

Experience Report: How to deploy CMMI ML3 for a small to medium size Software Company in Thailand

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Abstract

In this paper describe, How to deploy CMMI ML3 for a small to medium size Software Company in Thailand. The information is gathering from the observation on the working processes from the appraisal team member and company team. The result from the observation, we inform that in order to successfully in implementation of CMMI level 3.

A company should consider and taking into account of our four recommended.

Key Words- CMMI, SCAMPI, Appraisal Requirements for CMMI

1. Introduction

More than 10 years there have been attempts in Thailand to improve software quality by adopting the international software process improvement models. Many software companies try to apply a process maturity and Capability Maturity Model Integration (CMMI) as guidance how to improve products, services and getting a CMMI certification of their process. Major elements involved in CMMI are relevant with high cost and resources required. It is a limitation of small to medium size Software Company to define the software standard in their organizations.

In Thailand, Software Companies are mainly formed by small to medium size companies with 25-250 employees. Less companies, provided that most software development standards and models have been created based on rigorous traditional processes and methodologies, it is necessary to define what new practices these companies need to accomplish in order to be able to get software standard as CMMI certification. The advantage are turned a passion into a produce in term of software profession and can competition with another country.

The SPI@ease Program [1] - is a join program from three organizations as Software Park Thailand, Industrial Technology Assistant Program (ITAP) of Technology Management Center (TMC) and National Science and Technology Development Agency (NSTDA). Its main goal is to motivate small and medium size software companies towards improving and verifying their

development processes. The framework includes practical recommendations for process implementation, in order to facilitate their certification, as well as a tool for process definition.

Throughout this work, we have also shared the experiences and lessons learnt from conducting standard CMMI v1.2 appraisal method for process improvement SCAMPI Class C on a small to medium software company in Thailand on two pilot projects.

The paper is composed as follows: Section 2 presents the Background of IDEALSM model and CMMI; Section 3 Our Case Study contexts, Section 4 Provides insights into the experiences and lessons we have learnt. The last section concludes the paper with the final remarks.

2. Background

In this section are describing a life-cycle model is name IDEALSM model, CMMI and The Appraisal Requirements for CMMI (ARC) V1.2 as following:

2.1 IDEALSM model [2], [3]

IDEALSM model as originally conceived was a life-cycle model for software process improvement based upon the Capability Maturity Model Integration (CMMI) for software process improvement terms.

IDEALSM model, as shown in Figure 1 provides a usable, understandable approach to continuous improvement by outlining the steps necessary to establish a successful improvement program. Following the phases, activities, and principles of the IDEAL model has proven beneficial in many improvement efforts. The model provides a disciplined engineering approach for improvement, focuses on managing the improvement program, and establishes the foundation for a long-term improvement strategy. The model consists of five phases:

1. I - Initiating Laying the groundwork for a successful improvement effort.
2. D - Diagnosing determining where you are relative to where you want to be.
3. E - Establishing planning the specifics of how you will reach your destination.
4. A - Acting doing the work according to the plan.

- L - Learning from the experience and improving your ability to adopt new technologies in the future.

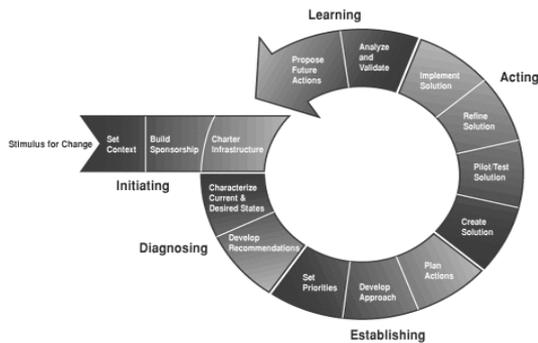


Figure 1: The IDEALSM model

The IDEALSM model as a guidance when the organizations adopt new software engineering tools, processes, and methods. Many improvement efforts, including software process improvement, continuous risk, management, or the introduction of a new development environments are so complex and their effects so far reaching, So require a specialized, systematic approach for managing the technology adoption life cycle.

2.2 CMMI [7]

Capability Maturity Model Integration (CMMISM) is a widely known appraisal approach for determining organizational maturity and process capability. CMMI has four disciplines to choose from: systems engineering (SE), software engineering (SW), integrated product and process development (IPPD) and supplier sourcing (SS). The model itself has two representations: staged and continuous. The staged representation focuses on a set of process areas, which are organized by maturity levels (1-5), while in continuous representation each process area is rated in terms of capability level (0-5).

On CMMI v1.2 was produced from the CMMI framework in August 2006. Three primary groups involved in this development were the Steering Group, Product Team, and Configuration Control Board. By CMMI v1.2 model framework consist of development, services, and acquisition.

The process areas have specific and generic goals, the fulfillment of which is appraised through practices. The practices are further categorized as specific and generic. Generic goals and practices apply to multiple process areas, whereas specific goals and practices apply to individual process areas. The specific goals and practices of process areas describe what kind of activities need to

be carried out. Generic goals and practices are aimed at finding out how well the activities are performed.

There are five maturity levels [9], each a layer in the foundation for ongoing process improvement, designated by the numbers 1 through 5: (1). Initial, (2) Managed), (3) Defined, (4) Quantitatively Managed, (5) Optimizing. As shown on Figure 2

Level	Focus	Process Areas
5 Optimizing	<i>Continuous Process Improvement</i>	Organizational Innovation and Deployment Causal Analysis and Resolution
4 Quantitatively Managed	<i>Quantitative Management</i>	Organizational Process Performance Quantitative Project Management
3 Defined	<i>Process Standardization</i>	Requirements Development Technical Solution Product Integration Verification Validation Organizational Process Focus Organizational Process Definition Organizational Training Integrated Project Management (without IPPD) Risk Management Decision Analysis and Resolution
2 Managed	<i>Basic Project Management</i>	Requirements Management Project Planning Project Monitoring and Control Supplier Agreement Management Measurement and Analysis Process and Product Quality Assurance Configuration Management
1 Initial		

Figure 2: CMMI v1.2 – Staged Representation (SW/SE)

The maturity levels 2 through 5 uses the same terms as capability levels 2 through 5.

2.3 The Appraisal Requirements for CMMI® (ARC) V1.2 [8]

The Appraisal Requirements for CMMI (ARC) V1.2 defines the requirements considered essential to appraisal methods intended for use with Capability Maturity Model® Integration (CMMI®) models. In addition, a set of appraisal classes is defined, based on typical applications of appraisal methods. These classes are intended primarily for developers of appraisal methods to use with CMMI capability models in the context of the CMMI Product Suite. Appraisal methods, as used in this document, may be applied for different purposes, including assessments for internal process improvement and capability evaluations for supplier selection and process monitoring. The Appraisal Requirements for CMMI (ARC 1.2) [9] defines three classes of appraisals (Class A, B and C). Class A appraisals are the most comprehensive, but require substantial resources and may be considered very intrusive by the organization being appraised. As the number of Class A appraisals performed so far and hence the available data is quite limited, these will not be addressed any further in this paper. Class B appraisals are less comprehensive and consequently less intrusive, but still require considerable resources. Finally, Class C appraisals are the least comprehensive, but again require fewer resources and are less intrusive. The

comprehensiveness of the appraisals of course influences the reliability and validity of the appraisal results. Table 1 summarizes the main characteristics of the different appraisal classes.

Table 1: Characteristics of CMMI Appraisal Classes

Characteristics	Class A	Class B	Class C
Amount of Objective Evidence Gathered (relative)	High	Medium	Low
Ratings Generated	Yes	No	No
Resource Needs (relative)	High	Medium	Low
Team Size (relative)	Large	Medium	Small
Appraisal Team Leader Requirements	Lead appraiser	Lead appraiser or person trained and experienced	Person trained and experienced
	↓	↓	↓
	SCAMPI-A	SCAMPI-B	SCAMPI-C

The benefit on recognizing the model had great potential outside of the process arena.

3. Our Case Study Contexts

The SPI@ease Program intends to establish the possibility of software companies in Thailand to reach a CMMI certification, the goal in this program to sustain the framework as shown on Figure 3:

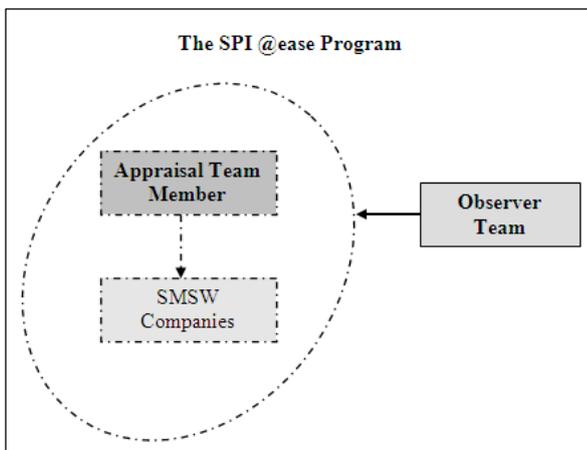


Figure 3: The three participant’s members on the SPI@ease Program

3.1 The The SPI@ease Program Structure

The SPI@ease Program defined a three participant’s members are consist of;

1. Appraisal Team Member is responsible for consulting the software companies to pass a certify CMMI.
2. Small to Medium Software (SMSW) Company as Company undergoing appraisal and apply in

the SPI@ease Program and pass quality to examine 29 beneficiary companies from 100 companies.

3. Observer Team: Team to observe the procedures during work process and tracking the operational of the appraisal team and SMSW to reach CMMI certification.

All three participant’s members must sign contract to join with SPI@ease Program.

3.2 Two pilot process overview

The goal of this company for improving software development processes within company by benchmarking with CMMI Maturity level 3 process area. Then the appraisal team and company selected two pilot projects on appraised projects and must be complete in eighteen months on schedule from the SPI@ease Program Plan.

3.2.1 This Company’s Software Process Improvement(SPI) Plan

A SPI plan for this company on 11 tasks cover eighteen months and specify a % size of work in project in sequence: (Shown on Table 2)

Table 2: SPI Plan

Task Name	% Size of work in Project
1. Process definition and template documentation	35
2. Process management process	5
3. Support process	25
4. Organization policies and R&R refinement	2
5. Software development policies	1.50
6. Coaching on process definition and refinement	5.0
7. Company’s process training	3.5
8. Trail use: pilot project	15.0
9. Process adoption and adjustment	2.0
10. Process deployment	6.0

As present, we on the task sequence no. 7: Company’s process training the 77 approximate on the percent size of work in project.

3.2.2 Step to define SCAMPI in Phase Structure [7]

The three primary phase structures for SCAMPI assessment in two pilot projects for this company on started:

1. Plan and prepare for appraisal, the minimum requirements for conducting planning processes and creating artifacts are specified in this section. This phase consists of the following processes:
 - 1.1. Analyze requirements
 - 1.2. Develop Appraisal plan
 - 1.3. Select and Prepare Team
 - 1.4. Prepare participants & obtain initial objective evidence
 - 1.5. Prepare for collection of objective evidence
2. Conduct the appraisal, the minimum requirements for data collection processes and artifacts are specified in this section.
 - 2.1. Examine Objective Evidence
 - 2.2. Document Objective Evidence
 - 2.3. Verify Objective Evidence
 - 2.4. Validate Preliminary Appraisal Outputs
 - 2.5. Generate Appraisal Results
3. Report the result, the minimum requirements for the process of reporting results and the required artifacts to be produced are specified in this section.
 - 3.1. Deliver Appraisal Results
 - 3.2. Package and Archive appraisal assets

During the Plan and prepare for appraisal Phase the appraisal team is responsible for developing a detailed plan for the Conduct the appraisal and Reporting Phases. This involves scoping the appraisal, identifying the interviewees, deciding on interview questions, solving onsite logistics etc. This phase also includes training the appraisal team. During the Conduct the appraisal Phase, the appraisal team uses a variety of techniques to gather data on the current state of the appraised organization. Techniques typically include questionnaires, document reviews, interviews, and process modeling, and can be conducted both on-site and remotely. The typical scenario is that questionnaires and/or document reviews are conducted prior to going onsite and interviews are then used while on-site to elicit additional information as well as confirming findings from the pre on-site data collection. Finally, during the Report the result Phase, all the collected data is analyzed and aggregated into appraisal findings. Findings are then prioritized and reported back to the organization. Ideally, reporting back to the organization also entails some form of workshop on how to proceed based on the reported findings.

4. Experiences and Lessons Learnt

From our observation and consolidate the discussion from ten observation teams, offered several lessons learnt about how organizations can more successfully in implementation, we will share our four experience and lessons learnt: (1) To get full support and commitment from Top Management, (2) Arrange the process improvement in company, (3) Assign the project team

will be users of the process and (4) Different cultural values for Thai people. In more detail as following:

1. To get full support and commitment from Top Management.

Process improvement requires extra efforts from the company: trainings, changes to the daily work and habits, even relations with customers. All this cannot be achieved without support and understanding from top management. Support is also needed because the first results do not come up very soon. Good communication about the improvement project progress among employees and managers is very crucial. At the same time Process improvement goals must be aligned directly with business goals. This allows getting top management buy in and also narrows focus on the key areas of software process improvement program.

2. Arrange the process improvement in company.

This project like any other should have project plan with identified milestones and risks, it has to be monitored and controlled, there has to be contain dedicated resources assigned for it. One very common failure of the process improvement project is when the other projects get higher priority. Suddenly it may appear that short-term goals to earn money now is more important and risk to freeze or even fail process improvement gets very high. Process improvement can also be started relying on enthusiasm of key people, there might even start an established team of people who sacrifices they spare time for this, but usually enthusiasm disappears faster than first results are achieved. We recommend dedicating at least one full time person (for this company about 30-50 people) for the project. The rest of the team should have clearly defined goals, responsibilities and time has to be allocated.

3. Assign the project team will be users of the process.

People into project team that will be users of the process: managers, project managers, senior developers and testers. Process change project is touching so many daily activities, and it is common to every human to resist, changing. So if the people will define the change by themselves it will minimize the risk of resistance. It is also worth mentioning that the implementation of process improvement model should depend on the culture of the company and improvement program should be defined taking into account likely behavior of project participants and the rest employees.

4. Different cultural values for Thai people.

In Thailand, Software process improvement models are increase cost and schedule due to the fact that each process involves numerous people. This can be explained by the characteristics of people, having numerous Thais working on the same process brings a lot of overhead to the process, seeing that Thais generally value social interaction higher than process compliance. Deadlines are

generally renegotiated and the meetings are often times postponed. In addition to the overhead of time commitment, there is also an overhead of building relationships and avoiding conflicts amongst team members. As stated in [4], Thais will try to maintain surface harmony by keeping the conflict between individuals to minimum. In a culture, Thai workers are expected to be multi-purpose employees. For example, project managers are also responsible for reconciling system requirements, analyzing systems, ensuring quality assurance and programming if there is a time constraint. Furthermore, project managers are assigned to more than one project at a time. Managing many projects and tasks at the same time in culture generally results in incompletely implemented processes and lower quality of end products.

5. Conclusions and Future Work

Going on our project pass 50 percent of project schedule. On the next step is preparing to reach CMMI maturity level 3 on times and can apply to a similar software project according on standard.

In this experience report is a recommendation to pass satisfy on CMMI maturity level 3 and sustainable for the consultant team and interested companies.

As possible the SPI@ease Program must define the detail of an interaction property for all the relevant teams because some information or documents are not opening. It's an obstacle to observer tam.

In the near future, we plan to build some example process assets and plan to completely populate the catalog and use it in academic as well as industrial software environments and take effectiveness to improve software development processes consistently with the SPI@ease Program goals.

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