



# How to use CMMI® to bring your project management process to the next level

## A CMMI Implementation Case Study

Based on [1]

### ***Introduction***

This paper focuses on how an Engineering organization improved its project management methods by using CMMI level 2 project management processes as a target [CMMI Product Team]. The client organization selected the specific goals for project planning (PP) and project monitoring and control (PMC). Then these goals were transformed into requirements for project management templates.

In order to explain how we met these CMMI goals, we provide examples of the schedule and project plan template designed for engineering projects. As a result this paper demonstrates how CMMI level 2 goals for project management can be used as a tool to drive change and improve project management processes within an Engineering organization.

### ***The Situation at the Client's Organization***

In order to aggressively expand their business opportunities, the client organization decided that they needed to re-position the company to go after newly formed market opportunities.

This laid the foundation for the following product development goals:

- Build the right products needed to grow a profitable business
- Build a development organization that can respond quickly to an ill-defined, yet fast-changing marketplace
- Expect that product teams will scale quickly, either through additional hiring or through acquisition
- Increase productivity

- Ensure the development organization is self-sustaining in terms of day-to-day operation

These goals required the following changes in the client's approach to product and project management:

Moved from a centralized, executive-level product and project management style into a de-centralized style where there existed three levels of management: product, project, and coordination.

Changed their focus away from being release-centric into being project-centric.

To implement product and project management in this way, it was critical that the client organization had a solid, well defined, and self sustaining project management program within the organization. After some research, it was clear that CMMI clearly identified all of the steps that they needed to adopt.

When the client evaluated their processes in relation to CMMI, they identified that they were performing well in some areas, but not in others. As a result, they didn't consider themselves as being a typical level 1 company.

### ***CMMI Level 2 Process Areas***

CMMI level 2 consists of the following process areas:

- Requirements Management (REQM)
- Project Planning (PP)
- Project Monitoring and Control (PMC)
- Configuration Management (CM)
- Supplier Agreement Management (SAM)
- Measurement and Analysis (MA)
- Process and Product Quality Assurance (PPQA)

Although all seven process areas add value, the client placed priority on the first three process areas ; REQM, PP, and PMC. The others were either already working well (CM and SAM), or were deemed as having a lower return on investment. With the creation of the product team organization, it was critical that they had well defined roles and responsibilities as well as a clear set of processes and templates around requirements

definition and change control. REQM process was fully adopted and executed with great success. To help understand the scope of process areas PP and PMC, the specific CMMI practices are shown in Exhibits 1 and 2.

Specific Goal	Specific Practice
SG 1 Establish Estimates	SP 1.1 Estimate the Scope of the Project SP 1.2 Establish Estimates of Work Product and Task Attributes SP 1.3 Define Project Life Cycle SP 1.4 Determine Estimates of Effort and Cost
SG 2 Develop a Project Plan	SP 2.1 Establish the Budget and Schedule SP 2.2 Identify Project Risks SP 2.3 Plan for Data Management SP 2.4 Plan for Project Resources SP 2.5 Plan for Needed Knowledge and Skills SP 2.6 Plan Stakeholder Involvement SP 2.7 Establish the Project Plan
SG 3 Obtain Commitment to the Plan	SP 3.1 Review Plans that Affect the Project SP 3.2 Reconcile Work and Resource Levels SP 3.3 Obtain Plan Commitment

Exhibit 1: Specific Goals and Practices for Project Planning (PP) [2]

Specific Goal	Specific Practice
SG 1 Monitor Project Against Plan	SP 1.1 Monitor Project Planning Parameters SP 1.2 Monitor Commitments SP 1.3 Monitor Project Risks SP 1.4 Monitor Data Management SP 1.5 Monitor Stakeholder Involvement SP 1.6 Conduct Progress Reviews SP 1.7 Conduct Milestone Reviews
SG 2 Manage Corrective Action to Closure	SP 2.1 Analyze Issues SP 2.2 Take Corrective Action SP 2.3 Manage Corrective Action

Exhibit 2: Specific Goals and Practices for Project Monitoring and Control (PMC) [2]

### ***Implementation of PP and PMC Process Areas***

Given that the client had limited project management documentation in place, a focused and streamlined approach was important for the successful implementation of PP and PMC CMMI processes. As a result, we implemented PP and PMC as a 10 steps program:

1. Gather data on existing project management and tracking practices used within the organization
2. Assess current used practices against PP and PMC, then identify the gaps
3. Design and/or upgrade the client's project management processes to meet PP and PMC needs
4. Design and/or upgrade the client's project plan, project schedule, and project tracking spreadsheet templates
5. Select individuals in the organization that we felt would make strong project leads
6. Define roles and responsibilities, then assign this responsibility to these leads
7. "Test run" the new CMMI-compliant processes and templates by having the selected project leads use these processes as part of implementing one new project.

8. Gather feedback and update processes and templates as needed.
9. Create formal project management training that fully articulates PP and PMC processes and templates
10. Roll out training across the entire development organization (not just Engineering)

### ***Implementation Examples***

This section demonstrates how the specific practice SP 1.1 (Estimate the Scope of the Project) of PP’s specific goal SG 1 (Establish Estimates) has been implemented at the client’s organization:

- Exhibit 3 shows the product development lifecycle that the client used. As this model has been working well for the company, it was used to build the baseline for the release/project template. Only minor modifications were needed to create consistency to CMMI level 2.
- Exhibit 4 shows the WBS for the project schedule template. The first-level work breakdown shows the main activities for a typical project; Requirements (tasks 1.1), Planning (tasks 1.2 ), Development (task 1.3 ), and Validation (task 1.4).
- Exhibit 5 shows how sections of the project plan relate to activities captured in the WBS. Standard activities and dependencies are part of the schedule template. Project-specific activities and dependencies are documented in the project plan.

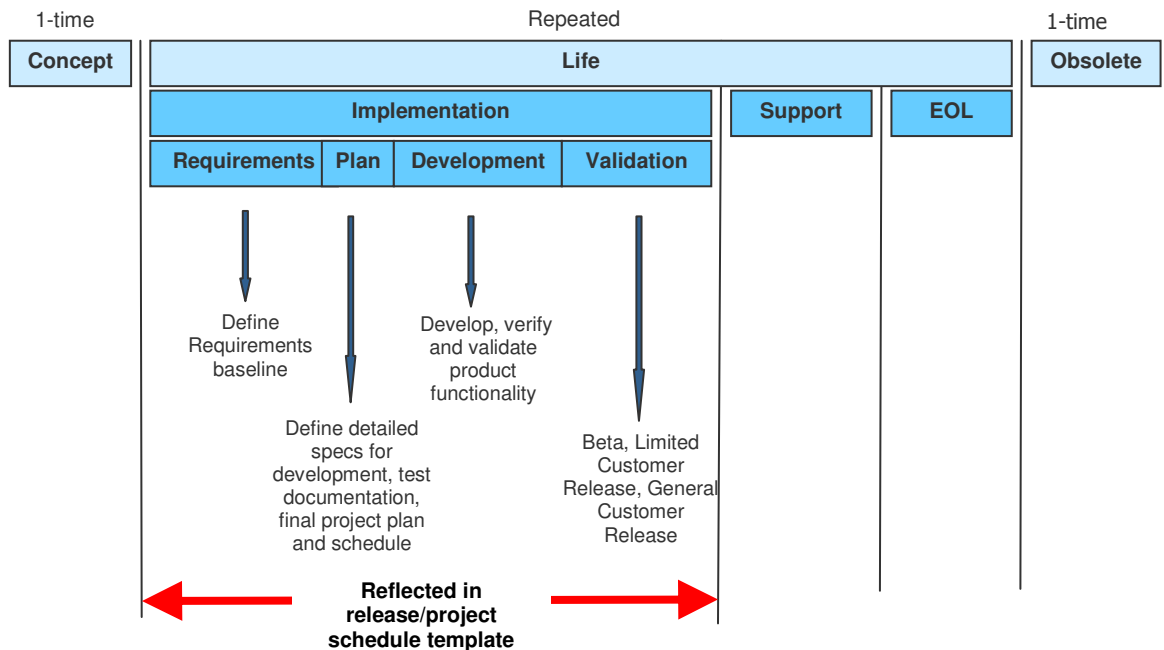


Exhibit 3: Product Life Cycle

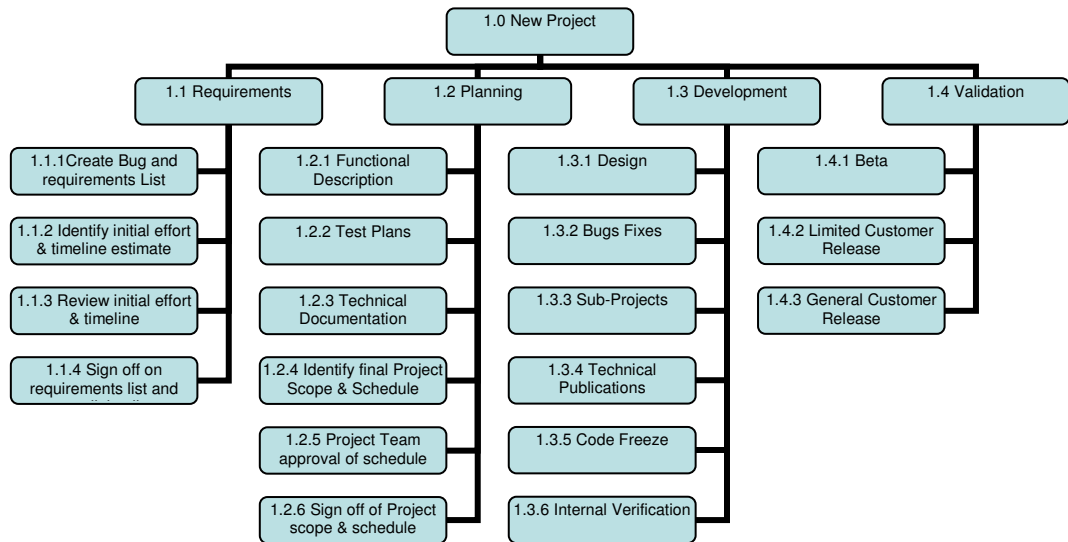


Exhibit 4: WBS for project schedule template

<p><b>Project product (Section 1.5)</b></p> <ul style="list-style-type: none"> <li>Provide an overview of the product of your project</li> <li>List the key components of the product based on the product architecture.</li> <li>Specify the location of the project requirements specifications and other documents that are considered input for your product development.</li> <li>List all the standards your product has to fulfill</li> <li>List what processes or methods will be required by the project.</li> </ul> <p><b>WBS (Section 1.7)</b></p> <ul style="list-style-type: none"> <li>Use the schedule template as a baseline. Add and remove tasks that are applicable to your project</li> <li>If you add or modify task only use 3 to 5 words to name each task.</li> <li>Save your schedule in the database in the section of your release.</li> <li>List the location of the MS Project file</li> </ul>	<p><b>Dependencies (Section 2.1)</b></p> <ul style="list-style-type: none"> <li>The purpose if this section is to document non-standard tasks</li> <li>Refer to the work break down of section 1.7 Identify each task's dependencies by asking what tasks have to be completed to start the current one.</li> <li>Also identify any external dependencies. This means the outcome of one task can be needed by an external party</li> <li>Assign the time it takes to accomplish each task.</li> <li>Identify the resource needed for each task.</li> <li>Add all these information into the schedule.</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">Task</th> <th style="text-align: left;">Duration [days]</th> <th style="text-align: left;">Dependency</th> <th style="text-align: left;">Resource</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	Task	Duration [days]	Dependency	Resource																
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Exhibit 5: Examples of Sections of the project plan template relevant for implementation of SP1.1

## ***Outcome***

By leveraging the strong foundation of experience, process, and structure provided by the CMMI maturity model, the client made significant progress in transitioning to his new product development model. After the implementation of PP and PMC processes the client felt that the organization had a very strong infrastructure in-place. Product teams were ramping up and were taking on responsibility for product business decisions. Projects and releases were planned and managed proactively through the steps of the product development lifecycle. CMMI's project management (PP and PMC) were in place and became part of daily routine. The introduction of the project lead role empowered the project teams to resolve issues and make decisions quicker in order to achieve project goals and deadlines. Because of the distributed project leadership function, the client successfully removed the highly anticipated bottleneck in product and project management.

As a result of becoming a project driven organization, the client observed a significant increase in productivity (product content) as well as increased flexibility in reacting to customer and market conditions. In conclusion, the client felt that adopting CMMI's maturity model had significantly contributed to their success in transitioning to their new product development model, as well as reaching the strategic goals outlined in the introduction.

For more details or any questions about CMMI Implementation please feel free to contact [sonja@interglobeconsulting.com](mailto:sonja@interglobeconsulting.com) or +1.408.807.0443.

## **References**

[1], S. Koppensteiner and G. Swan, "How to use CMMI® to bring your project management process to the next level" PMI Global Congress Proceedings-Edinburgh, Scotland, May 2005.

[2], Capability Maturity Model® Integration (CMMISM), Version 1.1, CMMISM for Systems Engineering, Software Engineering, and Integrated Product and Process Development (CMMI-SE/SW/IPPD, V1.1), Carnegie Mellon SEI, December 2001.