Part II

SCAMPI Appraisals

After the dishes have been prepared and the guests are seated at the table, if you wait too long to serve them you may hear the question, "Where's the beef?" Or, if the menu is seafood you may of course hear instead, "Where's the shrimp?" In any case, keeping diners waiting too long can lead either to impatience or boredom. Similarly, when readers pick up a book on process appraisals, the authors should not keep them waiting too long to get to the meat of the subject. Having examined in Part I, "Why SCAMPI Now?", the menu of process appraisal options, we now turn to the details of the CMMI SCAMPI appraisal methods. Here is where you discover the best ways to use these appraisals so that they meet the needs of your organization, without giving you indigestion.

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Chapter 4. SCAMPI Class B and C Appraisal Methods

The less rigorous and less costly versions of the SCAMPI method, "Class B" and "Class C," may be used to develop process improvement plans and (perhaps) to prepare an organization for a full-scale Class A SCAMPI appraisal.

Chapter 5. SCAMPI for Internal Process Improvement

We highlight for those wanting to use SCAMPI for internal process improvement or for an internal organizational benchmark some aspects of the method that may be new or deserve emphasis, including preparation, the appraisal team, and the appraisal timeline.

Chapter 6. SCAMPI for External Audits

Some of the issues that arise when a SCAMPI appraisal is used for an external audit or evaluation, including a government source selection, the selection of suppliers, and contract monitoring.

Chapter 2

New Aspects of the SCAMPI Method

shrimp scam·pi   *an appraisal whose scope includes only a very small number of the* CMMI *process areas*

chick·en scam·pi   *an appraisal whose lead appraiser comes from within the organization being appraised*

In this chapter, we briefly review several of the major factors that drove the development of the SCAMPI appraisal method. For readers who have some familiarity with legacy appraisal methods, such as CBA-IPI and the EIA 731 method, this may be useful as you transition to the SCAMPI method. For all readers, as you work toward an in-depth understanding of the SCAMPI method, keep these factors in mind along with why things are the way they are and how you can best make use of it.

2.1 From Discovery to Verification

The integrated CMMI models combine the materials from three legacy models; the disciplines addressed include software, systems engineering, and integrated process and product development. Therefore, it is no surprise that the size of the integrated model, an amalgam that covers all three areas, is larger than any one of the single-discipline legacy models. With a larger model, there is more to review during an appraisal. One of
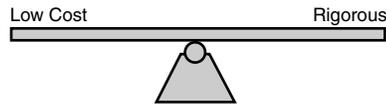
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Figure 2-1: *Balancing Low Cost and Rigorous Benchmarking*

the primary objectives of the SCAMPI development was to maintain the quality of the legacy appraisals but at the same time keep the cost of a CMMI SCAMPI appraisal lower than the combined cost of multiple single-discipline appraisals. Several methods were evaluated by the Product Development Team to address the expanded size of the CMMI models; the goal was to keep cost within reasonable limits and at the same time retain a rigorous benchmarking capability. These two objectives were in competition on the opposite ends of a teeter-totter. It was a challenge to keep these two objectives balanced during the development of SCAMPI and it remains so at present.

The CBA-IPI assessment method, which was used with the CMM for Software, was considered a rigorous benchmarking method. However, it was based on the "discovery" of evidence by an assessment team that the goals of the model were indeed satisfied. This was a very labor-intensive process. The team was responsible for finding evidence that each activity was satisfied through a review of documents and interviews. The developers of CMMI and its appraisal methods determined that the time required discovering that all of the CMMI goals were satisfied in the style of the CBA-IPI method would be excessive with a large model like CMMI.

In addition, some believed that the CBA-IPI method allowed for too much variability. Given the same organization, how consistently could different CBA-IPI teams reach the same conclusions on the model satisfaction? The developers of the method considered consistency of appraisal findings to be an important objective of the new CMMI appraisal method. They strove for a low-cost benchmarking method where there was a high probability that different SCAMPI teams would reach the same findings for an organization.

The basis of the solution to these challenges was to create a "verification" appraisal method rather than a discovery method. With a verification method, the organization undergoing the appraisal is responsible for providing traces from the model's goals and practices to the evidence generated by the processes that they use. The appraisal

team then verifies that what the organization has provided is valid for each practice. While this reduces the appraisal team's effort, a SCAMPI appraisal is still neither easy nor quick. There are ongoing challenges to further reduce the cost of applying the method while maintaining the benchmarking capabilities of the method.

2.2 Focused Investigations

Large amounts of objective evidence are necessary due to the size of the CMMI model, the disciplines covered, and SCAMPI method rules. Efficient appraisals require effective data collection and management strategies. Focused investigations are used to track and prioritize appraisal team effort on the data that may still be needed for sufficient coverage of model practices within the appraisal scope. The appraisal team must continually keep in mind the following questions: What data do I have? What data do I still need? How am I going to collect the data? If the organization has prepared properly, the appraisal team's effort to verify the processes is much easier. How does the organization deal with the large amount of data required by the team to verify the processes?

Let's take a look at the amount of data to be collected and verified for an organization that is appraising three projects against the CMMI-SE/SW/IPPD/SS. There are 185 specific practices in this model (staged representation). Each specific practice requires at least one direct evidence data item.[1] Some practices may require more. This model has 25 process areas for maturity level 5, so the generic practice direct evidence may include at least one item of data for each GP for each process area. Table 2-1 summarizes the number of data items for each project.

The appraisal team also looks for indirect evidence or affirmations for each practice. To reduce the risk of not satisfying the desired maturity level rating, let's assume that the organization and projects collect at least one indirect evidence data item for each practice. (Although this is not required by the SCAMPI method, the organization being appraised may feel safer by providing to the appraisal team indirect evidence

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[1] See section 3.3.5 for a discussion of the difference between direct and indirect evidence in a SCAMPI appraisal. Briefly, if you prepare a dish following a recipe, the dish itself is the direct evidence that you prepared it and followed (more or less) the recipe, whereas the receipts for the ingredients and a food-spattered copy of the recipe would be examples of indirect evidence.

Table 2-1: *Data Items Required for Each Project (ML5)*

	Direct Evidence	*Indirect Evidence*	*Total*
Specific practices	185	185	370
Generic practices	300	300	600
Total	**485**	**485**	**970**

data items for all practices.) This doubles the amount of data needed for the appraisal.

This adds up to a minimum of about 1,000 data items for a single project and 3,000 data items for three projects. In reality, there could be an even larger number needed to ensure that the appraisal team can verify each practice for each project. For example, some practices are compound sentences and a single data item may not satisfy the verification needs of the team. For instance, take GP 3.2: *Collect work products, measures, measurement results, and improvement information derived from planning and performing the process to support the future use and improvement of the organization's processes and process assets.* It might be difficult to create a process work product that shows all these expectations for a process area. More than likely, a measurement repository output will be needed as well as example work products in the process asset library or libraries, reports, and lessons learned. This GP is needed for every PA within the scope of the appraisal. Add these data items and their indirect evidence items and the number of data items to be collected for each project can easily approach 1,500 to 1,700. This results in 4,500 to 5,100 data items to be collected and verified for a three-project appraisal at maturity level 5.

An undeniable conclusion: It is a significant task for the organization and its projects to manage the collection and presentation of this large number of data items.

However, it should be noted that these data items reflect the results of work performed by the project or organization. Thus, a high-maturity organization that would be striving for maturity level 5 does not have to create them—it just has to find them. This is the collection of work products that are the natural consequence of the organization and its projects following their defined processes. The task is to organize the data and map it to the model practices. While this is still a significant

undertaking, one side effect of the effort may be the sharing of lessons learned across projects and across disciplines, which can support future process improvement efforts.

Please remember that requiring indirect artifacts for every practice is not required, and in many cases affirmations may be a much more efficient way to corroborate the direct artifacts.

Some organizations use hard copies of each data item and create indexes to the library. This was a common practice in CBA-IPI assessments. However, the larger amount of data required for CMMI is driving the need for automated libraries and online access to the data items. Some organizations have created databases that provide links to the files on servers or web sites that contain the data items. Others have created web sites that control the access to the same types of information. There are also tools provided by software development companies and consulting organizations to be used by their clients.

2.3 For EIA 731 Users

The appraisal method in EIA 731[2]—*Systems Engineering Capability Model* (SECM)—is quite different from the CBA-IPI method in some respects, but in others it is very similar. If you listened in on a group of EIA 731 appraisers, you would hear them talking about questionnaires, interviews, and focus area ratings. The SCAMPI appraisers would be talking about document reviews, interviews, and either process area capability level ratings or maturity level ratings. EIA 731 is primarily an affirmation process rather than a discovery process or a verification process. The EIA 731 method uses questionnaires to collect data. The team evaluates the questionnaires and then interviews the participants to fill gaps in what was affirmed by the questionnaires. Next, they rate the practices within the focus areas and roll up the data to themes and focus areas.

Some of the EIA 731 appraisal features have been combined with the CBA-IPI method to define the SCAMPI method. However, SCAMPI is much closer to the CBA-IPI than the EIA 731 method. One of the reasons for this is that the EIA 731 method was not written for third-party

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[2] The EIA 731 Appraisal Method was developed by the G47 SECM Working Group of the Government Electronics & Information Technology Association (GEIA).

evaluations or benchmarking appraisals. One of the SCAMPI requirements is that it can be used for these purposes. In fact, the EIA 731 method says that it is not to be used for that purpose (like LESAT, described in Section 1.3 of Chapter 1, "Process Appraisal Strategies"). Performing benchmarks requires more rigor in the appraisal than that provided by the EIA 731 method. On the other hand, the EIA 731 method provided the affirmation features of the SCAMPI approach.

The phases of an EIA 731 appraisal and the primary outputs of the EIA 731 appraisal are the same as that of the SCAMPI. The phases are called Preparation, On-site, and Post Appraisal in EIA 731, and Plan and Prepare for Appraisal, Conduct Appraisal, and Report Results in SCAMPI. The most significant difference in the phases is in the preparation phase. In EIA 731 preparation, the participants complete a questionnaire and attend interview and feedback sessions. In preparing for SCAMPI, the programs being appraised prepare objective evidence for every practice within the scope of the appraisal. This can be a very expensive and time-consuming activity. In comparing the two methods, EIA 732 is nearer the low cost end of the teeter-totter while SCAMPI is nearer the rigorous end.

The primary outputs for both methods are findings and a rating report. The ratings report produced by EIA 731 is in the form of a capability profile. See Figure 2-2 for an example EIA 731 profile. A scoring profile is also an optional output of the SCAMPI. One key difference in the scoring is that in an EIA 731 appraisal, partial credit for satisfaction of a focus area is given. Notice in the example profile in Figure 2-2 that the scores provide the capability to score the focus areas at 1.5, 2.5, and so on. SCAMPI only allows full satisfaction of capability levels.

The SCAMPI method provides a very good mechanism for doing partially satisfied (more informative) charts by reporting the ratings at the practice and goal levels as well as the process area, but this level of graphing is not done. The information would be available in the findings report, and an organization could create such charts after the appraisal team leaves. The advantage of this charting method is that the organization can see at a glance what the weaknesses are. Of course, if the organization asks for a maturity level rating it may get just a number and no profile at all.
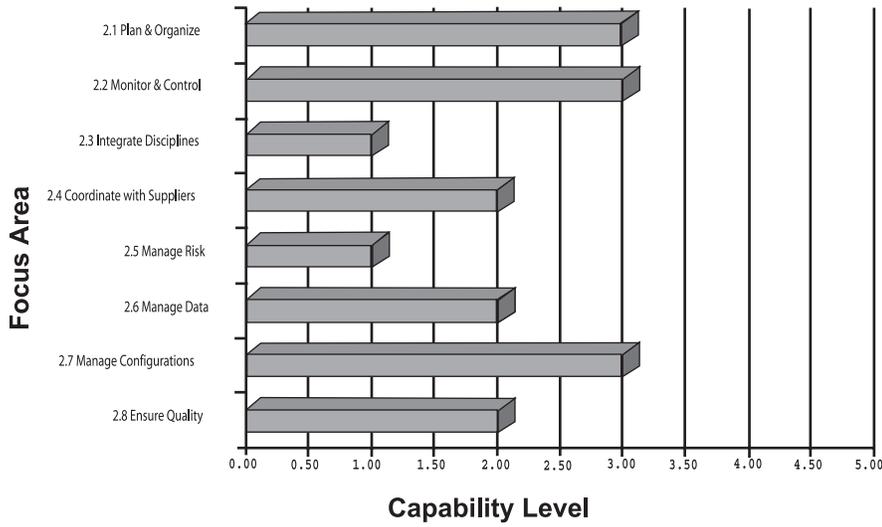
Figure 2-2: *Example EIA 731 Profile*

Profile Use

The *Australia Ministry of Defense* (AMOD) uses profiles instead of maturity level ratings in their acquisition selection process. Just as an organization can create profiles to meet their business needs as efficiently as possible, the AMOD uses them to meet their acquisition needs. This allows them to expect higher capability in key areas than in areas that are not as critical given the situation for the acquisition.

2.4 Summary

The authors of SCAMPI have worked to balance the cost and rigor of
the method. SCAMPI was developed from the CMM for Software's
CBA-IPI method and the SECM method; one very rigorous and one
very cost effective. This balance of cost and rigor has been accom-
plished (in part) by basing the SCAMPI appraisal method on verifica-
tion of data rather than on discovery. One consequence of this is that
the organization is responsible for presenting a large amount of data
to the appraisal team for them to verify. A vehicle to communicate how
the data from the organization being appraised relates to the model
is the Practice Implementation Indicator Description (PIID). PIIDs and
the Class A SCAMPI method are discussed in the next chapter.