Setting Up a CMMI Initiative

4

Key Topics

- Continuous Improvement Cycle
- CMMI Improvement Teams
- CMMI Project Plan and Schedule
- CMMI Kick-Off Session
- Process Mapping
- Piloting a New Process
- Deploying a New Process
- CMMI Appraisals

4.1 Introduction

The implementation of the CMMI is a project and as with any project it needs good planning and project management to ensure its success. Once an organization makes a decision to embark on a CMMI initiative, a project manager needs to be appointed to manage the project. The CMMI project manager will treat the implementation as a standard project, and plans are made to implement the CMMI within the approved schedule and budget. The improvement initiative will often consist of several improvement cycles, with each improvement cycle implementing one or more process areas. Small improvement cycles may be employed to implement findings from an appraisal or improvement suggestions from staff.

One of the earliest activities carried out on any improvement initiative is to determine the current maturity of the organization with respect to the CMMI model. This will usually

G. O'Regan, *Introduction to Software Process Improvement*, Undergraduate Topics in Computer Science, DOI 10.1007/978-0-85729-172-1_4,

involve a SCAMPI[1] Class B or C appraisal conducted by one or more experienced appraisers. The findings will indicate the current strengths and weaknesses of the processes as well as gaps with respect to the practices in the CMMI. This initial appraisal is important, as it allows management in the organization to understand its current maturity with respect to the model and to communicate where it wants to be, as well as how it plans to get there. The initial appraisal assists in prioritizing improvements for the first improvement cycle, which is usually to implement the CMMI level 2 process areas. These include

- Project planning and monitoring and control
- Requirements management
- Configuration management
- Process and product quality assurance
- Measurement and Analysis
- Selection and Management of Suppliers

The project manager will then prepare a project plan and schedule. The plan will detail the scope of the initiative, the budget, the process areas to be implemented, the teams and resources required, the initial risks identified, the key milestones, the quality and communication plan, and so on.

The project schedule will detail the deliverables to be produced, the resources required, and the associated timeline for delivery.

4.2 Approach to Continuous Improvement

The need for a process improvement initiative often arises due to the realization that the organization is weak in some areas in software engineering, and that it needs to improve to achieve its business goals more effectively. The starting point of any improvement initiative is an examination of the business needs of the organization, and these may include goals such as delivering high-quality products on time or delivering products faster to the market.

The software process improvement initiative is designed to support the organization in achieving its business goals more effectively. The steps include examining organization needs; conducting an appraisal to determine the current strengths and weaknesses; and analysing the results to formulate an improvement plan. The improvement plan is

[1]There are three types of SCAMPI appraisals (Class A, B, C) which may be carried out in an organization, and they vary in formality and expense. A SCAMPI Class A appraisal has strict requirements and the appraisal team consists of four to nine members. It is conducted when an organization wants its processes rated against the CMMI standard to benchmark itself against other organizations. The appraisal results including the maturity rating are reported back to the SEI. A SCAMPI Class C appraisal is the least formal and costly appraisal type and is generally sufficient at the start of an improvement initiative.

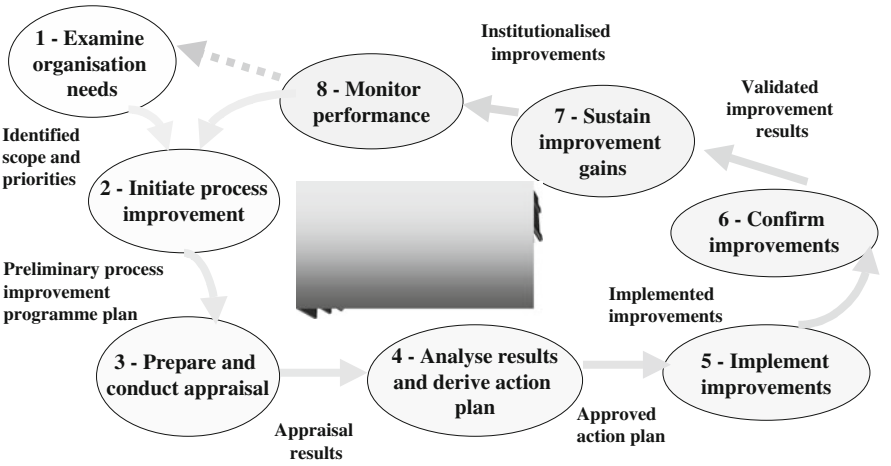


Fig. 4.1 Steps in process improvement

then implemented; the improvements monitored and confirmed as being effective; and the improvement cycle repeat. These steps are described in Fig. 4.1.

There is more than one approach to implement the CMMI. A small organization has fewer resources available, and team members will typically be working part-time. Larger organizations may be able to assign people full-time to the improvement project. The improvement cycle suggested in this book is influenced by the IDEAL model and is described in Fig. 4.2. The following is the approach to improvement suggested in this book:

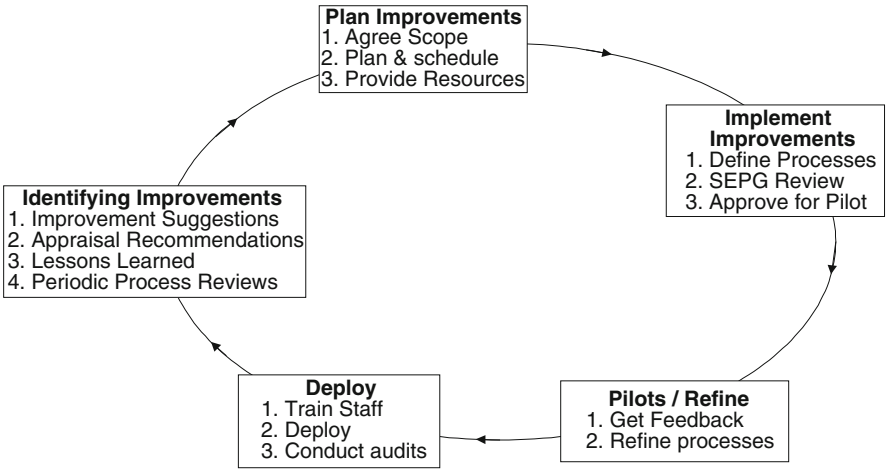


Fig. 4.2 Continuous improvement cycle

- The CMMI initiative is run as a project with a CMMI project manager.
- There is a project plan and schedule for the initiative.
- There is a target of 3–4 h work per week for each team member involved.
- The CMMI Development Model V1.2 (Staged Representation) is employed.
- The CMMI appraisal methodology (SCAMPI) is employed.
- A CMMI Steering Group is set up to provide overall management direction.
- Issues are escalated to the Steering Group where applicable.
- A SEPG team is set up to coordinate the day-to-day improvement activities.
- Dedicated improvement teams are set up to implement specific process areas or improvement actions.
- The SEPG team approves the new processes produced by the specific improvement teams.
- Team members are involved in the definition of the new processes.
- Selected processes will be piloted prior to deployment.
- Feedback from pilots will be used to refine processes and standards.
- Staff are trained on the new processes and standards prior to their deployment.
- Staff are encouraged to make improvement suggestions.
- Audits are conducted to verify that the processes are followed.
- Lessons learned will feed into improvement cycles.
- Periodic process reviews are conducted to determine which processes are working well and which need to be adjusted.
- Independent appraisals are carried out at the end of an improvement cycle.
- Feedback from appraisals (strengths and weaknesses) will be acted upon in the next improvement cycle.
- Appropriate training and consultancy are provided during the initiative.

The continuous improvement cycle is described in more detail in Table 4.1.

4.3 CMMI Improvement Structure and Teams

The implementation of the CMMI requires several teams with specific responsibilities to be formed. These teams will oversee the initiative and actively participate in its implementation. The CMMI project manager is responsible for setting up the various teams, defining a charter to explain the purpose of each team, providing orientation to the team members, and actively working with each team.

The project manager needs to be active in monitoring progress, identifying potential roadblocks and resolving them, and escalating issues to the SPEG or Steering Group where appropriate. The following is a suggested improvement structure and teams for a CMMI implementation (Table 4.2).

The CMMI project manager is responsible for running the CMMI initiative as a project. This involves tracking and managing the schedule, budget, effort, risks, and issues during the project and reporting progress to the SEPG team who will coordinate the day-to-day implementation of the CMMI. The project manager will report progress to the

Table 4.1 Continuous improvement cycle

Activity	Description
Identify improvements to be made	The improvements to be made during an improvement cycle come from several sources: – Improvement suggestions from staff – Lessons learned by projects – Periodic process reviews – Recommendations from CMMI appraisals – CMMI implementation strategy
Plan improvements	A project plan and schedule is prepared for a large improvement cycle (involving the implementation of several process areas) For a shorter improvement cycle an action plan (with owners and target completion dates) will often be sufficient
Implement improvements	The plan will detail the resources required to carry out the improvements The improvements will generally be conducted by a dedicated improvement team and approved by the SEPG The improvements will consist of new processes, standards, templates, procedures, guidelines, checklists, and tools (where appropriate) to support the process
Pilots/refine	Selected new processes and standards will often be piloted[2] prior to their deployment to ensure that they are fit for purpose The feedback from the pilot is used to refine the process prior to its general deployment
Deploy	The processes and standards are deployed using a structured approach: – Staff are trained on the new processes and standards – Staff receive support during the deployment – Audits are conducted to ensure that the new processes are followed
Do it all again	Improvement is continuous and as soon as an improvement cycle is complete its effectiveness is considered and a new improvement cycle is ready to commence

Steering Group who provide management sponsorship of the initiative and who have the management influence to remove any roadblocks that may arise.

The project manager will work closely with the specific improvement teams that are set up and resourced by the SEPG. These teams are responsible for implementing one or more CMMI process areas such as project planning and project monitoring and control; requirements management; configuration management. The teams involved in a typical implementation of CMMI level 2 are described in Fig. 4.3.

[2]The result from the pilot may be that the new process is not suitable to be deployed in the organization or that it needs to be significantly revised prior to deployment.

Table 4.2 CMMI improvement structure and teams

Role/Team	Members	Responsibility
CMMI Project Manager	CMMI Project Manager	Project manage the CMMI improvement project Provide leadership on process improvement Plan and coordinate CMMI improvements Ensure Steering Group, SEPG, and improvement teams receive appropriate training on the CMMI Chair the SEPG team and report progress of improvement teams to SEPG Report progress to the Steering Group Facilitate review of improvement suggestions at SEPG Facilitate the review of lessons learned at the SEPG Facilitate periodic process reviews Facilitate independent appraisals Maintain continuous improvement cycle
Steering Group (Project Board)	Senior manager(s) and CMMI project manager	Provides management sponsorship of initiative Provides resources and funding for the initiative Meets monthly, bi-monthly, or quarterly Reviews progress with initiative Uses influence to remove any roadblocks that arise with the improvement activities
SEPG team	Managers, technical, and CMMI project manager	Coordinate day-to-day improvement activities Generally meets every 2 weeks Provides direction and support to improvement teams Provides sufficient staff/resources to teams Review and approve new processes Coordinate pilots of new processes Coordinate training on new processes and standards Coordinate rollout of new processes and standards
Improvement teams	Process users and CMMI project manager	Focus on specific process area(s) Teams will usually meet weekly (or bi-weekly) Review the current process "as is" and define the new process "to be" (brainstorming/CMMI) Identify and create standards, templates, procedures, guidelines, and tools needed to support the new process Get feedback from the SEPG on the new process Conduct pilots to ensure the new process is effective Refine process as appropriate to address the feedback Obtain approval from the SEPG on the new process Provide any required training on the new process Conduct rollout of new process
Staff	All affected staff	Participate in improvement teams as directed by CMMI project manager and SEPG

Table 4.2 (continued)

Role/Team	Members	Responsibility
External Consultancy	External Consultant	Participate in pilots (as directed by CMMI project manager) Participate in training on new processes Adhere to new processes Conduct appraisal to determine initial maturity and assist in planning of first improvement cycle Provide expertise on the CMMI and software engineering Review progress made during the initiative and conduct periodic process reviews Provide training on the CMMI and software engineering disciplines Conduct appraisal at end of each improvement cycle and identify strengths and weaknesses in the organization processes

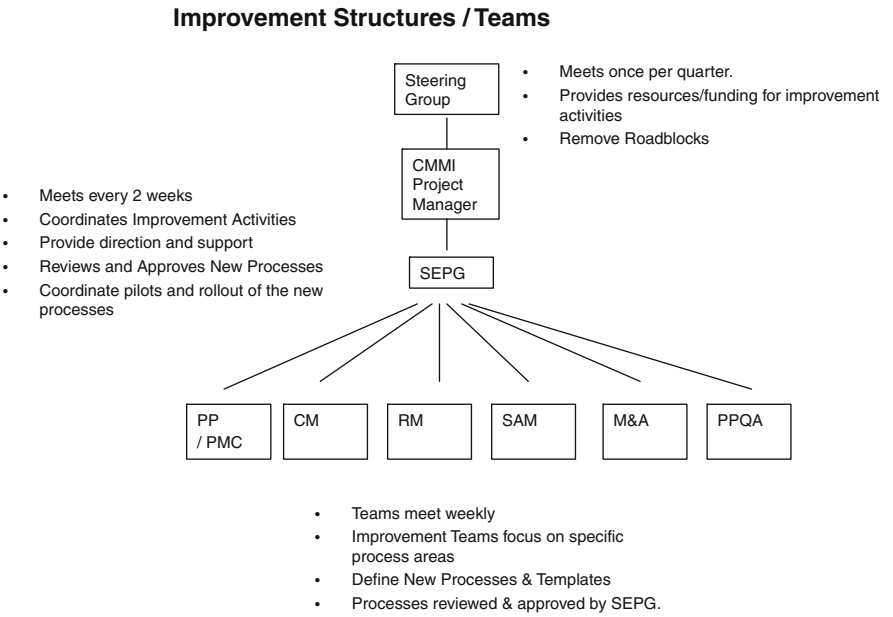


Fig. 4.3 CMMI improvement structure and teams

4.3.1 Setting Up the SEPG Team

The SEPG team is one of the first teams to be set up in the initiative. It is responsible for day-to-day coordination of the improvement initiative, and it provides direction and support to the improvement teams working on the implementation of specific process areas.

The members of the SEPG will include management and technical representatives, and the team members will receive appropriate training on the CMMI. The CMMI training will typically include

- Overview of software process improvement
- Overview of the CMMI and maturity levels
- Overview of CMMI process areas

The SEPG team will decide on the number of improvement teams to be initially set up as well as the members of each team. Typically, team members will need to spend a minimum of 3–4 h per week working on improvement activities as otherwise little progress will be made. This requires that an appropriate balance is kept between the normal day-to-day project and support work that team members are involved in and the software process improvement activities.

The SEPG team will review and approve the new processes and standards that are developed by the improvement sub-teams, and it will also coordinate pilots, rollout, and training on the new processes and standards. The SEPG may decide to place processes and standards on an Intranet site in the company, and if so, the SEPG will review and approve the Intranet site prior to its deployment.

The CMMI project manager will chair the SEPG team and will report progress, risks, and issues regularly during the initiative. The project manager will report any roadblocks to the Steering Group for resolution.

The SEPG team will generally meet to review progress every 2 weeks. The project manager will provide a regular status report to summarize the activities taking place, as well as listing the key risks and issues and status with respect to the schedule and budget.

4.3.2 Setting Up the Steering Group

The Steering Group is responsible for management sponsorship of the improvement initiative, and it provides the funding and resources required to enable the improvement teams to implement their assigned process areas.

The steering group is typically composed of senior and middle managers, and it has sufficient influence to remove any roadblocks that may arise during the initiative. The team will resolve any issues that have been escalated by the SEPG team.

The steering group will not be involved in the day-to-day implementation of the CMMI, and so the team members do not require detailed training on the CMMI model. They will receive high-level training on the CMMI and process improvement and the benefits that are gained from implementing the CMMI.

The steering group will ensure that a balance is kept between project work and process improvement activities. It approves the organization policy for software development, and this policy states the management expectations of the way that work will be done in the organization. All projects need to be carried out consistently with this policy.

The Steering Group is also responsible for reviewing and approving the project plan for the improvement initiative, as well as the schedule and budget. The CMMI project manager is a member of the Steering Group and will prepare regular status reports to provide visibility into progress with the improvement initiative and also the status with respect to the allocated budget, schedule, and effort, as well as documenting the key risks and issues.

The Steering Group typically meets less frequently than the SEPG and a frequency of bi-monthly or once per quarter is often sufficient. Extra meetings (in response to serious issues) may be scheduled where appropriate.

4.3.3 Setting Up Dedicated Improvement Sub-teams

The dedicated improvement teams are responsible for the implementation of one or more CMMI process areas. For example, the project management improvement team will usually implement the project planning and project monitoring and control process areas. The SEPG is responsible for setting up the improvement team; selecting team members; and providing orientation and training to the team members.

The team members will receive appropriate orientation on the CMMI model to enable them to implement their assigned process areas effectively. The CMMI project manager will conduct a kick-off session to commence work on the improvements and this includes introducing team members, communicating the objectives of the team and the planned deliverables, and the roles of the team members. The team will usually commence its work with process mapping and this involves defining and understanding the process as currently performed, i.e. the process “as is”.

The team then critically examines the current process and brainstorms ways to improve it. Strengths and weaknesses in the current process are considered as well as best practice in the CMMI for the process area. The specific and generic practices in the CMMI for the process area will be considered and used to guide the definition of the new process, i.e. the process “to be”. Once the new process is agreed there will be a need to identify the standards, procedures, guidelines, checklists, and templates required to support the new process.

The CMMI project manager may be a member of or may chair the specific improvement team. The project manager will facilitate the process mapping session and will apply the CMMI specific and generic practices to the process area and verify that the specific and generic goals are satisfied.

The number of improvement teams set up at any period of time will depend on the size of the organization and the amount of time that the organization can devote to software process improvement. Larger organizations have more resources available and are in a position to set up several improvement teams at the start of the initiative. Small

organizations have fewer resources available and it may only be practical to set up only one or two improvement teams at any one time.

It is essential that sufficient time is available to team members to work on improvement activities, as otherwise little progress will be made in the initiative. The steering group is responsible for ensuring that the team members have 3–4 h of time available to them to work on their improvement activities.

The SEPG is responsible for reviewing and approving the new processes and standards, and it will coordinate the pilots, rollout, and training on the new processes and standards.

The improvement team will act upon any feedback that the SEPG provides, and it will participate in pilots, training, and rollout as directed by the SEPG team. The CMMI project manager will report progress and issues for all active improvement teams to the SEPG and the Steering Group.

4.3.4 Role of the CMMI Project Manager

The CMMI project manager plays a key role in managing the improvement initiative. This includes

- Setting up the various teams (SEPG, Steering Group, and specific improvement teams)
- Providing training and orientation to the various teams
- Managing the improvement initiative as a project
- Preparing the project plan and schedule
- Tracking schedule, effort, and budget
- Managing project risks and issues
- Reporting progress regularly to the Steering Group
- Chairing the SEPG team and discussing progress, risks, and issues
- Recording minutes and actions from SEPG meetings
- Providing guidance and direction to specific improvement teams
- Ensuring roadblocks are identified and resolved appropriately

The CMMI project manager is required to have a strong background in the CMMI and software process improvement. A good understanding of SCAMPI appraisals is required as well as good verbal and written communication. The CMMI project manager needs skill in influencing people to change behaviour, as a software process improvement initiative involves changing the way that work is done in the organization. The project manager will need to be highly motivated to drive the improvement project to a successful conclusion.

4.3.5 Risks to Success

Software process improvement initiatives do not always succeed, and it is important to understand some of the reasons why initiatives fail and to identify and manage risks. Senior

management need to be fully behind the initiative, as this will ensure that middle managers and staff on the ground remain fully committed. Some common causes of failure include

- Lack of senior management commitment to the initiative
- Lack of buy-in from staff
- Lack of sufficient time to perform the improvement activities
- Poor project management of the initiative
- Lack of participation from staff in defining the new processes
- New processes may not meet the needs of the process users
- Lack of pilots on the new processes and standards
- Inadequate training on new processes and standards
- Lack of enforcement of new processes and standards
- Lack of sense of ownership of processes and standards
- Insufficient communication of issues to senior management

It is essential that staff participate in the definition of the new processes and standards as this will help to promote ownership and buy-in of the processes by staff. It will also help to ensure that the new processes and standards fully meet the needs of the process users.

4.4 Planning the Improvement Cycle

A major improvement cycle such as the implementation of a CMMI maturity level requires detailed planning and scheduling. However, the planning required for a small improvement cycle such as the implementation of a small number of process improvements may be as simple as an action plan. Large improvement cycles will require dedicated improvement teams to be set up to implement specific process areas, whereas improvement actions may be assigned to individuals for smaller cycles.

A CMMI project manager is assigned to manage a major improvement cycle and a project plan and schedule prepared. The project plan records the key project planning information such as the business case, the key project goals and objectives for the initiative, the scope of the initiative, as well as the process areas to be implemented. The roles and responsibilities of the various teams and individuals involved are recorded in the project plan. The project plan also documents the approved budget as well as the key project milestones and the high-level estimates for the work to be done.

The project manager will set up the risk and issue logs and will be proactive in identifying risks early in the project and managing risks throughout the project. The project manager will work with the improvement teams to ensure successful delivery of the desired improvements and will inform the SEPG of progress and any roadblocks that may impede progress.

For a shorter improvement cycle (e.g. such as the implementation of recommendations from an appraisal or the implementation of improvement suggestions from staff) it will usually be sufficient to employ an improvement action plan. Such an action plan will include

target dates and owners for the various improvement actions, and the project manager and SEPG will track these to completion.

4.4.1 Appraisals

Appraisals were discussed in Section 3.7 and play a key role in software process improvement. They allow an organization to understand its current software process maturity and the strengths and weaknesses in its processes.

An initial appraisal is conducted at the start of the initiative to assist with planning. The improvements are then implemented, and an appraisal is conducted at the end of the improvement cycle to determine the progress made. The extent to which the CMMI has been implemented is determined, as well as strengths and opportunities for improvement to the processes (Fig. 4.4).

An appraisal is an independent evaluation of the practices in an organization against a model or standard. One or more experienced appraisers who are knowledgeable on the model conduct it. The SCAMPI appraisal methodology (Class A, B, or C) is used to conduct appraisals against the CMMI model. The scope of the appraisal will often be the level 2 or level 3 process areas, and the appraisal will identify strengths and weaknesses and gaps with respect to the implementation of the CMMI.

The appraisal will typically consist of interviews and reviews of documentation, and the appraisal team[3] will determine the extent to which the CMMI goals as well as the specific

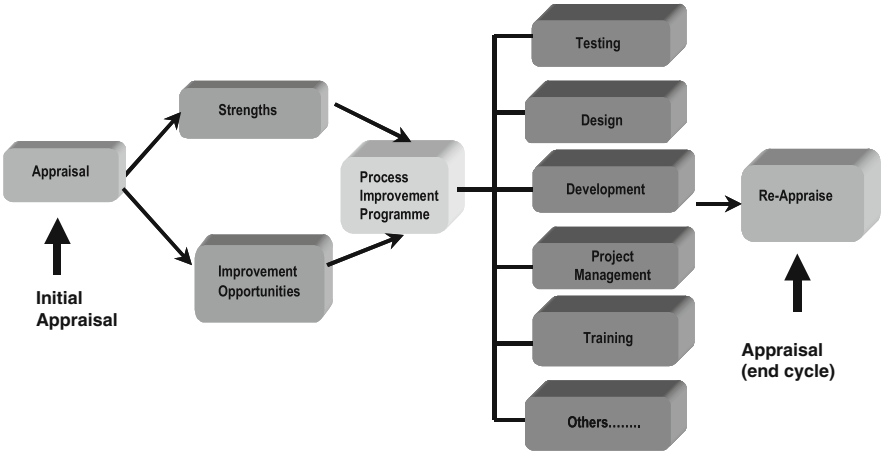


Fig. 4.4 Appraisals and process improvement

[3] The appraisal team could be the CMMI project manager only (if the project manager is a SCAMPI trained appraiser); alternatively, it could be an external appraiser and the project manager. For

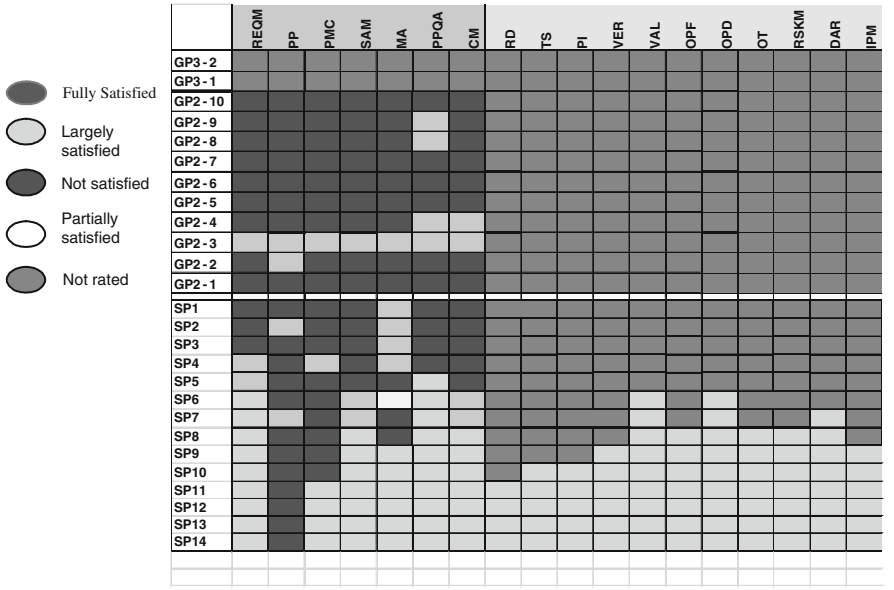


Fig. 4.5 CMMI appraisal results summary

and generic practices for each process area within the scope of the appraisal are satisfied. Sample output[4] from an L2 appraisal is presented in Fig. 4.5, and each column represents a CMMI process area with each row representing a specific or generic practice.

Colour coding is employed to indicate the extent to which the specific or generic practice has been implemented and satisfies the CMMI requirements:

- Fully satisfied
- Largely satisfied.
- Partially satisfied
- Not satisfied
- Not rated

The appraisal output will often be presented in a PowerPoint presentation by the lead appraiser and documented in the appraisal report. These summarise the appraisal findings including the strengths and weaknesses of the processes. The ratings of the process areas

very large organizations interested in a very formal appraisal it could be a large team of four to nine appraisers including a SCAMPI lead appraiser. There is a strict qualification process for a SCAMPI lead appraiser and it requires attending the official SEI CMMI and SCAMPI training as well as conducting two appraisals under the direction of a qualified SCAMPI lead appraiser.

[4]The output presented in Fig. 4.5 indicates the extent of implementation (e.g. fully, largely, partially) of each specific and generic practice for each process area within the scope of the appraisal. This output is produced only when ratings are part of the appraisal for a SCAMPI Class A appraisal.

within the scope of the appraisal will be recorded (where ratings are a part of the appraisal), as well as the overall CMMI rating for the organization and the gaps that exist with respect to the targeted CMMI maturity level.

The appraisal findings are valuable and will allow the CMMI project manager to plan and schedule the next improvement cycle. Appraisals are discussed in detail in Chapter 9.

4.4.2 CMMI Project Plan

The CMMI project manager will prepare the project plan for the CMMI initiative. It will include the business case for the initiative, the approved budget, and the key project milestones. It will document the approach taken, as well as the goals and objectives of the improvement initiative. The scope of the initiative including the process areas to be implemented will be defined in the plan. The stakeholders and teams involved will be documented as well as the key success factors and any assumptions, risks, and dependencies.

The project plan will include a section on estimation, and the estimation may be based on a work-breakdown structure where the estimates for the various phases of the project (and deliverables within the phase) are recorded. The knowledge, skills, and tools required to carry out the improvement project are also recorded. The initial risks to the success of the initiative are documented, and the project manager will need to be proactive in identifying and managing risks during the project.

The project plan will include sections on quality and test planning and communication planning. The quality planning covers how quality will be built into the deliverables, and communication planning covers how communication will take place during the project. The communication to the stakeholders will include project status reports and project meetings with the various stakeholders.

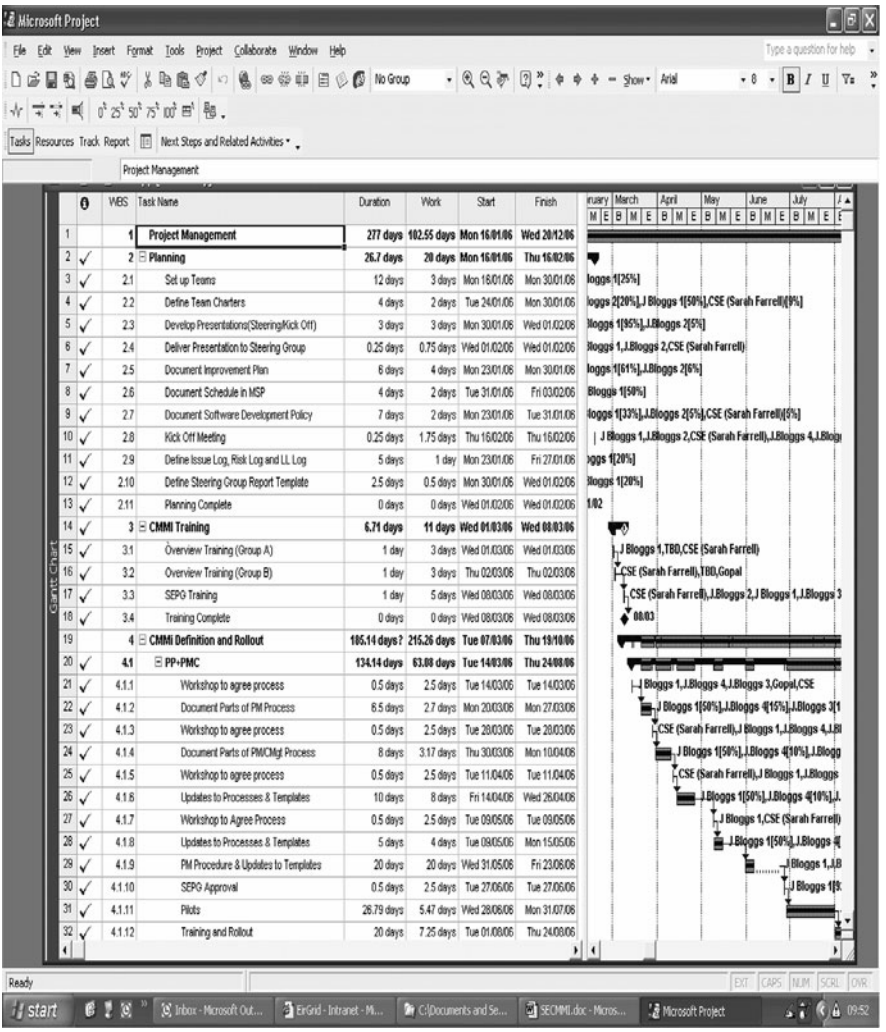
The plan will include a section on configuration management, and this will detail how changes will be controlled during the project. It will detail where the project deliverables will be placed, as well as defining how releases will be done. It will define how the deployment of the new processes and standards is done.

Once the project plan has been approved by the stakeholders, the project manager is in a position to prepare the project schedule. This will detail the various phases of the project life cycle and the tasks and activities to be conducted.

4.4.3 CMMI Project Schedule

The project schedule details the tasks and activities to be carried out during the improvement project; the effort and duration of each task and activity; and the resources required. The schedule shows how the project will be delivered within the key project parameters such as time and cost without compromising quality in any way (Fig. 4.6).

The project manager will manage the schedule and will take corrective action when project performance deviates from expectations. The project schedule will be updated regularly during the improvement project (usually weekly or bi-weekly).



		WBS	Task Name	Duration	Work	Start	Finish
1		1	**Project Management**	**277 days**	**102.55 days**	**Mon 16/01/06**	**Wed 28/12/06**
2	✓	2	**Planning**	**26.7 days**	**20 days**	**Mon 16/01/06**	**Thu 16/02/06**
3	✓	2.1	Set up Teams	12 days	3 days	Mon 16/01/06	Mon 30/01/06
4	✓	2.2	Define Team Charters	4 days	2 days	Tue 24/01/06	Mon 30/01/06
5	✓	2.3	Develop Presentations(Steering/Kick Off)	3 days	3 days	Mon 30/01/06	Wed 01/02/06
6	✓	2.4	Deliver Presentation to Steering Group	0.25 days	0.75 days	Wed 01/02/06	Wed 01/02/06
7	✓	2.5	Document Improvement Plan	6 days	4 days	Mon 23/01/06	Mon 30/01/06
8	✓	2.6	Document Schedule in MSP	4 days	2 days	Tue 31/01/06	Fri 03/02/06
9	✓	2.7	Document Software Development Policy	7 days	2 days	Mon 23/01/06	Tue 31/01/06
10	✓	2.8	Kick Off Meeting	0.25 days	1.75 days	Thu 16/02/06	Thu 16/02/06
11	✓	2.9	Define Issue Log, Risk Log and LL Log	5 days	1 day	Mon 23/01/06	Fri 27/01/06
12	✓	2.10	Define Steering Group Report Template	2.5 days	0.5 days	Mon 30/01/06	Wed 01/02/06
13	✓	2.11	Planning Complete	0 days	0 days	Wed 01/02/06	Wed 01/02/06
14	✓	3	**CMMI Training**	**6.71 days**	**11 days**	**Wed 01/03/06**	**Wed 08/03/06**
15	✓	3.1	Overview Training (Group A)	1 day	3 days	Wed 01/03/06	Wed 01/03/06
16	✓	3.2	Overview Training (Group B)	1 day	3 days	Thu 02/03/06	Thu 02/03/06
17	✓	3.3	SEPG Training	1 day	5 days	Wed 08/03/06	Wed 08/03/06
18	✓	3.4	Training Complete	0 days	0 days	Wed 08/03/06	Wed 08/03/06
19		4	**CMMI Definition and Rollout**	**185.14 days?**	**215.26 days**	**Tue 07/03/06**	**Thu 19/10/06**
20	✓	4.1	**PP+PMC**	**134.14 days**	**63.08 days**	**Tue 14/03/06**	**Thu 24/08/06**
21	✓	4.1.1	Workshop to agree process	0.5 days	2.5 days	Tue 14/03/06	Tue 14/03/06
22	✓	4.1.2	Document Parts of PM Process	6.5 days	2.7 days	Mon 20/03/06	Mon 27/03/06
23	✓	4.1.3	Workshop to agree process	0.5 days	2.5 days	Tue 28/03/06	Tue 28/03/06
24	✓	4.1.4	Document Parts of PM/CMgt Process	8 days	3.17 days	Thu 30/03/06	Mon 10/04/06
25	✓	4.1.5	Workshop to agree process	0.5 days	2.5 days	Tue 11/04/06	Tue 11/04/06
26	✓	4.1.6	Updates to Processes & Templates	10 days	8 days	Fri 14/04/06	Wed 26/04/06
27	✓	4.1.7	Workshop to Agree Process	0.5 days	2.5 days	Tue 09/05/06	Tue 09/05/06
28	✓	4.1.8	Updates to Processes & Templates	5 days	4 days	Tue 09/05/06	Mon 15/05/06
29	✓	4.1.9	PM Procedure & Updates to Templates	20 days	20 days	Wed 31/05/06	Fri 23/06/06
30	✓	4.1.10	SEPG Approval	0.5 days	2.5 days	Tue 27/06/06	Tue 27/06/06
31	✓	4.1.11	Pilots	26.79 days	5.47 days	Wed 28/06/06	Mon 31/07/06
32	✓	4.1.12	Training and Rollout	20 days	7.25 days	Tue 01/08/06	Thu 24/08/06

Fig. 4.6 CMMI implementation schedule

4.4.4 CMMI Kick-Off Session

The implementation of the CMMI is a major initiative for an organization, and it is essential to raise its profile early in the initiative. This will allow senior management to state its importance and to motivate the staff involved in its implementation. A CMMI kick-off meeting is important as it sets the scene for the activities in the CMMI implementation for the years ahead.

The meeting allows the CMMI project manager to give an introduction to the CMMI, its benefits, the improvement initiative planned for the organization, and the teams and people involved. A senior manager will typically open the kick-off meeting and will introduce the CMMI project manager as well as stating the importance of the initiative to the organization, their commitment to it, and the expectation that all staff in the organization will give it full support. The project manager will give a presentation on the CMMI including

- Introduction to the CMMI and software process improvement
- Benefits of software process improvement
- Teams involved in the improvement initiative
- Approach to CMMI implementation
- People involved and team composition
- Goals and objectives of the initiatives
- The timelines
- Next steps

Senior management will commit to making resources available to support the initiative, and senior management support is essential in ensuring that middle management and staff make the initiative a priority.

4.5 Implementation of Improvements

Once the specific improvement teams have been set up and the team members appropriately trained, the teams are ready to commence work on their assigned process areas. The improvement teams will generally meet weekly, and the first task is to prepare a plan for the implementation of its assigned process areas. The CMMI project manager will work closely[5] with the team to ensure that the plan is realistic and will address the CMMI requirements. The plan will detail the activities to be carried out and the deliverables to be produced. These include

- Policy for the performance of the process (There will usually be one policy that covers all of the relevant process areas.)
- Process map to show the flow of activities for the process area
- Procedure or guidelines that describe the process in more detail
- Templates and standards to assist in the performance of the process
- Checklists to assist in the performance of the process
- Evaluation and selection of tools to support the performance of the process
- Metrics to measure the effectiveness of performance of the process
- Training materials to assist in piloting and rollout of the process

[5] The CMMI project manager may be a member or may chair the improvement team. It will depend on the experience of the team.

The CMMI project manager may be a member of each improvement team or may work closely with the teams to drive improvements and to determine progress on a regular basis. Any roadblocks that arise are first communicated to the SEPG, and if the SEPG is unable to resolve the issue it is escalated to the Steering Group.

The project manager will report progress regularly to the SEPG and at appropriate intervals to the CMMI Steering Group.

4.5.1 Process Mapping

The starting point for each improvement team is to understand the process as it is currently performed and to determine the extent to which it is effective. The stakeholders of the process participate in the discussion of how the process is currently performed, and the process is then sketched pictorially with activities and their inputs and outputs recorded graphically. This graphical map is a representation of the process "as is".

The approach used in this book is to represent activities in the process by rectangles (with tasks within an activity being numbered). Each activity has an input and an output and these are recorded in the process map. There may be standards to support the process (e.g. procedures and templates), and the tasks and activities are conducted by various roles. The process maps presented here are kept as simple and abstract as possible and focus on inputs, tasks, activities, and outputs.

For example, Fig. 4.7 is a simple process map that is part of supplier selection.

There are two activities listed in this process map. These are the "Issue RFP" activity that has two tasks and the "Evaluate Proposals" activity that has four tasks associated with it. A more detailed process would specify standards to support the process and the roles involved in carrying out the tasks and activities. Entry and exit criteria could be specified as well as any verification steps and measures.

Process mapping was discussed earlier in Section 1.6, and the process map is an abstraction of the way that work is done. The team critically examines the process map to determine how effective the process is, and weaknesses are identified. The CMMI specific and generic practices for the process area are considered, as they contain best practice for process performance.

This leads to modifications to the definition of the current process to yield the process "to be". Once the team has agreed to the new process the templates required to support the process become clear from an examination of the input and output to the various activities. Templates will be prepared to standardize input and output from the process. Procedures or guidelines will be required to provide detailed information on how the process is to be carried out.

The SEPG team is responsible for approving the processes and deliverables produced by the improvement team. The SEPG may approve without comments or it may require changes to the process and deliverables prior to approval.

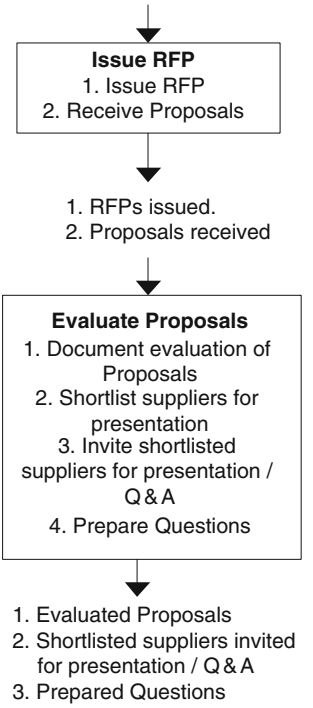


Fig. 4.7 Sample process map

Once the deliverables for a process area have been approved by the SEPG they are ready for piloting (where required) or deployment. The SEPG will decide whether a pilot is required prior to deployment.

4.5.2 Layout of Templates

Templates are employed to support the process and it is desirable that they have a common look and feel. The first three to four pages for each template should have identical headings such as

- Title page
- This includes a unique document number, the date the current version was prepared, and the release status of the document
- It may include an abstract and an approval section
- Version history
- This includes the history of who modified the document, the reason for modification, and the date of modification
- Table of contents
- Introduction

– This includes the purpose of the document, the definition of any acronyms, and references to other documents
– Template version number
– Each template has an associated version number

There are standard templates available (e.g. the IEEE standards) for various activities in software engineering. The organization may decide to use or tailor the IEEE standards to meet its needs or it may decide to devise its own templates.

4.5.3 Layout of Procedures and Guidelines

Processes are an abstraction of the way in which work is done. They need associated procedures or guidelines to describe in detail how the process is performed. It is desirable that these have a common look and feel with common sections such as

– Title page
– Version history
– Table of contents
– Introduction
– Overview of process
– Process map
– Details
– Training and metrics
– Roles and responsibilities

4.6 Piloting the Process

The SEPG team will decide if the new processes and standards need to be piloted prior to their deployment. This involves the following:

- New process is approved for pilot by the SEPG.
- Project(s) and staff are selected for the pilot.
- Training is provided to all staff that will participate on the pilot.
- The CMMI project manager will communicate the objectives of the pilot to all participants.

The pilot then commences and the CMMI project manager will work closely with the participants to determine the effectiveness of the new process and standards.

- The participants will prepare feedback as to what went well and what went poorly during the pilot.

- The project manager and SEPG will consider the feedback and decide whether the process and standards are ready to be rolled out.
- The processes and standards are refined accordingly.
- If the pilot is unsuccessful the improvement team and the CMMI project manager will analyse the reasons why and develop an appropriate strategy for the process area.

4.7 Rolling Out Process

The SEPG team is responsible for approving the new process for rollout and for coordinating the activities for rollout. These include the following:

- New process is approved for rollout by the SEPG.
- Training material on the process is prepared by the improvement team and approved by SEPG.
- Training is provided on the new process to all affected staff.
- The Intranet site with the standards will be updated to include the new process and standards.
- The induction checklist will be updated to include induction on the new process and standards.
- The audit checklist will be updated to audit the new process and standards.

The new process and standards will be deployed on all new projects (and possibly on projects that have recently commenced). The post-rollout activities may include

- Induction to new staff on the new process
- Audits to verify that the new process is followed and effective
- Metrics on the performance of the process are periodically reviewed to ensure that its performance is effective

4.8 Review Questions

1. Discuss the approach suggested for software process improvement in this book.
2. Discuss the continuous software process improvement cycle.
3. Describe the teams involved in a typical software process improvement initiative.
4. Discuss the planning and scheduling required in a software process improvement initiative.

5. Describe the activities that take place during the kick-off session of a software process improvement initiative.
6. Describe the activities involved in process mapping.
7. Describe the purpose of pilots of new processes.
8. Describe how a new process may be rolled out to the staff in the organization.
9. Describe how appraisals fit into the software process improvement cycle.

4.9 Summary

This chapter was concerned with the activities and teams required to set up a CMMI improvement initiative in an organization. It requires detailed planning and the initiative needs to be managed as a project.

A CMMI project manager is assigned to run the initiative, and the project manager is responsible for defining the approach to implementation and setting up the teams involved. These include the Steering Group, the SEPG, and dedicated improvement teams. The CMMI project manager will ensure that all team members receive appropriate training.

A CMMI improvement initiative consists of one or more improvement cycles. A major improvement cycle will implement several process areas, whereas minor improvement cycles may be concerned with implementing actions from an appraisal or improvement suggestions from staff.

One of the earliest activities in an appraisal is to determine the current maturity of the organization with respect to the CMMI model, as well as strengths and weaknesses in its processes. The first improvement cycle has often been concerned with the implementation of level 2 of the CMMI.

A CMMI initiative is run as a project with a project manager assigned. The CMMI project manager will prepare the project plan and schedule, monitor and report progress, and manage risks and issues. The project manager will work closely with the dedicated improvement teams and will assist in process mapping and in defining improved processes.

The SEPG will approve the new processes and templates and coordinate any pilots, as well as coordinating the rollout of the new processes and standards. A software process improvement programme involves

- Identify improvements to be made
- Plan improvements
- Implement improvements
- Pilots and refine
- Deploy
- Do it all again

The next chapter is concerned with the implementation of CMMI level 2 in an organization.