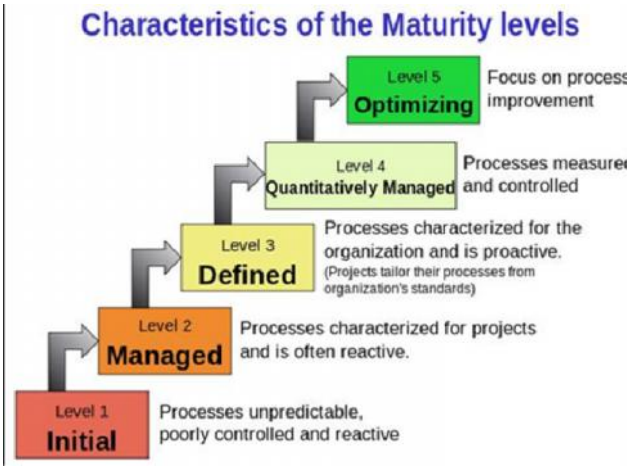
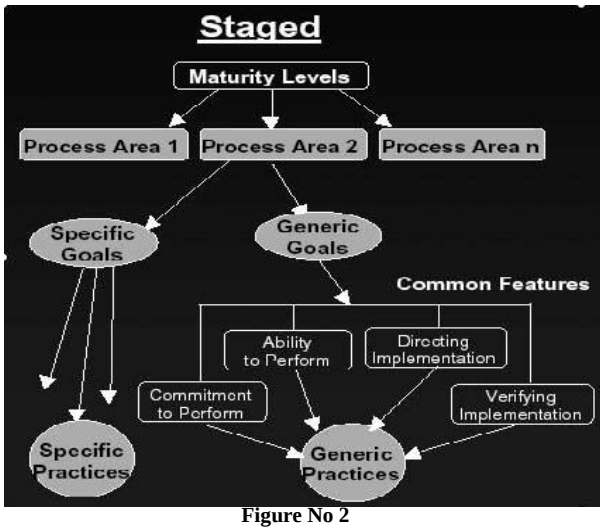


Figure No 1



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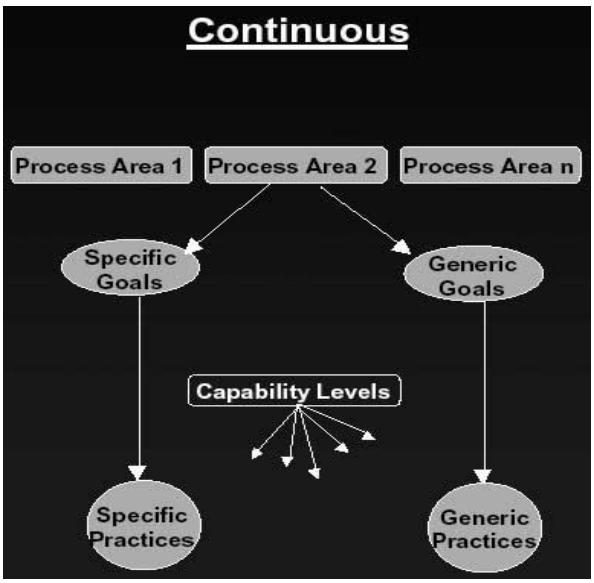

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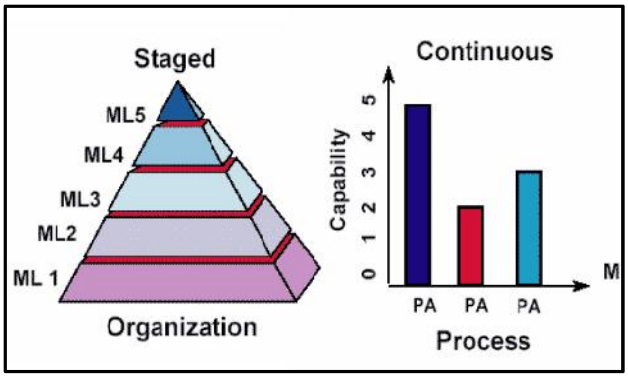

Figure No 4 Graphical Representations

Key Process Area

Key Process Area is described by identifying the following characteristics

Goals the overall objectives that the KPA must achieve

Commitments requirements (imposed on the organization) that must be met to achieve the goals or provide proof of intent to comply with the goals.

Abilities those things that must be in place (organizationally and technically) to enable the organization to meet the commitments.

Activities the specific tasks required to achieve the KPA function.

METHODS FOR MONITORING IMPLEMENTATION

The manner in which the activities are monitored as they are put into place.

Methods for Verifying Implementation—the manner in which proper practice for the KPA can be verified.

CMMI Model Disciplines

CMM Integration is a model that has integrated several disciplines / bodies of knowledge. Currently there are four bodies of knowledge available to you when selecting a CMMI model.

Systems engineering (SE)

Systems engineering covers the development of total systems, which may or may not include software. Systems engineers focus on transforming customer needs, expectations, and constraints into product solutions and supporting these product solutions throughout the entire lifecycle of the product.

Software engineering (SW)

Software engineering covers the development of software systems. Software engineers focus on the application of systematic, disciplined, and quantifiable approaches to the development, operation, and maintenance of software.

Integrated Product and Process Development (IPPD)

Integrated Product and Process Development is a systematic approach that achieves a timely collaboration of relevant stakeholders throughout the life of the product to better satisfy customer needs, expectations, and requirements. The processes to support an IPPD approach are integrated with the other processes in the organization.

Supplier Sourcing (SS)

As work efforts become more complex, project managers may use suppliers to perform functions or add modifications to products that are specifically needed by the project. When those activities are critical, the project benefits from enhanced source analysis and from monitoring supplier activities before product delivery. Under these circumstances, the supplier sourcing discipline covers the acquisition of products from suppliers.

Cmmi Discipline Selection

Selecting a disciplines may be a difficult step and depends on what an organization wants to improve. If you are improving your systems engineering processes, like Configuration Management, Measurement and Analysis, Organizational Process Focus, Project Monitoring and Control, Process and Product Quality Assurance, Risk Management, Supplier Agreement Management etc. then you should select Systems engineering (SE) discipline. The discipline amplifications for systems engineering receive special emphasis.
A representation allows an organization to pursue different improvement objectives. An organization can go for one of the following two improvement paths:

STAGED REPRESENTATION

The staged representation is the approach used in the Software CMM. It is an approach that uses predefined sets of process areas to define an improvement path for an organization. This improvement path is described by a model component called a Maturity Level. A maturity level is a well-defined evolutionary plateau toward achieving improved organizational processes.

- Provides a proven sequence of improvements, each serving as a foundation for the next.
- Permits comparisons across and among organizations by the use of maturity levels.

- ❖ Provides an easy migration from the SW-CMM to CMMI.
- ❖ Provides a single rating that summarizes appraisal results and allows comparisons among organizations.
- ❖ Thus Staged Representation provides a pre-defined roadmap for organizational improvement based on proven grouping and ordering of processes and associated organizational relationships.

CMMI Staged Structure

Following picture illustrate CMMI Staged Model Structure. Following picture illustrate CMMI Continuous Model Structure. Process improvement efforts generally require the following individuals and groups:

PI Sponsor: The person from the organization responsible for over-seeing the entire PI effort. This person generally has the power to allocate funds and personnel. This person is usually at the directorate level or above.

PI Champion: This is the public relations person for the PI effort. This person may or may not also serve as the EPG Lead. This person markets the idea, approach, and results of PI.

Engineering Process Group (EPG) Lead: This person leads the group that reviews processes. This person assigns tasks to the EPG members, monitors their efforts, and plans the daily duties of the EPG.

EPG Members: These individuals serve on the EPG as committee members. They are responsible for ensuring that process improvement documentation is written and followed. They are also responsible for generating metrics to track the process improvement process. They lead the pats.

CONCLUSION

The model of CMMI should be used and is the necessity as the complete guide process for the improvement efforts and to help the organizations in the IT industry to achieve the improvement goals. It can also be used as a process for bench marking the communication between the organizations. It also helps the various upcoming IT organizations to understand the framework and to improve the quality and the capability in performing the practices and to which are the important key process areas to focus the organizational endeavors.

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