

CMMI Myths and Realities

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This article seeks to deconstruct several myths circulating through the software engineering community about upgrading from the Capability Maturity Model® for Software (SW-CMM®) to the CMMI IntegrationSM. Early adopters and model experts share advice for how your organization can make the upgrade.

Many myths are often heard in discussions about upgrading from the Capability Maturity Model® for Software (SW-CMM®) to the CMMI IntegrationSM (CMMI®):

1. The CMMI is too big and complex.
2. A CMMI appraisal takes longer and costs more than one for SW-CMM.
3. The CMMI is only for large organizations.
4. The CMMI is only for enterprise-wide process improvement.

However, those who have been using the new set of models, appraisal method, and training materials contend that making the upgrade to the CMMI Product Suite is not only easier than it looks, but also well worth it.

“For organizations already operating at a high SW-CMM maturity level, the process of adopting CMMI is very straightforward,” said Sarah Bengzon, an associate partner at Accenture, a leading management consulting and technology services organization. “People think that with CMMI everything is new and that the process is too complex to undertake. But at Accenture, we have always been doing things this way. If anything, CMMI validates the best practices we already had in place.”

In fact, Accenture’s USA Government Operating Unit, which is an early adopter of the CMMI Product Suite, attained CMMI Maturity Level 3 just eight months after making the upgrade from the SW-CMM model. “CMMI enforces tying project objectives to organizational objectives, which is not only a good thing to do, but a bad thing not to do,” Bengzon said. “CMMI shows you exactly what you should be doing to improve your quality processes.”

Accenture’s group is just one of hundreds making the upgrade to the CMMI worldwide. To date, more than 16,000 people have attended an Introduction to CMMI course offered by the Software Engineering Institute (SEISM) and its transition partners, more than 230 instructors

have been trained to teach the introductory course, and more than 290 individuals have become authorized Standard CMMI Appraisal Method for Process Improvement (SCAMPISM) Lead Appraisers. “Initial acceptance of CMMI seems to be much faster than it was for SW-CMM,” said Bill Peterson, director of the Software Engineering Process Management Program at the SEI.

While some myths from the earlier development and piloting days of the CMMI models are still circulating, Bengzon

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and others are proving that these misconceptions are easy to clear up with a little guidance from the experts.

CMMI Myths

1. CMMI Is Too Big and Complex

For more than 10 years, the SW-CMM model has been the global, de facto standard for appraising and improving software processes. As organizations came to know and experience the value of the SW-CMM model and other capability maturity models, these organizations sought to expand the use of the capability maturity model concept beyond its initially defined scope. This evolution of the capability maturity model concept naturally grew into the development of the CMMI Product Suite. Its purpose is to provide guidance for an organization to improve its processes and

its ability to manage the development, acquisition, and maintenance of products and services. The CMMI Product Suite places proven practices into a structure that helps an organization appraise its organizational maturity and process capability, establish priorities for improvement, and guide the implementation of these improvements.

However, at 700-plus pages each, the CMMI models can seem a bit daunting.

Roger Bate, principal architect of the CMMI Product Suite, said the models are so lengthy because they provide comprehensive guidance and details. “It’s similar to an encyclopedia,” he said. “There are a lot of subjects in there that you’ll never need to look up, but they’re there so they can be available to everyone when and if they need them.”

The most obvious additions to the models are related to integrated product and process development (IPPD), which now includes two additional goals and three new process areas (PAs) called Integrated Teaming, Organizational Environment for Integration, and Integrated Supplier Management. Best practices covering risk management were also enhanced. In addition, the SW-CMM’s single Software Product Engineering key process area was expanded into five, more comprehensive PAs in the CMMI Product Suite. A Measurement and Analysis PA at maturity Level 2 and a Decision Analysis and Resolution PA at maturity Level 3 were also added to the models.

“But don’t let the page count throw you,” Bate said. He recommended three ways that an organization can address this myth:

1. **Select the right model.** There are several CMMI models to choose from, including CMMI for Software Engineering, CMMI for Systems and Software Engineering (SE/SW), CMMI SE/SW with IPPD, and CMMI SE/SW with IPPD and Supplier Sourcing. Once you select a model, tailor it to fit your organization’s needs.
2. **Do not try to implement an entire model at once.** “Select those parts that are most applicable and will have the

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biggest payoff at the first stage of process improvement,” Bate said. “Get at those things that are most important: improving quality, predicting costs and schedules, and reducing time to market. Develop a base from which you can move forward.”

- 3. Follow the practices that make the most sense for your organization.** “You can pick and choose or substitute your own processes as long as they meet the overall goals. Every sub-practice does not need to be implemented. They are informational guides, not requirements,” he said.

Additionally, an organization can further tailor its adoption of a model by selecting the staged or continuous representation.

Organizations new to process improvement tend to prefer a staged approach, which predefines the process areas required to attain each maturity level (1-5) and thereby provides a roadmap for institutionalizing best practices. Organizations that are upgrading from the SW-CMM, a staged model, are more likely to prefer staged.

In the continuous representation, process areas are organized into four process area categories: process management, project management, engineering, and support. Based on its business objectives, an organization selects which process areas it wants to address and to what degree. Instead of maturity levels, capability levels (0-5) are used to measure improvement against the best practices of a single process area. Generally, an organization that does not want a maturity level to help it compete with other businesses might select continuous.

Although there are several small differences, process experts agree that both representations contain nearly identical information. Either one will help an organization improve its products, projects, and processes.

2. A CMMI Appraisal Takes Longer and Costs More Than One for SW-CMM

The SCAMPI Class A appraisal method, which is used to appraise an organization’s use of CMMI best practices, is designed as an Appraisal Requirement for CMMI (ARC) Class A appraisal method. It is intended for use where the highest confidence and accuracy is desired on the part of the appraisal sponsor. David Kitson, principal architect of the SEI appraisal methods, said he and the SEI Appraisal Program team have seen a number of SCAMPI Class A appraisals performed and have been very happy with the results.

After hearing three years ago from

CMMI early adopters that the SCAMPI method was often taking 150 or more hours for a maturity Level 3 appraisal, Kitson and a team from government, industry, and the SEI adopted a stretch goal: Maturity Level 3 appraisals would take no longer than 100 hours on site. Since the first round of SCAMPI Lead AppraiserSM Training in April 2002, Kitson said, one defense contractor has reported conducting its maturity Level 3 SCAMPI appraisal in just 60 hours.

“We are seeing in practice the realization of the benefits we expected SCAMPI would provide,” Kitson said. “The organizations that are reaping the maximum benefits that SCAMPI offers are the ones that are taking the time to make genuine improvements in their processes and to treat process improvement just as they would any other project they undertake.”

Additionally, the SEI has developed two alternatives to a SCAMPI Class A appraisal: SCAMPI Class B and SCAMPI Class C.

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Although neither method can be used to produce a maturity level rating, both can be used to help organizations gauge the state of their process improvement and uncover process strengths and weaknesses.

“These methods can take less time, depending on the scope of the appraisal, and provide much more flexibility,” said Jack Ferguson, who leads the SEI appraisal program. “The Class B method,” Ferguson explained, “is slightly more rigorous than the Class C method. It requires a minimum-sized team to perform the appraisal and a corroboration of appraisal artifacts through interviews or other methods that demonstrate the practices are being performed. Class C can be done entirely with interviews or with document and artifact review.

“When you are looking for a rating, it is necessary to use Class A,” Ferguson said. “But if you’re doing the appraisal to help

yourself, or you want to give upper management a sense of where things stand, both B and C are good options.”

3. CMMI Is Only for Large Organizations

Although the CMMI models were developed in part to help larger organizations tackle complex issues across multiple disciplines, they can be tailored to meet the needs of smaller companies and organizations.

The SEI and the Army’s Software Engineering Directorate at Redstone Arsenal have partnered for a pilot study to implement a subset of CMMI process areas at two small companies in the Huntsville, Ala., region. The focus of the study is to enable better understanding of the enablers and barriers to CMMI adoption in the small company environment, while demonstrating business benefit to the companies involved.

“With the Huntsville pilots, our experience is that you use CMMI differently than you might in a larger organization,” said Suzanne Garcia, a member of the piloting team at the SEI. “Because of the limited resources in a small company for supporting process infrastructure, we took the approach of analyzing the business issues that were giving the companies problems, and using the related process areas and generic practices to help them solve those problems.”

Garcia and her teammates identified three major cost areas for using the CMMI in most organizations: (1) the periodic cost of conducting an appraisal, (2) the cost of establishing and maintaining a process improvement infrastructure, and (3) the cost of deploying new processes throughout the organization.

“A large company has an advantage in the first two cost areas, because the cost of appraisal and the cost of infrastructure will be a smaller percentage of their overall revenue than for a small company,” she said. “However, the cost of getting the new processes adopted and used by the intended scope of the organization is typically much less for a small company, and the deployment can go faster. If the small company can find ways to reduce the cost of the appraisal and infrastructure, they actually may have an overall advantage in getting business benefit from using the CMMI over a large company.”

4. CMMI Is Only for Enterprise-Wide Process Improvement

In 2003, the SEI launched an Interpretive Guidance project to collect information

about how the CMMI is being utilized by software, information technology, and information systems organizations, and to identify problems these organizations may have as they adopt the CMMI.

Mary Beth Christis, project manager of the Interpretive Guidance project, said the project was formed to respond to organizations that were interested in implementing only the software engineering best practices. "These 'software-only' organizations, we were told, were having some difficulty applying CMMI in their environments," she said. "This project set about collecting information to find out what these problems were."

The project gathered information using various methods, including an online survey and meetings at process improvement events. A preliminary report, published in late 2003, summarized the data gathered. The results were surprising¹.

"We expected to see patterns that would help us identify problems with the CMMI models that were causing specific

trouble for software-only organizations. Instead, we found that these organizations were experiencing very few problems with CMMI," she said. "If anything, this project has validated that CMMI models meet the needs of software-only organizations just as well as those pursuing enterprise-wide process improvement."

Conclusion

The CMMI Product Suite is a set of products that enable users to improve their product and service development and maintenance processes. These products include a set of CMMI models, the SCAMPI appraisal method, and the CMMI training program. Hundreds of organizations are currently using the CMMI Product Suite and sharing their experiences with the SEI. While some misconceptions from the early development and piloting days of the CMMI project are still circulating, those with experience using the product suite are helping to resolve and dismiss many of

these initial concerns. ♦

Notes

1. For more information, please see: <www.sei.cmu.edu/publications/documents/03.reports/03sr007.html> and <www.sei.cmu.edu/publications/documents/03.reports/03sr009.html>.

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Capability Maturity Model Integration

www.sei.cmu.edu/cmmi

The Software Engineering Institute hosts the Capability Maturity Model® Integration (CMMI®) Web site. It features general information about the CMMI, the latest models, how to get training, help with adoption, information about appraisals, and background information about the CMMI project as well as tips and information for the newcomer.

iSix Sigma

www.isixsigma.com

iSixSigma is a free information resource created to meet the needs of business professionals in search of proven methodologies for improving process efficiency, implementing data-driven decision making, and focusing on customer needs. The site offers comprehensive information, unique tools, checklists, calculators, and in-depth editorial and personalized advice to help quality and management professionals implement Six Sigma quickly and successfully into their organizations.

Software Technology Support Center

www.stsc.hill.af.mil

The Software Technology Support Center is an Air Force

organization established to help other U.S. government organizations identify, evaluate, and adopt technologies to improve the quality of their software products, efficiency in producing them, and to accurately predict the cost and schedule of their delivery.

The Quality Assurance Institute

www.qaiusa.com

The Quality Assurance Institute (QAI) is dedicated to partnering with the enterprise-wide information quality profession. QAI is an international organization consisting of member companies in search of effective methods for detection-software quality control and prevention-software quality assurance.

Software Productivity Consortium

www.software.org

The Software Productivity Consortium (SPC) is a non-profit partnership of industry, government, and academia. The SPC develops processes, methods, tools, and supporting services to help members and affiliates build high-quality, component-based systems, and continuously advance their systems and software engineering maturity pursuant to the guidelines of the major process and quality frameworks.

Software Program Managers Network

www.spmn.com

The mission of the Software Program Managers Network (SPMN) is to identify proven industry and government software best practices and convey them to managers of large-scale software-intensive acquisition programs. The SPMN enables program managers to achieve project success and deliver quality systems on schedule and on budget. More than 200 Department of Defense programs have benefited directly from SPMN expertise, consulting, and assessments.