In my previous career as a librarian, I used book reviews to make purchasing decisions. However, I was wary of dictionary and reference book reviews because I believed (and still do) that only use by many people over a long time can determine whether a reference book is excellent, leaves gaps in coverage, has a useful format, and so forth. However, this reference book is an exception. I already know that the content is essential. In this book, authors from the Software Engineering Institute (SEI) explain how their organization developed the CMMI model, how they present it, and how to use it; they also provide a case study of an organization preparing for a CMMI implementation. Their claim is that "this book provides a single source for all CMMI model information"; as I describe what is in the book, we will examine that claim.

A brief history

In 1993 the SEI at Carnegie Mellon University published the first version of the Capability Maturity Model (CMM) in the form of two technical reports. In 1995, bringing together some introductory material and the current version of the software CMM, the SEI published The Capability Maturity Model: Guidelines for Improving Software Process (Addison-Wesley, 1995). In the years after the first technical reports were released, the SEI, with the assistance of other organizations, developed other maturity models — for systems engineering, software acquisition, workforce management, and integrated product and process development. The SEI recognized that having multiple models within the software industry was problematic, so they conducted the CMM Integration project to provide organizations with a model for
enterprise-wide process improvement. Initially released in 2001, the CMMI combines three source models:

1. The Capability Maturity Model for Software (SW-CMM) v2.0 draft C
2. The Systems Engineering Capability Model (SECM), also known as the Electronic Industries Alliance 731 (EIA 731)
3. The Integrated Product Development Capability Maturity Model (IPD-CMM) v0.98

The CMMI is designed to replace these three models, and the SEI has released a sunset plan for the SW-CMM. They will make no further updates to the model, provide no additional assistance with training and appraisals, and transition to a new appraisal process. So what are the next steps for organizations that already rely on the SW-CMM or one of the other integrated models? And what does an organization do if it is just starting on the path to process improvement? This new volume provides many of the answers.

Introducing CMMI

The first of the book's three sections contains essential background information and describes how to use the process areas presented in the second section. Here are summaries of the first seven chapters:

- Chapter One: Basic concepts of process improvement, along with their history, benefits, and possible approaches to applying them.
- Chapter Two: Instructions on how to use different categories of information provided in the process areas.
- Chapter Three: Generic practices and what they can do for your organization. Discusses model components that provide effective, repeatable, lasting processes for an organization.
- Chapter Four: Discussion of how different process areas interact, and similarities and differences among them.
- Chapter Five: Brings previous discussions together into a discussion of "levels" — staged maturity levels and continuous capability levels.²
- Chapter Six: Explaining how to use the CMMI models for process improvement and benchmarking: a brief introduction to adopting CMMI and applying the SCAMPI appraisal process.³
- Chapter Seven: A case study of an organization as it prepares to adopt CMMI.

Chapters One through Six are a densely packed treasure-trove of information. The language is terse and precise. I had to refer frequently to the list of acronyms and glossary in Section Three. And even then, it took me several readings to understand some sections. It wasn't until I had completed an introductory course on CMMI that I felt I could reread certain sections and completely grasp the concepts they described.
To suggest that organizations new to process improvement could learn how to use CMMI with this volume as a reference would be disingenuous. That would be like taking a graduate class in database system design before knowing how to use databases. In addition, the case study in Chapter Seven discusses the actions of an organization currently operating at SW-CMM Maturity Level 5 as it prepares to convert to CMMI. This sophisticated organization faces very different problems than an organization still at Maturity Level 3, or one that is relatively new to process improvement. A case study of a more typical organization would have been more useful to a broader group of readers.

Section on process areas

The book's second section is the meatiest; it contains the complete model. Unless you are already familiar with CMMI process areas, you wouldn't want to jump to this section without at least reading the process area component descriptions in Chapter Two. Section Two presents the process areas alphabetically, without regard to either staged maturity level or continuous capability level. For each of the twenty-five process areas, there are sections on purpose, specific goals, specific practices, practice-to-goal relationships for both continuous and staged level representations, related process areas, and examples or other explanatory material. Process areas range from Requirements Management to Project Planning, and from Risk Management to Causal Analysis and Resolution. The introductory notes for each process area discuss its scope and major concepts. Each process area discussion also includes information that is specific to different executions of the model or that varies depending on the type of representation being implemented. Be prepared to read and re-read the information about each process area, often with glossary at the ready, in order to really understand what that area attempts to accomplish.

Using the process areas of the CMMI are not like using a cookbook. Individual organizations must analyze and interpret each one to fit their needs. They must develop processes that satisfy each goal and specific practice, but what is contained in those processes is up to the individual organization. Rather than telling readers what to develop, the process area section of this book helps them focus on objectives they must achieve in order to satisfy the process area's practices and goals.

Appendices and glossary

The last section of the book includes the appendices, the glossary, and an index. Normally a book reviewer might not discuss this section, but much of the material in it is far more than "nice to know." Included in the appendices are references to publicly available sources from various organizations for practitioners who want more in-depth information on one particular process area or model implementation. A list of regularly updated SEI sources includes FAQs on CMMI and a link to the IDEALSM (Initiating, Diagnosing, Establishing, Acting, Learning) model for implementing process improvement. One appendix interprets acronyms used in the book.
The most important feature in this section is a glossary. Although the words used in the model are not complicated, within the context of the CMMI some have very precise meanings that differ from the word's common meaning. For example, in the CMMI the word goal does not mean a desired end or purpose (the model uses objective to mean this), but instead refers specifically to a required component that can be either a generic goal or a specific goal. For example, within a process area a specific goal is "a required model component that must be present to satisfy the process area." In other words, a goal is not merely a desirable result, but rather a practice that must be satisfied in order to satisfy the process area. Such particular meanings for common words make the glossary an essential reference.

A must have?

Is this book a must have? Should everyone involved in organizational process improvement, or more specifically, the implementation of CMMI at their organization, own and study a copy of CMMI: Guidelines for Process Integration and Product Improvement? That depends on your goals (everyday use of the word.) If all you are focused on is completing and passing that Level 2 SCAMPI appraisal, then you can purchase material on Level 2 process areas, ignore their interrelationships with other process areas, and not worry about what comes next. However, if you are part of an organization that is committed to process improvement, then this is an invaluable reference book.

However, remember the caveat I mentioned earlier: If you are unfamiliar with any CMM model, the information in the book can be overwhelming. The authors recommend different ways to use the book for those who are new to process improvement, those familiar with process improvement but not the CMMI, and those familiar with the CMMI. Their recommendations for the latter two groups will probably work. However, those without process improvement experience and someone to guide them through what applies today and what will be interesting for tomorrow will find the comprehensive information in the book's first section daunting. Plus, the process area descriptions in the second section, presented alphabetically, can be very confusing.

Also, as I noted earlier, if you are looking for a prescriptive model that will tell you exactly what must be done in your organization to pass an appraisal at Maturity Level 3, this volume is not the answer. There are no policy or process samples, no templates, no forms, and no examples to copy. Instead of a one-size-fits-all solution, this book provides a model for process improvement that organizations can tailor to their particular needs.

In my opinion this volume is a worthwhile investment for anyone involved in process improvement. It is not a book that you pick up, read from cover to cover, and then put on a shelf to gather dust. My copy is marked with highlights, notes, and a permanent tab at the beginning of the glossary, not to mention temporary tabs at each of the process areas with which I am currently involved. If you are part of a process
improvement effort, I expect you will use it as I do, as a reminder and guide — in fact as a comprehensive reference book for CMMI.

Notes


2 Staged representations of the model involve a set of process area goals whereby each level you attain establishes a foundation for the next level. Continuous representations recommend an order for improving processes within a specific process area. A maturity level extends across all process areas for the level; a capability level is specific to a process area and may be different for different areas.

3 Standard CMMI Appraisal Method for Process Improvement

4 *CMMI: Guidelines for Process Integration and Product Improvement:* p.628

This article originally appeared in *The Rational Edge*, an IBM online publication – http://www.ibm.com/developerworks/rational/rationaledge/