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Assignment #5

Report on

Software Engineering Institute CMMI

Instructor–

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Submitted by–

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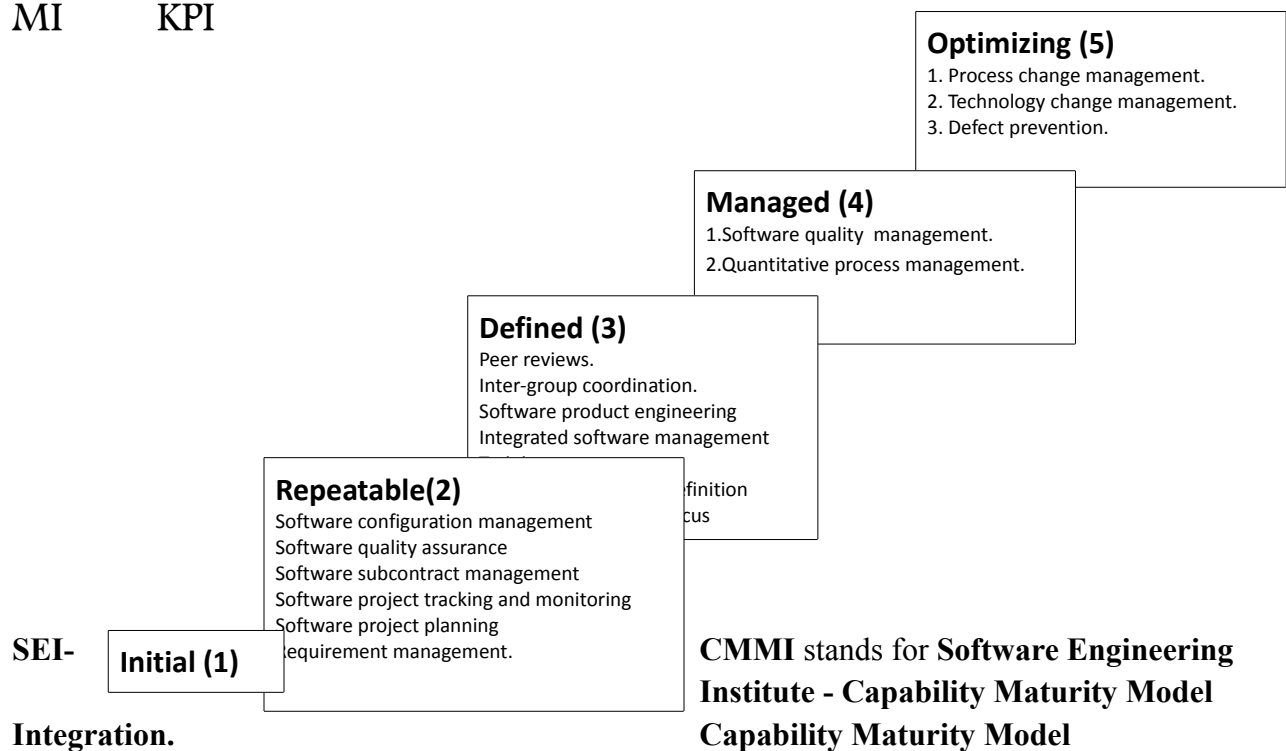
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SEI CMM VS SCI CMMI

SEI-CMM stands for **Software Engineering Institute - Capability Maturity Model**. The term "maturity" relates to the degree of formality and optimization of processes, from ad hoc practices, to formally defined steps, to managed result metrics, to active optimization of the processes. A model that positions a software engineering (SE) organization in one of 5 maturity levels which can be used as an improvement tool by an SE organization and as an evaluation tool in a subcontracting situation. A maturity level is a well-defined evolutionary plateau toward achieving a mature software process.

Each maturity level provides a layer in the foundation for continuous process improvement. It uses the concept of key process areas (KPAs). Each level comprises a set of process goals that, when satisfied, stabilize an important component of the software process. Achieving each level of the maturity framework establishes a different component in the software process, resulting in an increase in the process capability of the organization.

MI KPI

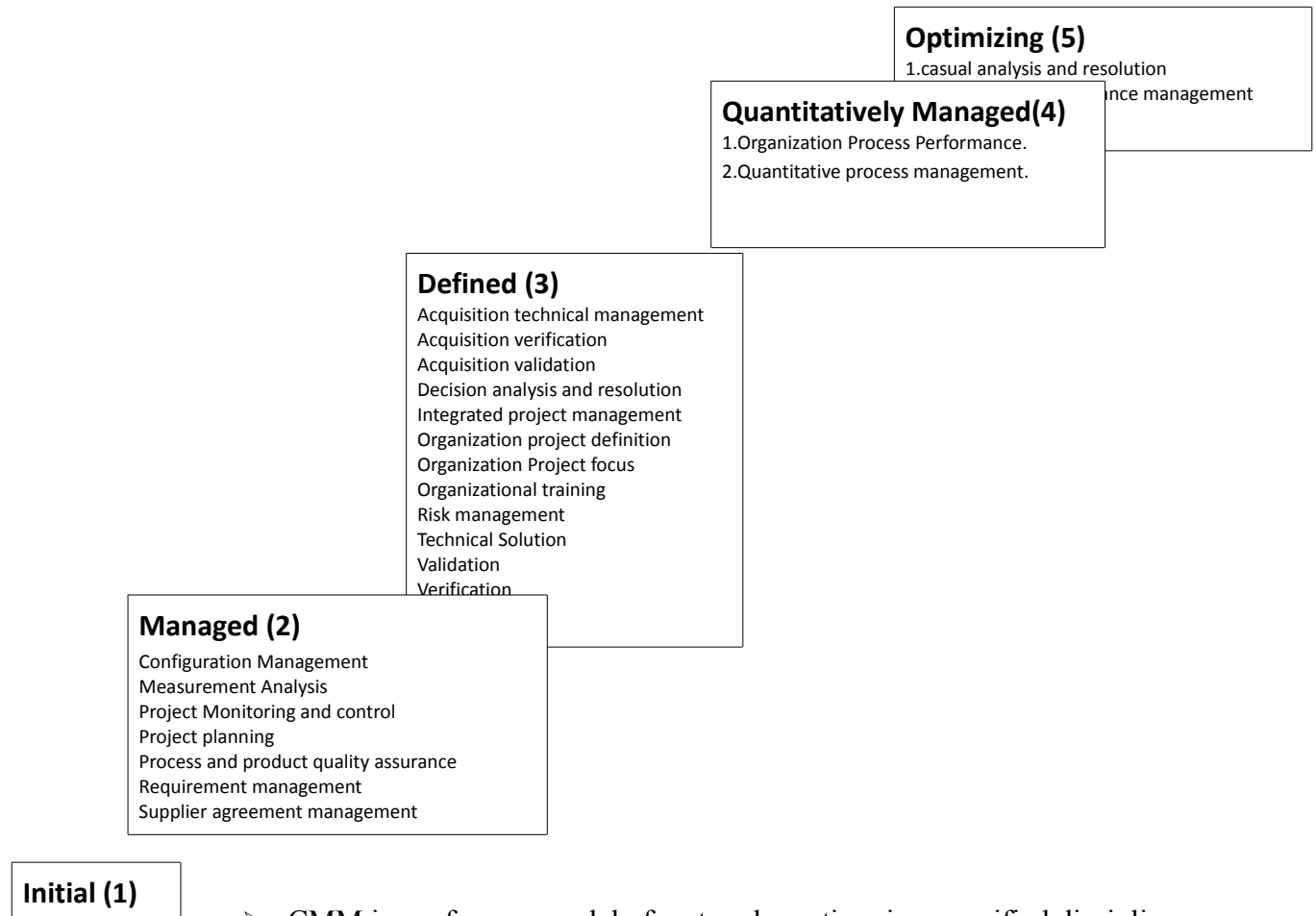


Integration.

Integration (CMMI) is a process improvement approach whose goal is to help organizations improve their performance. CMMI can be used to guide process improvement across a project, a division, or an entire organization. CMMI in software engineering and organizational development is a process improvement approach that provides organizations with the essential elements for effective process improvement. According to the Software Engineering Institute (SEI, 2008), CMMI helps "integrate traditionally separate organizational functions, set

process improvement goals and priorities, provide guidance for quality processes, and provide a point of reference for appraising current processes."

There are five maturity levels. However, maturity level ratings are awarded for levels 2 through 5.



- CMM is a reference model of matured practices in a specified discipline for e.g. Systems Engineering CMM, Software CMM, People CMM, Software Acquisition CMM etc. But they were difficult to integrate as and when needed. So the CMMI evolved as a more matured set of guidelines and was built combining the best components of individual Disciplines of CMM (Software CMM, People CMM etc). It can be applied to product manufacturing, People management, Software development etc.
- The Capability Maturity Model is a baseline of key practices that should be implemented by any entity developing or maintaining a product which is completely or partially software. With the SW-CMM, the emphasis is on the software practices whereas with the CMMI, we can find both software and systems practices. We can imagine that these models would be the outcome of vast consultation of successful projects which would then be documented in a model of what to do to carry out projects with success and to

improve continuously, and recommended to the software and systems engineering community

- CMM measures the maturity level of an organization by determining if an organization completes the specific activities listed in the Key Performance Areas (KPA), oblivious to whether the completion of such activity leads to the desired result. CMMI is also an activity based approach but the major difference between CMM and CMMI is that CMMI takes a more result-oriented approach when defining and measuring Key Performance Areas.
- Comparing CMMI vs CMM, CMM KPA concentrates on the completion of specific tasks or processes and does not motivate the organization to focus on process architecture. [CMMI](#), on the other hand has an iterative lifecycle that integrates the latest best practices from the industry and attacks risks in process architecture at an early stage. CMMI supersede CMM in software development processes, but CMM is still relevant and appropriate for sequential, activity-based management paradigm.
- Both CMM and CMMI give importance to paperwork and meetings that distract management's time and effort from actual work process. CMM is however concerned at recording processes whereas CMMI documentation and meetings focus on strategic goals of the organizations.
- Comparing CMMI vs CMM, CMM has focused attention on processes, but the new CMMI goes a step further and focus attention on result-oriented processes.

SEI CMMI-Assessment

The CMMI Appraisal is an examination of one or more processes by a trained team of professionals using an appraisal reference model as the basis for determining strengths and weaknesses of an organization.

Appraisals require planning. When planning an appraisal of your organization, determine the scope of the organizational unit, which disciplines to include, whether the appraisal team will consist of members internal or external to your organization, projects to be included, individuals to be interviewed, and the type or class of appraisal necessary.

Appraisals consider three categories of model components as defined in the CMMI:

- **Required:** specific and generic goals only.
- **Expected:** specific and generic practices only.
- **Informative:** includes sub practices and typical work products.

The SEI has released two guiding documents for CMMI assessments:

- **Appraisal Requirements for CMMI (ARC):** contains the requirements for three classes of appraisal methods Class A, Class B, and Class C. These requirements are the rules for defining each class of appraisal method.
- **Standard CMMI Appraisal Method for Process Improvement (SCAMPI):** Method Description Document (MDD): currently the only approved Class A appraisal method.

SCAMPI is currently the only approved CMMI Class A Appraisal Method. That is, SCAMPI satisfies all the requirements of an ARC Class A Appraisal Method and has been approved by the SEI.

There are three classes of CMMI Appraisal Methods: Class A, Class B, and Class C.

SCAMPI Class A Appraisal

A SCAMPI A appraisal is typically conducted when an organization has implemented a number of significant process improvements and needs to formally benchmark its process relative to the CMMI. A SCAMPI A is the only appraisal method that provides CMMI Maturity Level or Capability Level ratings.

You can expect following outcomes from a SCAMPI A:

- A Maturity Level rating or Capability Level ratings.
- Findings that describe the strengths and weaknesses of your organization's process relative to the CMMI.
- Consensus regarding the organization's key process issues.
- An appraisal database that the organization can continue to use to monitor process improvement progress and to support future appraisals.

SCAMPI Class B Appraisal

A SCAMPI B is called for when an organization needs to assess its progress towards a target CMMI Maturity Level, but at a lower cost than a SCAMPI A. SCAMPI B appraisals provide detailed findings and indicate the likelihood that the evaluated practices would be rated as satisfactorily implemented in a SCAMPI A appraisal.

A SCAMPI Class B appraisal, one of three SEI appraisal methods, helps an organization understand, with a relatively high degree of confidence, the status of its software and systems engineering process relative to the CMMI. A SCAMPI B is often performed when an organization needs to accurately assess its progress towards a target CMMI Maturity Level.

You can expect following outcomes from a SCAMPI B:

- Detailed findings that describe the strengths and weaknesses of your organization's process relative to the CMMI.
- Practice characterizations indicating the likelihood that the examined practices would satisfy the goals and meet the intent of the CMMI.

- Consensus regarding the organization's key process issues.
- A FIDO database that the organization can continue to use to monitor process improvement progress and to support future appraisals.

SCAMPI Class C Appraisal

SCAMPI C appraisals are shorter and more flexible than SCAMPI A and B appraisals and are conducted to address a variety of special needs, from a quick gap analysis to determining an organization's readiness for a SCAMPI A.

SCAMPI Class C appraisals, the least formal of the SEI's suite of appraisal methods, are highly flexible and can be conducted to address a variety of needs. Typically much shorter in duration than Class A and B appraisals, SCAMPI C appraisals are often performed for reasons such as:

- Provide a quick gap analysis of an organization's process relative to the CMMI.
- Assess the adequacy of a new process before it is implemented.
- Monitor the implementation of a process.
- Determine an organization's readiness for a SCAMPI A.
- Support the selection of a supplier.

You can expect following outcomes from a SCAMPI C:

- Findings that describe the strengths and weaknesses of the assessed processes. Depending on the appraisal scope and strategy, findings may be mapped to the relevant CMMI components.
- Characterizations that summarize the adequacy of the assessed processes vis-?-vis the CMMI.
- Recommended process improvement actions.
- A FIDO database that the organization can continue to use to monitor process improvement progress and to support future appraisals.

Appraisal Class Characteristics

Each class is distinguished by the degree of rigor associated with the application of the method. Class A is the most rigorous. Class B is slightly less rigorous; and Class C is the least rigorous. Following table gives some idea of the expected differences between the methods in each class.

Characteristics	Class A	Class B	Class C
Amount of objective evidence gathered	High	Medium	Low
Rating generated	Yes	No	No
Resource needs	High	Medium	Low
Team size	Large	Medium	Small
Data sources (instruments, interviews, and documents)	Requires all three data sources	Requires only two data sources (one must be	Requires only one data source

		interviews)	
Appraisal team leader requirement	Authorized Lead Appraiser	Authorized Lead Appraiser or person trained and experienced	Person trained and experienced

SEI CMMI-Positioning

Strengths

Advantages of implementing CMMI:

- a. Detailed coverage of the product life cycle than other process-improvement products used alone.
- b. CMMI provides an opportunity to eliminate the stovepipes and barriers that typically exist in different parts of an organization and that typically are not addressed otherwise
- c. CMMI products incorporate lessons learnt that were learnt as a result of many other standard processes. Therefore they inherently, handle some of the common problems faced by other process improvement approaches.
- d. Promotes collaboration between systems and software engineering.
- e. Allows users to choose model representation that best suits them and their objectives.
- f. The implementing challenges are highly influenced by the size of the organization and the extent of institutionalization.
- g. These practices are efficient and flexible. The reason behind it is, the processes have not been hardened over time.
- h. It is more efficient and flexible to communicate information and receiving it.

Weaknesses

- CMMI is not the answer for every organization. Its rigid requirements for documentation and step-by-step progress make it better suited to large organizations than to small.
- Smaller organizations also often lack the resources and knowledge required to initiate CMMI-based process improvement.
- May requires a considerable amount of time and effort to implement and a major shift in organizational culture and attitude.
- The organization's culture can also be adversely impacted by adding to its rigid bureaucracy and reducing creativity and freedom on the part of the developers.
- CMMI models are not themselves processes or even process descriptions

- The actual processes an organization chooses depend on many factors, and the process areas of a CMMI model may simply not map one-to-one with those used in your organization.
- It turns out that the traits CMMI measures are, in practice, difficult to develop, even though they're easy to recognize.
- Most large, commercial developers that sell packaged Software rarely manage their requirements documents as formally as CMMI requires.
 - Because documentation is a requirement for Level 2, all of those companies would, if rated, rank on the maturity scale as Level 1, initial or ad hoc.
 - includes companies such as Apple Computer Inc. and Microsoft Corp