

Standard CMMI[®] Appraisal Method for Process Improvement (SCAMPISM) A, Version 1.3: Method Definition Document

SCAMPI Upgrade Team

March 2011

HANDBOOK
CMU/SEI-2011-HB-001

Software Engineering Process Management
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This report was prepared for the

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This work is sponsored by the U.S. Department of Defense. The Software Engineering Institute is a federally funded research and development center sponsored by the U.S. Department of Defense.

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Acknowledgments

Great thanks are due to the many talented people who participated in developing Version 1.3 of the SCAMPI Method Definition Document.

SCAMPI Upgrade Team (SUT)

- Mary Busby, Lockheed Martin
- Palma Buttles-Valdez, Software Engineering Institute
- Paul Byrnes, Integrated System Diagnostics
- Will Hayes, Software Engineering Institute
- Ravi Khetan, Northrop Grumman
- Denise Kirkham, The Boeing Company
- Lisa Ming, BAE Systems
- Charlie Ryan, Software Engineering Institute
- Kevin Schaaff, Booz Allen Hamilton
- Alexander Stall, Software Engineering Institute
- Agapi Svolou, Alexanna LLC
- Ron Ulrich, Northrop Grumman

Many dedicated individuals reviewed preliminary versions of this document and offered their valuable feedback and suggestions. We would like to thank them for their contributions.

- Daniel Blazer
- Michael Campo
- William Deibler
- Geoff Draper
- Nancy Fleischer
- Sam Fogle
- Eileen Forrester
- Brian Gallagher
- Hillel Glazer
- Michael Konrad
- Kelly Lanier
- Steve Masters
- Yukio Miyazaki
- Judah Mogilensky
- Boris Mutafelija
- James Nash
- Heather Oppenheimer
- Pat O'Toole
- Alice Parry
- Lynn Penn
- Ron Radice
- John Ryskowski

- P.M. Shareef
- Sandy Shrum
- Kathy Smith
- Dick Waina
- Ed Weller

We also acknowledge a special group of contributors who helped generate ideas and clarifications. These individuals volunteered their time and effort to improve the appraisal method as well as to achieve broader community acceptance of the changes.

- Daniel Blazer
- Michael Campo
- Geoff Draper
- Ravi Khetan
- Lisa Ming
- Robert Moore
- James Nash
- Lynn Penn
- Kathy Smith
- Alex Stall
- Agapi Svolou

The SUT Extended Team, a group of early contributors to the team's thinking, is also rightly acknowledged for their valuable input:

- Jim Armstrong
- Emanuel Baker
- Richard Barbour
- Yan Bello
- Daniel Blazer
- Jorge Boria
- Michael Campo
- Sean Cassell
- Sandra Cepeda
- Bill Deibler
- Geoff Draper
- Jeff Dutton
- Nancy Fleischer
- Hillel Glazer
- Barbara Hilden
- Raymond Kile
- Ralf Kneuper
- Frank Koch
- Renee Linehan
- John Maher
- Diane Mizukami-Williams

- Bob Moore
- Wendell Mullison
- Gary Norausky
- So Norimatsu
- Heather Oppenheimer
- Malcolm Patrick
- David Rolley
- Viviana Rubinstein
- Winfried Russwurm
- Kobi Vider
- Randy Walters
- Gian Wemyss
- Jitka West
- Michael West

Thanks also go to the members of the CMMI Steering Group and the CMMI Configuration Control Board for their valuable oversight. The membership of these groups is available on the SEI website: <http://www.sei.cmu.edu>

Rusty Young, who manages the SEI appraisal program, is thanked for encouraging us to “do the right thing” in the face of differing viewpoints and conflicting preferences.

And finally, our intrepid and cheerful editor, Eric Hayes, is to be commended for his tireless efforts to produce the MDD. Thank you Mr. Hayes!

Abstract

The Standard CMMI Appraisal Method for Process Improvement (SCAMPI) is designed to provide benchmark quality ratings relative to Capability Maturity Model Integration (CMMI) models and the People CMM. The SCAMPI Method Definition Document (MDD) describes the requirements, activities, and practices associated with the processes that compose the SCAMPI method. The MDD also contains precise descriptions of the method's context, concepts, and architecture.

Part I: Overview

About this Document

This document, also called the Method Definition Document (MDD) describes the Class A Standard CMMI Appraisal Method for Process Improvement (SCAMPI). The MDD is divided into three major parts, each with a different level of detail, intended usage, and primary audience. The structure, audiences, and suggested use of each part of the document are described below.

Revision History

April 12, 2011 SCAMPI Method Definition Document published to the SEI website at the following URL: <<http://www.sei.cmu.edu/library/abstracts/reports/11hb001.cfm>>

April 25, 2011 - SCAMPI Method Definition Document republished to the SEI website with corrections.

June 1, 2011- SCAMPI Method Definition Document republished to the SEI website with corrections.

For details about revisions and editorial corrections, please reference the Revision sheet at the following URL: <http://www.sei.cmu.edu/cmmi/tools/upload/11hb001-revisions.cfm>

Part I: Overview

Part I of the MDD provides an overview of the method's context, concepts, and architecture. Part I gives a big picture of the method, rather than details about how to enact it. Table 1 shows the contents of Part I of the MDD.

Table 1: Part I Contents

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About This Document	3
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SCAMPI A Method Overview	13

Part II: Process Definitions

Part II of the MDD describes the method requirements and the detailed activities and practices associated with each of the processes that compose the SCAMPI A method. Part II lists required practices, parameters, and the limits of allowable variation, and gives guidance for enacting the method. Table 2 shows the contents of Part II.

Table 2: Part II Contents

Phase	Process	Page Number
1: Plan and Prepare for Appraisal	1.1 Analyze Requirements	37
	1.2 Develop Appraisal Plan	59
	1.3 Select and Prepare Team	76
	1.4 Obtain and Inventory Initial Objective Evidence	96
	1.5 Prepare for Appraisal Conduct	104
2: Conduct Appraisal	2.1 Prepare Participants	113
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3: Report Results	3.1 Deliver Appraisal Results	165
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Part III: Appendices, References, and Glossary

Part III of the MDD includes appendices that elaborate selected topics and supplement the first two parts of this document. Read the first two parts of the MDD prior to reading Part III. The topical elaboration and reference material available in the appendices provides deeper insights to readers already knowledgeable about the material. Table 3 shows the contents of Part III.

Table 3: Part III Contents

Section	Page Number
Appendix A The Role of Objective Evidence in Verifying Practice Implementation	185
Appendix B Alternative Practice Identification and Characterization Guidance	191
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Audiences for this Document

The MDD is primarily intended for SCAMPI Lead Appraisers certified by the Software Engineering Institute (SEI). It is expected that these professionals have the prerequisite knowledge and skills specified by the SEI Appraisal program (see <http://www.sei.cmu.edu/> for details), and that they use the MDD as a key part of their knowledge infrastructure. SCAMPI Lead Appraisers are the primary audience for Part II. The MDD is also used as a training aid in SCAMPI Lead Appraiser training.

Appraisal team members are expected to refer to this document as a training aid. Portions of the MDD may also be used as work aids during the conduct of an appraisal. Potential appraisal team members can use the MDD to build their knowledge base so they can participate in a future appraisal.

Appraisal stakeholders are also part of the targeted audience for the MDD, particularly for Part I. These stakeholders include the following:

- appraisal sponsors—leaders who sponsor appraisals to meet business objectives
- process group members—process improvement specialists who need to understand the method, and sometimes to also help others gain familiarity with the method
- other interested people—those who want deeper insight into the methodology for purposes such as ensuring that they have an informed basis for interpreting SCAMPI A outputs or making comparisons among similar methodologies

How to Use this Document

Part I

It is expected that every member of the audience for this document will find value in Part I. The two primary sections in this part are the Executive Summary and the Method Overview.

The **Executive Summary** is intended to provide high-level information describing SCAMPI A, and does not require extensive knowledge of appraisals. This portion of the document may be excerpted and provided to a more casual reader or a stakeholder in need of general information to support their decision to conduct an appraisal.

The **Method Overview** section provides comprehensive coverage of SCAMPI A, and can be used to begin building a base of knowledge for readers who need more detailed information. Appraisal sponsors wanting more than a summary view should read this section. Every prospective SCAMPI A appraisal team leader and team member is expected to read this section of the document to ensure that they have the “big picture” before they study the detailed methodology.

Part II

People who will enact an appraisal are expected to read the second part of the document. Members of this audience need to know how to enact the method, not just what the method is. Part II is divided into Process Definitions, which are in turn divided into Activities. Each Activity delineates Required Practices, Parameters and Limits, and Implementation Guidance.

There are several **processes** contained in SCAMPI A. The processes support a variety of orderings and enactments to facilitate a variety of usage modes for SCAMPI A. The temporal flow, as well as the flow of inputs and outputs among the processes, is described in the Method Overview section. The Process Definitions are not intended to provide a start-to-finish view of SCAMPI A. Instead, these sections provide detailed definitions of processes and activities that are implemented according to the appraisal plan created by the appraisal team leader.

Each of the Process Definitions begins with an **overview** of the process. Every process is defined by information contained in the elements shown in Table 4.

Table 4: *Process Definition Elements*

Element	Description
Purpose	A brief summary of what is accomplished by enacting the process
Entry Criteria	Conditions that must be met before enacting the process
Inputs	Artifacts or information needed to enact the process
Activities	The set of actions which, in combination, make up the process
Outputs	Artifacts and assets that result from enacting the process
Outcome	Any change in important conditions or artifacts that results from enacting the process
Exit Criteria	Conditions to be met before the process can be considered complete
Key Points	A summary of the most notable events associated with the process
Tools and Techniques	Work aids commonly used in enacting the process
Metrics	Useful measures that support the process enactment, or future enactments
Verification and Validation	Techniques to verify and/or validate the enactment of the process
Records	Information to be retained for future use
Interfaces with Other Processes	A discussion of how the process interacts with other processes in the method
Summary of Activities	A narrative summary of the set of activities

Following the introductory material, each **Activity** that is a part of the Process Definition is briefly summarized to orient the reader to the scope of the activity. Each Activity includes the elements shown in Table 5.

Table 5: Activity Elements

Element	Description
Activity Description	A brief overview of what is accomplished by enacting the activity
Required Practices	A listing of practices that must be implemented to consider the enactment a valid SCAMPI A
Parameters and Limits	Acceptable limits for things that are allowed to vary, and acceptable limits for things under the discretion of the appraisal team leader
Implementation Guidance	A narrative description of advice or things to consider in performing the activity

Part II provides complete, unambiguous descriptions of the method processes and activities. In combination with the training materials and work aids that comprise the SEI's appraisal program, this information provides a firm basis for standardization of the practice of Process Appraisals.

Part III

The appendices of the document provide detailed coverage of special topics as well as references and a glossary. Readers knowledgeable about SCAMPI A are expected to read these sections to gain further understanding of best practices and implementation guidance on SCAMPI A concepts that may span multiple appraisal activities.

Feedback Information

We are very interested in your ideas for improving this document. See the CMMI web site for information on how to provide feedback by using a Change Request form:

<http://www.sei.cmu.edu/cmmi/tools/cr/>

If you have questions, please send an email to cmmi-comments@sei.cmu.edu.

Executive Summary

What Is SCAMPI A?

The Standard CMMI Appraisal Method for Process Improvement (SCAMPI) is designed to provide benchmark-quality ratings relative to Capability Maturity Model Integration (CMMI) models. SCAMPI A satisfies all of the Appraisal Requirements for CMMI (ARC) requirements for a Class A appraisal method. Although designed for conducting appraisals against CMMI-based reference models, the SCAMPI A method can also be applied for conducting appraisals against the People CMM and other reference models.

SCAMPI A enables a sponsor to

- gain insight into an organization’s capability by identifying the strengths and weaknesses of its current processes relative to appraisal reference model(s)
- prioritize improvement plans
- focus on improvements (correct weaknesses that generate risks) that are most beneficial to the organization given its current level of organizational maturity or process capabilities
- derive capability level ratings as well as a maturity level rating
- *identify risks relative to capability/maturity determinations*

As a Class A appraisal method, SCAMPI A is an appropriate tool for benchmarking. Sponsors who want to compare an organization’s process improvement achievements with other organizations in the industry may have a maturity level determined as part of the appraisal process.

Decisions made on the basis of maturity level ratings are only valid if the ratings are based on known criteria. Consequently, contextual information—organizational unit, organizational scope, reference model scope, appraisal method type, the identity of the appraisal team leader and the team—are items for which criteria and guidance are provided within the method to ensure a consistent interpretation within the community. Benchmarking can only be valid when there is a consistent basis for establishing the benchmarks.

The SEI maintains industry aggregates for appraisal results. These data are reported in industry maturity profiles gathered from organizations that have performed appraisals since 1987. The profile is based on appraisal data provided by SEI-trained professionals, and is updated twice annually.

The SEI supports the SCAMPI A method and operates a certification program for SCAMPI Lead Appraisers. Additional details can be found on the SEI web site at <http://www.sei.cmu.edu>.

Core Concepts and Approach

SCAMPI A, as a benchmarking appraisal method, relies on an aggregation of information that is collected via defined types of objective evidence. The objective evidence feeds an “information-processing engine” whose parts are made up of a series of data transformations. The appraisal team observes, hears, and reads information that is transformed into notes, and then into characterizations of practice implementation gaps or compliance, and then into preliminary findings. These findings are validated by the organizational unit before they become final findings. The critical concept is that these transformations are applied to data reflecting the enacted processes in the organizational unit and the appraisal reference model, and this collection of data forms the basis for ratings and other appraisal results.

Planning is critical to the execution of SCAMPI A. All phase and process activities briefly discussed below derive from a well-articulated plan developed by the appraisal team leader in concert with members of the appraised organization and the appraisal sponsor.

SCAMPI A Methodology

SCAMPI A consists of three phases and several essential processes, as was shown in Table 2. Each phase is described in detail below.

Phase 1: Plan and Prepare for Appraisal

Appraisal planning starts with understanding the sponsor’s objectives, requirements, and constraints. All other planning, preparation, execution, and reporting of results proceed from this initial activity. Because of the significant investment and logistical planning involved, considerable iteration and refinement of planning activities should be expected in phase 1. With each subsequent phase, the amount of iteration will decrease as data are collected, analyzed, refined, and translated into findings of significance relative to the model.

A team of experienced and trained personnel performs a SCAMPI A over a period of time negotiated by the sponsor and the appraisal team leader. The scope of the organization to be appraised, as well as the scope of the appraisal reference model (process areas), must be defined and agreed upon. The scope of the organization and model provides the basis on which to estimate personnel time commitments, logistical costs (e.g., travel), and overall costs to the appraised organization and to the sponsoring organization.

During the appraisal, the appraisal team verifies and validates the objective evidence provided by the appraised organization to identify strengths and weaknesses relative to the appraisal reference model. Objective evidence consists of **artifacts** and **affirmations** used as indicators for implementation and institutionalization of model practices. Before the Conduct Appraisal phase begins, members of the appraised organization typically collect and organize documented objective evidence, using defined data collection strategies based on the extent of artifacts available within the organization and aligned with the appraisal reference model.

Advance preparation by both the appraisal team and the appraised organization is key to the most efficient execution of the method. Analysis of preliminary documented objective evidence provided by the appraised organization plays an important role in preparing for appraisal execution. If substantial data are missing at this point, subsequent appraisal activities can be

delayed or even cancelled if the judgment is made that continuing appraisal activities will not be sufficient to make up for the deficiency given the resources available.

The collection of documented objective evidence, to some degree, by the appraised organization in advance of the appraisal can help improve appraisal team efficiency, but can also offer several other benefits to the organization:

- improved accuracy in appraisal results delivered by external appraisal teams (i.e., clear *understanding of implemented processes, strengths, and weaknesses*)
- obtaining a detailed understanding of how each part of the organization participating in the appraisal has implemented model practices, and the degree of compliance and tailoring of organizational standard processes
- establishing residual appraisal assets that can be reused on subsequent appraisals, minimizing the effort necessary for preparation

However, the effort to collect, organize, and review large amounts of objective evidence in advance of the appraisal can be a large cost to appraised organizations, and can lead to diminishing returns if not done efficiently. Incremental data collection strategies with specific data requests can help mitigate the risks of inefficiently using the organization's resources on collecting data that is not appropriate or useful. A data collection plan, developed by the appraisal team leader in conjunction with the appraised organization, can help make explicit the choices on how much data collection effort to distribute between the organization and the appraisal team.

Phase 2: Conduct Appraisal

In phase 2, the appraisal team focuses on collecting data from the appraised organization to judge the extent to which the model is implemented. Integral to this approach is the concept of coverage, which implies two things: first, the collection of sufficient data for each model component within the model scope selected by the sponsor, and second, obtaining a representative sample of ongoing processes.

Sampling is planned quantitatively based on the diversity of unique process implementations within the appraisal scope, with the goal of both ensuring a representative sample of the organizational unit and optimizing the effort for collection and analysis of objective evidence. This means collecting data and information on all the appraisal reference model practices in the appraisal scope, across sampled process instantiations within the organizational unit being appraised. The data collection plan developed in phase 1 undergoes continuous iteration and refinement until sufficient coverage is achieved.

Upon determining that sufficient coverage of the appraisal reference model and organizational unit has been obtained, appraisal findings and ratings may be generated. Goal ratings are determined within each process area, which collectively can be used to determine aggregate ratings for the individual process areas or for the organizational unit, as appropriate.

Phase 3: Report Results

In phase 3, the appraisal team provides the findings and ratings to the appraisal sponsor and the organization. These artifacts become part of the appraisal record, which becomes protected data in accordance with the appraisal disclosure statement. The level of protection and the plan for the

disposition of appraisal materials and data are determined in phase 1 in collaboration with the sponsor. A completed appraisal data package, which includes a subset of the contents of the appraisal record, is provided to the SEI. The SEI adds the appraisal data to confidential databases, and provides overall profiles of the community on a periodic basis.

SCAMPI A Tailoring

Successful application of SCAMPI A relies on adjusting the parameters of the method to the needs of the organization and to the objectives and constraints of the sponsor's organization.

The sponsor's objectives largely influence tailoring decisions. The reference model scope and representation (staged or continuous), the size of the organizational unit, the parts of the organization sampled, the size of the appraisal team, and the number of interviews greatly influence things such as preparation time, time on site, and monetary costs, and so are also major factors when choosing tailoring options. All tailoring decisions must be documented in the appraisal plan.

Tailoring provides flexibility to efficiently adapt the appraisal to the needs of the appraisal sponsor, within acceptable limits allowed by the appraisal method. The appraisal team leader is responsible for ensuring that the requirements of the method are satisfied. Tailoring the method too severely could result in failure to satisfy method requirements, the inability to obtain sufficient data for generation of appraisal findings or ratings, or failure to meet the criteria necessary for recognition as a valid SCAMPI A appraisal.

Time Frame and Personnel Requirements

A requirement of the SCAMPI A method is that the Conduct Appraisal phase must be completed within 90 days. Afterwards, the follow-on activities implicit with a full cycle of appraisal to reappraisal would typically include an extended period of time for creating an action plan and implementing improved processes, with a reappraisal occurring in the latter six months of that period. SCAMPI A appraisal results are valid for a timeframe of up to 36 months.

Personnel needed to participate in activities or perform tasks in a SCAMPI A appraisal include the sponsor, the appraisal team leader, the appraisal coordinator, selected participants, and appraisal team members. Their time commitments will vary widely depending on the specific parameters of the appraisal (e.g., organizational scope) and their role.

Much of the effort spent by an organization preparing for an appraisal is for the collection and review of objective evidence; these costs can vary widely based on the data collection strategy and acceptable level of risk. Excluding data collection costs, appraisal participants can typically expect to spend one to three hours each to participate in interviews and attend validation sessions, plus one to three hours each for presentations. On the other extreme, the appraisal coordinator may spend many weeks of full-time effort helping the team and the organization to prepare for and conduct the appraisal. Appraisal team leaders should engage appraisal sponsors on effort estimates and the set of tailoring options to be used in conducting a SCAMPI A appraisal.

SCAMPI A Method Overview

This section provides an overview of the underlying principles and concepts of the SCAMPI A method. Readers of the SCAMPI A MDD should become familiar with this material prior to reading the process descriptions in Part II, where the method requirements and tailoring options are defined. This overview is primarily targeted at appraisal team leaders and appraisal team members who will be performing SCAMPI A appraisals. Additional audiences might include appraisal sponsors or process improvement professionals interested in understanding SCAMPI A features and the results that can be expected.

Method Context

The SCAMPI A appraisal method is used to identify strengths, weaknesses, and ratings relative to appraisal reference models. It incorporates best practices recognized as successful in the appraisal community, and is based on the features of several legacy appraisal methods.

SCAMPI A satisfies the Appraisal Requirements for CMMI (ARC) V1.3 and is a Class A appraisal method.

Method Objectives and Characteristics

The SCAMPI A method has the following primary objectives:

- provide a common, integrated appraisal method capable of supporting appraisals in the context of internal process improvement, supplier selection, and process monitoring (see “Modes of Usage” on page 18)
- provide an efficient appraisal method capable of being implemented within reasonable performance constraints (see “Conducting Cost-Effective Appraisals” on page 28)

The SCAMPI A method is also designed to prioritize and satisfy certain essential characteristics, which were obtained via community feedback and are summarized in Table 6. These characteristics have been used as the rationale for key method architecture and design decisions, which are described in this overview and throughout the MDD.

Table 6: Essential Characteristics of the SCAMPI A Method

Characteristic	Explanation
Accuracy	Appraisal ratings truly reflect the organization’s maturity/capability, reflect the appraisal reference model, and can be used for comparison across organizations. Appraisal results reflect the strengths and weaknesses of the appraised organization (i.e., no exemplary strengths and weaknesses are left undiscovered).
Repeatability	The ratings and findings of an appraisal are likely to be consistent with those of another independent appraisal conducted under comparable conditions (i.e., another appraisal of identical scope will produce consistent results).
Cost/Resource Effectiveness	The appraisal method is efficient in terms of person-hours spent planning, preparing, and executing an appraisal. The method takes account of the organizational investment in obtaining the appraisal results, including the resources of the host organization, the impact on the appraised organization, and the appraisal team.
Meaningfulness of Results	Appraisal results are useful to the appraisal sponsor in supporting decision making. This support of decision making may include application of the appraisal results in the context of internal process improvement, supplier selection, or process monitoring.
ARC Compliance	SCAMPI A is a Class A method and complies with all ARC requirements.

Summary of SCAMPI V1.3 Changes

Updates to the SCAMPI A method for V1.3 are based on community change requests, grouped into three overarching goals and improvement objectives, as summarized in Table 7. SCAMPI V1.3 method features that implement these goals and objectives are further described in the remainder of the MDD and detailed in Part II process descriptions.

Table 7: Summary of SCAMPI A V1.3 Updates

SCAMPI V1.3 Goals	SCAMPI V1.3 Objectives	SCAMPI Essential Characteristics	SCAMPI V1.3 Change Concepts
1. Increase Efficiency of the Appraisal Process	<ul style="list-style-type: none"> • Consider entire lifecycle of cost/value (not just 'onsite') • Decrease cost while maintaining accuracy and utility • Increase value returned per cost incurred 	<ul style="list-style-type: none"> • Cost/Resource Effectiveness • Accuracy Meaningfulness of Results 	<ul style="list-style-type: none"> • Appraisal scoping: analysis of sampling factors to assure representative coverage and efficient data collection. (Replaces focus/non-focus projects.) • Clarify handling of basic units and support functions (sufficiency, coverage) • Formalized plans for data collection and resources • Managed discovery, iterative data calls (limit PIID crafting) • Removed distinction of direct and indirect artifacts • Multi-constellation appraisals
2. Remove Barriers to Broader Usage (e.g., other constellations)	<ul style="list-style-type: none"> • Remove terminology unique to CMMI-DEV • Clarify skill/experience requirements for all users 	<ul style="list-style-type: none"> • Meaningfulness of Results • Repeatability 	<ul style="list-style-type: none"> • Terminology: <ul style="list-style-type: none"> -organization: "project" > "basic unit" -term "indirect artifact" not used -sampling "subgroups" • Appraisal team qualifications and field experience for model scope; manage conflicts of interest • Multi-constellation appraisals
3. Synchronize with CMMI V1.3 Product Suite	<ul style="list-style-type: none"> • Enhance consistency of usage and fidelity to method requirements • Evolve methods based on change requests 	<ul style="list-style-type: none"> • Repeatability • ARC Compliance 	<ul style="list-style-type: none"> • Consistency with other V1.3 product suite (ARC/model) updates • MDD clarifications, cleanup, errata • Simplified features/terms from removal of ARC ISO/IEC 15504 conformance (e.g., appraisal input).

Key SCAMPI V1.3 MDD Change Concepts

Broadened Applicability of SCAMPI Method

A primary objective for SCAMPI V1.3, as depicted in Table 7, is to synchronize with other components of the CMMI product suite. Though SCAMPI has been applied in many contexts, the MDD legacy was primarily written to support single-model CMMI-DEV appraisals. This sometimes made it difficult to apply the method to other reference models, such as CMMI for Services (CMMI-SVC) or People CMM (P-CMM). The SCAMPI V1.3 MDD uses more generic terminology to better accommodate the architectures used in these other reference models. In addition, guidance has been added (refer to Appendix G) on how to conduct a SCAMPI appraisal using more than one reference model (i.e., multi-model appraisals).

Terminology Changes

Several different terms are used or emphasized in the SCAMPI V1.3 MDD, largely due to the broadened applicability (described above) or particular focus areas for method improvements. (Reference the Glossary to read definitions.) This does not imply these prior concepts from SCAMPI V1.2 no longer exist, but rather that they are reflected differently due to emphasis in SCAMPI V1.3. Some of the key terminology changes evident in the SCAMPI V1.3 MDD include:

- **Basic units:** used throughout the document to identify blocks of work or people who form the elements of the organizational unit to be sampled. Previously, this would have been called “project” in the context of CMMI-DEV. The concept of “support function” has also been introduced to explicitly account for other structures within the organizational unit that do not tend to do “customer-facing work.” Examples of support functions include Quality Assurance or Process Engineering groups. Organizations will define basic units and support functions to suit their needs - it is not presumed that these terms will imply the same things in every organizational unit.
- **Artifacts:** the distinction between direct and indirect artifacts has been removed in SCAMPI V1.3. This distinction was often confusing and could unnecessarily drive data collection costs higher. The more general term artifact is used now.
- **Practice Implementation Indicator (PII):** PIIs, and the related term Practice Implementation Indicator Description (PIID), were used in prior MDD versions primarily to describe internal appraisal team data structures for organizing objective evidence. Their optional use by appraised organizations to collect artifacts in a verification-based appraisal was, however, over-interpreted in practice and greatly influenced ineffective and costly data collection. To break some of these ineffective practices, these terms have been replaced in V1.3 with the labels objective evidence and database of objective evidence. See the Data Collection section for further discussion.

- **Focus and non-focus projects:** this V1.2 concept is reflected in V1.3 data sampling and coverage rules, which still require some number of basic units to provide objective evidence for most, if not all process areas, while some basic units provide evidence for fewer process areas. The terms ‘focus project’ and ‘non-focus project’ were removed in V1.3 to better reflect the new sampling approach and to avoid confusion that has occasionally occurred with these terms in prior MDD versions.
- **Corroboration:** the concept of corroboration of objective evidence, required by the ARC and fundamental to verifying accurate data collection for appraisals, is reflected in revised data coverage rules for V1.3. The concept is designed directly into the method rules even though the term ‘corroboration’ itself is de-emphasized.
- **Appraisal input:** due to the removal of the ARC requirement for ISO/IEC 15504 conformance, this term is no longer used in SCAMPI V1.3. Content previously required by the appraisal input is reflected in the initial appraisal plan, consistent with current common practice.

Appraisal Scoping and Sampling

Planning and selection of the organizational scope of the appraisal is now based on quantitative sampling rules to ensure adequate representation of basic units across the organizational unit, while also offering opportunities to optimize data collection and appraisal costs. Selection is based on analysis of sampling factors (formerly called critical factors in V1.2) and subgroups that characterize differing definitions or implementations of the processes in use within the organizational unit. Details on appraisal scoping and sampling, including the formula required to ensure representative coverage of basic units within sampling subgroups, are further described in activity 1.1.4, Determine Appraisal Scope and Appendix F, Scoping and Sampling in SCAMPI A Appraisals.

Data Coverage Rules

(To read more, refer to activity 1.1.4, Determine Appraisal Scope)

With the change to a sampling-based approach in SCAMPI V1.3, new method rules are defined for the amount of objective evidence (artifacts and/or affirmations) that must be provided for basic units and support functions within each sampling subgroup. These data coverage rules, which vary for basic units and support functions, also define minimum constraints on process areas for which objective evidence must be provided, based on the quantity of samples within the sampling subgroup and differences of process implementation. Data coverage rules in V1.3 are conceptually similar to SCAMPI V1.2 method rules for corroboration and the extent to which verbal affirmations were required across process instantiations, but redefined to ensure adequate coverage and confidence in results obtained using the V1.3 sampling approach.

Data Collection

Much of the organizational cost incurred for conducting SCAMPI A appraisals has been attributed to the inefficient collection of data provided in (optional) PIID data structures for verification-based appraisals, resulting in much effort lost by both the organization and the appraisal team (see the topic Conducting Cost-Effective Appraisals for further discussion). Several SCAMPI V1.3 method features have been improved to make data collection more efficient and cost-effective, including the following:

- De-emphasizing PIID data structures and distinctions between direct and indirect artifacts
- Sampling approaches to obtain better representation with potentially less data collection impact
- Defining the concept of managed discovery, balancing verification-based and discovery-based techniques with iterative data calls to close specific gaps in objective evidence needed. Guidance is also provided for product-based data collection with one-to-many mapping to reference model practices (refer to Appendix E, Managed Discovery Collection).
- Adding emphasis on defining and maintaining a data collection strategy, negotiated with the appraisal sponsor as part of the appraisal plan (refer to 1.1.2, Determine Data Collection Strategy and 1.2.3, Develop Data Collection Plan)

These improvements are expected to optimize appraisal data collection (“just enough data and no more”) with a better balance of effort between the appraisal team and the appraised organization.

Appraisal Team Qualifications

Method requirements for appraisal team selection have been clarified for team member training, qualifications, and experience in the domains addressed by the reference models used. Objectivity is assured by mitigating potential conflicts of interest (refer to 1.3.2, Select Team Members and 1.3.3, Document and Manage Conflicts of Interest).

Modes of Usage

As an ARC Class A method, SCAMPI A is primarily a method oriented towards benchmarking and suitable for generating ratings. SCAMPI A appraisals can be performed in three modes of usage, as depicted in Table 8.

Table 8: SCAMPI A Modes of Usage

Usage Mode	Description
Internal Process Improvement	Organizations use appraisals to appraise internal processes, generally to either baseline their capability/maturity level(s), to establish or update a process improvement program, or to measure progress in implementing such a program. Applications include measuring process improvement progress, conducting process audits, focusing on specific domains or product lines, appraising specific parts of the organization, and preparing for external customer-led appraisals. In this manner, SCAMPI A appraisals supplement other tools for implementing process improvement activities.
Supplier Selection	Appraisal results are used as a high-value discriminator to select suppliers. The results are used in characterizing the process-related risk of awarding a contract to a supplier. The appraisal results are typically only one criterion among many used to select suppliers. Results are often used as a baseline in subsequent process monitoring with the selected supplier.
Process Monitoring	Appraisal methods are also used in monitoring processes (e.g., after contract award, by serving as input for an incentive/award fee decision or a risk management plan). The appraisal results are used to help the sponsoring organization tailor its contract or process monitoring efforts by allowing it to prioritize efforts based on the observed strengths and weaknesses of the supplying organization's processes. This usage mode focuses on a long-term teaming relationship between the sponsoring organization and the development organization (i.e., buyer and supplier).

Where appropriate, differences in the method requirements, tailoring, or recommended implementation applicable to these usage modes are discussed in process descriptions and activities provided in Part II. These differences occur most significantly in the planning processes (e.g., appraisal objectives, sponsorship, appraisal planning, selection of participants, and preparation) and reporting processes (e.g., reporting of appraisal results, use of appraisal results for decision making, and follow-on activities).

With the extension of the SCAMPI method family to include ARC Class B and Class C methods, appraisal sponsors for these usage modes are encouraged to consider the SCAMPI B or SCAMPI C appraisal methods which may produce acceptable results where ratings are not required, with significantly less investment of cost and resources. Refer to “Requirements for CMMI Appraisal Method Class Structure” and “Requirements for CMMI Appraisal Methods” in the ARC for further discussion of these issues and for guidance in selecting an appropriate appraisal method to fit desired business objectives.

Method Concepts

This section describes fundamental concepts employed by the SCAMPI A method. These concepts are treated here to provide readers with an overall understanding of the method prior to reading the method Process Definitions in Part II. Many of these concepts are distributed across several appraisal method processes or activities, so it is important to ensure that a common understanding is obtained to recognize the components of these concepts as they appear elsewhere in this document.

In addition to requirements of the ARC, these method concepts are derived from, and heavily influenced by, the method objectives and essential method characteristics.

Method Assumptions and Design Principles

In addition to method objectives and characteristics, SCAMPI A features are based on certain method assumptions and design principles, described below, related to the expected use of the method.

SCAMPI A is a Class A benchmarking method.

As an ARC Class A method, SCAMPI A can be used to generate ratings as benchmarks to compare maturity levels or capability levels across organizations. As a benchmarking method, the SCAMPI A emphasis is on a rigorous method capable of achieving high accuracy and reliability of appraisal results through the collection of objective evidence from multiple sources.

Goal ratings are a function of the extent to which the corresponding reference model practices are present in the planned and implemented processes of the organization.

In the CMMI appraisal reference models, there is a direct relationship between goals and the practices that contribute toward achievement of those goals. Goals are required model components; practices are expected model components in that alternative practices could be implemented that are equally effective in achieving the intent of the associated goals.

In the SCAMPI A method, a fundamental premise is that satisfaction of goals can be determined only upon detailed investigation of the extent to which each corresponding practice is implemented for each sample instantiation used as a basis for the appraisal (i.e., basic units and support functions).

Additional information on rating goals is provided in “Data Collection, Rating, and Reporting” in this document.

The aggregate of objective evidence provided is used as the basis for determining practice implementation.

To make reasonable judgments regarding an organization’s implemented processes relative to the appraisal reference model, appraisal teams base their judgments on the collection of objective evidence for each practice applicable to process area goals within the appraisal reference model scope.

Appraisal teams compare the objective evidence collected against the corresponding practices in the appraisal reference model. In making inferences about the extent to which practices are or are not implemented, appraisal teams draw on the entire model document to understand the intent of the model, and use it as the basis for their decisions. This comparison includes the required and expected model components (i.e., goals and practices) as well as informative material, such as model front matter, introductory text, glossary definitions, and subpractices.

Practice implementation at the organizational unit level is a function of the degree of practice implementation at the instantiation level.

Practices described in the CMMI appraisal reference models are abstractions that are realized by their implementation within organizations, and instantiated at the level of basic units and support functions in the organizational unit. The context within which the practice is applied drives the implementation. The details of the implementation, as well as the context within which the practice is implemented, are referred to as the instantiation of the practice.

An organizational unit is the part of an organization that is the focus of an appraisal. An organizational unit operates within a coherent process context and a coherent set of business objectives. (Refer to the Glossary for a complete definition of organizational unit.)

The extent to which an organizational unit has implemented appraisal reference model practices can be determined only by considering, in aggregate, the extent to which those practices are implemented within the organizational unit by basic units and support functions. This process, in turn, necessitates the consideration of objective evidence for each instantiation, for each model practice within the appraisal reference model scope.

Appraisal teams are obligated to seek and consider objective evidence of multiple types in determining practice implementation and goal satisfaction.

The SCAMPI A method is data-oriented in that decisions on practice implementation and goal rating are made based on the aggregate of objective evidence available to the appraisal team. Multiple types of objective evidence (artifacts and affirmations) must be considered; these types are described in *Types of Objective Evidence* in this document. Artifacts indicative of practice implementation are a requirement of the SCAMPI A method.

Affirmations are required to ensure that the documentation reflects the actual organizational process implementation and to preclude rating judgments being made solely on the basis of artifacts. The SCAMPI A method establishes minimum requirements, called data coverage rules (described in activity 1.1.4, Determine Appraisal Scope) for the extent to which objective evidence from affirmations must be collected from basic units and support functions for model practices to corroborate other sources of objective evidence prior to rating goals.

Types of Objective Evidence

The fundamental idea behind SCAMPI appraisals is that the conduct of an activity or process results in *footprints* or objective evidence, that substantiates work being done consistent with appraisal reference model practices. For example, the establishment of an artifact, such as a

document, is often an expected outcome resulting from implementation of a model practice. Other artifacts may also substantiate implementation of the practice, such as evidence of a status meeting or review being held. Members of the organizational unit may affirm through interviews how practices are implemented.

The SCAMPI A method provides for the collection and analysis of data from the following types of objective evidence:

- *artifacts* - a tangible form of objective evidence indicative of work being performed that represents either the primary output of a model practice or a consequence of implementing a model practice. These artifacts may include organizational policies, meeting minutes, review results, or other implementation-level work products. Sufficient artifacts demonstrating and corroborating that the work is being done are necessary to verify the implementation of associated model practices.
- *affirmations* - an oral or written statement confirming or supporting implementation (or lack of implementation) of a model practice provided by the implementers of the practice, provided via an interactive forum in which the appraisal team has control over the interaction. These statements are typically collected using interviews, demonstrations, questionnaires, or other means. Note that negative affirmations confirming the lack of implementation of a practice are possible.

Using multiple data-gathering mechanisms improves the team's depth of understanding and enables corroboration of the data. An over-reliance on one type of objective evidence or another is undesirable. Too much dependence on artifacts could result in the perception that the appraisal was a "paper review" (i.e. a cursory examination of prepared documents) and not truly indicative of organizational and/or project behavior. An over-reliance on affirmations could be criticized as not truly objective or repeatable. Therefore, the SCAMPI A method requires a balance across these types of objective evidence, described in data coverage rules (refer to 1.1.4, Determine Appraisal Scope).

The extent to which objective evidence is judged appropriate to determine a given practice is implemented (or not implemented) will vary according to the context in which the process is implemented, and influenced by factors such as size, organizational culture, application domain, customer market, and so on. For example, the level of detail necessary for a work breakdown structure will differ widely for a one-person, two-week maintenance effort as opposed to a 100-person, multi-year, and mission-critical development of a new product.

Data Collection Approaches

SCAMPI A appraisals are data-intensive activities, involving the collection, organization, and evaluation of a large set of artifacts that substantiate the implementation of appraisal reference model practices. Data collection is typically the single largest driver in the overall cost and schedule for conducting SCAMPI A appraisals, and can be a substantial impact on resources within the appraised organization. Often this may depend on the extent to which the appraised organization has existing assets already collected and in place to serve as objective evidence

provided to the appraisal team. This range of advance data readiness can be characterized by the following three appraisal data collection approaches:

1. **Verification approach:** For organizations that already have detailed collections of artifacts organized by mappings to practices in the reference model, much of the appraisal team effort can concentrate on verifying the appropriateness of the data collected. This approach leverages prior investments in data collection by the organization for its own purposes (such as standardization, process compliance monitoring, or product reuse), and can offer great efficiencies to the appraisal team. Rarely, however, has this ideal been fully realized in practice, and many organizations have spent huge effort creating these verification-ready appraisal data structures essentially from scratch, often with very little business value and frequently resulting in much rework of artifacts that are inappropriate, incomplete, or overkill for what is needed. Despite the potential for high costs, this preparation-intensive approach may still be preferable to organizations for which risk of achieving maturity level ratings is a primary concern.
2. **Discovery approach:** At the other end of the spectrum, an organization may have few such collections of artifacts already collected and mapped to the reference model. The appraisal team must then work directly with the organization to identify, locate, organize, and evaluate these artifacts in order to proceed with the appraisal. This can be a time-consuming task for the appraisal team, and may involve planning for higher costs and a longer schedule for the additional appraisal team effort, however it limits the advance preparation needed to be done by the organization. This approach may be appropriate for some situations, such as organizations just starting a process improvement initiative.
3. **Managed discovery:** An incremental (phased) approach to data collection can also be used. Initial data collection is focused on a predetermined set of high-leverage work products that typically provide substantial coverage of reference model practices – for example, plans, documents, schedules, measures, and reviews. The appraisal team maps these artifacts to the appraisal reference model, and determines the extent to which gaps in model coverage still remain. These gaps are closed by iteratively acquiring more data through a series of specific data calls. This approach balances the distribution of effort between the appraisal team and the appraised organization, and can optimize data collection by focusing on the work products most naturally understood by the organization and leaving much of the detailed model knowledge to the appraisal team. In many situations, this can offer the most cost-effective approach to data collection and best use of an organization’s resources. However, lack of an initial reference model-centric focus could also obscure the potential risk an organization may face for model compliance.

Often some combination of these approaches may be used. With data collection such a large influence on the cost of appraisals, this topic is given much emphasis throughout the SCAMPI A MDD, notably in appraisal planning where a data collection strategy (refer to 1.1.2, Determine Data Collection Strategy) and data collection plan (refer to 1.2.3, Develop Data Collection Plan) must be negotiated with the appraisal sponsor to understand the choices and costs involved. Appendix E, Managed Discovery, provides more guidance on the managed discovery approach and associated tradeoffs.

Focused Investigation

In order to achieve efficient appraisals, emphasis is needed not only on effective data collection and management approaches, but also on the methods used by the appraisal team to maintain focus on the end objectives and to prioritize effort where it most needed. The term *focused investigation* is used to describe this concept of optimized investment of appraisal team resources, which applies throughout the SCAMPI A appraisal processes. Essentially, this approach can be described at a high level using the following paradigms:

- Understand what objective evidence is available, and how it contributes toward implementation of model practices within the appraisal reference model scope.
- Continually consolidate data to determine progress toward sufficient coverage of model practices.
- Focus appraisal resources by targeting those areas for which further investigation is necessary, and collect additional data to complete the set of objective evidence needed.
- If sufficient objective evidence has been gathered to conclude a practice is implemented, there is no need to continue working on it. Stop and move on to another practice where adequate data has not yet been gathered or where the appraisal team still has concerns.
- Avoid unnecessary or duplicated effort that does not contribute additional information toward achievement of sufficient coverage or toward obtaining significantly greater confidence in the appraisal results. For example, keep interviews efficient by asking further questions only about practices for which sufficient data has not already been obtained.

This approach begins with the initial collection and analysis of objective evidence from the organizational unit. The appraisal team's inventory of objective evidence can be annotated to identify practices that are strongly supported, or those that need further clarification. This knowledge can be used as the basis for determining findings that affect appraisal outcomes.

As the appraisal process progresses, the appraisal team aggregates and synthesizes additional objective evidence, and uses this evidence to draw inferences about the overall implementation within the organizational unit. Wherever there are shortcomings in the appraisal team's understanding of the organizational unit's implementation of model practices, data collection strategies can be determined to probe for and obtain additional information.

For example, cases where the objective evidence is missing, unclear, or insufficient might be addressed through additional documentation requests or by generating focused questions for specific interview participants. By maintaining a current inventory of the status of the appraisal objective evidence and prioritizing areas where additional information is still needed, these focused investigation approaches can be continuously and iteratively applied to narrow remaining gaps and converge on sufficient coverage for proceeding with rating.

Data Collection, Rating, and Reporting

The appraisal team follows a consensus-based, structured process to synthesize and transform information collected from the sources described in “Types of Objective Evidence” in this document. Data from these sources are collected and considered in several discrete data-gathering sessions, either as integrated appraisal team activities or by subsets of the team organized into mini-teams operating in parallel. Mini-teams are typically organized around related process areas, with mini-team members assigned by the appraisal team leader on the basis of their individual experience, knowledge, and skills.

The SCAMPI A data transformation and rating process is depicted in Figure 1.

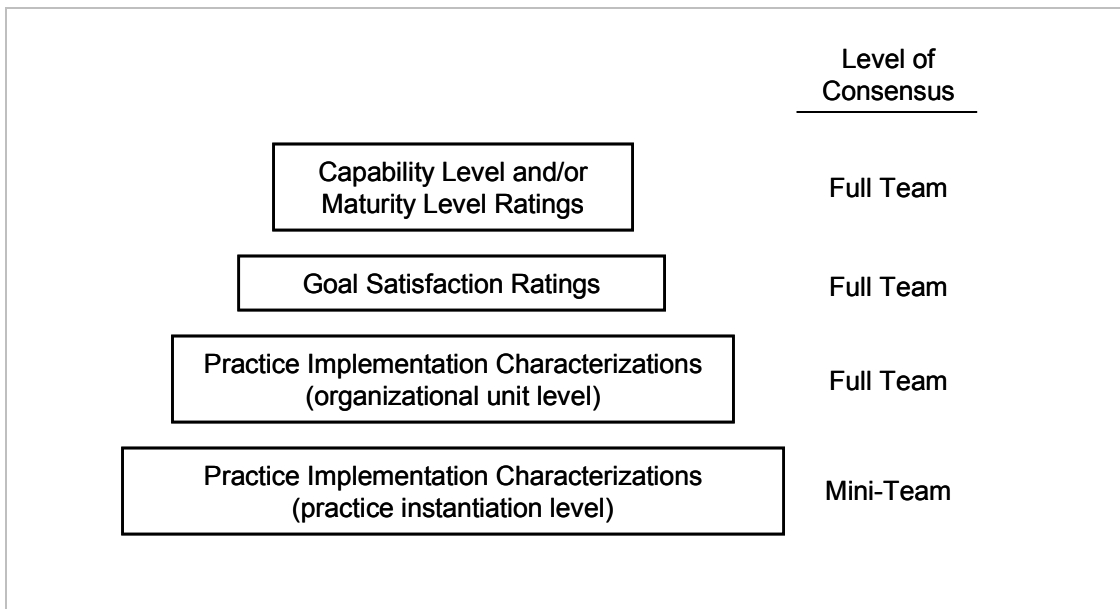


Figure 1: SCAMPI A Rating Process

Team members review objective evidence provided by the organizational unit and determine its relevance to the appraisal reference model practices.

Areas of strength or weakness observed relative to the implementation of appraisal reference model practices are recorded in written findings. Findings are generated primarily for weaknesses or gaps of the implementation compared to the intent of a model practice.

Findings of strengths should be reserved for exemplary practices that are particularly effective and are candidates for inclusion in aggregated findings. Observations that simply reflect a sufficient implementation of a practice can produce substantial data management overhead that does not contribute toward generation of findings; these gratuitous strengths are more effectively captured as simple indicators in the appraisal team’s database of objective evidence. Findings may also be generated for alternative practices, which are acceptable alternatives to implementing one or more model practices that contribute equivalently to the satisfaction of process area goals.

Characterizing Practices

Verification of objective evidence continues in this way at the instantiation level (basic units and support functions) until sufficient objective evidence has been obtained to characterize the implementation of an appraisal reference model practice. Consensus is obtained at the mini-team level on the sufficiency of objective evidence and the accuracy of strengths and weaknesses.

Based on the objective evidence supporting practice implementation, the appraisal team assigns values to characterize the extent to which the appraisal reference model practice is implemented.

Each practice is characterized as one of the following values:

- Fully Implemented (FI)
- Largely Implemented (LI)
- Partially Implemented (PI)
- Not Implemented (NI)
- Not Yet (NY)

These values are based on criteria defined by the method (refer to 2.4.2, Characterize Implementation of Model Practices and Generate Preliminary Findings).

The intent of this characterization is to summarize the appraisal team's judgment of practice implementation and identify and prioritize areas where further judgment, investigation, or corroboration may be necessary. These characterization values are an aid, not a replacement, for the recorded findings of weaknesses, which are used as a basis for rating decisions.

Upon assigning characterization values for a given model practice for each basic unit or support function, the characterization values are aggregated, using full appraisal team consensus, to the organizational unit level. Weaknesses across the basic units and support functions are similarly aggregated to the organizational unit level, and form the basis for rating. Where team judgment is necessary to characterize practice implementation, these decisions are made considering factors such as the mix of practice characterizations, the reasons for the supporting instantiation-level characterizations, and the severity of the associated weaknesses (in aggregate).

Generating Findings

Strengths and weaknesses identified across basic units and support functions within the organizational unit are synthesized and aggregated to statements of preliminary findings, expressed at the organizational unit level. These strengths and weaknesses are often organized at the level of process area goals using common themes. Preliminary findings are provided to the organizational unit for validation; the mechanisms and timeframe used for this validation may vary across the appraisal modes of usage (internal process improvement, supplier selection, process monitoring).

During this activity, the appraisal team is still in the process of collecting data to ensure that an accurate understanding of the organizational process implementation is obtained. Feedback from the participants in the appraisal is used to validate the preliminary findings and may result in revised or additional findings.

The appraisal team may also request additional data sources for areas where their understanding of the organizational unit's implementation of model practices is insufficient. Final findings are generated based on the complete, validated set of appraisal data (i.e., findings and additional aggregated strengths and weaknesses, if any).

Generating Ratings

Ratings are generated based on the set of validated appraisal data. At a minimum, ratings are generated for each of the process area goals within the appraisal reference model scope. Ratings may also be generated for process areas, capability levels, or maturity levels if desired by the appraisal sponsor. Maturity level ratings and/or capability level ratings are based on the definitions of capability levels and maturity levels in the appraisal reference model. Refer to Process Definition 2.6, Generate Appraisal Results for additional information about SCAMPI A rating processes.

Reporting Results

The results of the appraisal are reported to the appraisal sponsor and to the appraised organization. In supplier selection or process monitoring contexts, the mechanisms and timeframe used for reporting results may be subject to acquisition or contractual restrictions. An appraisal record is generated and provided to the sponsor, documenting further information regarding the appraisal according to the specifications found in later sections of this document. Appraisal results are valid for a period not to exceed three years.

A subset of this data is provided to the SEI for the purposes of quality control and the collection of appraisal measures for reporting to the appraisal community. The appraisal data to be provided is defined by the SEI separately from this document to allow for continuous improvement of appraisal reporting apart from the CMMI Product Suite.

Instruments and Tools

Instruments are artifacts that may be used in an appraisal for the collection and presentation of data. Instruments are provided by the organizational unit to inform the appraisal team about the processes implemented in the organization and how they relate to the appraisal reference model. Instruments can take various forms, including questionnaires, surveys, site orientation packets, and mappings from reference model practices to the corresponding processes that are defined and implemented within the organizational unit.

The SCAMPI A method does not require that an instrument be used. However, instruments can provide the appraisal team with an in-depth understanding of the organizational implementation

of the model on a practice-level basis for the basic units and support functions within the organizational unit to be investigated in the appraisal.

Instruments also often provide an opportunity for the organizational unit to provide a self-characterization of their implemented processes, identify applicable substantiating objective evidence, and specify any additional comments that might be useful in understanding the implemented processes. Used in this manner, instruments can support the SCAMPI A method emphasis on verification-based appraisals and minimize the need for discovery of objective evidence (see the discussion of Data Collection Approaches on page 22), thus helping to facilitate efficient appraisal performance.

An appraisal team member should facilitate the entry of data into instruments where feasible to ensure that appropriate data are obtained. This approach can help the appraised organization clarify or interpret the intent of the appraisal reference model practices, understand what data are expected, and focus the responses. The entry of either too much or too little data into instruments can be problematic for both the appraisal team and the appraised organization and result in inefficient use of resources.

Effective management of appraisal data is a challenge that can be simplified with the use of automated tools. The SEI provides a rudimentary toolkit to SCAMPI Lead Appraisers that can be used to collect practice-level data and to characterize, consolidate, and summarize information. Several vendor tools are also available in the marketplace. The choice of tools is largely one of personal preference; some appraisal team leaders prefer manual techniques, such as wall charts, to record information and findings.

Conducting Cost-Effective Appraisals

High appraisal costs can be a significant factor in the overall business value obtained from CMMI-based process improvement and conducting SCAMPI A appraisals. While much has been done to improve the integrity of maturity level ratings and protect the corresponding investments of CMMI adopters, it is the improvement actions taken as a result of appraisals, and not the benchmark ratings, that are most likely to provide substantial and lasting benefits to the organization's business results and operational effectiveness. High appraisal costs can substantially impact the investment available for other aspects of a process improvement cycle, and could even detract from a business case for CMMI adoption. We conclude this overview with a discussion of approaches, both in improvements to the SCAMPI V1.3 method and its efficient enactment by adopters, that can help achieve cost-effective SCAMPI A appraisals and maximize business returns.

These descriptions are based on inefficient practices that have been commonly observed to drive high appraisal costs, with a summary of V1.3 method improvements and recommendations to help improve these practices and reduce appraisal costs across the community. Several of these appraisal efficiency topics are described more fully in other areas of the SCAMPI A method overview or following sections of this document. This is not an exhaustive list of the sources of appraisal cost inefficiencies or of the potential strategies that could help address them; numerous ideas are also suggested in other publications and conference presentations.

Strategies for Planning Cost-Effective SCAMPI Appraisals

Data Collection

(For more detailed information, also refer to the Data Collection topic on page 19.)

Observation: Inefficient collection of data from the appraised organization has been a driver of high appraisal costs. Much of this has been due to a misunderstanding of Verification-mode appraisals, which are an optional approach (not a SCAMPI A method requirement) intended to save costs by leveraging any existing assets the organization may be able to provide to help the data collection effort. Instead, this has often led to a disproportional shift of data collection responsibility to the appraised organization. Efforts to build model-centric evidence tables (e.g. PIIDs, populated with both direct and indirect artifacts) can increase appraisal preparation costs.

Method: Revisions made to the method clarified and contrasted data collection approaches. It also added a focus on managed discovery, phased data collection, and product-centric data sets to reduce costs associated with data collection and better balance effort between the organization and the appraisal team. The revisions to the method also added emphasis on maintaining a data collection plan to anticipate, reduce, and manage the data collection effort, in communication with the appraisal sponsor.

Recommendations: Negotiate expectations for the delivery of data to the appraisal team. Lead appraisers are trained to seek artifacts that result from routine implementation of practices. Use managed discovery and other techniques to enable the appraisal team to incrementally request and map specific artifacts to the model. Iterative data collection allows the team to ask for the only the data that are needed thereby optimizing the use of resources by the appraised organization. Work with the lead appraiser to strike a balance between the duration of the appraisal and the time spent preparing for it in order to balance data collection time between the two.

Sampling Factors

Observation: Prior SCAMPI versions were based on focus and non-focus projects, with at least three instantiations needed for each process area, and representation of the organizational unit based on coverage of critical factors. Without guidance about the number of projects and instances needed, implementation on appraisals has sometimes been inconsistent, impacting repeatability, confidence in the representativeness of the sample, and uncertainty about the amount of data collection needed (too much or too little) which can impact predictability of appraisal costs.

Method: Quantitative sampling approaches have been implemented (described in detail elsewhere in the MDD) to determine the organizational scope based on sampling factors and subgroups reflecting coverage of the variety of conditions under which the process is used. These sampling factors, in conjunction with data coverage rules, define how much data is needed to assure coverage. Not only does this improve representation and confidence in results, but selection of well-designed sampling factors may reduce the overall amount of data needed and associated cost incurred by the appraised organization.

Recommendations: Invest due diligence in defining sampling factors that truly characterize the range of conditions in which the process must operate. Work with the lead appraiser to find a value-added compromise between depth and breadth. The lead appraiser will help the sponsor to strike a balance between generalizability and appraisal cost. If the initial appraisal scope is too costly, consider constraining the organizational scope to a smaller subset of the organization where the attributed appraisal results (e.g., maturity level ratings) are most valuable and needed.

Understand SCAMPI Tailoring Options

Observation: For both lead appraisers and sponsoring organizations, a lack of clarity about the range of accepted tailoring options may have led to an over-reliance on traditionally implemented approaches.

Method: This revised method clarifies tailoring options and the range of expected implementations of the method.

Recommendations: Lead appraisers serve as an intermediary for appraisal sponsors and organizations, and when needed, act as a translator between business space and model space. Appraisal sponsors, as informed consumers should strive to understand available SCAMPI tailoring options and make trade-offs to help conduct cost-effective appraisals.

Method Description

This section provides an overview of the SCAMPI A method architecture, including appraisal phases, processes, and activities. These descriptions are high-level abstractions of the process descriptions contained in Part II of this document.

A summary of the SCAMPI A method processes and activities for each of the three appraisal phases is contained in Table 9, Table 10, and Table 11.

Table 9: SCAMPI A Phase Summary: Plan and Prepare for Appraisal

Phase	Process	Purpose	Activities
1 Plan and Prepare for Appraisal	1.1 Analyze Requirements	Understand the business needs of the organizational unit for which the appraisal is being requested. The appraisal team leader will collect information and help the appraisal sponsor match appraisal objectives with their business objectives.	1.1.1 Determine Appraisal Objectives 1.1.2 Determine Data Collection Strategy 1.1.3 Determine Appraisal Constraints 1.1.4 Determine Appraisal Scope 1.1.5 Determine Appraisal Outputs 1.1.6 Obtain Commitment to Initial Appraisal Plan
	1.2 Develop Appraisal Plan	Document the results of appraisal planning including the requirements, agreements, estimates, risks, method tailoring, and practical considerations (e.g., schedules, logistics, and contextual information about the organization) associated with the appraisal. Obtain and record the sponsor's approval of the appraisal plan.	1.2.1 Tailor Method 1.2.2 Identify Needed Resources 1.2.3 Develop Data Collection Plan 1.2.4 Determine Cost and Schedule 1.2.5 Plan and Manage Logistics 1.2.6 Document and Manage Risks 1.2.7 Obtain Commitment to Appraisal Plan
	1.3 Select and Prepare Team	Ensure that an experienced, objective, trained, and appropriately qualified team is available and prepared to execute the appraisal process.	1.3.1 Identify Appraisal Team Leader 1.3.2 Select Team Members 1.3.3 Document and Manage Conflicts of Interest 1.3.4 Prepare Team
	1.4 Obtain and Inventory Initial Objective Evidence	Obtain information that facilitates site-specific preparation and an understanding of the implementation of model practices across the organizational unit. Identify potential issues, gaps, or risks to aid in refining the plan. Strengthen the appraisal team members' understanding of the organization's operations and processes.	1.4.1 Obtain Initial Objective Evidence 1.4.2 Inventory Objective Evidence

Phase	Process	Purpose	Activities
	1.5 Prepare for Appraisal Conduct	Ensure readiness to conduct the appraisal, including confirmation of the availability of objective evidence, appraisal team commitment, logistics arrangements, risk status and associated mitigation plans. Plan and document data collection strategies.	1.5.1 Perform Readiness Review 1.5.2 Re-Plan Data Collection

Table 10: SCAMPI A Phase Summary: Conduct Appraisal

Phase	Process	Purpose	Activities
2 Conduct Appraisal	2.1 Prepare Participants	Ensure that appraisal participants are appropriately informed of the appraisal process, purpose, and objectives and are available to participate in the appraisal process.	2.1.1 Conduct Participant Briefing
	2.2 Examine Objective Evidence	Examine information about the practices implemented in the organization and relate the resultant data to the appraisal reference model. Perform the activity in accordance with the data collection plan. Take corrective actions and revise the data collection plan as needed.	2.2.1 Examine Objective Evidence from Artifacts 2.2.2 Examine Objective Evidence from Affirmations
	2.3 Document Objective Evidence	Create lasting records of the information gathered by identifying and then consolidating notes, transforming the data into records that document gaps in practice implementation or exemplary practice implementation.	2.3.1 Take/Review/Tag Notes 2.3.2 Record Presence/Absence of Objective Evidence 2.3.3 Document Practice Implementation 2.3.4 Review and Update the Data Collection Plan

Phase	Process	Purpose	Activities
	2.4 Verify Objective Evidence	Verify the sufficiency of objective evidence to determine the implementation of model practices for each instantiation. Describe any strengths and weaknesses in the implementation of model practices. Each implementation of each practice is verified so that it may be compared to the practices of the reference model. Then the team characterizes the extent to which the practices in the model are implemented.	2.4.1 Verify Objective Evidence 2.4.2 Characterize Implementation of Model Practices and Generate Preliminary Findings
	2.5 Validate Preliminary Findings	Validate preliminary findings, including weaknesses (i.e., gaps in practice implementation) and strengths (i.e., exemplary implementation of model practices) with members of the organizational unit.	2.5.1 Validate Preliminary Findings
	2.6 Generate Appraisal Results	Rate goal satisfaction based on the extent of practice implementation throughout the organizational scope of the appraisal. The extent of practice implementation is judged based on validated data (e.g., artifact and affirmation objective evidence) collected from the entire representative sample of the organizational unit. Aggregate ratings (process area ratings, maturity level ratings, capability ratings, etc.) are driven by the goal satisfaction ratings.	2.6.1 Derive Findings and Rate Goals 2.6.2 Determine Process Area Ratings 2.6.3 Determine Process Area Profile 2.6.4 Determine Maturity Level 2.6.5 Document Appraisal Results

Table 11: SCAMPI A Phase Summary: Report Results

Phase	Process	Purpose	Activities
3 Report Results	3.1 Deliver Appraisal Results	Provide credible appraisal results that can be used to guide actions. Represent the strengths and weaknesses of the processes in use at the time. Provide ratings (if planned for) that accurately reflect the capability level or maturity level of the processes in use.	3.1.1 Deliver Final Findings 3.1.2 Conduct Executive Session(s) 3.1.3 Plan for Next Steps
	3.2 Package and Archive Appraisal Assets	Preserve important data and records from the appraisal, and dispose of sensitive materials in an appropriate manner.	3.2.1 Collect Lessons Learned 3.2.2 Generate Appraisal Record 3.2.3 Provide Appraisal Feedback to the SEI 3.2.4 Archive and/or Dispose of Key Artifacts

Part II: Process Definitions

1 Plan and Prepare for Appraisal

1.1 Analyze Requirements

Purpose Understand the business needs of the organization for which the appraisal is being requested. The appraisal team leader will collect information and help the appraisal sponsor match appraisal objectives with their business objectives.

Determine and communicate the strategy for collecting appraisal evidence. The appraisal team leader will work with the appraisal sponsor to determine the overall strategy for collecting appraisal information. This strategy will form the basis for the appraisal data collection plan.

Entry Criteria

- An appraisal sponsor has decided that a SCAMPI appraisal should be performed.
- People who can provide statements of requirements for the appraisal are available.

Inputs

- sponsor appraisal objectives
- initial requirements and constraints
- process-related legacy information
- business objectives

Activities

- 1.1.1 Determine Appraisal Objectives
- 1.1.2 Determine Data Collection Strategy
- 1.1.3 Determine Appraisal Constraints
- 1.1.4 Determine Appraisal Scope
- 1.1.5 Determine Appraisal Outputs
- 1.1.6 Obtain Commitment to Initial Appraisal Plan

Outputs Initial Appraisal Plan

Outcome The decision to proceed with the appraisal based on a shared understanding of the appraisal objectives, constraints, outputs, and scope.

1.1 Analyze Requirements

- Exit Criteria**
- Initial contact between the appraisal sponsor and the appraisal team leader (i.e., a certified or candidate SCAMPI Lead Appraiser) has occurred.
 - The appraisal team leader has been given access to members of the sponsoring organization.
 - The initial strategy for collecting appraisal data has been established for use in subsequent planning activities.
 - The initial appraisal plan has been approved by the appraisal sponsor and placed under change management.
-

Key Points

At this early stage in the process, gathering information that supports good planning is most important. Often, the appraisal team leader must educate members of the sponsor's organization in the purpose and role of appraisals.

Tools and Techniques

Collaborative consultation between the appraisal team leader and the appraisal sponsor is important in this activity. The appraisal team leader may be able to simply interview the sponsor to get the needed information and reach agreements. In some settings, a series of meetings with different stakeholders may be needed to elicit and build consensus on the business needs that can be met through a SCAMPI A appraisal.

Understanding the history of appraisals in the organization, especially the organizational and appraisal reference model scope of past appraisals, is important for understanding the requirements for the appraisal under consideration. The choices sponsors make about appraisal scope are often tied to their (sometimes unstated) priorities for process improvement.

- Metrics**
- A number of metrics support the appraisal team leader's monitoring of this work:
- calendar time between initial contact and finalization of requirements
 - effort expended to gather and analyze requirements
 - number of meetings with representatives of the sponsoring and/or appraised organization
-

Verification and Validation

The exit criterion for this activity is the approval of the initial appraisal plan and its placement under change management.

Review of the documented agreements resulting from the work of this set of activities will serve to validate the requirements, which feed into appraisal planning.

Records

The initial appraisal plan

1.1 Analyze Requirements

Interfaces with Other Processes

This process is a foundation for the success or failure of the entire appraisal; it is at this point in the appraisal that the most leverage exists for avoiding problems and issues downstream. Gathering and understanding the requirements for the conduct of a SCAMPI A appraisal is vital to making appropriate decisions and providing value to the sponsor. Many examples of problems encountered during appraisals can be traced to shortcomings in the conduct of this process. The activities described here form the basis for the activities described in the next process, Develop Appraisal Plan.

The selected data collection strategy, which includes the data collection approach (discovery, managed discovery and/or verification) will affect the activities of Section 1.4, Obtain and Inventory Initial Objective Evidence. The balance between discovery and verification will have a significant impact on the amount of time required by the organization to prepare for an appraisal in a verification-based mode or the amount of time for the team to conduct the appraisal in a discovery-based mode. A managed discovery approach balances verification and discovery activities using an iterative, phased based approach to data collection. The results of the readiness review in Section 1.5, Prepare for Appraisal Conduct could result in revisions to the data collection approach.

Summary of Activities

The objectives that motivate the conduct of an appraisal as well as the intended strategy for collecting appraisal data must be well understood so that appropriate participants, tailoring decisions, and appraisal outputs can be selected. The constraints that shape the appraisal enactment, in light of the objectives and data collection strategies, may limit achievement of the desired result if they are not adequately understood and negotiated. A clear agreement regarding appraisal outputs and their intended usage will help maintain the sponsorship needed for conducting the appraisal and acting on the results. Establishing agreement on these objectives, constraints, outputs, and intended usage forms the basis for a commitment to the plan for conducting the appraisal.

1.1.1 Determine Appraisal Objectives

Activity Description

The business needs for process improvement drive the requirements for the conduct of any given appraisal and generally include one or more of three closely related factors:

- reducing costs
- improving quality
- decreasing time to market

The fundamental premise of process improvement is that organizational processes significantly impact these factors.

Obtaining a fair and objective characterization of the processes in use in the organization(s) is the essential reason for conducting an appraisal. In addition to this motivation, a sponsor's desire to conduct an appraisal could be driven by one or more of the following business-related objectives:

- Document a credible benchmark that reflects successful process improvement.
- Evaluate areas of potential risk that may affect the performance of the organization.
- Involve members of the appraised organization in improving the performance of the process.
- Support specific decisions related to the direction of a new or existing improvement program.
- Motivate a supplier to focus on process issues that affect contract performance.

Required Practices

The appraisal team leader or designee shall

- identify sponsor and relevant stakeholders, and establish communication
- document the business objectives provided by the sponsor and the specific appraisal objectives
- ensure the alignment of the appraisal objectives to the business objectives
- determine and document the appraisal usage mode (i.e., Internal Process Improvement, Supplier Selection, or Process Monitoring)

Parameters and Limits

At least one communication between the appraisal team leader and sponsor is required.

1.1.1 Determine Appraisal Objectives

Implementation Guidance Organizations with experience in the use of appraisals may have a clear set of appraisal objectives identified in advance of contacting an appraisal team leader.

In some cases, the usage mode will be self-evident; however, there may be instances in which the appraisal sponsor either may not be sure or may have made an assumption that is not founded on fact. The appraisal team leader is responsible for ensuring that the best choice of usage mode is made consistent with the sponsor's input and direction.

Depending on the structure of the appraised organization, as well as the usage mode, it is often important to distinguish the role of senior site manager from that of the appraisal sponsor. For some appraisals, these two roles are encompassed in the duties of a single person. For other appraisals, these two roles may represent two people working many time zones away from each other.



1.1.2 Determine Data Collection Strategy

Activity Description

The data collection strategy is determined based on the appraisal objectives. The data collection strategy employed to obtain an objective characterization of the processes in use in the organization has major implications for the appraisal in terms of:

- the amount of time and effort expended by the organization in preparing for the appraisal
- the ability of the team to make accurate judgments
- the usefulness and accuracy of the appraisal results
- the overall cost of the conduct appraisal phase

A well-defined data collection strategy is important for appraisal planning, as it provides the basis for detailed data collection planning (see activity 1.5, Prepare for Appraisal Conduct) and examining objective evidence (see activity 2.2, Examine Objective Evidence). It should be established early and continually refined throughout the Plan and Prepare phase as it provides the basis for effective data collection.

The data collection strategy outlines the overall high level scheme for data collection including the choice of data collection approach (discovery, managed discovery, and/or verification), when the data will be collected (e.g., preparation phase or conduct phase) and what data collection techniques (e.g., demonstrations, presentations, interviews and questionnaires) will be employed for both objective evidence types (artifacts and affirmations). A complete data collection strategy will address how and when all evidence types will be collected (artifacts and affirmations). It will specify what the organization is responsible for collecting.

Required Practices

The appraisal team leader or designee shall

- work with the sponsor or designee to identify the data collection strategy that best aligns with appraisal objectives and constraints
- document the planned data collection strategy
- document the tailoring decisions made using the tailoring checklist in Appendix H - SCAMPI A Tailoring Checklist

Parameters and Limits

The data collection strategy must address:

- the data collection approach (discovery, managed discovery and/or verification)
 - the techniques for collecting artifacts (e.g., documents, demonstrations, presentations)
 - the techniques for collecting affirmations (e.g., interviews, demonstrations, presentations)
 - a high-level schedule for collecting data
 - roles and responsibilities for collecting appraisal data
-

1.1.2 Determine Data Collection Strategy

Parameters and Limits

The identified data collection strategy must be documented in the data collection plan, which is part of the overall appraisal plan. The data collection strategy will evolve throughout the appraisal planning process.

Implementation Guidance

There are three basic data collection approaches.

Discovery – A data collection approach where limited objective evidence is provided by the appraised organization prior to the appraisal, and the appraisal team must probe and uncover a majority of the objective evidence necessary to obtain sufficient coverage of reference model practices.

Managed Discovery – A phased data collection approach beginning with an initial data call for a pre-determined set of artifacts (e.g., plans, requirements documentation, test procedures), followed by a set of iterative calls based on the appraisal team's evaluation of the artifacts and remaining evidence gaps. Refer to Appendix E, Managed Discovery for more information on managed discovery and comparison to discovery and verification data collection approaches.

Verification – A data collection approach in which the focus of the appraisal team is on verifying the set of objective evidence provided by the appraised organization (i.e. mapped to CMMI practices) in advance of the appraisal.

Appraisal team leaders, in conjunction with the appraisal sponsor, select one or a combination of these three data collection approaches to best satisfy the needs of the organization and appraisal.

Organizations that have not previously conducted an appraisal or are increasing their organizational maturity or capability relative to a previous appraisal may likely find a discovery or managed discovery data collection approach (at least in part) would make the most effective use of organizational resources to prepare for the appraisal. These two discovery-type approaches would minimize organizational resources to supply artifacts that are not applicable and/or are never reviewed by the appraisal team due to the organization misinterpreting the CMMI model and/or the misperceiving appraisal team's need for artifacts. Organizations that employ a discovery or managed discovery data collection approach are likely to expend far less resources in preparing data for the appraisal than if a verification data collection approach is used.

Organizations that have undergone past appraisals may have a data collection approach the appraisal team can use. If so, a verification-based appraisal may be the most efficient data collection approach. The appraisal team lead should work with organization staff to ensure that existing strategies are still applicable, and changes should be made to ensure that the strategy aligns well with the objectives and usage mode of the current appraisal.

1.1.2 Determine Data Collection Strategy

Implementation Guidance (continued) Organizations that have undergone past appraisals typically have an existing objective evidence data base mapped to model practices. The use of prior appraisal events (e.g., SCAMPI B or SCAMPI C appraisals) can be used to help complete the organization's evidence database, and can be included in the defined data collection strategy. The data collection strategy will impact appraisal planning, and may be revised after planning milestones, such as readiness reviews, other appraisal events, sponsor meetings, or even changes in business objectives. As changes or refinements are determined, the data collection plan will be maintained to accurately reflect the strategy in place.

The data collection strategy should be tailored to meet the needs of the organization and the appraisal team. It is important that the strategy be documented and understood, so that appropriate appraisal planning can be done.



1.1.3 Determine Appraisal Constraints

Activity Description The constraints within which the appraisal must be conducted are determined based on a dialog between the appraisal team leader and the appraisal sponsor and/or senior site manager. This dialog typically is an iterative process in which the preferences of the appraisal sponsor, the limits of the method, and the consequent resource requirements are balanced against each other to arrive at an optimal set of appraisal plan parameters.

Required Practices The appraisal team leader or designee shall

- establish high-level cost and schedule constraints
- document model scope of the appraisal and initial rating targets (if any)
- document initial description of the organizational unit
- negotiate constraints and objectives with stakeholders to ensure feasibility
- document negotiated constraints to be met

Appraisal constraints are documented in the appraisal plan.

Parameters and Limits Constraints identified by the appraisal plan must be negotiated between the sponsor and the appraisal team leader.

Implementation Guidance Constraints on cost and schedule identified during this early stage of the appraisal are expected to be high level and not detailed estimates. They may take the form of statements such as “We need this to be done in Q4,” “You can’t use more than five of my people on the team,” and “I can’t afford to have it last more than a month.” During these initial discussions with the sponsor, the appraisal team leader gains an understanding of the desired model scope as well as the organizational scope of the appraisal. The process of specifying the organizational unit, as well as the sampling that defines the organizational scope of the appraisal (described in activity 1.1.4, Determine Appraisal Scope) is influenced by this understanding.

Practical limitations relating to time, cost, and effort are clarified and negotiated in the context of other requirements the sponsor has. The business context in which the appraisal is conducted drives choices that the appraisal team leader must make. For example, if virtual methods (e.g., video conferences, teleconferences, and other similar technology) are to be used to conduct appraisal activities, the constraints imposed by these methods should be discussed, documented, and taken into account as the appraisal is planned. Appraisals should not be conducted in isolation from other activities relating to process management and improvement. The needs of relevant stakeholders, be they acquisition organizations or division heads managing an engineering-related process group, often place requirements on the conduct of the appraisal.



1.1.4 Determine Appraisal Scope

Activity Description

The appraisal scope consists of the appraisal reference model scope and the organizational scope to be examined during the appraisal. The reference model scope must be determined and documented early in the planning process, identifying the relevant models and process areas.

For CMMI models, the scope specification includes selection of the staged representation (and the maturity levels included) or the continuous representation (and the capability levels included). In conjunction with the appraisal sponsor, the appraisal team leader is responsible for deciding which process areas to include in the scope of the appraisal and which model representation to use.

An organizational unit is the part of an organization that is the subject of an appraisal and to which the appraisal results will be generalized. This organizational unit may include the entire organization, one or more divisions within the organization, or one or more basic units and support functions within the organization. Depending on the reference model used for the appraisal, the organizational unit may be comprised of different types of basic units and support functions. These building blocks of the organizational unit will differ according to how people are organized to accomplish the work. The organizational scope is a subset of the organizational unit. The organizational scope is determined by selecting support functions and sampling basic units to supply data for the appraisal.

The organizational scope of the appraisal is selected as a representative sample of the organizational unit, based on sampling factors that reflect meaningful differences in the conditions under which work is performed. This selection process involves defining subgroups that reflect differences according to the sampling factors. Basic units within these subgroups are sampled in the process of defining the organizational scope.

There can be an iterative process in which a preliminary specification of the organizational scope leads to re-scoping the organizational unit. A more narrowly defined organizational unit permits a smaller organizational scope of the appraisal. Conversely, a broader definition of the organizational unit leads to a larger organizational scope of the appraisal. This interplay between scoping and sampling is managed collaboratively by the appraisal team leader and the appraisal sponsor.

Finally, the mapping of process areas to basic units and support functions is established to support data collection planning. Differences in the way people are organized to perform the work within the organizational unit may affect the sources of data which must be considered to appraise each process area. Some organizations may share resources to perform support functions like configuration management or measurement and analysis whereas other organizations may establish those functions within each basic unit. Data coverage requirements applied to the mapping between the model and the organization form the detailed data collection plan.

1.1.4 Determine Appraisal Scope

Required Practices

The appraisal team leader, in conjunction with the appraisal sponsor and/or the sponsor's designee, shall determine and document the following:

- the reference model scope to be used for the appraisal
- the organizational unit to be investigated during the appraisal
- the basic units into which people are organized to accomplish the work done by the organizational unit
- the support functions that exist and the responsibilities assigned to each function
- the sampling factors used to specify the organizational unit and the organizational scope of the appraisal
- a mapping between each basic unit or support function and the process areas in the scope of the appraisal
- the organizational scope of the appraisal
- the list of individuals who will participate in the appraisal
- the planned coverage of each process area in the model scope of the appraisal for each basic unit or support function within the organizational scope of the appraisal

Parameters and Limits

The reference model scope shall include the process areas in the selected model(s) and for CMMI models the representation chosen as well as the associated maximum capability or maturity level targeted.

The reference model scope of the appraisal shall include at least one process area. All practices and goals that are part of the selected process areas must be included; individual practices and goals within a process area shall not be excluded.

When a process area is determined to be outside of the organizational unit's scope of work, the process area is designated as "not applicable." Any process area designated as "not applicable" and the rationale for its exclusion must be documented in the appraisal plan and appraisal disclosure statement (ADS).

1.1.4 Determine Appraisal Scope

Parameters and Limits (continued)

The organizational scope of the appraisal shall be documented by listing the basic units and support functions selected for inclusion in the appraisal. The rationale for these selections is based on the way the organization allocates roles and responsibilities to accomplish the work as well as the sampling factors that affect the way people do the work.

Sampling factors associated with the variety and diversity of conditions under which work is performed in the organizational unit must be recorded during planning. The following candidate sampling factors must be evaluated to determine the organizational scope of the appraisal:

- **Location:** if work is performed differently in different locations (e.g., countries, cities, sites or installations)
- **Customer:** if work is performed differently depending on the customer served by that work
- **Size:** if work is performed differently based on the size of the basic unit or support function
- **Organizational Structure:** if work is performed differently in different parts of the organizational structure (e.g., different divisions as depicted on an organization chart)
- **Type of Work:** if work is performed differently based on the “type of work” (e.g., system integration, software development, IT-support services, or help-desk)

Each of these potential sampling factors shall be evaluated for its effect on the conditions under which work is performed in different parts of the organizational unit. Other sources of diversity that affect these conditions shall also be considered as additional potential sampling factors. Examples of sampling factors could include funding source, duration, complexity, or other factors that affect the conditions under which work is performed.

Evaluations of potential sampling factors shall be based on the identification of meaningful values (e.g., large or small units; the name of cities where sites are located) into which basic units can be allocated for each sampling factor. The number of subgroups is determined by analyzing all combinations of values within the sampling factors. The result is a set of subgroups that represents the potentially unique conditions under which work is performed across the organizational unit.

Potential sampling factors that do not drive differences in conditions under which work is performed may reasonably be excluded. Rationale for inclusion or exclusion of these factors in determining a representative sample shall be documented in the appraisal plan, along with the subgroups defined by the combination of all relevant sampling factors.

1.1.4 Determine Appraisal Scope

Parameters and Limits (continued)

Subgroups defined using the sampling factors determined to be relevant represent clusters of similar conditions for process implementation. These subgroups contain one or more basic units that are candidates to participate in the appraisal data collection activities (i.e., supply artifacts and/or affirmations).

Establish a representative sample for the organizational unit by selecting basic units from each of the subgroups according to the following formula:

$$\text{Minimum number of basic units to be selected from a given subgroup} = \frac{\text{Number of subgroups} \times \text{Number of basic units in the given subgroup}}{\text{Total number of basic units}}$$

Figure 2: Sampling Formula

The computed value of the formula above may generate a fractional number. If the computed value using this formula is less than 1, then the required number of basic units shall be 1. Fractional values (greater than 1) resulting from the computation shall be subject to standard rounding rules (i.e., 1.51 becomes 2, and 1.49 becomes 1). The organizational scope of the appraisal is defined as the set of basic units selected using the process described above and the identified support functions. This set of organizational entities shall provide data for the model scope of the appraisal, in accordance with the data coverage rules specified below.

The mapping of process areas to basic units and support functions shall be recorded in order to establish how the organizational scope of the appraisal is linked to the model scope of the appraisal. Some process areas may be instantiated in each and every basic unit. Other process areas may be instantiated in a single support function. It is also possible that a given process area is instantiated in parallel support functions that exist within given subgroups, or are shared across a number of subgroups.

The following coverage rules ensure corroboration of objective evidence from multiple independent sources across the set of basic units or support functions sampled.

1.1.4 Determine Appraisal Scope

Parameters and Limits (continued)

Coverage Rules for Process Areas

Coverage–1: Objective evidence provided for a process area must address all practices that are part of that process area. For CMMI models, this includes all specific practices as well as all generic practices included in the scope of the process area. Each basic unit or support function sampled must address all practices in the process areas for which they supply data.

Coverage–2: In terms of the organizational coverage of a process area, the design of the process in the organization may lead to process areas implemented by one of the following:

- an individual basic unit within a subgroup
- a single support function that serves the entire organizational unit
- a set of support functions that each serve different parts of the organizational unit
- some hybrid of the above where the groupings of basic units in subgroups would be too limiting (It would make sense to ‘collapse the subgroups together’ for the purpose of looking at this process area because of the level of standardization.)

As an exception to the following coverage rules specified for basic units below, the implementation of a process area in a standardized manner across subgroups may reduce the data collection needs. By documenting rationale in the appraisal plan, the appraisal team leader may define a data collection strategy that collapses the subgroups when considering process areas implemented in a highly standardized fashion.

Coverage Rules for Basic Units

Coverage–1: For each subgroup, both artifacts and affirmations shall be provided for at least one basic unit for every process area implemented by basic units within that subgroup. This sampled basic unit shall provide data for all process areas. Selection of this basic unit must consider the schedule of work (e.g., lifecycle stage) achieved, in order to maximize coverage of the process areas. In cases where this sampled basic unit would have “not yet” characterizations in a process area, additional basic units must be sampled to cover that process area (unless no other basic units remain to be sampled in the subgroup).

Coverage–2: For at least 50 percent of the sampled basic units in each subgroup, both artifacts and affirmations shall be provided for at least one process area implemented by basic units within that subgroup.

Coverage–3: For all sampled basic units in each subgroup either artifacts or affirmations shall be provided for at least one process area implemented by basic units within that subgroup.

1.1.4 Determine Appraisal Scope

Parameters and Limits (continued)

For subgroups with only one sampled basic unit, satisfaction of the first rule leads to satisfaction of the other two rules.

Coverage Rules for Support Functions

Coverage–1: Both artifacts and affirmations shall be provided for each support function for all process areas relating to the work performed by that support function.

Coverage–2: The artifacts and affirmations provided by support functions shall demonstrate the work performed for basic units for at least one sampled basic unit in each subgroup. This applies for each process area relating to the work performed by that support function for basic units.

For example, quality assurance or configuration management functions would provide data on the application of PPQA or CM respectively. The linkage of the functions to assure quality or maintain configurations of key work products related to other process areas does not mean these support functions must address all the practices in those other process areas.

Coverage–3: In cases where multiple support functions exist within the organizational unit, all instances of the support function shall be included in the appraisal scope. For example, if division-specific Configuration Management groups exist, every group in each division included in the organizational unit must be sampled.

Organizational unit size (i.e., number of people and number of basic units) and sizes of basic units (i.e., number of people) in the organizational scope shall be documented in the appraisal plan as well as the percentage ratio of these two measures:

- Population percent: the number of people in the organizational scope divided by the number of people in the organizational unit (x100)
- Basic unit percent: the number of basic units in the organizational scope divided by the number of basic units in the organizational unit (x100)

Basic units that are specifically excluded from participating in the appraisal (though they are included in the definition of the organizational unit) must be identified in the appraisal plan and in the appraisal disclosure statement along with a justification for their exclusion. Such exclusions might arise from logistical constraints identified during planning—such as unplanned urgent customer demands. Units that are not part of the organizational unit need not be listed in this manner—as the results do not apply to them.

1.1.4 Determine Appraisal Scope

Parameters and Limits (continued)

The appraisal team reserves the right to seek clarification or data from other basic units or support functions within the organizational unit, beyond those specified in the data collection plan. These basic units or support functions must also be identified in the appraisal disclosure statement.

The organizational scope to be investigated during the appraisal will drive the selection of participants needed to provide sources of objective evidence. An initial determination of appraisal participants, by name and role, must be negotiated with the appraisal sponsor and/or the senior site manager as part of the early determination of organizational scope. This initial determination will be refined later during detailed appraisal planning.

If the Conduct Appraisal phase is to be performed using incremental subsets of the organizational unit or the model, the appraisal plan must identify the organizational scope and appraisal reference model scope for each increment.

Delta appraisals are not permitted. A delta appraisal is defined as a second appraisal performed on a subset of an original appraisal model scope after correcting weaknesses reported in the previous appraisal, and then combining the results of the second appraisal with the results of the parts of the first appraisal that were not investigated in the second appraisal to get new results.

Implementation Guidance

The topic of sampling and determining the organizational scope can be a complex issue, with considerable impacts on the credibility of the appraisal overall and the cost-effective implementation of SCAMPI A appraisals. A thorough understanding of these concepts is necessary to ensure they are consistently and practically applied. Appendix F, Scoping and Sampling in SCAMPI A Appraisals, provides much more detailed descriptions, illustrations, and case studies to further elaborate these concepts.

The selection of the appraisal reference model scope should have been discussed during the setting of appraisal objectives. Choices regarding the reference model and the selection of components to include may impact the achievability of appraisal objectives. Clearly, a broadly-defined organizational unit (e.g., a multi-national enterprise) will require collecting and analyzing significantly more objective evidence than a narrowly defined organizational unit (e.g., a specific product line within a specific business unit at a single geographical location).

1.1.4 Determine Appraisal Scope

Implementation Guidance (continued) The organizational unit to which appraisal results will be attributed should be described accurately in all statements made by the appraisal team leader and sponsor. It is the responsibility of the appraisal team leader to understand the larger organizational context in which the appraised organizational unit resides. Familiarity with the nature of departmental structures, matrixed subject matter expert groups, integrated product teams, program and basic unit groupings, or product line implications that may affect the interpretation of appraisal outcomes will aid in obtaining this understanding.

In some organizations, a small number of process areas may be implemented uniformly across basic units to an extent that differences across subgroups do not exist as they do in the implementation of other process areas. For example, maintenance projects or service offerings that fall under a common program management structure may be governed by a unified set of work processes relating to Project/Work Monitoring and Control. Such a program (which is a collection of basic units) would be managed by common management lines with shared reporting requirements.

The behavior of staff in the program is guided by a set of conditions that override the influences of sampling factors that lead to differences in other parts of the organizational unit. In these exceptional cases, the method supports a different form of sampling for basic units—one that considers an instantiation of the process area that is identical among basic units from different subgroups.

The organizational unit should be documented in the clearest terms possible. It is often difficult to specify unambiguous boundaries without resorting to naming individual people in some organizations. Information about the organizational unit should be documented in a way that allows future appraisal sponsors to replicate (to the extent possible) the organizational unit appraised. This information should be in the appraisal plan, and used (in summary form if needed) in briefing the appraisal team and appraisal participants.



1.1.5 Determine Appraisal Outputs

Activity Description

Identify the specific appraisal outputs to be produced. Some appraisal outputs are required and additional outputs are tailorable (see Parameters and Limits). Some possible SCAMPI outputs are supported by all reference models; other possible outputs are reference-model specific (see model-specific implementation guidance below).

Obtain information to answer the following questions:

- What ratings will be generated during the appraisal?
- Will a final report be written to document appraisal results?
- Will recommendations on how to address specific findings be generated and reported?

Required Practices

The appraisal team leader or designee shall

- review required SCAMPI A outputs with the appraisal sponsor
- review and select optional SCAMPI A outputs with the appraisal sponsor

Parameters and Limits

Required SCAMPI A outputs include

- appraisal record (see activity 3.2.2, Generate Appraisal Record)
- SEI data (see activity 3.2.3, Provide Appraisal Feedback to the SEI)

At least all the goals for the process area or process areas within the model scope must be rated for the organizational unit, although the choice may be made to not disclose the ratings to anyone other than the appraisal sponsor. Ratings for individual disciplines or for individual basic units, unless the basic unit is the organizational unit, are not allowed.

The sponsor shall receive the appraisal record, which includes

- final findings, including statements of strengths and weaknesses
- documented for every process area investigated
- all ratings planned for and generated by the team
- the appraisal disclosure statement

The appraisal team leader and sponsor are required to sign the appraisal disclosure statement.

1.1.5 Determine Appraisal Outputs

Implementation Guidance Non-model findings reflect items that have significant positive or negative impact on the enactment of processes within the organizational unit that do not directly relate to model practices.

While statements of findings (strengths and weaknesses) are a required output of the method, creating a written report that elaborates on the findings is optional. The sponsor should decide if resources are to be spent creating this artifact.

Similarly, the task of creating recommendations to address appraisal results may require expertise that is not represented on the appraisal team in some cases. Recommendations may address suggestions to resolve a weakness or to propagate a strength. When requested, recommendations are often included in final findings; however, the sponsor may request a separate recommendations report that elaborates on the recommendations.

Additionally, the characteristics of the appraised organization and the constraints that shape its improvement program should be carefully considered when generating a process improvement action plan that defines the tasks necessary to address weaknesses.



1.1.6 Obtain Commitment to Initial Appraisal Plan

Activity Description

The appraisal sponsor formally approves the initial appraisal plan, and this set of information is placed under change management.

Required Practices

The appraisal team leader or designee shall

- record required information in the initial appraisal plan
 - obtain sponsor approval of the initial appraisal plan
 - manage changes to the initial appraisal plan, obtaining sponsor approval of changes
-

Parameters and Limits

The appraisal plan is often generated incrementally throughout the Plan and Prepare for Appraisal phase, and must be approved prior to the start of the conduct appraisal phase. The initial appraisal plan addresses the requirements of the appraisal, and guides future appraisal planning. At a minimum, the initial appraisal plan provide the information needed to address the following:

- the identity of the appraisal sponsor and the relationship of the sponsor to the organizational unit being appraised
 - the appraisal purpose, including alignment with business objectives (see activity 1.1.1, Determine Appraisal Objectives)
 - the organizational unit being appraised
 - the appraisal scope (see activity 1.1.4, Determine Appraisal Scope)
 - the organizational scope of the appraisal
 - the reference model scope
 - sampling factors affecting the appraisal
 - the process context, which includes, at a minimum
 - organizational unit size and demographics
 - application domain, size, criticality, and complexity
 - high-priority characteristics (e.g., time to market, feature richness, and reliability) of the products and services of the organizational unit
 - the data collection strategy (see activity 1.1.2, Determine Data Collection Strategy) which include
 - the data collection approach (discovery, managed discovery, and/or verification)
 - the data collection timing (e.g., preparation phase or conduct phase)
 - the data collection techniques (e.g., demonstrations, presentations, interviews and questionnaires)
 - responsibility for data collection
-

1.1.6 Obtain Commitment to Initial Appraisal Plan

Parameters and Limits (continued)

- the appraisal constraints (see activity 1.1.3, Determine Appraisal Constraints) which include at a minimum
 - availability of key resources (e.g., staffing, funding, tools, and facilities)
 - schedule constraints
 - the maximum amount of time to be used for the appraisal (The maximum time to perform the Conduct Appraisal phase is 90 days.)
 - specific process areas or organizational entities to be excluded from the appraisal
 - the maximum, minimum, or specific sample size or coverage desired for the appraisal
 - ownership of appraisal results and any restrictions on their use
 - controls on information resulting from a confidentiality agreement
 - non-attribution of appraisal outputs to individuals
 - the identity of the appraisal reference models used (version, addition, and representation)
 - any process area designated as “not applicable” and the rationale for its exclusion (note that “not applicable” areas may preclude ratings, for some reference models)
 - the rationale for selecting the sample basic units and support functions as representative of the organizational unit
 - basic units, categories, or groups/functions that are specifically excluded from the appraisal as well as the justification for their exclusion
-

1.1.6 Obtain Commitment to Initial Appraisal Plan

Parameters and Limits (continued)

- the identity and affiliation of the SCAMPI Lead Appraiser who is to be the appraisal team leader for the appraisal
- the identity and affiliation of the appraisal team members and their specific appraisal responsibilities
- the identity (i.e., name and organizational affiliation) of appraisal participants and support staff, and their specific responsibilities for the appraisal
- any additional information to be collected during the appraisal to support the achievement of the appraisal objectives
- a description of the planned appraisal outputs (see activity 1.1.5, Determine Appraisal Outputs), including ratings to be generated
- anticipated follow-on activities (e.g., reports, appraisal action plans, or re-appraisal)
- planned tailoring of SCAMPI A and associated tradeoffs
- appraisal usage mode (i.e., Internal Process Improvement, Supplier Selection, or Process Monitoring)

Implementation Guidance

An appraisal team leader's ability to build and maintain commitment from the sponsor and the members of the sponsoring organization is a major factor contributing to the success of the appraisal. The process of understanding the requirements and constraints should yield a series of agreements that form an input to the appraisal plan. Based on the judgment of the appraisal team leader, these agreements may be covered in a formal (signed) document that forms a basis for future activities. More typically, the appraisal team leader maintains a record of interactions with the sponsor, which are incorporated into the appraisal plan as it is drafted.

The appraisal team leader and the sponsor should have verbal agreement on the items discussed above, and these items should be documented in some way. The formality of the documentation may range from simple meeting minutes maintained by the appraisal team leader, to a more formal memorandum of understanding or other vehicle that documents agreements and provides traceability. It is expected that the appraisal plan will be used to document important issues pertaining to requirements.



1.2 Develop Appraisal Plan

Purpose Document the results of appraisal planning including the requirements, agreements, estimates, risks, method tailoring, and practical considerations (e.g., schedules, logistics, and contextual information about the organization) associated with the appraisal. Obtain and record the sponsor's approval of the appraisal plan.

Entry Criteria The appraisal sponsor and appraisal team leader have agreed to proceed with appraisal planning based on a common understanding of the key parameters that drive the planning process.

Inputs Documented agreements, reflected in the appraisal plan, that support a common understanding of appraisal objectives and key appraisal-planning parameters

Activities

- 1.2.1 Tailor Method
- 1.2.2 Identify Needed Resources
- 1.2.3 Develop Data Collection Plan
- 1.2.4 Determine Cost and Schedule
- 1.2.5 Plan and Manage Logistics
- 1.2.6 Document and Manage Risks
- 1.2.7 Obtain Commitment to Appraisal Plan

Outputs

- approved appraisal plan

Outcome The sponsor and appraisal team leader agree on technical and non-technical details for the planned appraisal. The plan is refined in conjunction with performing the other Planning and Preparation phase activities. This agreement is documented and reviewed by affected stakeholders as appropriate.

Exit Criteria The final appraisal plan is reviewed and approved.

1.2 Develop Appraisal Plan

Key Points	Skilled appraisal team leaders will effectively develop and use outputs from the other Planning and Preparation phase activities to achieve clarity of the shared vision necessary to make the tradeoffs and decisions resulting in a final plan. This activity is an important opportunity for the appraisal team leader to demonstrate process discipline, as well as the type of careful planning described in the reference models. Experienced appraisal team leaders will leverage data, templates, and assets (developed through their own experience) to improve the completeness and effectiveness of the appraisal plan, recognizing the return on investment that will be obtained through smooth and efficient appraisals.
Tools and Techniques	Tools include an appraisal plan template, samples, and embedded procedural guidance in planning templates. Estimation worksheets and methods for assessing the impact of appraisal constraints are also quite useful.
Metrics	<ul style="list-style-type: none">• calendar time spanned by the activity• effort consumed in carrying out the activities of this process• level and frequency of changes to the appraisal plan
Verification and Validation	<ul style="list-style-type: none">• comparison of actual effort for this activity with historical data accumulated by the appraisal team leader• review of the appraisal plan by affected stakeholders• sponsor's approval of the plan
Records	<ul style="list-style-type: none">• estimation worksheets (if used)• appraisal plan (see activity 1.2.7, Obtain Commitment to Appraisal Plan, for a detailed list of plan contents)

1.2 Develop Appraisal Plan

Interfaces with Other Processes

The appraisal plan will guide and define the execution of the appraisal such that it is in concert with the business needs and constraints. An initial plan can be generated immediately following consultation with the sponsor. Further refinement is done as detailed planning occurs and new information comes to light in executing appraisal planning and preparation. A final appraisal plan must be completed prior to the completion of process 1.5, Prepare for Appraisal Conduct. Typically, resources, method tailoring, model-related decisions, and a planned list of outputs are finalized early on, while cost, schedule, and logistics are finalized later in the Plan and Prepare for Appraisal phase.

While it may not be necessary to formally separate the requirements analysis activities from the activities described in this section, prior understanding of the appraisal requirements is a necessary input to this process. The plan for the appraisal provides an important vehicle for

- documenting agreements and assumptions
- establishing and maintaining sponsorship
- tracking and reporting the performance of the appraisal process
- reinforcing commitments at key points in the appraisal process

The initial version of the appraisal plan is intended to capture key appraisal requirements and strategic objectives, which require high sponsor visibility and change control approval. Later versions of the appraisal plan add the tactical planning details necessary to implement and satisfy these objectives.

Summary of Activities

This process is composed of the activities summarized here and described below. The scope of the appraisal is defined in terms of (a) the portion of the appraisal reference model that will be investigated and (b) the bounds of the organizational unit for which the results can be considered valid (e.g., a basic unit, a product line, a work group, an operating division, a business unit, or an entire global enterprise). Method-tailoring choices are made to most effectively achieve appraisal objectives within defined constraints of time, effort, and cost. The resources required to carry out the appraisal are identified. The cost and schedule are negotiated and recorded. The details of logistics, particularly for the Conduct Appraisal phase, are documented. Risks and risk-mitigation plans are identified and documented. Completion of these activities results in a well-defined, achievable appraisal plan.



1.2.1 Tailor Method

Activity Description

Tailoring of SCAMPI A includes

- selection of choices (if any) within the Required Practices
- setting parameters that are allowed to vary within the Parameters and Limits

Because SCAMPI A is designed to apply to a wide range of appraisal applications, the tailoring activity is one that deserves careful and thoughtful attention.

The SCAMPI MDD is designed to clearly indicate which aspects of the method are required and which are tailorable. The Parameters and Limits sections of each activity description provide discussions of tailoring options, in context.

In addition, the appraisal usage mode will determine some tailoring choices.

Required Practices

The appraisal team leader or designee shall

- review and select tailoring options within each activity
- ensure that the tailoring decisions are self-consistent and that they are appropriate in light of the appraisal objectives and constraints
- document the tailoring decisions made in the appraisal plan

Parameters and Limits

The structure of the MDD clarifies which SCAMPI A features are required. Parameters and Limits sections define the allowable variation within these method requirements. Tailoring guidance and Implementation Guidance are provided to assist with tuning the method to fit sponsor objectives and appraisal constraints.

1.2.1 Tailor Method

Implementation Guidance This appraisal method offers a wide variety of choices that allow the appraisal team leader and sponsor to select appraisal features that best address appraisal and business objectives.

Method tailoring is directly related to the organizational scope and appraisal reference model scope decisions. Most of the allowable tailoring options flow logically from these decisions when taken in context of the appraisal objectives and constraints. Tailoring decisions typically affect the appraisal risk. Typical tailoring choices that significantly impact appraisal planning include

- assigning mini-teams by basic unit or by process area grouping
- data collection approaches to be utilized (discovery, managed discovery and/or verification) and the associated supporting work aids and tools (e.g., use of video conference, teleconference, or other similar technology to conduct interviews, conducting parallel interview sessions with a minimum of two team members, and use of a database of objective evidence mapped to model practices)
- verification approaches to be utilized, including supporting work aids and tools (e.g., mini team verification of practices at the instantiation level)
- validation approaches to be utilized including supporting work aids and tools (e.g., use of instrument or targeted focus group for validation of preliminary findings)
- selection of optional SCAMPI outputs (e.g., preliminary findings focused on basic units, division, or disciplines, and the goal ratings, capability level ratings, and maturity level ratings)
- documenting non-model findings
- optional activities (e.g., conduct executive session, plan for next steps, or collect lessons learned)

Experienced appraisal team leaders will provide a well-defined approach to ensure that the appraisal objectives are achieved in an efficient and effective manner. Experienced sponsors will require a well-defined approach to ensure an acceptable level of risk in meeting objectives within the constraints. The appraisal plan documents the method-tailoring decisions and their rationale, and the associated method variations and techniques that will be employed.



1.2.2 Identify Needed Resources

Activity Description This activity is concerned with the identification and estimation of resources needed to carry out the appraisal. Resources include personnel, facilities, tools, and access to information.

Required Practices The appraisal team leader or designee shall do the following:

- identify appraisal team members
- identify appraisal participants
- identify equipment and facilities
- identify other appraisal resources needed
- document resource decisions in the appraisal plan

Parameters and Limits The level of detail in the identification of needed resources must be sufficient to support the creation of the appraisal plan. At a minimum, the appraisal team leader must identify the following:

- the names of people who are candidates for affirmations or appraisal team membership, and support personnel
- the organizational or basic unit affiliation of these people
- the location, seating capacity, and configuration of rooms to be used by the team
- specific equipment needed (e.g., overhead projector, laptop projector, or video-conferencing)

1.2.2 Identify Needed Resources

Implementation Guidance Appraisal resources are typically defined early in the appraisal-planning process. Identifying resources goes hand in hand with estimating appraisal cost and schedule (see activity 1.2.4, Determine Cost and Schedule), and these resources may be iteratively refined. Tradeoffs are routinely made in light of the appraisal objectives and constraints.

The appraisal sponsor or senior site manager may identify candidate appraisal team members and appraisal participants. Review of the organizational unit structure or other site-specific information can also be useful for this identification. Initially, participants can be specified in terms of roles or responsibilities, with specific names to be determined later. Process 1.3, Select and Prepare Team, contains additional guidance on selecting appraisal team members.

Equipment and facilities are often negotiated with the organizational unit where the appraisal activities will be performed, but sometimes these equipment and facilities must be acquired. A room for dedicated use by the appraisal team is usually necessary for private discussions and to protect the confidentiality of appraisal data. Ideally, this room is separate from the other rooms where interview sessions are held.

The availability of computing resources, such as computers, printers, and networks, is a key consideration that should be planned and understood. Access to special tools or applications may also be needed.



1.2.3 Develop Data Collection Plan

Activity Description

The data collection plan is based on the data collection strategy defined in activity 1.1.2, Determine Data Collection Strategy. It is considered a part of the overall appraisal plan and is part of the record submitted at the end of the appraisal. It is typically documented as section of the appraisal plan. However, it can also be documented as an appendix to the appraisal plan or as a standalone document. This plan information is higher level information that helps document and communicate the overall approach to data collection for the appraisal.

The data collection activities are tailored to meet the needs for objective evidence so that the extent of practice implementation can be determined.

For practices that have objective evidence, a strategy for verifying that evidence will be formulated.

For practices that lack objective evidence, a strategy for discovering that evidence will be formulated.

Detailed information on data collection can be recorded in work aids that manage appraisal data and in the appraisal schedule. A record of “information needed” items is the most detailed, while artifact lists, interview schedules, and the assignment of process area mini-teams help shape the strategy for obtaining the needed data. The documented data collection plan will explicitly state where this detailed information will be recorded. The data collection plan will evolve and be revised as the appraisal is planned and performed. Analysis of the data collection plan can be used to identify important risks to the appraisal which will be documented in the risk section of the appraisal plan.

Required Practices

The appraisal team leader or designee shall document the data collection plan.

Parameters and Limits

The data collection plan must specify contingencies to manage the risk of having insufficient data.

For every instantiation of every model practice, the data collection plan must specify how, when, and by whom the objective evidence will be verified.

For instantiations of model practices that have not been addressed in the initial objective evidence, the data collection plan must specify how the team intends to discover the presence or absence of objective evidence that characterizes the extent of implementation for that practice.

1.2.3 Develop Data Collection Plan

**Parameters
and Limits
(continued)**

The data collection plan is considered part of the appraisal plan and is often documented in a variety of artifacts, which may be completed at different phases of appraisal planning. The data collection plan includes

- documentation of the data collection strategy (see activity 1.1.2, Determine Data Collection Strategy)
 - identification of participants to be involved in affirmation activities
 - assignment of process areas to team members
 - the schedule and success criteria for readiness reviews
 - the approach for using Class C and Class B appraisals for data collection and/or readiness reviews (if they are used for this purpose)
 - a summary of initial objective evidence provided by the organization
 - identification of highest priority data needs
 - a schedule of interview-gathering events, revised over time to include more detail
 - for interviews, the identification of an initial set questions (this may be maintained outside of the overall appraisal plan)
 - identification of artifacts still needed after the performance of readiness reviews (if any)
 - risks associated with the sufficiency of the data and the adequacy of the schedule
-

1.2.3 Develop Data Collection Plan

Implementation Guidance Types of objective evidence include artifacts and affirmations (see process 2.2, Examine Objective Evidence). A combination of these evidence types is required for corroboration (see activity 1.1.4, Determine Appraisal Scope). The data collection status is continually monitored during appraisal activities (see process 2.3, Document Objective Evidence) to ensure that sufficient data coverage is obtained. These key considerations should be understood and accounted for in the generation of the data collection plan.

Multiple types of interviews can be used to obtain affirmations (see activity 2.2.2, Examine Objective Evidence from Affirmations):

- standard structured interviews scheduled in advance that use scripted questions
- on-call interviews, scheduled in advance for calendar purposes, but held only if it is determined they are necessary
- office hours interviews in which interviewees are notified that they may need to be available as a contingency during scheduled periods

The data collection plan should specify sources of data, tools, and techniques to be used.

A robust data collection plan will plan for interviews of all three types. Start with a full set of scheduled interviews and gradually add, eliminate, or modify events as the inventory of initial objective evidence indicates the need.

The data collection plan should clearly specify whether any virtual methods (e.g., video conferences, teleconferences, and other similar technology) will be used and how they will be used. It is the responsibility of the appraisal team leader to ensure that virtual methods do not compromise the integrity or accuracy of appraisal activities or appraisal results.

Planning for evidence reviews should include artifacts as described in activity 2.2.1, Examine Objective Evidence from Artifacts.

Ultimately, the appraisal team must have data on each practice in the reference model within the appraisal scope for each organizational element within the appraisal scope. For process areas addressing practices implemented at the basic unit level (e.g., Project Planning), this requirement means that data will be collected for each practice from each basic unit selected to provide data for that process area. For process areas addressing practices implemented at the organization level (e.g., Organizational Training), only one instantiation of each practice may be needed, depending on the way the organization chooses to implement such practices.

1.2.3 Develop Data Collection Plan

**Implementation
Guidance
(continued)**

The results of the analysis of initial objective evidence are used to determine which practices are not already covered with objective evidence. Practices for which no initial objective evidence has been provided should be identified as high-risk areas for the team to address immediately. The schedule for data collection may need to change dramatically if the team is unable to find relevant data for these areas in short order. In the case of practices for which data are available in the initial objective evidence, the team members assigned to the process areas plan the strategy for verifying the implementation of each of the practices through review of the named artifacts, affirmations from the people who fill the named roles, or other data collection events. Artifacts used to manage data collection events are populated with the current understanding of the planned data collection events, as follows:

- The schedule for interviews is finalized, so participants can be informed of the expectations for their participation as interviewees.
- The list of documents on hand (e.g., accessible electronically) is finalized so that the team members know what is and is not available for document review.
- A preliminary allocation of practices to be covered in each of the scheduled interviews is documented.

A list of needed documents (not yet available to the team) is generated, if there are any known needs for documents at this point.



1.2.4 Determine Cost and Schedule

Activity Description	A top-level cost breakdown and schedule are developed and included in the plan.
Required Practices	<p>The appraisal team leader or designee shall</p> <ul style="list-style-type: none">• estimate the duration of key events as a basis for deriving a comprehensive schedule• estimate the effort required for the people participating in the appraisal• estimate the costs associated with using facilities and equipment as appropriate• estimate the costs for incidentals (e.g., travel, lodging, and meals) as appropriate• document a detailed schedule in the appraisal plan• document detailed cost estimates in the appraisal plan
Parameters and Limits	Scheduling for each day of the appraisal is required.

1.2.4 Determine Cost and Schedule

Implementation Guidance

Cost and schedule may be developed top-down based on sponsor objectives and constraints, bottom up based on results of other planning and preparation processes and activities, or more generally using a combination of the two approaches. Scheduling the events and activities of the appraisal is an ongoing logistical task that requires the coordination of many different groups of individuals. Determining and communicating a schedule for the appraisal, and maintaining ongoing visibility as the details take form, is the primary responsibility of the appraisal team leader. The appraisal coordinator is expected to provide support in this task, and the appraisal team leader typically selects the person who plays that role with this duty in mind.

The needs of the sponsor for appraisal outputs of a specified quality fulfilling a specified purpose, balanced against the resources available to conduct the appraisal, will determine the schedule constraints. Schedule and cost must be considered for the entire span of the appraisal activities. Effort estimates should be developed not only for the appraisal team, but also for the expected participants within the organizational unit (e.g., interviewees, respondents to instruments administered, attendees at briefings, and support staff).

Organizational costs for preparing and supporting appraisals can be reduced by gathering and maintaining objective evidence for each instantiation. In addition to providing an effective mechanism for monitoring the process implementation and improvement progress of the organizational unit, this approach enables the ready availability and reuse of objective evidence for subsequent appraisals.

While the schedule for the appraisal is shared with a fairly wide audience, the cost of the appraisal (or basic units within the appraisal) is often kept from wide view, due to the potentially sensitive nature of this information.



1.2.5 Plan and Manage Logistics

Activity Description The logistical details of the appraisal are negotiated and documented. The appraisal team leader, supported by the appraisal coordinator, manages planning tasks that document and communicate logistical arrangements. Checklists and action item tracking mechanisms are important structures used to manage these tasks.

Required Practices The appraisal team leader or designee shall

- document logistical schedules and dependencies
- maintain communication channels for providing status
- assign responsibilities for tracking logistical issues

Parameters and Limits None

Implementation Guidance Effective planning depends on anticipating a variety of logistical issues that may occur during the appraisal. The time-critical nature of appraisal activities makes it difficult to manage last-minute changes in important details such as the following:

- identifying hotels for people traveling to the appraisal
- providing transportation and/or lodging for team members or the remote members of the organizational unit
- providing workstation support
- ordering meals
- interacting with facilities staff on site
- meeting security/classification requirements
- providing badges or arranging for escorts in limited-access facilities
- providing access to rooms, equipment, and supplies needed for administrative tasks
- providing use of virtual methods (e.g., video conferences, teleconferences, and other similar technology) to conduct appraisal activities
- providing communication channels and back-up staff to support the team on site

If virtual methods such as video conferences, teleconferences, and other similar technology are to be used to perform appraisal activities, these methods should be clearly defined in the Appraisal Plan. Furthermore, it is the responsibility of the appraisal team leader to ensure that the use of virtual methods in no way compromises the integrity or accuracy of the appraisal activities or the appraisal results. Virtual methods should allow for adequate interaction between the appraisal team members and the appraisal participants and should provide mechanisms for the appraisal team to control the interactions.



1.2.6 Document and Manage Risks

Activity Description

As with any activity containing dependencies among events, people, and other resources, risk management is an important ingredient to success. The appraisal team leader is responsible for documenting and communicating risks and associated mitigation plans to the sponsor and appraisal team members.

Required Practices

The appraisal team leader or designee shall

- identify appraisal risks
- develop mitigation plans for key appraisal risks and implement these plans as necessary
- keep the appraisal sponsor and other stakeholders informed of the appraisal risk status

The risks and mitigation plans identified through conducting this activity are required elements of the appraisal plan (see Parameters and Limits for activity 1.2.7, Obtain Commitment to Appraisal Plan). If an identified risk occurs during appraisal execution then this should also be documented in the plan.

The appraisal team leader is responsible for keeping the appraisal sponsor informed of risk management activities so that, if needed, timely sponsor intervention is possible to ensure the achievement of appraisal objectives.

Parameters and Limits

When evaluating risks to an appraisal the following potential risk areas must be considered:

- personnel
 - logistic
 - technical
 - facilities
 - schedule
-

1.2.6 Document and Manage Risks

Implementation Guidance Risk management is the systematic process of planning for, identifying, analyzing, responding to, and monitoring risks. It involves processes, tools, and techniques that help the appraisal team leader maximize the probability and results of positive events and minimize the probability and consequences of adverse events as indicated and appropriate within the context of risk to the overall appraisal objectives. Risk management is most effective when performed early in the appraisal planning process and is a continuing responsibility of the appraisal team leader throughout the appraisal.

Most appraisal team leaders include a section titled “Risk Management” in the appraisal plan. The level of effort devoted to risk-management activities is something the appraisal team leader must adjust to fit the situation.



1.2.7 Obtain Commitment to Appraisal Plan

Activity Description Formal sponsor commitment to the appraisal plan is obtained. The appraisal plan constitutes a contract between the appraisal sponsor and the appraisal team leader, so it is vital that this agreement be formal.

Required Practices The appraisal team leader or designee shall

- document the appraisal plan
- review the appraisal plan with the sponsor and secure the sponsor's approval
- provide the appraisal plan to relevant stakeholders for review

Parameters and Limits Required contents of the appraisal plan include the following, at a minimum:

- the initial appraisal plan (see activity 1.1.6, Obtain Commitment to Initial Appraisal Plan)
- the activities to be performed in conducting the appraisal
- resources needed for conducting the appraisal (see activity 1.2.2, Identify Needed Resources)
- data collection plan (see activity 1.2.3, Develop Data Collection Plan)
- cost and schedule estimates for performing the appraisal (see activity 1.2.4, Determine Cost and Schedule)
- appraisal logistics (see activity 1.2.5, Plan and Manage Logistics)
- risks and mitigation plans associated with appraisal execution (see activity 1.2.6, Document and Manage Risks)

There must be a signature block for the appraisal team leader and the sponsor to indicate in writing their commitment to the plan. If minor updates are made to the plan, signatures do not have to be obtained again. If changes affect the scope (model or organizational) of the appraisal, then the plan must be re-baselined.

At a minimum, the appraisal team members are considered relevant stakeholders and should receive a copy of the approved appraisal plan.



1.3 Select and Prepare Team

Purpose Ensure that an experienced, objective, trained, and appropriately qualified team is available and prepared to execute the appraisal process.

- Entry Criteria**
- Appraisal requirements have been documented (at least in draft form).
 - Appraisal constraints are understood and documented (at least in draft form).
 - The appraisal plan is defined (at least in draft form).
-

- Inputs**
- appraisal requirements and constraints (in draft or final form)
 - appraisal plan (in draft form)
 - team training materials
-

- Activities**
- 1.3.1 Identify Appraisal Team Leader
 - 1.3.2 Select Team Members
 - 1.3.3 Document and Manage Conflicts of Interest
 - 1.3.4 Prepare Team
-

- Outputs**
- training records
 - appraisal team member assignments and qualifications
 - identified and documented conflicts of interest
 - a prepared appraisal team that has completed
 - appraisal method training
 - appraisal reference model training
 - team-building activities
 - team orientation regarding appraisal
-

Outcome The successful completion of this process results in an experienced, objective, qualified, and trained team ready to execute the appraisal. The appraisal team members have acquired the necessary knowledge to play their roles, or their previous knowledge is confirmed to be satisfactory. The appraisal team leader has provided opportunities to practice the skills needed for each person to play his/her role, or has confirmed that these skills have already been demonstrated in the past. The team members have been introduced to one another, and have begun to plan how they will work together.

- Exit Criteria**
- The prepared team is committed to the appraisal.
 - Training has been provided and its results recorded.
 - Conflicts of Interest have been mitigated.
 - Remediation of knowledge/skill shortfalls has been completed (if needed).
-

1.3 Select and Prepare Team

Key Points	Whether the appraisal team leader trains an intact team or forms a team from a corps of experienced team members, the responsibility to ensure that the team is ready to succeed rests with the appraisal team leader.
Tools and Techniques	<p>Training course material is available from the SEI for training teams. This training should be tailored or supplemented by the appraisal team leader based on the appraisal context or degree of team member experience. Case studies and exercises are recommended to reinforce the situations team members are likely to encounter during the appraisal.</p> <p>Other ways of accomplishing this activity may draw on one or more of the following:</p> <ul style="list-style-type: none">• providing supplementary training to previously experienced team members so that the operational details of the approach used will be familiar• training a cadre of team members and keeping their knowledge and skills up-to-date as part of an overall program of appraisals
Metrics	<ul style="list-style-type: none">• summary of team member qualifications• effort and calendar time expended to accomplish training• trainee ratings of instructional materials and approach (if applicable)• achievement of milestones for remedial activities (if applicable)
Verification and Validation	<ul style="list-style-type: none">• sponsor and appraisal team leader approval of identification and mitigation of conflicts of interest, team membership and preparation• results of exams used to demonstrate training effectiveness (if used)• feedback from team members on their readiness to perform their role(s)
Records	<ul style="list-style-type: none">• team member contact information• training records (if applicable)• feedback provided by trainees (if applicable)• team qualification summary (recorded in appraisal plan)

1.3 Select and Prepare Team

Interfaces with Other Processes

This process includes selecting appraisal team members, identifying and mitigating conflicts of interest, and preparing the appraisal team. It may occur after obtaining sponsor commitment to the initial appraisal plan. The appraisal plan should be available, at least in draft form, as a necessary input (see activity 1.2.7, Obtain Commitment to Appraisal Plan for contents). Selected appraisal team members may provide input into further definition of the appraisal planning. Appraisal team training may provide an initial means to obtain a preliminary understanding of the appraised organization's operations and processes. If available, the organizational unit's database of objective evidence mapped to model practices is a useful resource for orienting the appraisal team on organizational characteristics, such as the application domain, the organizational structure, the process improvement structure, and approaches for appraisal reference model implementation.

Summary of Activities

The appraisal team is a cohesive unit of objective, trained and capable professionals, each of whom must meet stringent qualifications. An appraisal team leader is selected to plan and manage the performance of the appraisal, delegate appraisal tasks to team members, and ensure adherence to SCAMPI A requirements. Appraisal team members are selected based on defined criteria for experience, objectivity, knowledge, and skills to ensure an efficient team capable of satisfying the appraisal objectives. Training is provided to ensure proficiency in the appraisal reference model and appraisal method.



1.3.1 Identify Appraisal Team Leader

Activity Description

The appraisal sponsor selects an appraisal team leader who has the appropriate experience, knowledge, and skills to take responsibility for and lead the appraisal. By definition, an appraisal team leader is a SCAMPI Lead Appraiser, certified by the SEI Appraisal Program, and is a member of that program in good standing. The SEI Appraisal Program is described on the SEI web site: <<http://www.sei.cmu.edu/>>. The appraisal team leader ensures that the appraisal is conducted in accordance with SCAMPI A requirements, with tailoring to meet appraisal objectives and constraints within allowable bounds defined by the method.

Required Practices

The sponsor or designee shall

- select a certified SCAMPI Lead Appraiser to serve as the appraisal team leader
 - verify the qualifications of the appraisal team leader (experience, knowledge, and skills)
-

Parameters and Limits

The appraisal team leader must be an SEI-certified SCAMPI Lead Appraiser in good standing (or a candidate SCAMPI Lead Appraiser or People CMM Appraiser being observed by a qualified observing lead appraiser). This certification can be verified on the web or by contacting the SEI directly.

If the SCAMPI A to be performed includes the rating of high maturity process areas, the appraisal team lead must be an SEI-certified SCAMPI high-maturity lead appraiser in good standing. This certification can be verified on the web, or by contacting the SEI directly.

There can be only one official appraisal team leader on any given appraisal. The appraisal team leader has sole discretion to delegate important tasks to appraisal team members, but cannot delegate leadership responsibility or ultimate responsibility for the successful completion of the appraisal. The inclusion of multiple SCAMPI Lead Appraisers on a team for a given appraisal can be a strong asset for the leader of that team. However, the single designated appraisal team leader must perform the leadership role and manage the appraisal process.

1.3.1 Identify Appraisal Team Leader

Implementation Guidance SCAMPI Lead Appraisers, by definition, will have participated on a minimum of three appraisals (two as an appraisal team member and one as an appraisal team leader). These requirements are outlined in the SEI Lead Appraiser program. An additional consideration impacting team experience requirements, however, is the appraisal usage mode for SCAMPI A. Additional experience may be necessary if the appraisal is for supplier selection and/or process monitoring, or if it will focus on other disciplines or environments. Similarly, if the appraisal will be used in a high maturity organization (maturity levels 4-5), additional team qualifications are needed as listed in activity 1.3.2, Select Team Members.

Appraisal team leader responsibilities are defined and described throughout the SCAMPI A MDD, but a summary overview of these responsibilities includes the following:

- Confirm the sponsor's commitment to proceed with the appraisal.
- Ensure that appraisal participants are briefed on the purpose, scope, and approach of the appraisal.
- Ensure that all appraisal team members have the appropriate experience, knowledge, and skills in the appraisal reference model and in SCAMPI A.
- Ensure that the appraisal is conducted in accordance with the documented SCAMPI A method.
- Verify and document that the appraisal method requirements have been met.

The appraisal team leader may be selected at any time in the appraisal planning phase; preferably, the appraisal team leader is selected upon initiation of appraisal activities so that he or she may participate in analyzing the requirements with the appraisal sponsor. In any event, the appraisal team leader is identified in time to (a) review and approve the appraisal plan with the appraisal sponsor prior to beginning the Conduct Appraisal phase of the appraisal, and (b) ensure adequate planning and the preparation of appraisal team members.



1.3.2 Select Team Members

Activity Description

This activity involves identifying available personnel, assessing their qualifications, and selecting them to become appraisal team members. It may occur after obtaining the sponsor's commitment to conduct the appraisal and may provide input to appraisal planning.

Required Practices

The appraisal team leader shall

- select individual team members that meet the minimum criteria for individual team members
- select individual team members that collectively meet the minimum criteria for the team as a whole
- document the qualifications and responsibilities of team members in the appraisal plan.

Parameters and Limits

The minimum acceptable team size for a SCAMPI A appraisal is four people (including the appraisal team leader).

Each Appraisal Team Member must have previously completed an SEI-licensed offering of the designated introductory course relating to each and every reference model (e.g., CMMI Constellation, or People CMM) that is included in the scope of the appraisal.

The team overall must have field experience relating to the content of the reference model (e.g., development of products and services for CMMI-DEV, delivery of services for CMMI-SVC, acquisition for CMMI-ACQ, human resources for P-CMM). For each reference model (e.g., constellation) in the scope of the appraisal, the team must have the following:

- Individual team members, each of whom have at least two years of experience performing the type of work addressed in each appraisal reference model included. This means each team member has field experience with each included model. The appraisal team leader, at their discretion, may accept one team member with no field experience – however, this must be documented along with the rationale for this exception in the appraisal plan.
 - An average of at least six years of field experience excluding the experience of the appraisal team leader, relating to the content of each of the reference models. This ensures that team members with relatively limited experience are balanced by others who have a greater level of experience.
 - An aggregate of 25 years of field experience relating to the content of each of the reference models excluding the experience of the appraisal team leader. This ensures that the team as a whole has a substantial experience base to support their judgments.
-

1.3.2 Select Team Members

**Parameters
and Limits
(continued)**

The appraisal team leader is required to evaluate and validate the team members experience by either a review of the team members resume or interview each team member to determine their level of expertise.

The team (as a group) must have a total of at least ten years of management experience, and at least one team member must have at least six years of experience as a manager – excluding the appraisal team leader.

The selected appraisal team members and their organizational affiliation and qualifications (individually and in aggregate) must be documented in the appraisal plan. The team leader must identify the range of roles, functions or activities performed in the work done within the organizational unit (e.g., lifecycle stages for CMMI-DEV).

The appraisal team, as a whole, must have members with experience performing practices from all of the process areas included in the appraisal scope. The appraisal team shall not be comprised entirely of staff who wrote the processes being appraised. If one or more process authors are included on the team, the risk management section of the appraisal plan must address how potential conflicts of interest will be managed.

The sponsor of the appraisal shall not be an appraisal team member. A senior manager who has supervisory authority over the entire organizational unit shall not be an appraisal team member.

Additional requirements specific to High Maturity appraisals:

- Ensure all members of the high maturity mini-team have high maturity experience.
- A high maturity lead appraiser or appraisal team member with statistical analysis and other high maturity-related training and experience shall be assigned to all mini-teams focused on high maturity process areas.

The team as a whole must have collective experience implementing high maturity activities such as establishing, evaluating, using, or analyzing process performance baselines and process performance models.

The appraisal team leader is the final authority on acceptance of appraisal team members and is responsible for ensuring their qualifications and suitability for the appraisal purpose.

1.3.2 Select Team Members

Implementation Guidance Although not required in the Parameters and Limits section, the following are considered recommended best practices and should be employed whenever feasible:

- Each member should have good written and oral communication skills, the ability to facilitate the free flow of communication, and the ability to perform as team players and negotiate consensus.
- At least half of the team members should have participated in a previous process appraisal.
- Team members should be perceived by the appraisal sponsor as credible.

Additional appraisal team member selection considerations include

- Consider the personal characteristics of individual team members (e.g., communication preferences and personality types) and how these characteristics may affect the dynamics of the team.
 - Using more internal or external team members based on appraisal parameters like model scope or organization size
 - Recruiting team members from other divisions, or external organizations where applicable and appropriate
 - Encourage the sponsor or internal process lead or appraisal coordinator to identify team members that are external to the organizational unit or organization in order to get a greater component of non-organizational unit members
 - In small organizations, where the appraised organizational unit may equal the full organization, it may be more appropriate to select some external personnel (outside of the organization) as appraisal team members (cooperation with other small organizations to exchange team members is also an option). For large organizations, persons external to the organizational unit, e.g. from another corporate function, may bring in the same objectivity as an external person. All these situations should be considered, discussed with the sponsor and rationale should be given in the appraisal plan.
 - Making tradeoffs between team size and team member expertise levels
 - Appraisal constraints, such as security classification, may be additional criteria for team member selection.
 - Continuity of team members across multiple appraisals
-

1.3.2 Select Team Members

- Implementation Guidance (continued)**
- Encourage involvement of team members who participated on previous appraisals within the organization, in order to benefit from legacy experience.
 - Consider lessons learned from prior events in adjusting the team for the current event
 - Consider bringing in some new team members to get a fresh perspective
 - For a series of appraisals (e.g. for a SCAMPI C, B, A sequence or related OU) strive for maintaining overall team member continuity. Consider exchanging team members by assigning them to other tasks. Another option might be to add team members while moving from C to B to A (also due to changing minimum team size).
 - Making tradeoffs between assigning specialized roles to certain team members versus a ‘more uniform distribution of tasks.’
 - If the appraisal team leader allows mini teams to ask the questions during an interview, ensure that the mini-teams are aware of the rules associated with interviews.
 - Consider adjusting the work load of team members that are assigned specialized responsibilities such as time keeper, etc. as the situation dictates.
 - Use one or more certified SCAMPI Lead Appraisers as team members.

The maximum recommended team size is nine, but a balance between the scope of the appraisal and the size of the team should be considered. Team member training in the appraisal method is discussed in activity 1.3.4, Prepare Team.

Team members should not be managers of any of the selected basic units or support functions or be within the direct supervisory chain of any of the anticipated interviewees.

Appraisal team members are selected to provide a diverse set of qualified professionals with the appropriate experience, knowledge, and skills to make reasoned judgments regarding implementation of the appraisal reference model. The accuracy and credibility of the appraisal results depends greatly on the capability, qualifications, and preparation of the appraisal team members. In addition to the qualifications described above, other factors that may affect the performance of the team or reliability of appraisal results should be considered. Appraisal constraints, such as security classification, may be additional criteria for team member selection.

1.3.2 Select Team Members

Implementation Guidance (continued)

Appraisal team members are typically selected from a pool of qualified individuals provided by the appraisal sponsor or his/her designee. Situations where a conflict of interest may arise should be avoided. Team members who manage people or processes in the organization may struggle with their ability to be objective. Team members who are directly impacted by the appraisal outcome may be distracted by the potential consequences of the decisions they contribute to on the appraisal team.

Additional guidance specific to High Maturity appraisals:

- Consider having a certified high maturity lead appraiser lead the high maturity mini-team.
- Consider splitting up high maturity skills on the team onto multiple mini-teams to spread input and balance experience across the process areas in scope. Assign team members with particular knowledge (e.g. statistical techniques), to different mini- teams to balance expertise among teams.



1.3.3 Document and Manage Conflicts of Interest

Activity Description This activity involves identifying and handling conflicts of interest that may impair an appraisal team’s ability to function objectively. The appraisal team leader is responsible for handling potential conflicts of interest by avoiding or developing strategies to manage them.

-
- Required Practices** The appraisal team leader shall
- identify potential conflicts of interest
 - take steps to avoid those conflicts of interest that can be avoided
 - develop strategies to manage potential conflicts of interest that cannot be avoided, and document those strategies in the appraisal plan
 - monitor the conflicts of interest to ensure that management strategies are effective
 - take appropriate corrective action when conflict of interest management strategies do not work

-
- Parameters and Limits** The appraisal team leader must use professional judgment and evaluate, at a minimum, the following potential conflicts of interest, review them with the sponsor and ensure detailed documentation and rationale in their appraisal plan:
- Are any team members authors of one or more processes included in the scope of the appraisal?
 - Are any members of the organization’s process group serving on the appraisal team?
 - Are any “process owners” serving as appraisal team members?
 - Are staff with supervisory responsibility over one or more parts of the organizational unit on the team?
 - Are people who served on previous appraisals (Class C, B or A) of the organizational unit serving as appraisal team members?
 - Are any of the appraisal team members in a direct reporting relationship above any appraisal participants or other appraisal team members, including administrative, functional, basic unit, performance, or technical authority (e.g., supervisory, basic unit, program, technical)?
 - Will any of the appraisal team members be interviewed or providing evidence?
 - Are members of the appraisal team involved in process or product quality audits?
-

1.3.3 Document and Manage Conflicts of Interest

**Parameters
and Limits
(continued)**

- If using a translator,
 - Is the translator an appraisal team member?
 - Does the translator work for the appraised company?
 - Does the translator work within the organizational unit?
 - In support of this appraisal, was the appraisal team leader or any of the appraisal team members providing coaching, consulting, or labor for the organizational unit's project work or process identification, documentation, or creation? (Providing SEI-licensed training is excluded.)

The sponsor of the appraisal shall not be an appraisal team member (see activity 1.3.2, Select Team Members).

Potential conflicts of interest that cannot be avoided, along with the strategy to be used to manage them, are to be documented in the risk management section of the appraisal plan.

The appraisal team leader must keep the appraisal sponsor informed of management activities for conflicts of interest so that, if needed, timely sponsor intervention is possible to ensure the achievement of appraisal objectives. Caution must be exercised to ensure that confidentiality and non-attribution requirements of the appraisal are maintained.

In the event that conflicts of interest prove unmanageable, or compromise the team's objectivity and ability to reach valid conclusions, the appraisal team lead must take appropriate steps, up to and including termination of the appraisal.

The level of effort devoted to conflict of interest management activities is something the appraisal team leader must adjust to fit the existing situation.

1.3.3 Document and Manage Conflicts of Interest

Implementation Guidance The following practices to manage potential conflicts of interest should be considered whenever possible:

Pairing of internal and external team members on a mini-team

- Pairing internal and external team members provides benefits of external objectivity and internal knowledge.
- If mini-teams are planned, ensure each mini-team has at least one member with experience in the process areas to which they are assigned

Balancing mini-teams based on expertise or areas of interest

- If this is the first SCAMPI A for any of the appraisal team members, ensure they are paired with an experienced appraisal team member and/or give them experience on other types of appraisal events prior to the A.
- If any mini-teams do not have at least one member with experience from at least one SCAMPI A then consider the following:
 - appraisal team leader spends more time with that mini-team during the event
 - include that mini-team on other appraisal events prior to the A to increase their experience level
 - provide a greater amount of training prior to the appraisal
 - assign the process areas with the least risk to the mini-team
 - potentially increase the team size or extend duration to account for lack of appraisal experience
- If all appraisal team members are not experienced in all product development, service delivery, and/or project management areas in scope:
 - pair mini-teams based on known experience to mitigate areas where some have less experience in a particular area

Identify internal and external team members

- External team members do not work for the organizational unit, but may be from the same organization.
- Internal team members work directly for the organizational unit being appraised.
- Document how many appraisal team members will be external to the organizational unit, including the appraisal team leader.
- Document the number of internal appraisal team members.
- Document the number of external appraisal team members that are from the organization, but not the organizational unit.
- If any appraisal team members perform process evaluations for the organizational unit, assign them to mini-teams covering process areas unrelated to those evaluations.
- Do not assign an appraisal team member to evaluate a process they improved or developed.



1.3.4 Prepare Team

Activity Description

The appraisal team leader ensures that appraisal team members are sufficiently prepared for performing the planned appraisal activities. This preparation includes ensuring team members are familiar with the appraisal reference model, the appraisal method, the appraisal plan, organizational data and characteristics, and the tools and techniques to be used during the appraisal. Roles and responsibilities are assigned for appraisal tasks. Team building exercises are used to practice facilitation skills and reach unity in understanding the team objectives and how they will be satisfied.

All team members are expected to observe strict rules for confidentiality, the protection of proprietary or sensitive data, and the non-attribution of information to appraisal participants. Non-disclosure statements are often used to formalize these understandings.

Required Practices

The appraisal team leader shall

- ensure that appraisal team members have received appraisal reference model training
 - provide appraisal method training to appraisal team members or ensure that they have already received it
 - foster team building and establishing team norms
 - provide an orientation to team members on appraisal objectives, plans, and their assigned roles and responsibilities
 - ensure that no appraisal activity (performed by team members) begins until after the method training relating to that activity has been completed.
-

1.3.4 Prepare Team

Parameters and Limits

Model training must be provided using the standard introductory course for the model(s) in scope, delivered by an instructor who is certified by the SEI.

At a minimum, all team members must be trained on the following topics using information from the SCAMPI A team training materials provided by the SEI:

- SCAMPI A method overview
- appraisal planning, including the contents of the appraisal plan
- objective evidence collection and analysis
- team decision making
- appraisal confidentiality and non-attribution
- practice characterization
- findings development, verification, and validation
- rating
- appraisal output requirements

For teams involved in U.S. government source selection or process monitoring appraisals, team members must also be trained in

- applicable laws, regulations, and policies that affect the appraisal such as Federal Acquisition Regulations and DoD service or organizational regulations and policies
- role of the appraisal and the appraisal team in source selection or process monitoring processes and structures
- limitations on findings development, validation, and release
- special domain and/or model requirements (e.g. space, command and control, information technology, supplier sourcing, and statistical process management)

Appraisal activities may not be performed until the method training for those activities has been provided.

Three configurations of method training are recognized:

- to a single appraisal team
- to multiple appraisal teams in a single event
- to a large group of potential future team members who are not currently engaged in an appraisal

When appraisal method training will be delivered to more than one appraisal team in a single event, the SEI must be notified in writing (e.g., via email), at least 30 days prior to the first day of training. When method training is delivered in this way, care must be exercised to ensure that confidentiality of information is maintained between organizations.

1.3.4 Prepare Team

**Parameters
and Limits
(continued)**

Method training delivered to groups of potential future team members must cover the complete set of tailoring options and allowable variations for the method to prepare them for a range of situations they are likely to encounter on future appraisals. When method training is to be delivered in this way, the SEI must be notified, in writing (e.g., via email), at least 30 days prior to the first day of training.

Team members who have previously received SCAMPI A team training are not automatically qualified to participate on an appraisal without first attending method training. In such cases, the appraisal team leader is required to understand the nature of the training delivered previously and the adequacy of that training for the appraisal at hand.

There must be at least one event where the team gathers as a group for the purpose of establishing team norms and make operational decisions about how the team will work for the appraisal at hand. Even if all team members have previously been trained in the method, there must be a team orientation session that brings the team together in order to identify potential issues with team operation.

Any training-related waivers must be documented in the appraisal plans.

Individuals who are not SEI-certified SCAMPI Lead Appraisers or People CMM appraisers may not deliver appraisal method training.

Due to the confidentiality required during an appraisal and the cohesiveness needed to participate in appraisal activities, observers are not permitted to participate in the appraisal processes. The only exception is an observer who is certified by the SEI.

1.3.4 Prepare Team

Implementation Guidance The team training event is a good place to review the appraisal plan with appraisal team members, having sent it to them in advance of their arrival. This event provides the orientation for the entire appraisal that all appraisal team members must execute their roles appropriately. This event also is in keeping with the “Provide appraisal plan to relevant stakeholders for review” required practice in activity 1.2.7, Obtain Commitment to Appraisal Plan.

Additionally, the team training event is an opportunity to conduct activity 1.5.1, Perform Readiness Review. The assembled, trained appraisal team can then appropriately assess the organization’s readiness for the appraisal and validate the reasonableness of appraisal plan.

Implementation Guidance A typical model training course is delivered in three days. The successful completion of appraisal reference model training precedes training in the appraisal method. There is no “aging” requirement for when this model training was received, but the appraisal team leader ensures that each team member has adequate reference model understanding, and takes remedial action if necessary. Attendance at model training is recorded by the training instructor and provided to the SEI, in accordance with the terms of instructor authorization. This action establishes a record in a database which makes that trained individual eligible to be added to the appraisal team in the SEI Appraisal System (SAS).

Training in the Reference Model

For appraisals that include higher levels (i.e., maturity levels 4 and 5), team members may benefit from receiving additional training on this subject matter.

1.3.4 Prepare Team

Implementation Guidance A typical delivery of appraisal team training takes two-and-a-half to three days. More or less time may be necessary, depending on the relative experience of the appraisal team members.

Training in the Appraisal Method

Exercises in appraisal techniques and team development are used to reinforce the skills that will be important during conduct of the appraisal. It is recommended that exercises be used that are appropriate for the organizational unit being appraised. Where sufficient organizational artifacts exist, “live” data can be collected and used in training exercises where appropriate. Just-in-time training can also be used to re-emphasize method concepts at appropriate points in the appraisal process during which the skills will be utilized.

Appraisal team training materials are tailored to fit team needs and objectives of the specific appraisal. Tailoring provides opportunities to

- provide insight into the context, objectives, and plans of the particular appraisal
- communicate team members’ assigned roles and responsibilities
- identify tailoring of SCAMPI A for the upcoming appraisal
- acquaint the team with the organizational unit’s characteristics and documentation
- focus on skills that may be more critical to the upcoming appraisal, such as the ability to facilitate interviews

It is recommended that this training be provided within 60 days of the appraisal. The appraisal team leader typically provides method training using materials available in the SCAMPI Lead Appraiser kit, but other delivery options are also acceptable (as described above). Although alternative training options can provide some advantages and efficiencies for method training, there are also potential negative consequences. Familiarization with the particular tailoring options of a given event, or unique aspects of the organization may not be adequately covered in a large training session that includes many teams. Regardless of how method training is delivered to the team members, opportunities for team building are provided to coalesce the team and bring the team up to speed on the specifics of the appraisal being planned.

Implementation Guidance Method training and team building provide good opportunities to establish team familiarity with the appraisal plan. This familiarity includes such items as appraisal objectives, organizational scope, appraisal reference model scope, and the schedule, resources, and constraints for conducting the appraisal. Team member input can be obtained to refine or complete the contents of the appraisal plan.

Familiarization with the Appraisal Plan

1.3.4 Prepare Team

Implementation Guidance Analysis of the objective evidence provided by the appraised organization, such as questionnaire responses or worksheets summarizing objective evidence, can be accomplished following or as an integrated part of appraisal team preparation and training.

Analysis of Objective Evidence

Demonstrations or exercises using the data collection tools and methods planned for the appraisal provide appraisal team members with an opportunity to practice techniques for data recording, verification, and analysis. These tools and methods may include mechanisms such as wall charts, spreadsheets, or data reduction tools. The more familiarity and comfort obtained with these tools in advance, the greater the savings in team efficiency during the Conduct Appraisal phase.

1.3.4 Prepare Team

Implementation Guidance	The appraisal team leader assigns and explains team member roles and responsibilities to be performed during the appraisal. Typical roles to be assigned include
Roles and Responsibilities	<p>Appraisal Coordinator: The appraisal coordinator handles logistics and provides technical, administrative, and logistical support to the appraisal team leader. This support usually includes activities such as coordinating schedules, notifying participants, arranging adequate facilities and resources, obtaining requested documentation, and arranging catering. He or she may also coordinate or provide clerical support to the team. This role is often assigned to one or more members of the organizational unit. The appraisal coordinator may be one of the appraisal team members, or this role may be assigned to other site personnel.</p> <p>Librarian: The librarian manages the inventory of appraisal documents, coordinates requests for additional documentation evidence, and returns documents at the end of the appraisal. This role can be filled by an appraisal team member or by a member of the support staff.</p> <p>Process area or basic unit mini-teams: mini-team members take the lead for data collection in assigned process areas or basic units. They ensure that information collected during a data gathering session covers their process areas or basic units, request additional information needed relative to their process areas or basic units, and record the work performed by individual appraisal team members pertaining to their process areas or basic units.</p> <p>Mini-teams typically consist of two or three members. Mini-team assignments can be made based on several factors, including related process areas (e.g., process area categories) and a mix of mini-team members (e.g., discipline experience and appraisal experience).</p> <p>Facilitator: The facilitator conducts interviews.</p> <p>Timekeeper: The timekeeper is responsible for tracking time and schedule constraints during interviews and other activities.</p> <p>Appendix C contains additional information about the roles and responsibilities of appraisal team members.</p>



1.4 Obtain and Inventory Initial Objective Evidence

Purpose	<p>Obtain information that facilitates site-specific preparation and an understanding of the implementation of model practices across the organizational unit. Identify potential issues, gaps, or risks to aid in refining the plan. Strengthen the appraisal team members' understanding of the organization's operations and processes.</p> <p>Note: The data collection approach (discovery, managed discovery, and/or verification) is a tailoring option of SCAMPI A. If the discovery option is chosen, there may be limited objective evidence to inventory at this stage of the appraisal. If the managed discovery option is chosen, an initial data call results in a set of evidence that is evaluated, and followed by successive data calls based on remaining evidence gaps.</p>
Entry Criteria	<ul style="list-style-type: none">• draft appraisal plan• sponsor authorization to proceed• availability of practice implementation data for organizational unit
Inputs	<ul style="list-style-type: none">• practice implementation data for organizational unit• identified participants
Activities	<p>1.4.1 Obtain Initial Objective Evidence</p> <p>1.4.2 Inventory Objective Evidence</p>
Outputs	<ul style="list-style-type: none">• data inventory results (e.g., data availability summaries)• identification of additional information needed• initial set of objective evidence
Outcome	<ul style="list-style-type: none">• Initial objective evidence has been collected, organized, and recorded.• Potentially important areas of needed information have been noted.• The team has a deeper understanding of the organizational unit's operations and processes.• The team is ready to make detailed plans for data collection.
Exit Criteria	<ul style="list-style-type: none">• All objective evidence captured during this activity has been recorded for later use.• High-priority areas for additional data collection have been identified.• The level of sufficiency of the inventory of objective evidence to support the appraisal is determined.

1.4 Obtain and Inventory Initial Objective Evidence

Key Points	Gather high-leverage objective evidence. The amount of initial objective evidence provided by the organization will determine the proportion of evidence that remains to be discovered (versus verified) during the appraisal. Efficient and effective time spent in collection, inventory, and verification of evidence is a key performance objective for the Conduct Appraisal phase.
Tools and Techniques	<ul style="list-style-type: none">• Automated support, including data reduction tools, may be available to make the data inventory activity more efficient.• Breaking into mini-teams to inventory data related to specific process areas is a way to help ensure completeness of the data.
Metrics	<ul style="list-style-type: none">• the number of practices for which complete objective evidence is available• the calendar time and effort expended for this activity compared to the planned values
Verification and Validation	<ul style="list-style-type: none">• Where the team includes members of the appraised organization, these members should be used to help understand the initial objective evidence provided to prevent misinterpretation of terms or special conditions.• Inconsistencies and contradictions among the items provided in initial objective evidence should be identified and recorded for resolution.
Records	<ul style="list-style-type: none">• Lists of information needed should be maintained and used as input to the later data collection activities.• Calendar time and effort expended in this activity should be recorded and compared to the plan. These data will be part of the appraisal record.

1.4 Obtain and Inventory Initial Objective Evidence

Interfaces with Other Processes

This process plays a critical role in the planning and preparation processes. The information generated in this process provides the most important opportunity to reset expectations and plans with the appraisal sponsor, if initial assumptions about the availability of objective evidence turn out to be in error. It will also provide the basis of data collection planning.

For appraisals that are conducted in discovery or managed discovery mode, some activities in this process may necessarily be combined with the activities in Section 2.2, Examine Objective Evidence.

Summary of Activities

The appraisal team leader works with representatives of the organization to obtain an initial data set that provides input for an inventory of the objective evidence pertaining to the implementation of each practice among the selected sample basic units and support functions within the appraisal scope. This initial data set may be first reviewed by the appraisal team leader for a high-level assessment of adequacy and completeness. The appraisal team leader or appraisal team then performs a more detailed inventory to use as input for planning the data collection and verification activities that will occur when they begin the Conduct Appraisal phase. Finally, a record is created that reflects a detailed accounting of any missing objective evidence. This record is used as primary input for the generation of the data collection plan.



1.4.1 Obtain Initial Objective Evidence

Activity Description

The appraisal team leader will request that the organization provide detailed data on the implementation of practices in the organization. The appraisal team leader is free to specify the format to be used and the level of detail to be provided, knowing that anything that is not provided in advance must be collected later in the appraisal process. There are no minimum requirements set by the method with respect to completeness or detail in this initial data set. Before the appraisal outputs can be created, the team must verify objective evidence for each instantiation of each practice within the scope of the appraisal. For detailed requirements on the sufficiency of data, refer to process 2.4, Verify Objective Evidence.

The data collection approach influences the conduct of this activity. Minimal evidence may be available in a discovery-based appraisal. A pre-determined set of high-leverage evidence requested in an initial evidence call is provided in a managed discovery appraisal. In a verification-based appraisal, the organization may provide a completely populated database of objective evidence mapped to model. The appraisal team leader must allow an opportunity for the organization to provide evidence based on the chosen data collection approach.

Required Practices

The appraisal team leader or designee shall

- obtain data reflecting the implementation of model practices among sample basic units and support functions within the organizational unit

Parameters and Limits

At a minimum, the organization must provide a list of artifacts that are relevant to understanding the processes in use among sample basic units and support functions within the organizational unit, unless a discovery-based appraisal has been planned. This list must be mapped to the model practices that are in the scope of the appraisal.

This activity does not replace the activities in Section 2.2, Examine Objective Evidence.

1.4.1 Obtain Initial Objective Evidence

Implementation Guidance Whether collected using questionnaires, reviewing artifacts, attending presentations, observing demonstrations, or conducting interviews, the data used for an appraisal is related to the practices of the appraisal reference model. For every practice within the reference model scope of the appraisal, and for every instance of each practice, objective evidence is used as the basis for appraisal team determinations of the extent to which the practice is implemented. Objective evidence that substantiates practice implementation includes the following:

- *artifacts*, which represent a tangible form of objective evidence indicative of work being performed that represents either the primary output of a model practice or a consequence of implementing a model practice. Sufficient artifacts demonstrating and corroborating that the work is being done are necessary to verify the implementation of associated model practices.
- *affirmations*, which are oral statements that confirm whether or not a model practice has been implemented. Those who have implemented (or should have implemented) a model practice provide affirmations to the appraisal team during an interactive forum which the appraisal team controls.

Prior to the data collection activities carried out by the appraisal team, an initial data set is usually created by the appraised organization. This data set contains descriptions of the objective evidence available for the team to examine, complete with references to artifacts and identification of the personnel who can provide relevant affirmations. The data set provides the baseline of objective evidence for the appraisal. Most organizations experienced in process improvement will already have this type of data on hand, as they will have used it to track their improvement progress.

Artifacts may be obtained as hard copies, soft copies, or hyperlinks to where these documents reside in a web-based environment. If hyperlinks are used, the accessibility of artifacts via these links should be verified in the appraisal environment. For example, appraisal team access could be inhibited by invalid references or firewalls.

The initial data set forms the basis for planning data collection activities, including interviews, demonstrations, and presentations on site. Any objective evidence that is not identified in advance of the team's arrival must be sought by the team members once they begin the Conduct Appraisal phase. This process of discovering whether and how the organization has addressed a given practice in the model can be quite time consuming and it is often difficult to predict how long it will take.



1.4.2 Inventory Objective Evidence

Activity Description

The inventory of the initial data set provides critical new information for the overall planning of the appraisal and forms the basis for the detailed data collection plan that must be developed before the Conduct Appraisal phase. The inventory of initial objective evidence at this stage is focused primarily on the adequacy and completeness of information in the context of the data collection approach chosen (discovery, managed discovery, and/or verification) and the implications for future data collection. The results of this activity are the primary basis for determining the extent of additional evidence collection to be performed in the future appraisal activities.

Required Practices

The appraisal team leader and/or designees shall

- examine the initial set of objective evidence provided by the organizational unit, unless a discovery-based appraisal has been selected
- determine the extent to which additional objective evidence is needed for adequate coverage of model practices

Parameters and Limits

Information provided by the organizational unit must be detailed enough to understand the extent to which each type of objective evidence (i.e., artifacts and affirmations) is available for each process instantiation for each model practice within the scope of the appraisal. This initial review of objective evidence identifies model practices for which the team may decide it has

- strong objective evidence
- no objective evidence
- conflicting objective evidence
- inconsistent objective evidence
- insufficient objective evidence

In the process of inventorying the available objective evidence, potential alternative practices must be considered. Any objective evidence for such practices must be determined as early as possible. See Appendix B, Alternative Practice Identification and Characterization Guidance, for information on identifying acceptable alternative practices.

Key artifacts are identified that can be used to gain insight regarding a number of model practices. These artifacts contain potential high-leverage information and may be good candidates for early review by team members.

Identify additional objective evidence needs relative to model practices for each basic unit or support function within the scope of the appraisal. This activity does not replace the activities in Section 2.2, Examine Objective Evidence.

1.4.2 Inventory Objective Evidence

Implementation Guidance Members of the team may choose to summarize the extent of available information at the discretion of the appraisal team leader. However, the objective of this activity is to determine how much additional data team members must gather to complete their work. It is recommended that the appraisal team leader establish an expectation with the sponsor that the results of this activity will form the basis for a revised schedule estimate. If the initial objective evidence is lacking in completeness and detail, the team will need to seek more information during the Conduct Appraisal phase, unless corrective actions are taken before that time.

It is important to keep all stakeholders focused on the fact that SCAMPI A is intended as a benchmarking appraisal. This method is not well suited for organizations that have a limited understanding of CMMI. Such organizations may not yet have a clear idea of how the practices described in the reference models ought to be implemented to meet their specific business needs. Deciding on a reasonable implementation of the practices, and working to ensure that they are enacted throughout the organization, are activities that precede a benchmarking appraisal. A different type of appraisal (Class B or C) is probably more valuable if the objective of the sponsor is to begin the process of understanding what CMMI could mean for the organization. It is not reasonable to schedule a two-week appraisal and expect to collect *all* of the data required for benchmarking during the Conduct Appraisal phase.

Whatever data collection approach is chosen (discovery, managed discovery, and/or verification), the appraisal team leader often reviews the initial data set provided by the organization prior to assembling the team for its first meeting to identify areas where additional data will be needed and to assess the feasibility of the planned appraisal schedule. This readiness review should be conducted prior to finalizing the appraisal schedule, and may comprise a “go/no-go” decision for the appraisal in some situations. The appraisal team may then review the initial objective evidence in more detail (typically toward the end of the team-training event) to begin formulating plans for how missing evidence will be collected. This preliminary readiness review is the basis for the data collection plan, which is described in the next process, 1.5, Prepare for Appraisal Conduct.

1.4.2 Inventory Objective Evidence

Implementation Guidance (continued) The appraisal team leader generates a list of additional information needed. The results of the inventory of initial objective evidence are documented as an input to the data collection plan. The use of an integrated appraisal tool to annotate the set of initial objective evidence will permit the automated tracking of information needs, and will aid in the compilation of a detailed data collection plan. Where the completeness of initial objective evidence is insufficient to conduct the appraisal under the original schedule, the results of this activity form an important basis for renegotiating the appraisal schedule in some cases.

The adequacy of objective evidence relative to model practices is typically determined using a software tool of some sort, either one built for use on appraisals or a spreadsheet template. However, paper forms and wall charts may be used if preferred.



1.5 Prepare for Appraisal Conduct

Purpose	Ensure readiness to conduct the appraisal, including confirmation of the availability of objective evidence, appraisal team commitment, logistics arrangements, risk status and associated mitigation plans. Plan and document data collection strategies.
Entry Criteria	<ul style="list-style-type: none">• Sponsor commitment to proceed with the appraisal has been documented.• Appraisal objectives and constraints have been documented.• Initial objective evidence has been received and an inventory has been completed.• Appraisal logistics and risks have been documented.• The appraisal team is trained.
Inputs	<ul style="list-style-type: none">• appraisal plan• initial data collection plan• data base of objective evidence mapped to model practices• initial objective evidence inventory• data collection status
Activities	1.5.1 Perform Readiness Review 1.5.2 Re-Plan Data Collection
Outputs	<ul style="list-style-type: none">• revised appraisal plan• updates to the data collection plan as required
Outcome	<ul style="list-style-type: none">• updated plans• team member awareness of data status and needs
Exit Criteria	<ul style="list-style-type: none">• The team is ready to conduct the appraisal.• Logistical arrangements are confirmed.• All preparations for data collection by the team have been made and the data collection plan has been revised to reflect current understanding.• The data collection plan is revised based on readiness review results in preparation for the conduct appraisal phase.

1.5 Prepare for Appraisal Conduct

Key Points	Performance of at least one readiness review resulting in the appraisal team leader's and sponsor's joint decision to continue the appraisal as planned, re-plan the appraisal, or cancel the appraisal is paramount to the successful conduct of the appraisal. The data collected are the most important input the team receives. Careful planning, disciplined tracking against the plan, and effective corrective actions are cornerstones to success in this process.
Tools and Techniques	The use of a spreadsheet to record and track the data collection plan is a common technique. A matrix showing the practices of the model, or questions to be asked, arrayed on the vertical axis and the sources of information arrayed on the horizontal axis provides a simple planning and tracking tool. A number of vendor-provided data management tools are available as well.
Metrics	<ul style="list-style-type: none">• estimated and tracked calendar time and effort for this activity• planned and actual number of data sources per practice• planned and tracked number of scripted questions used per interview• planned and tracked number of scripted questions used per process area• percentage of planned coverage achieved per data collection event or process area• number of changes to the appraisal plan relative to the appraisal team, logistics, and risks
Verification and Validation	The data collection plan should be summarized and reviewed with the team to ensure that appraisal requirements will be successfully implemented if the plan is carried forward. Experienced appraisal team leaders will use historical data to assess the feasibility of (and risks associated with) the data collection plan.
Records	Planned and actual coverage of practices and process areas across the set of data collection activities should be recorded. These data support future estimates and corrective actions during data collection activities.

1.5 Prepare for Appraisal Conduct

Interfaces with Other Processes

The data collection plan is an essential element of the appraisal plan. The activities described here rely on the results of an inventory of the initial objective evidence to derive a plan and set of strategies for accomplishing the data collection needed to meet the objectives of the appraisal. The data collection plan developed through these activities is reviewed and revised on a continual basis throughout the appraisal. Dynamically managing the inventory of data on hand, the list of data needed, and the available data collection opportunities are processes critical to the success of the appraisal.

Summary of Activities

The activities in this process serve to (a) ensure readiness to conduct the appraisal, (b) establish the initial planning baseline for the acquisition of objective evidence, and (c) update the plan to account for information acquired and unexpected developments. Since SCAMPI A is a data-intensive method, the conduct of these activities in accordance with the descriptions provided is essential to the successful use of the appraisal method.



1.5.1 Perform Readiness Review

Activity Description

The purpose of the readiness review is to determine whether or not the appraisal team and appraised organization are ready to conduct the appraisal as planned, and in the time allocated. The readiness review addresses several aspects of readiness to conduct the appraisal: data readiness, team readiness, logistics readiness, and appraisal risk status. The readiness review will result in a decision to continue as planned, re-plan or reschedule, or cancel the appraisal. The appraisal team leader and sponsor are responsible for the decision and determining the conditions under which to proceed.

Required Practices

The appraisal team leader or designee shall

- determine whether the objective evidence for each instance of each practice in the appraisal scope is adequate to proceed with the appraisal as planned (refer to activity 1.4.2, Inventory Objective Evidence)
 - determine whether the appraisal team is prepared to conduct the appraisal (refer to activity 1.3.4, Prepare Team)
 - ensure the appraisal logistics (e.g. facilities, equipment, and participant availability) have been arranged and confirmed (refer to activity 1.2.5, Plan and Manage Logistics)
 - review identified appraisal risks to determine status and impact to conducting the appraisal as planned (refer to activity 1.2.6, Document and Manage Risks)
 - review the feasibility of the appraisal plan in light of data readiness, team readiness, logistics readiness, and overall risk
-

Parameters and Limits

The number of readiness reviews planned and their dates must be documented in the data collection plan.

Explicit criteria for determining readiness must be established by the appraisal team leader. These criteria must be documented in the data collection plan. At least one readiness review must be conducted.

The conduct of a readiness review may trigger the start of the 90 day constraint for accomplishing phase II activities. If team members perform document review during the readiness review (for the purpose of data collection to support characterization) or if any practice characterizations are determined – then the readiness review starts the “90 day clock” for conducting phase II activities. If the plan calls for such document review or characterization, then the entire team must participate in the readiness review where those activities are carried out.

A readiness review may not be used to identify weaknesses in the organization’s implementation with the intent to fix them prior to the beginning of the Conduct Appraisal phase.

1.5.1 Perform Readiness Review

**Parameters
and Limits
(continued)**

If the performance of readiness review for a SCAMPI A is integrated with the performance of a class B or class C appraisal, then the following constraints apply:

- The phase II start date of the class B or class C appraisal is taken as the start of the 90 day period of performance for phase II of the SCAMPI A appraisal
- The draft appraisal plan for the SCAMPI A must be written prior to the start of phase I of the class B or class C appraisal.

The performance of class B and class C appraisals in advance of the SCAMPI A does not require performance of readiness review activities. The constraints above apply only in situations where readiness review activities are carried out along with the class B or class C appraisal activities.

1.5.1 Perform Readiness Review

Implementation Guidance More than one readiness review might be needed. One should be performed early in the planning phase, long enough in advance to give the organization time to collect any additional objective evidence and for the appraisal team leader to address any logistics problems, team issues, or other critical appraisal risks to support a more successful appraisal. Another should be performed once the objective evidence has been gathered and the appraisal is ready to start. This review may be conducted in conjunction with the team training event.

The appraisal team leader should lead the readiness review. Recommended participants include at least one representative from each appraisal mini-team, the appraisal coordinator, and any additional organizational unit representatives desired.

Data readiness should address what data is available, what data is still needed, and how and where additional data will be obtained.

Recommended minimum criteria for data readiness include the following:

- There are no significant coverage gaps in the evidence-to-practice mapping provided by the organization.
- Artifacts identified in the objective evidence databases are accessible.
- The state of readiness and completeness is consistent with the duration of the planned Conduct Appraisal phase.

Thresholds for the sufficiency of data should be established as targets to be met at the readiness review. For example, an 80 percent threshold may be used to initiate replanning at the final readiness review. That is, the appraisal team leader establishes an expectation with the sponsor that, if more than 20 percent of the objective evidence is missing at the time of team training, the appraisal must be re-planned. However, the primary objective is reducing the risk that there will be insufficient objective evidence to make the determinations required by the appraisal plan in the time allotted.

Objective evidence for all basic units and support functions sampled to represent the organizational unit should be reviewed to assess appropriateness and applicability to the practice.

Objective evidence for alternative practices should be considered. See Appendix B, Alternative Practice Identification and Characterization Guidance, for information on identifying acceptable alternative practices.

Team readiness should address whether the appraisal team is prepared to conduct the appraisal. The appraisal team leader should determine whether the team members are adequately trained and the mini-teams are operating effectively and efficiently. If necessary, the appraisal team leader may change mini-team membership, add resources, or change assignments to optimize team performance.

1.5.1 Perform Readiness Review

Implementation Guidance (continued) Logistics readiness should address whether the necessary logistics arrangements have been made for the Conduct Appraisal phase. The appraisal team leader should review the logistics arrangements to determine whether appropriate facilities have been reserved, the necessary equipment will be available, and the appraisal participants have been contacted and will be available during the Conduct Appraisal phase.

A summary of the inventory of objective evidence and readiness to proceed should be reviewed with the sponsor or his/her designee. If insufficient objective evidence is available or if any other aspect of appraisal readiness is not met, the appraisal team leader may need to initiate replanning in light of newly discovered constraints (e.g., insufficient data to support the appraisal as planned). Refer to activity 1.1.3, Determine Appraisal Constraints. The criteria for adequacy will depend on where the readiness review occurs in the schedule, and the chosen data collection approach (discovery, managed discovery, and/or verification) that is being sought for the Conduct Appraisal phase of the appraisal.

The readiness review is a key event whose impact should not be underestimated. Failure to ensure that all aspects of appraisal readiness (i.e., data, team, logistics, and overall risk) are reviewed to determine the impact on the appraisal plan can have grave consequences for the appraisal team during the Conduct Appraisal phase. The Conduct Appraisal phase may include long hours, exhaustion, extensive ad hoc data collection (i.e., discovery), or the inability to achieve appraisal objectives within defined estimates and constraints.



1.5.2 Re-Plan Data Collection

Activity Description

The data collection plan is updated as required during the conduct of the readiness review or during the appraisal itself as objective evidence is found, or as new sources of information are uncovered. The activity described in this section refers to a more substantial change in the plan, which is expected to be a rare occurrence in practice. If during the conduct of an appraisal the team discovers that their assumptions about the availability of objective evidence are substantially incorrect, the appraisal team leader may renegotiate the appraisal plan with the sponsor.

Required Practices

The appraisal team leader or designee shall

- review the current inventory of objective evidence and determine model practices for which the objective evidence is inadequate relative to the appraisal plan
 - revise the data collection plan as necessary based on the appraisal status and availability of objective evidence
 - renegotiate the appraisal plan with the sponsor if the appraisal cannot proceed as planned
-

Parameters and Limits

None

1.5.2 Re-Plan Data Collection

Implementation Guidance This activity is not a substitute for tactical decisions about where and how to find objective evidence. The intent of this activity is to respond to a major gap between expected data and actual data.

Major gaps between expected and actual data may occur, for example, as a result of the following:

- inaccurate assumptions about the availability of objective evidence
- content of artifacts or information from interviews not providing significant amounts of the information required and other sources not being planned
- unexpected absence of multiple key interviewees
- unanticipated delays in the implementation of new processes
- major customer-driven emergencies for one or more of the sampled basic units or support functions

This activity serves as a “pressure valve” of sorts for the appraisal. The pressure to perform the appraisal under unrealistic conditions can lead to a severe degradation in the quality of the appraisal outputs. Carefully planning for contingencies and communicating them to the sponsor help to protect the standards that must be met in the performance of an appraisal. Clearly documenting the data collection plan, and regularly monitoring the availability of data compared to that plan, support effective risk mitigation.

When this activity must be employed to recover from an unrealistic expectation, the documentation reflecting the assumptions made during planning, as well as concrete facts about what is or is not available, are used to renegotiate with the appraisal sponsor. This need to renegotiate is one of the reasons why a detailed appraisal plan, with the sponsor’s signature, is a required artifact for the conduct of a SCAMPI A appraisal.



2 Conduct Appraisal

2.1 Prepare Participants

Purpose	Ensure that appraisal participants are appropriately informed of the appraisal process, purpose, and objectives and are available to participate in the appraisal process.
Entry Criteria	<ul style="list-style-type: none">• Data collection has been planned.• The sponsor has approved the appraisal plan.• The appraisal team is trained and is familiar with the appraisal plan.
Inputs	<ul style="list-style-type: none">• appraisal plan
Activities	2.1.1 Conduct Participant Briefing
Outputs	<ul style="list-style-type: none">• prepared appraisal participants
Outcome	At the end of this process, appraisal participants are prepared to provide relevant information to the appraisal team and have confirmed their participation.
Exit Criteria	A participant briefing has been conducted and appraisal participants are prepared to participate.
Key Points	Inform members of the organization who participate in the appraisal of their roles, and expectations of the sponsor and appraisal team.
Tools and Techniques	<ul style="list-style-type: none">• presentation tools• video conferencing facilities
Metrics	<ul style="list-style-type: none">• planned and actual number of participants briefed
Verification and Validation	<ul style="list-style-type: none">• feedback from appraisal participants on their readiness to perform their role(s)
Records	<ul style="list-style-type: none">• participants briefed compared to the plan

2.1 Prepare Participants

Interfaces with Other Processes

This process includes informing appraisal participants of the appraisal process, its purpose and objectives, and their roles in the appraisal. At a minimum, this communication is addressed in a single opening briefing at the start of the Conduct Appraisal phase. Alternatively, it might be addressed initially during the Plan and Prepare phase, but with a short, additional opening briefing to all participants—again at the start of the Conduct Appraisal phase—to introduce the team and reiterate the appraisal goals. In any event, it must occur prior to the conduct of any interviews.

Summary of Activities

The activities in this process serve to prepare participants for the appraisal. Participants are prepared prior to their participation to ensure they are aware of their roles in the appraisal, confirm their availability, and prepare for their participation.



2.1.1 Conduct Participant Briefing

Activity Description	Members of the organization who participate in the appraisal must be informed of their role and the expectations the sponsor and appraisal team have. This communication is typically accomplished through a briefing in which the appraisal team leader provides an overview of the appraisal process, purpose, and objectives. Specific information about the scheduled events and the locations where they occur is also communicated during this presentation, as well as through ongoing contact between the appraisal coordinator and the members of the organization.
Required Practices	<p>The appraisal team leader and/or designees shall</p> <ul style="list-style-type: none">• brief appraisal participants on the appraisal process• provide orientation to appraisal participants on their roles in the appraisal
Parameters and Limits	Participants must reconfirm their availability to participate in the appraisal.
Implementation Guidance	<p>The preparation of appraisal participants may be accomplished using a video conference or teleconference if desired.</p> <p>Depending on the appraisal usage mode (e.g., supplier selection versus internal process improvement), various types of communication may be used. In the internal process improvement usage mode, the importance of management sponsorship within the organization will likely lead the appraisal team leader to work with senior management to help demonstrate commitment to the appraisal process as well as the process improvement work that will follow. In the supplier selection usage mode, the possibility of the same team visiting multiple organizations adds coordination tasks and communication channels as well.</p>



2.2 Examine Objective Evidence

Purpose	Examine information about the practices implemented in the organization and relate the resultant data to the appraisal reference model. Perform the activity in accordance with the data collection plan. Take corrective actions and revise the data collection plan as needed.
Entry Criteria	<ul style="list-style-type: none">• Data collection has been planned, and the plan documented.• The sponsor has approved the appraisal plan.• The appraisal team is trained and is familiar with the appraisal plan.• Participants have been informed about the appraisal process and their roles in it.
Inputs	<ul style="list-style-type: none">• Appraisal data<ul style="list-style-type: none">– initial objective evidence– documented practice implementation gaps, if any– documented exemplary practice implementation, if any– feedback on preliminary findings (if that point in the timeline has been reached)• Data collection plan<ul style="list-style-type: none">– appraisal schedule– affirmation schedule– artifact list– new interview questions
Activities	2.2.1 Examine Objective Evidence from Artifacts 2.2.2 Examine Objective Evidence from Affirmations
Outputs	<ul style="list-style-type: none">• updated appraisal data• updated data collection plan
Outcome	After the final iteration of this process, the team has sufficient data to create or revise preliminary findings and to make judgments about the implementation of practices, as well as the satisfaction of specific and generic goals.
Exit Criteria	The coverage of the appraisal reference model and the organizational scope has been achieved, and the team is ready to produce the appraisal outputs.

2.2 Examine Objective Evidence

Key Points The appraisal team reviews the objective evidence that has been gathered according to the data collection plan. They evaluate this evidence against the reference model to determine if it is appropriate and adequate to support the implementation of model practices. The data collection plan is modified if additional information is needed to complete this task. Effective contingency planning and the use of work aids to monitor progress are key points to consider. The team must be able to focus on examining the most relevant information available, rather than be distracted by a mission to find new evidence.

Tools and Techniques Wall charts and other visual aids are often used to display the results of data collection activities. Electronic tools are prevalent among experienced appraisal team leaders and can be effective for continually monitoring and updating the inventory of objective evidence.

Metrics Tracking the actual coverage obtained, as compared to the planned coverage, in each data collection activity facilitates timely corrective actions where they are needed. The most critical resource during an appraisal is time. Using a timekeeper during data collection and verification activities provides feedback on team performance. Recording the actual duration of planned events helps the team in taking actions to recover from unexpected events.

Verification and Validation The appraisal method provides detailed verification and validation procedures for objective evidence. They are described in process 2.4, Verify Objective Evidence, and 2.5, Validate Preliminary Findings.

Records Work aids used to record and track the progress of data collection activities are retained for traceability and provide an important input to a final report describing the appraisal, if the sponsor has requested a final report. The duration and effort required for specific data collection events can be recorded to provide useful historical data for planning subsequent appraisals.

2.2 Examine Objective Evidence

Interfaces with Other Processes

The activities that provide the team with the data needed to produce reliable appraisal outputs are perhaps the most visible part of the appraisal process from the perspective of the appraised organization. For this reason, SCAMPI A places a heavy emphasis on methodically planning and tracking the data collected during an appraisal. The initial objective evidence collected early in the process allows team members to analyze the state of information available at the earliest stages of the appraisal and narrow their search for new information. This early work serves to facilitate an efficient use of time. An explicit understanding of what information is needed and how that information will be used therefore drives the activities associated with this process.

Summary of Activities

The members of the team continually manage the data collected previously and target new data collection activities to fill known information needs.

Instruments can be used early in the appraisal process and often provide leads to be pursued through other data collection activities. Presentations are sometimes used to provide a flexible interactive forum where members of the organization can explain important information about the practices implemented in the organization. Artifacts provide the most explicit and lasting representation of practice implementation in the organization, and the team uses them to understand how practices in the reference model are implemented. Finally, interviews are used as the most dynamic data collection technique, allowing for branching among related topics and the explanation of contextual information that affects the implementation of practices as well as alternative practices.

The appraisal activities conducted for each of these data collection sources are similar:

- Determine if the information obtained is acceptable as objective evidence.
- Relate the objective evidence to corresponding practices in the appraisal reference model.
- Relate the objective evidence to the appropriate part of the appraised organizational unit (i.e., the sample basic unit or support function).
- Determine the extent to which model practices have been implemented within the organizational unit.



2.2.1 Examine Objective Evidence from Artifacts

Activity Description A substantial portion of the data used by appraisal team members is derived from artifacts (see MDD glossary) that demonstrate or support the implementation of model practices. Artifact review is an effective means to gain detailed insight about the implementation of practices in the organizational unit. However, without a clear focus on the data being sought, artifact review can consume a great deal of time as team members sometimes attempt to read everything in hopes that something useful will be discovered. Likewise, if artifact review is not well planned, the team will be more likely to accept artifact(s) that do not completely address or support the implementation of the model practices in scope. Objective evidence obtained from artifacts and from other sources is documented in process 2.3, Document Objective Evidence, and verified in process 2.4, Verify Objective Evidence.

Required Practices The appraisal team shall

- update the inventory of artifacts used as a source of objective evidence
- review information obtained from artifacts and determine if it is acceptable as objective evidence
- determine the model practices corresponding to the objective evidence obtained from artifacts
- determine the portions of the organizational unit that correspond to the objective evidence obtained from artifacts
- review artifacts and determine the extent to which model practices have been implemented in the organizational unit

Parameters and Limits The appraisal team must evaluate the content of artifacts to determine how they support model practice implementation.

If the appraisal team performs any part of this activity during any readiness review or other appraisal preparation activity, the Conduct Appraisal phase has begun, and the appraisal must be completed within 90 days.

Artifacts used as objective evidence must have been created or revised prior to the start of the Conduct Appraisal phase. The team may request to view artifacts that result from recurring activities, even if the activity occurred after the start of the appraisal. In no case would an artifact created after the start of the appraisal be accepted as the only artifact demonstrating the implementation of a practice.

2.2.1 Examine Objective Evidence from Artifacts

Implementation Guidance The inventory should be sufficient to summarize the objective evidence used as a basis for appraisal ratings generated, as required by the appraisal record described in activity 3.2.2, Generate Appraisal Record. Much of the inventory contents can be obtained from the mapping data or instruments obtained from the organizational unit, such as the objective evidence database or questionnaires. The inventory can be used to maintain a list of artifacts reviewed or additional artifacts requested from the organizational unit. This inventory is created in activity 1.4.2, Inventory Objective Evidence, and is a key work product of data collection planning.

One or more team members will seek data for every practice in the appraisal reference model scope of the appraisal through artifact review. This review does not require an artifact for every practice, as any given artifact or set of artifacts is likely to provide data relevant to multiple practices. Reference Section 2.4.1, Verify Objective Evidence, for objective evidence sufficiency rules. In a verification-based appraisal, the location of objective evidence relating to every practice should be recorded in advance of the team's arrival at the site where the appraisal will occur. Organizations with established improvement infrastructures typically maintain this type of information to track their improvement efforts against the model.

In a discovery-based appraisal, the team will need to discover the links between the reference model and the organization's implemented practices, and will therefore require more time to perform the appraisal. In a managed discovery appraisal, the appraisal team calls for a predetermined set of high-leverage artifacts, and uses a succession of focused, iterative calls for evidence to fill remaining gaps. Refer to Appendix E, Managed Discovery for more information on managed discovery and comparison to discovery and verification data collection approaches.

Artifacts indicative of work being performed can take many forms including documents, presentations, and demonstrations. A single artifact can reflect the implementation of one or more model practices.

Documents are a collection of data regardless of the medium on which it is recorded (hard copy, soft copy, or accessible via hyperlinks in a web-based environment, such as wikis or blogs). Documents can be work products reflecting the implementation of one or more model practices. These documents typically include work products such as organizational policy, product components, process descriptions, plans, risk registers and specifications.

2.2.1 Examine Objective Evidence from Artifacts

Implementation Guidance (continued) A demonstration or walkthrough of the tool by the person who uses the tool as part of performing their process is an acceptable artifact. The demonstration includes review of the content of the tool for the respective basic units that use the tool relative to model practice implementation (e.g. a demonstration of fields in a requirements management tool showing traceability from a requirement to its derived requirement).

Note: This approach has the added benefit of being able to be used as an affirmation collection session (see activity 2.2.2, Examine Objective Evidence from Affirmations).

Members of the appraisal team observing a presentation that is developed by a basic unit team member as a consequence of their work in implementing a practice is another acceptable artifact (e.g., attending the presentation of a basic unit review by a project manager). The basic unit review package, together with its presentation is an example of an artifact.

Presentations created for an appraisal team as an aid in understanding the organizational processes and implementation of model practices is not an output of implementing a process and therefore is not a valid artifact demonstrating implementation of a model practice. However, such a presentation, delivered to the appraisal team in an environment that allows for interaction and follow-up, can serve as affirmations of practice implementation (see activity 2.2.2, Examine Objective Evidence from Affirmations).

It is recommended that the appraisal team evaluate objective evidence threads or sequences to better understand the extent of practice implementation across multiple model practices or process areas. An example (applicable to CMMI models) of evaluating objective evidence threads across process areas is establishing and monitoring work group schedules. The schedule is established in a project plan is typically part of an integrated master schedule (Project Planning). Periodic progress reviews of work group tasks are held to monitor performance against the established schedule (Project Monitoring and Control). Deviations are recorded in a report and actions are taken to align performance with work group needs and requirements (Integrated Project Management). See activity 1.1.4, Determine Appraisal Scope, for rules on sampling.



2.2.2 Examine Objective Evidence from Affirmations

Activity Description

Affirmations are used to confirm or support implementation of model practices within the organizational scope of the appraisal. Interviews, as well as other affirmation techniques (e.g., presentations, questionnaires, and demonstrations) are held with managers and practitioners responsible for the work being performed. The appraisal team uses affirmations to understand how the processes are implemented and to probe areas where coverage of model practices is needed.

Affirmations are a required and necessary component of a SCAMPI A appraisal in all usage modes. The criteria for the amount of affirmation objective evidence to be collected are described in activity 1.1.4, Determine Appraisal Scope. These criteria drive the development of the initial affirmation strategy documented in the data collection plan described in activity 1.2.3, Develop Data Collection Plan. The appraisal team leader works with the team to schedule the most appropriate affirmation techniques for the situation.

As objective evidence is gathered throughout the appraisal, the data collection plan is revised as necessary. By using focused investigation techniques, the need for affirmations may be either increased or diminished, as long as the criteria for affirmations are satisfied.

Objective evidence obtained from affirmations and other sources is documented in process 2.3, Document Objective Evidence, and verified in process 2.4, Verify Objective Evidence.

Required Practices

The appraisal team shall

- establish and maintain an inventory of affirmations used as a source of objective evidence
 - conduct affirmation activities to obtain information that may be used as objective evidence
 - review information obtained from affirmations and determine if it is acceptable as objective evidence
 - determine the model practices corresponding to the objective evidence obtained from affirmations
 - determine the portions of the organizational unit that correspond to the objective evidence obtained from affirmations
 - review information from affirmations and determine the extent to which model practices have been implemented in the organizational unit
-

2.2.2 Examine Objective Evidence from Affirmations

Parameters and Limits

All SCAMPI A appraisals must use affirmations as a source of information on the extent to which practices have been implemented in the organizational unit and within the sampled basic units and support functions.

Sessions where affirmations are sought and collected must include at least two members of the appraisal team designated by the appraisal team leader.

Whenever virtual methods such as video conferences, teleconferences, and other similar technologies are used for affirmations, the appraisal team leader must ensure that these methods do not compromise the integrity or accuracy of the appraisal activities or the appraisal results.

Sufficient affirmations must be obtained to meet the coverage specified in the data collection plan.

Steps must be taken to ensure open communication during affirmations by addressing potential issues among interviewees and team members (e.g., presence of supervisors or process owners).

The rules of confidentiality and the expected use of appraisal data must be communicated to every interviewee.

If the appraisal team performs any part of this activity during any readiness review or other appraisal preparation activity, the Conduct Appraisal phase has begun, and the appraisal must be completed within 90 days.

2.2.2 Examine Objective Evidence from Affirmations

Implementation Guidance Affirmations are typically sought from logical groupings within an organization to provide insight into the depth of the implementation by specific instance of the model practices being examined. Groupings include basic units (e.g. projects, teams, or workgroups), function within the groups (e.g. managers or service providers), or support functions (e.g. quality assurance, configuration management, human resources, IT, training).

A variety of affirmation collection techniques are employed during an appraisal including interviews, presentations, demonstrations, and questionnaires.

Interviews are used as the most dynamic data collection technique, allowing for exploration among related topics.

Presentations can be used as a flexible interactive forum where members of the organization performing the work can explain important information about the practices implemented in the organization. .

An interactive demonstration or walkthrough of the tool by the person who uses the tool as part of performing their process is another affirmation technique.

Use interactive virtual methods (e.g., video conference, teleconference, e-mail exchange, instant messaging, or other similar technology) to conduct affirmations at a distance.

Interviews provide the most flexible source of detailed data. Direct interaction with people who enact the practices being investigated allows the team to seek detailed information and to understand the interrelationships among various practices. Detailed information to address specific data collection needs can be sought and verified in real time.

Management personnel are typically interviewed individually, or grouped according to basic unit or support function. The focus of the discussion in these interviews will therefore be scoped to a particular basic unit or support function, rather than across the sampled basic unit or support functions.

Functional area representatives (FARs) are typically interviewed in a group across the basic units and within the organizational scope of the appraisal. The focus of the discussion in these interviews will therefore be scoped to a particular set of practices used across the instantiations within the organizational scope.

Request that interviewees bring a document or other artifact with them to their interviews for a “show-and-tell” style interview. The interviewee explains how the artifact is developed and used to support the work being performed.

2.2.2 Examine Objective Evidence from Affirmations

Implementation Guidance (continued) It is important to avoid sampling interviewees for a session such that two people in the same reporting chain (e.g., a superior and one of his/her direct reports) are in the same interview session. This restriction applies to members of the appraisal team as well. People who have this type of relationship with one another may be uncomfortable with the expectation for them to be completely candid during the interview.

Samples of interviewees are typically grouped into categories that roughly correspond to lifecycle phases, work groups, engineering disciplines, organizational groupings, and/or process area affinities. Interviews may include individuals performing work related to a single process area or group of process areas. As stated previously, interviews of management personnel are typically grouped by basic unit or support function, while FARs sampled for a given interview come from across the organizational unit.

Virtual methods can be used, but they should be set up to allow for adequate interaction between the appraisal team members and the appraisal participants and should provide mechanisms for the appraisal team to control the interviews (e.g., provide the ability to interrupt, ask questions, or redirect the discussion to other subjects).

2.2.2 Examine Objective Evidence from Affirmations

Implementation Guidance There are three basic forms of interviews used in SCAMPI A. They are described below.

Standard Interviews

The most structured approach is the standard interview, which is scheduled in advance and employs a series of scripted questions. Each standard interview typically involves interviewees with similar responsibilities in the organization (e.g., quality assurance personnel, systems engineers, help desk technicians, or middle managers). The schedule and location of each interview session is communicated to the interviewees well in advance. Questions intended to elicit data about particular practices are prepared and reviewed in advance, and the team follows a defined process for conducting the session.

Depending on the interview, the entire team or specific mini teams may be present for these interviews. Responsibility for tracking the coverage of individual process areas is typically assigned to team members. A single questioner may lead the interview, with the rest of the team or portion of the team listening and taking notes, or the responsibility for asking questions may be distributed among the team members. In any case, it is expected that all participating team members who are not asking questions listen and take notes for all questions.

A set of planned interviews will be defined during appraisal planning. As the appraisal progresses and the objective evidence accumulates, the team may find it convenient to cancel one or more of these interviews to use the time for other activities. Such changes in the data collection plan are made in a way that does not violate the coverage criteria described in process 2.4, Verify Objective Evidence.

Implementation Guidance

On-Call Interviews

A more flexible approach to scheduling interviews is available in the form of on-call interviews, a variant of the standard interview. Prospective interviewees are identified and notified in advance, just as described above. However, the interviews are only held if team members decide that there is a need and that the time will be well spent. The prospective interviewees are therefore asked to block a period of time for such a contingency. These interviews need not include the entire appraisal team (as long as two appraisal team members attend), thus permitting parallel sessions with different interviewees.

2.2.2 Examine Objective Evidence from Affirmations

Implementation Guidance Finally, office hours interviews represent an agreement for availability that permits pairs of team members (per the Parameters and Limits of this activity), to visit interviewees at their desks, cubicles, or offices. As with the on-call interviews, the prospective interviewees block a specific time period to be available on a contingency basis. Most prospective interviewees will be able to continue with their daily work and accommodate an interruption if the team needs to speak with them. Here again, only if specific data needs are identified will the interview occur. The interviewees should be informed that they may receive only limited advanced notice for these interviews, although confirming the interview at least a day in advance is a courtesy that should be offered whenever possible.



2.3 Document Objective Evidence

Purpose	Create lasting records of the information gathered by identifying and then consolidating notes, transforming the data into records that document gaps in practice implementation or exemplary practice implementation.
Entry Criteria	Planning activities for the appraisal are complete, including the selection and preparation of the appraisal team. At least one data collection activity has been conducted, and appraisal-relevant data are available to record.
Inputs	<ul style="list-style-type: none">• appraisal data• notes taken during data collection activities (if applicable)• annotated worksheets or other work aids containing data (if applicable)• gaps in practice implementation or exemplary practice implementation documented from previous activities• data collection plan
Activities	<p>2.3.1 Take/Review/Tag Notes</p> <p>2.3.2 Record Presence/Absence of Objective Evidence</p> <p>2.3.3 Document Practice Implementation</p> <p>2.3.4 Review and Update the Data Collection Plan</p>
Outputs	<ul style="list-style-type: none">• updated appraisal data<ul style="list-style-type: none">– tagged notes– noted practice implementation gaps (if any)– noted exemplary implementation (if any)– revised data collection plan (if applicable)– annotated worksheets• requests for additional data (artifacts or affirmations)
Outcome	Individual team members understand the data collected thus far, and have information to guide any needed subsequent data collection.
Exit Criteria	All data from the most recent data collection session has been captured as a new baseline of practice implementation evidence. The data-gathering plans have been updated to reflect additional information needed and topics that can be removed from active investigation.

2.3 Document Objective Evidence

Key Points This process has traditionally been the most difficult one to manage during an appraisal. Members of the team will tend to vary a great deal in their productivity and style of work. The appraisal team leader must be attentive to the progress of each team member and take effective corrective actions to ensure team progress.

Tools and Techniques Because of the challenging nature of this activity, appraisal team leaders tend to have strong preferences for using tools and techniques they have found to be successful. Only a high-level list of tools and techniques is provided here:

- Work aids like wall charts, spreadsheet programs, and automated database tools are frequently used to help track the status of data collection.
- Using mini-teams, where pairs (or triplets) of team members are assigned specific process areas or specific basic units, is a common practice.
- Time management is a critical skill for this activity. Explicitly reviewing the effort spent, in real time, is a useful way to focus the team.
- A variety of techniques for structuring team notebooks and formats for recording notes has been used.
- Team norms regarding techniques for managing debates and divergent views are important, and should be made explicit well in advance.

Metrics As mentioned above, tracking the effort expended during this activity (in real time) is a valuable technique to manage the team's time. The ability to quickly learn the rate at which each team member works is a skill that experienced appraisal team leaders develop using effort and duration metrics.

Verification and Validation The method rules for recording traceability and validating data provide verification and validation of the appraisal data. Monitoring progress and the consensus decision-making process, conducted by the appraisal team leader, also serves as important verification and validation activity.

Records All appraisal data are recorded with full traceability to information sources as well as the model components to which they pertain. The full detail in this traceability contains sensitive information that should not be provided to people outside of the appraisal team. The attribution of data to individuals must never be divulged even when detailed data are provided to the organization for use in process improvement.

2.3 Document Objective Evidence

Interfaces with Other Processes

The mechanics associated with the recording and transcription of objective evidence are described in this section. There are many links between these mechanics and the data collection process, as well as the data verification and validation process. The data-recording process must support these other processes, and the tools used during an appraisal must accommodate these linkages. Typically, a database tool is used to manage all appraisal data that results from the analysis of notes taken during data collection.

Summary of Activities

The most basic representation of appraisal data is found in the notes taken by individual team members. These notes are reviewed and are typically “tagged” or otherwise processed before their content is transformed into other lasting representations. The presence, absence, and/or appropriateness of objective evidence is then judged and recorded based on the data collected. The scheme by which this set of records is produced is an important implementation choice made by the appraisal team leader, and must be well understood by the team. Gaps in the implemented practices are also recorded in a consistent manner that ensures traceability. Finally, the data collection plan is reviewed in light of the changes in the set of data available to the team and the remaining data needed to support reliable rating judgments.



2.3.1 Take/Review/Tag Notes

**Activity
Description**

As team members examine data sources, they document *what* the objective evidence is (e.g., referencing documents, presentations, instruments, and interviewee comments), as well as *why* or *how* the objective evidence meets the intent of the model practice.

There may be special cases where team members elect to record data directly in the objective evidence tracking tool. In such cases, team members may choose not to take notes (on paper or in their notebooks) that describe the objective evidence.

For all interviews and presentations, the team members must take notes that capture the objective evidence before they move to the annotation of the objective evidence tracking tool.

**Required
Practices**

The appraisal team shall

- record notes obtained from objective evidence data-gathering sessions
- relate notes to corresponding practices in the appraisal reference model

**Parameters
and Limits**

Every team member present must take notes during interviews and presentations. These notes must cover all areas investigated during the interview, and are not limited to the process areas assigned to the individual team member (i.e., everybody takes notes on everything).

During document reviews, notes must be taken to preserve specific context or focused references, if the rationale for accepting the objective evidence is not self-evident.

2.3.1 Take/Review/Tag Notes

Implementation Guidance The raw notes taken during an appraisal are treated as confidential information and may not be provided to any person outside of the appraisal team. Team members are typically required to destroy their notes in a secure manner at the conclusion of the appraisal. This requirement ensures that the attribution of detailed information to individuals in the organization cannot lead to inappropriate consequences following the appraisal.

Implementation Guidance Team members actively take notes during all data-gathering sessions. The purpose is to record, verbatim, what the information source reveals about the implementation of practices in the basic unit or organization.

Taking Notes

Whenever notes are taken in a data-gathering session, individual team members should review their notes immediately after the conclusion of the session. The review will focus on tagging significant items that relate to one or more model practice(s). This review and tagging process should occur within 24 hours of the data-gathering session.

Implementation Guidance The context in which the data are provided—be it during an interview, presentation, or in a document—affects the proper interpretation of the facts. For example, notes taken during an interview are based on a give and take between the interviewer and the interviewee. The threads of discussion often provide a context that may not be reflected in a single excerpt from the middle of the interview. Note-takers should review their work to ensure that such contextual information can be preserved at least in their recollection, and preferably through the annotation of the notes.

Reviewing Notes

Implementation Guidance As notes are reviewed, team members often use highlighter pens or annotation schemes to identify the most salient excerpts. The process area and/or practice to which the information applies may be written in colored ink over the raw notes. All notes should identify the data-gathering session, and the pages should be numbered to preserve the sequence of information. For notes taken during interviews, it is often useful to draw a seating chart to show where each person was sitting during the interview. Scripts prepared in advance of scheduled interviews may already be tagged, and can help relate responses to appropriate sections of the appraisal reference model. Some interviewee responses may deal with model practices other than those targeted by a given question, which would still necessitate some additional tagging.

Tagging Notes



2.3.2 Record Presence/Absence of Objective Evidence

**Activity
Description**

The presence or absence of appropriate objective evidence for each model practice in the scope of the appraisal is determined based on information obtained from data-gathering sessions. Annotations are recorded indicating the source, relevance, and coverage of objective evidence collected. In situations where just referencing the data source would not make it obvious *why* the objective evidence is appropriate, a comment can be added to the annotation. For example, when an alternative to the typical work breakdown structure is used, it may be necessary to document why that alternative meets the intent of the model practice. Adding comments to the annotations can help to avoid rehashing the rationale for accepting the objective evidence multiple times during team discussions.

**Required
Practices**

The appraisal team shall

- for each instantiation, record the presence or absence of objective evidence collected for each reference model practice within the appraisal scope
-

**Parameters
and Limits**

The inventory of objective evidence (be it in electronic or paper form) is updated to reflect what the data imply about the implementation of particular practices. For every practice within the reference model scope of the appraisal, annotations indicating the presence or absence of objective evidence will be made throughout the appraisal conduct. The annotation scheme used must ensure that the record reveals the following information:

- the basic unit or support function to which the data apply
 - the specific or generic practice to which the data apply
 - the type of objective evidence being recorded (i.e., artifact or affirmation)
 - whether the data imply the presence or absence of the objective evidence
 - whether the data suggest that the objective evidence is appropriate
 - comments about the appropriateness of the evidence (if needed)
 - whether or not additional information is needed before the team can characterize the extent to which the practice is implemented
 - a description of what the evidence is, if such a description was not provided by the organization in advance
-

2.3.2 Record Presence/Absence of Objective Evidence

Implementation Guidance This activity represents the mechanical aspects of processing appraisal data, and is strongly tied to the activities described in process 2.4, Verify Objective Evidence. The emphasis of this activity description is on the steps needed to update the inventory of objective evidence and maintain traceability to data sources. The emphasis of the activity description in Verify Objective Evidence is on the interpretation of data collected and the sufficiency of objective evidence relative to the appraisal reference model.

Team members typically record the presence or absence of appropriate objective evidence into tools such as tracking tables or data consolidation worksheets. Prior to the assignment of goal ratings, the entire team reviews the status of the objective evidence as reflected in the annotations made by each team member.

The data gathered during every data collection session should be related to the practices in use in a basic unit (e.g., project or work group) or support function within the organizational unit. In recording the presence or absence of objective evidence, the intent is to quickly inventory the composite of factual information. Elaboration about what the data mean or how they relate to other important issues is captured either in notes or in the descriptions of practice implementation gaps crafted by team members.



2.3.3 Document Practice Implementation

Activity Description

The primary intent of this activity is to derive, from the objective evidence gathered, records that describe the gap between what the objective evidence shows and what the team was looking for to support a claim that the model practice was implemented. The statements explain why the practice is not considered to be Fully Implemented.

Statements expressing exemplary implementation of practices (i.e. strengths) may be recorded when objective evidence indicates that the implementation of the practice is exceptional. If the organization is compliant with the model practices, but the implementation is not considered to be exemplary, no statements are recorded.

Required Practices

The appraisal team shall

- document gaps in the basic unit or support function's implemented processes relative to appraisal reference model practices
- document exemplary implementation in the basic unit or support function's implemented processes relative to appraisal reference model practices

Parameters and Limits

For any practice that is characterized as something other than Fully Implemented, there must be a statement explaining the gap between what the organization does and what the model expects.

Statements of practice implementation gaps, presented to the organizational unit in the form of preliminary findings for validation, must be free of references to specific individuals or groups, unless basic unit level findings are planned for the appraisal.

Regardless of the medium used, statements describing practice implementation gaps or exemplary implementation of model practices must be annotated with the following identifying information:

- the model component to which the statement relates (i.e., process area, goal, and practice)
 - the data collection session(s) in which the information was uncovered
 - the basic unit or support function to which the statement applies
-

2.3.3 Document Practice Implementation

Implementation Guidance The database used to record the inventory of objective evidence may incorporate functionality to record practice implementation gaps and exemplary practice implementation, or a separate location or tool may be used if desired. Such statements should be recorded at the level of a particular instance of a model practice. These precursors to preliminary findings (i.e., strengths and weaknesses) are more detailed and pointed, while all information presented outside of the team will be aggregated to the goal and organizational unit level of abstraction. It is not necessary to generate statements expressing adequate implementation of a model practice.



2.3.4 Review and Update the Data Collection Plan

Activity Description	<p>This activity is used to continuously monitor the state of available objective evidence and to select the next tactic in the pursuit of obtaining full coverage of the reference model scope and organizational scope of the appraisal.</p>
Required Practices	<p>The appraisal team shall</p> <ul style="list-style-type: none">• review the inventory of objective evidence collected and the data collection plan to determine what additional objective evidence is still needed for sufficient coverage of the appraisal reference model scope• revise the data collection plan to obtain additional objective evidence for instances where insufficient data are available to judge the implementation of appraisal reference model practices• identify priorities for the upcoming data collection events and reevaluate the feasibility of the schedule in light of the current state of the objective evidence
Parameters and Limits	<p>This activity must be enacted at least once a day, and a consolidated summary of the appraisal data collection status must be available to the team at the start of each day during which data collection events are planned.</p>
Implementation Guidance	<p>The data collection status summarizes the differences between the objective evidence on hand and the evidence needed to support the creation of appraisal outputs (e.g., findings and ratings). Annotations regarding the presence (and appropriateness) of objective evidence allow the team to inventory the state of the “knowledge base.” This status then drives requirements for the collection of more data. Annotation of the inventory of objective evidence is described in process 2.4, Verify Objective Evidence.</p> <p>The plan for future data collection should be revisited and updated as necessary. There may be several situations in which additional data are required for the team to sufficiently characterize the implementation of appraisal reference model practices. For example:</p> <ul style="list-style-type: none">• The process of reconciling new data with the old may identify conflicts or ambiguities in the data that require clarification.• The search for objective evidence may lead to the discovery of one or more previously undocumented practice(s) in the organization.• Attempts to confirm the use of a particular practice or tool by a basic unit or support function may have been unsuccessful.

2.3.4 Review and Update the Data Collection Plan

Implementation Guidance (continued) Prioritizing data needs and allocating data collection effort to particular data collection events are ongoing activities that the appraisal team leader is responsible for overseeing. The data collection status summary may be maintained by the appraisal team leader and reported to the team members, or the appraisal team leader may elect to have each mini-team perform this activity for the process areas it is assigned.

Specific information needed to resolve ambiguities or conflicts in the existing data should be documented for follow-up by one or more members of the team. For detailed data items that have a limited scope of impact, the notes of individual team members may be adequate to document the data needed. For example, whether or not a particular person is involved in a meeting, or reviews a given document, can be confirmed by a simple question asked during an on-call interview. Therefore, a note made by an individual team member to make sure the question is asked may suffice.

In contrast, if conflicting information is uncovered about whether or not a given event occurred (e.g., a meeting) more visibility of this conflict may be needed among the team members to understand why the information collected thus far is not internally consistent. In such a case, the person(s) responsible for the process area in which that practice resides may need to alert the team to the conflicting data and facilitate a team discussion to seek clarity, as well as additional data. This potential conflict may lead to the crafting of a specific interview question, which is used in a standard interview.

The data collection plan and inventory of objective evidence provide a means for the appraisal team to continuously monitor progress toward sufficient coverage of appraisal reference model practices in preparation for rating. Estimates of the additional data collection effort should be regularly reviewed. If the feasibility of the appraisal schedule is called into question, a replanning effort may be necessary (as described in activity 1.5.2, Re-Plan Data Collection).



2.4 Verify Objective Evidence

Purpose Verify the sufficiency of objective evidence to determine the implementation of model practices for each instantiation. Describe any strengths and weaknesses in the implementation of model practices. Each implementation of each practice is verified so that it may be compared to the practices of the reference model. Then the team characterizes the extent to which the practices in the model are implemented.

Entry Criteria Objective evidence has been collected about the implementation of practices in the organization. Gaps in the implementation of model practices or exemplary practice implementation have been identified, and the team is ready to characterize the extent to which model practices (or acceptable alternatives to those practices) have been implemented.

Inputs

- appraisal plan, including schedule and participants for verification activities
- practice implementation gaps (if any)
- exemplary practice implementation (if any)
- data collection plan specifying any additional information needed

Activities

2.4.1 Verify Objective Evidence
2.4.2 Characterize Implementation of Model Practices and Generate Preliminary Findings

Outputs

- updated appraisal data
 - strength statements (if any)
 - weakness statements (if any)
 - annotated worksheets
- updated appraisal artifacts
 - preliminary findings
 - revised data collection plan
 - requests for additional data
- practice characterizations
 - instantiation level
 - organizational unit level

Outcome The team's confidence in the material that will form the basis for appraisal outputs is increased. Any critical deficiencies in the data on hand have been identified and actions to resolve these issues have been initiated.

Exit Criteria The team has recorded data on the implementation of practices in the organization, and characterized the extent to which practices in the model are implemented.

2.4 Verify Objective Evidence

Key Points	The data used to formulate appraisal outputs must be verified to ensure that the results of aggregating individual detailed data items will lead to appropriate appraisal outputs.
Tools and Techniques	Facilitation techniques to guide the team through difficult decisions are important during this activity (as they are during the rating activity as well). Techniques to enhance the credibility of the preliminary findings are also important.
Metrics	Planned versus actual effort expended for this process (as with all activities) will assist in monitoring progress as well as planning subsequent appraisals.
Verification and Validation	The appraisal team leader must ensure active participation in verification activities as a way of confirming that the verification process is working as intended. Reactions to the validation activity (activity 2.5.1, Validate Preliminary Findings) will provide feedback to help validate that this activity was successful.
Records	Characterizations of practice implementation and strength/weakness statements will be recorded for subsequent use by the team.

2.4 Verify Objective Evidence

Interfaces with Other Processes During the conduct of an appraisal, the team gathers and analyzes a great deal of detailed information. Processes described earlier in this document clarify how data are gathered and examined. The process described here is focused on understanding the information revealed by the data. The processes described after this one are focused on making reliable and valid rating judgments based on the verified data.

Summary of Activities The initial objective evidence provided by the organization is used to understand how practices are intended to be implemented. Members of the appraisal team then seek information to confirm that the intended practices are indeed implemented. This first verification activity (2.4.1, Verify Objective Evidence) may reveal gaps or strengths in the actual implementation that are not apparent in the initial objective evidence provided by the organization.

The next verification activity (2.4.2, Characterize Implementation of Model Practices and Generate Preliminary Findings) then compares the implemented practices to the practices in the reference model. This activity may also reveal gaps in the implementation(s) that will later bear on the ratings assigned by the team. Standard characterizations to capture the extent of practice implementation, first at the instantiation level and then at the organizational unit level, are recorded by the team with descriptions of gaps in implementation.



2.4.1 Verify Objective Evidence

Activity Description

The appraisal team establishes a clear understanding of the practices implemented in the organization through the data collection activities carried out during the appraisal. Typically, the organization provides a set of objective evidence at the beginning of the appraisal process, and the team follows the data collection plan to gather the complete set of data required to support the verification process described here. Parameters for adequacy, coverage and sufficiency are specified here. Consult Appendix F, Scoping and Sampling in SCAMPI A Appraisals, for more detailed illustrations of the flow of activities relating to sampling and data adequacy.

Required Practices

The appraisal team shall

- verify the appropriateness of artifacts provided by basic units or support functions to enable adequate understanding of the extent of implementation of each practice within the appraisal reference model scope
 - verify the appropriateness of affirmations provided by people from basic units or support functions to enable adequate understanding of the extent of implementation of each practice within the appraisal reference model scope
 - verify that the artifacts and affirmations provided are sufficient to cover the organizational and model scope of the appraisal
-

2.4.1 Verify Objective Evidence

Parameters and Limits

Data Adequacy Rules

Artifacts: For an artifact to be accepted as evidence of practice implementation, it must be a product or by-product of the practice being examined by the appraisal team.

Affirmations: For an affirmation to be accepted as evidence of practice implementation, it must be supplied by an individual who participated in the implementation of the practice being examined by the appraisal team.

Data Sufficiency: Verify that all data (i.e., artifacts and/or affirmations) are provided for all sampled basic units and support functions for the model scope of the appraisal, in accordance with the coverage rules specified in Section 1.1.4, Determine Appraisal Scope, and documented in the data collection plan.

Coverage of the Basic Unit or Support Function: For basic units or support functions that encompass multiple disciplines or facets of work, ensure that the objective evidence covers all aspects of the work (e.g., in a systems and software project, looking only at evidence relating to software engineering is inadequate).

Implementation Guidance

See Appendix B, Alternative Practice Identification and Characterization Guidance, for information on cases involving alternative practices.

The example work products listed in the reference models provide examples of artifacts that can be used to indicate practice implementation. These are examples only and are not required; alternatives more appropriate to the organization and the basic units will typically be appropriate.

Typically, many of the artifacts required to support this verification are provided in advance of the Conduct Appraisal phase. The primary focus of data collection is to permit the team to verify that the intended practices are implemented across the organizational unit. Where the implemented practices differ from the intended practices, the objective evidence provided at the start of the appraisal process is annotated to more accurately reflect the implemented process in the organization. These annotations are typically statements describing a gap in the implementation of a practice, some of which will eventually become weaknesses.

Only after team members have a clear understanding of the implemented practices can they compare them to the model to characterize the extent to which the organizational unit implements the practices in the model or acceptable alternatives.



2.4.2 Characterize Implementation of Model Practices and Generate Preliminary Findings

Activity Description

Once objective evidence on practice implementation has been verified, the team turns to characterizing the implementation of model practices. For each model practice, and each instance sampled (i.e., in each basic unit or support function supplying data for that practice), the team will document a characterization of the extent to which the model practice (or an acceptable alternative) has been implemented. The implementation-level characterizations are then aggregated to the organizational unit level.

Characterizations of practice implementation are used as a means to focus appraisal team effort on areas where professional judgment is needed, and to aid in reaching team consensus on the extent to which practices are implemented.

In preparation for validating the verified information, the appraisal team generates preliminary findings that summarize potential strengths or weaknesses that support judgments about practice implementation. The preliminary findings are written in reference to a single model practice, and are abstracted to the level of the organizational unit, unless the appraisal is planned to allow for basic unit-level preliminary findings.

Required Practices

The appraisal team shall

- characterize the extent to which appraisal reference model practices are implemented
- aggregate practice implementation characterization values to the organizational unit level
- document summary level weaknesses in practice implementation if appropriate
- document summary level strengths in practice implementation, if appropriate
- generate and verify preliminary strengths and weaknesses

Parameters and Limits

Characterize Implementation

Characterization of the implementation of each practice in each basic unit or each support function is assigned according to the table below. These initial characterizations may be assigned through consensus of a mini-team (consisting of more than one team member), or may be based on the consensus of the entire appraisal team.

Judgments described in the table below are contingent on the appraisal scope and requirements for sufficient data, as defined in 1.1.4, Determine Appraisal Scope and 2.4.1, Verify Objective Evidence. In some cases, only artifacts will be examined, and in some cases only affirmations will be examined.

2.4.2 Characterize Implementation of Model Practices and Generate Preliminary Findings

Parameters and Limits (continued)	Label	Meaning
	Fully Implemented (FI)	Sufficient artifacts and/or affirmations are present (per 1.1.4, Determine Appraisal Scope and 2.4.1, Verify Objective Evidence) and judged to be adequate to demonstrate practice implementation, and no weaknesses are noted.
	Largely Implemented (LI)	Sufficient artifacts and/or affirmations are present (per 1.1.4 and 2.4.1) and judged to be adequate to demonstrate practice implementation, and one or more weaknesses are noted.
	Partially Implemented (PI)	<p>Some or all data required (per 1.1.4, Determine Appraisal Scope and 2.4.1, Verify Objective Evidence) are absent or judged to be inadequate, some data are present to suggest some aspects of the practice are implemented, and one or more weaknesses are noted.</p> <p>OR</p> <p>Data supplied to the team (artifacts and/or affirmations) conflict –some data indicate the practice is implemented and some data indicate the practice is not implemented, and one or more weaknesses are noted.</p>
	Not Implemented (NI)	Some or all data required (per 1.1.4, Determine Appraisal Scope and 2.4.1, Verify Objective Evidence) are absent or judged to be inadequate, data supplied does not support the conclusion that the practice is implemented, and one or more weaknesses are noted.
	Not Yet (NY)	The basic unit or support function has not yet reached the stage in the sequence of work, or point in time to have implemented the practice.

2.4.2 Characterize Implementation of Model Practices and Generate Preliminary Findings

Parameters and Limits (continued)

The table below summarizes rules for aggregating implementation-level characterizations to derive organizational unit-level characterizations. Consensus of all members of the appraisal team is necessary for organizational unit-level characterizations.

The column labeled “Implementations” is the input condition—the pattern of practice implementation characterizations for basic units or support functions. The column labeled “Outcome” is the resultant aggregated practice implementation characterization at the organizational unit level.

Implementations	Outcome	Remarks
All FI or NY, with at least one FI	FI	All implementations are characterized FI or NY, with at least one FI.
All LI or FI or NY, with at least one LI	LI	All implementations are characterized LI or FI or NY, with at least one LI.
At least one LI or FI and at least one PI or NI	LI or PI	There is at least one implementation that is characterized as LI or FI and at least one implementation that is characterized as PI or NI. Team judgment is applied to choose LI or PI based on whether the weaknesses, in aggregate, have a significant negative impact on goal achievement.
All PI or NI or NY, with at least one PI	PI	All implementations are characterized PI or NI or NY, with at least one PI.
All NI or NY, with at least one NI	NI	All implementations are characterized NI or NY, with at least one NI.
All NY	NY	All implementations are characterized NY. There are no basic units or support functions within the organizational unit that have yet reached the stage in the sequence of work to have implemented the practice. (Note: If literally <i>all</i> basic units and support functions in an organizational unit have not reached the stage in the sequence of work to have implemented the practice, but will in the future, no rating can be given for the associated goal.)

2.4.2 Characterize Implementation of Model Practices and Generate Preliminary Findings

Parameters and Limits (continued)

For any practice that is characterized other than Fully Implemented, there must be a statement explaining the gap between what the organization does and what the model expects.

Generate Preliminary Findings

Statements of strengths and weaknesses presented to the organizational unit in the form of preliminary findings for validation must be free of references to specific individuals, basic units, or support functions. Attribution to basic units and support functions is permitted as a tailoring option – if it is planned and communicated to appraisal participants in advance of the data collection activities. However, attribution to individuals shall never be permitted.

Findings (i.e., strengths and weaknesses) must be verified, that is, they must be based on sufficient objective evidence (refer to activity 2.4.1, Verify Objective Evidence) and they must be consistent with other verified findings. Verified findings cannot be both true and mutually inconsistent; in aggregate, they constitute a set of truths about the organizational unit that must be consistent.

Strengths are only documented if the implementation of a practice is exemplary (above and beyond the capability described in the model), and reflects a strong asset of the process in use. An adequate implementation of a model practice is not a strength. Team members use their collective experience and judgment to determine whether or not they have uncovered a strength to highlight in the appraisal findings.

2.4.2 Characterize Implementation of Model Practices and Generate Preliminary Findings

Implementation Guidance A weakness is defined in the glossary as “the ineffective, or lack of, implementation of one or more reference model practices.” If there is no impact on the goal, there is no need to document a weakness. If the appraisal team identifies a process improvement suggestion with a model practice that is not an ineffective (or lack of) implementation of a model practice, it is recorded as a note rather than a weakness.

See Appendix B, Alternative Practice Identification and Characterization Guidance, for information on applying these characterization rules in situations where acceptable alternative practices have been identified.

When the team is ready to perform the ratings, these characterizations serve to simplify the judgments. The team is then able to focus on the aggregation of weaknesses observed to determine the goal satisfaction ratings (explained in process 2.6, Generate Appraisal Results). Instantiations in situations where the basic unit or support function has not yet reached the appropriate stage in the sequence of work where the practice would be enacted are characterized as Not Yet (NY). The appraisal-planning activities are expected to prevent situations that severely limit the examples of actual implementation for any given practice.

The characterization activity can begin as soon as sufficient data are available. It is not necessary that data for the entire organizational unit scope be available before any given practice can be characterized at the implementation level. However, before the implementation of a practice across the organizational unit can be characterized, the implementation-level characterizations have been completed. Each instance of practice enactment is characterized using the implementation-level characterization scheme.

The characterization of practice implementation for the organizational unit is carried out using the aggregation rules summarized in the table above. These rules provide a basis for identifying the areas where professional judgment is required, and simplify the areas where the data are unanimous.



2.5 Validate Preliminary Findings

Purpose	Validate preliminary findings, including weaknesses (i.e., gaps in practice implementation) and strengths (i.e., exemplary implementation of model practices) with members of the organizational unit.
Entry Criteria	Strengths and weaknesses in the implementation of model practices have been identified, and the team has characterized the extent to which model practices (or acceptable alternatives to those practices) have been implemented. Preliminary findings at the level of the organizational unit have been crafted and verified for validation.
Inputs	<ul style="list-style-type: none">• appraisal plan, including a schedule and participants for data validation activities• strength/weakness statements• verified objective evidence• characterizations of model practice implementation
Activities	2.5.1 Validate Preliminary Findings
Outputs	<ul style="list-style-type: none">• validated appraisal findings
Outcome	The team's confidence in the material that will form the basis for appraisal outputs is increased, and the process of transferring ownership of these results has been started. Any critical deficiencies in the data on hand have been identified and actions to resolve these issues have been initiated.
Exit Criteria	Preliminary findings have been validated with members of the organization who provided appraisal data.
Key Points	This activity has one purpose—ensuring the validity of the appraisal data and associated outputs. Managing the interaction with people outside of the team is a vitally important process to ensure that the results will be accurate.
Tools and Techniques	Techniques to enhance the credibility of the preliminary findings are important. Using a flip chart or note taker during the presentation of preliminary findings is often effective for instilling confidence among audience members.

2.5 Validate Preliminary Findings

Metrics	Planned versus actual effort expended for this process (as with all activities) will assist in monitoring progress as well as planning subsequent appraisals. Gauging the level of acceptance for preliminary findings can be facilitated by computing the percentage of findings adjusted based on feedback, then comparing this value with past experience.
Verification and Validation	The attendees of preliminary findings presentations are likely to express agreement and/or discuss issues with the data being validated. The appraisal team leader must ensure active participation in these activities as a way of confirming that the verification and validation process is working as intended. The actions taken following the appraisal will provide feedback to help validate that this activity was successful.
Records	Characterizations of practice implementation, strength/weakness statements, and changes made based on feedback will be recorded for subsequent use by the team.
Interfaces with Other Processes	During the conduct of an appraisal, the team gathers and analyzes a great deal of detailed information. Processes described earlier in this document clarify how data are gathered and examined. The process described here is focused on ensuring the data reflects actual conditions in the organization. The processes described after this one are focused making reliable and valid rating judgments based on the validated data.
Summary of Activities	When team members have achieved their planned coverage of data collection, the preliminary findings are validated with the members of the organization. This final activity prior to rating allows team members to build confidence that their investigation has been thorough, and the members of the organization are provided with an opportunity to correct any perceived errors in the appraisal data.



2.5.1 Validate Preliminary Findings

Activity Description Validation of preliminary findings is primarily a data collection activity, and the intent is to validate the appraisal team’s understanding of the processes implemented within the organizational unit. Feedback from participants may result in modifications to the appraisal team’s inventory of objective evidence. The results of the validation activity are considered in the formulation of final findings and goal ratings. These latter activities cannot commence until after the validation activity has occurred.

Required Practices The appraisal team shall

- validate preliminary findings (i.e., documented strengths and weaknesses) with members of the organizational unit

Parameters and Limits Every model practice characterized as Not Implemented, Partially Implemented, or Largely Implemented at the organizational unit level, must have at least one weakness associated with it.

At least one appraisal participant from each basic unit or support function providing objective evidence and from any associated staff function must participate in the set of validation activities.

Only appraisal participants may participate (i.e., only people who provided data may participate in validation).

The minimum number of validation sessions required is one.

At the Appraisal Team Lead’s discretion, or at the request of the sponsor, weaknesses can be written to describe connections between the weakness and business goals.

The rules of confidentiality and the expected use of appraisal data must be communicated to participants in each validation activity.

2.5.1 Validate Preliminary Findings

Implementation Guidance Areas where the appraisal team's inventory of objective evidence is insufficient to satisfy the corroboration (see 1.1.4, Determine Appraisal Scope) may instead be addressed by requests for additional information needed.

Preliminary findings are the building blocks that lead to the judgment of goal satisfaction, and are the detailed information that forms the basis for the final findings. As an intermediate artifact of the appraisal process, preliminary findings are used to ensure traceability between inputs to the appraisal and outputs of the appraisal.

Feedback from participants on the preliminary findings should be solicited by the appraisal team and considered for possible revisions to its inventory of objective evidence.

If virtual methods such as video conferences, teleconferences, and other similar technology are used for the validation session(s), the appraisal team leader should ensure that these methods in no way compromise the integrity of the appraisal or the accuracy of the results. Virtual methods should allow for adequate interaction between the appraisal team members and the appraisal participants and should provide mechanisms for the appraisal team to control the validation session. Appropriate arrangements, such as meeting rooms at remote sites, should be made and checks done to ensure only appraisal participants attend this presentation to maintain confidentiality.

It is not expected that preliminary findings will provide a detailed listing of the implementation status of every model practice in every sampled basic unit or support function. Furthermore, it is not expected that the preliminary findings will identify the status of individual basic units or support functions with regard to practice implementation or goal achievement. An appraisal sponsor may request these more detailed appraisal results. The appraisal team leader should negotiate for the proper allocation of time to accommodate this tailoring option, and the expectation that such information will be preserved at the end of the appraisal should be made clear to all appraisal participants.

2.5.1 Validate Preliminary Findings

Implementation Guidance An interactive presentation is the most effective mechanism for validating the preliminary findings. The members of the organization who provided data to the appraisal team are typically brought together in a conference room, and a slide presentation is used to review the preliminary findings in an effort to invite people to provide additional data or express their agreement with the summary statements. The audience is often grouped by seniority in the organization, and separate presentations are made for practitioners, project managers, and middle managers.

Preliminary Findings Presentations

During the presentation, one or more members of the team review the preliminary findings statements and provide the audience with an opportunity to comment or ask questions. The presenter uses only the words crafted by the appraisal team and avoids elaborating on the findings using his/her own words.

When questions are asked about a preliminary finding, the appraisal team leader provides any clarification needed to understand what the statement means. However, team members avoid the appearance that they are justifying the content of the statement.

The detailed data that led to the preliminary findings must be protected, and negotiations for wording changes avoided. The appraisal team records new data made available to them without commenting on how the data may be interpreted or how the findings may need to change.

Implementation Guidance As an alternative (or in addition) to the presentation, focus groups can be used to probe more deeply into specific areas of the reference model with a targeted audience. This use of focus groups permits the team to explore a particular area in more depth to help sharpen the appraisal results, or to raise the visibility of the results to people who are most informed on the topic. For example, a focus group conducted with project managers could be an ideal environment to validate (and gather more detailed data on) the topic of project planning and project monitoring.

Focus Groups

In contrast, a focus group composed of Engineering Process Group (EPG) members may be an ideal setting to validate findings associated with the organization's infrastructure for process improvement. The preliminary findings that relate to the group may be distributed as handouts or displayed using a projector, and the participants can engage in a free-form dialogue with the team and amongst themselves. Notes taken by the members of the team are treated as any data collected during an interview would be.

2.5.1 Validate Preliminary Findings

Implementation Guidance Finally, a survey instrument can be used in addition (or as an alternative) to either of the techniques above. A carefully worded instrument that asks respondents to rate their level of agreement with the finding statement, and provides an opportunity for written feedback, can provide a low-cost and timely source of data for the team.

Survey Instrument



2.6 Generate Appraisal Results

Purpose	Rate goal satisfaction based on the extent of practice implementation throughout the organizational scope of the appraisal. The extent of practice implementation is judged based on validated data (e.g., artifact and affirmation objective evidence) collected from the entire representative sample of the organizational unit. Aggregate ratings (process area ratings, maturity level ratings, capability ratings, etc.) are driven by the goal satisfaction ratings.
Entry Criteria	The set of validated preliminary findings, statements of practice implementation strengths and weaknesses, and/or tabulations of validated objective evidence of practice implementation on which they are based are available. Team members are confident that they have all the data needed to make rating judgments. The data obtained completely covers the practices within the defined appraisal reference model scope and the entire representative sample selected for the organizational unit.
Inputs	appraisal data <ul style="list-style-type: none">• validated preliminary findings• tabulations of objective evidence of practice implementation• annotated worksheets, checklists, working notes
Activities	2.6.1 Derive Findings and Rate Goals 2.6.2 Determine Process Area Ratings 2.6.3 Determine Process Area Profile 2.6.4 Determine Maturity Level 2.6.5 Document Appraisal Results
Outputs	<ul style="list-style-type: none">• final findings• recorded rating decisions
Outcome	A formal rating decision for each appraisal reference model component that was planned to be rated, and for which the team obtained complete or sufficient data
Exit Criteria	Ratings against all components per the plan have been made and recorded.

2.6 Generate Appraisal Results

Key Points	<p>The judgment of goal satisfaction is based on and traceable to the extent of the implementation of practices associated with that goal (or alternative practices contributing equivalently to goal satisfaction).</p> <p>Success in this activity is driven by team members' ability to limit their focus to the data that support the judgments, and to avoid issues that threaten their ability to be objective. This activity can create a great deal of stress for team members under pressure to help their organization "do well." The appraisal team leader must skillfully facilitate this activity when external pressures exist.</p>
Tools and Techniques	<p>There is a significant amount of data to review in making each round of judgments. Rating worksheets and automated support tools facilitate the team's decision-making process by presenting necessary data in a concise, well-organized manner. When controversial issues are encountered, the appraisal team leader must actively facilitate to ensure that the team remains focused on the pertinent issues. Strategic rest breaks, and sequencing and pacing critical discussions, are often keys to success.</p>
Metrics	<ul style="list-style-type: none">• planned versus actual effort for each component rated• number of model components rated satisfied or unsatisfied
Verification and Validation	<p>The appraisal team leader verifies that the rating process was performed in accordance with the method rules and the rating baseline selected and documented in the appraisal plan. Work aids used to record the team judgments help ensure traceability to the basis for the rating judgments.</p>
Records	<p>A worksheet or other work aid may be used to make a record of the rating decisions. A process area profile is often an effective means of recording and communicating these results.</p>

2.6 Generate Appraisal Results

Interfaces with Other Processes

The rating judgments made by the appraisal team are dependent on the quality of the data available to them, as well as their ability to reliably judge the implementation and institutionalization of practices in the organization that relate to the reference model. All processes previously described contribute to the team's ability to effectively execute this process to generate appraisal results.

The Analyze Requirements process establishes the rating baseline, the organizational unit to which ratings will apply, and the purpose for which the ratings are used. The Develop Appraisal Plan process, in conjunction with the Obtain and Inventory Initial Objective Evidence and Prepare for Appraisal Conduct processes, determines the sample of the organizational unit for which data will be collected and from which the ratings will be determined.

The Select and Prepare Team process ensures that the team has sufficient knowledge and skills to interpret the data and arrive at sound rating judgments. The Examine Objective Evidence and Document Objective Evidence processes provide the basic information that is needed to support judgments in a form that facilitates making the judgments.

The Verify Objective Evidence process characterizes the extent to which the organizational unit implements practices in the model (or acceptable alternatives). The Validate Preliminary Findings process validates findings that describe any weaknesses or strengths associated with the practice implementations.

Upon the successful execution of these processes, the team is ready to rate the satisfaction of goals dependent on those practices.

Summary of Activities

The required and fundamental rating activity involves making team judgments about goal satisfaction for each and every goal within the appraisal reference model scope. Once goal satisfaction has been determined, optional aggregate ratings may be produced.

The first level of aggregate rating aggregates goal satisfaction to process area ratings. This process is described in Section 2.6.2. The second level of aggregate rating is to produce a process area profile, as described in Section 2.6.3. The third and final level of aggregate rating is to produce a maturity level rating for the entire organizational unit.



2.6.1 Derive Findings and Rate Goals

Activity Description The judgments made about goal satisfaction are driven by the preliminary findings that were documented by the appraisal team and validated by appraisal participants as well as the extent of implementation of associated practices. The preliminary findings focus on exemplary practice implementations as well as gaps in the implementation of practices. When performing goal ratings, the team judges whether or not these weaknesses in the implementation of practices (in aggregate) threaten the organizational unit's ability to satisfy the goals associated with the practices.

Required Practices The appraisal team shall do the following:

- derive final findings using preliminary findings statements, feedback from validation activities, and any additional objective evidence collected as a result of the validation activities
- rate each goal within the reference model scope of the appraisal, based on the practice implementation characterizations at the organizational unit level as well as the aggregation of weaknesses associated with that goal
- obtain appraisal team consensus on the findings statements and ratings generated for the organizational unit level

Parameters and Limits When deriving final findings, the aim is to create goal-level statements that summarize the strengths and weaknesses in practice implementation. These statements must be abstracted to the level of the organizational unit, and cannot focus on individual basic unit or increments (unless the tailoring option for basic unit- or increment-specific findings has been agreed on during planning).

A goal must be rated Not Rated if there are any associated practices that are not characterized at the organizational unit level or that are characterized as Not Yet at the organizational unit level.

A goal is rated Not Rated if the associated set of objective evidence does not meet the defined criteria for sufficient data coverage.

The goal is rated Satisfied if and only if both of the following are true:

- All associated practices are characterized at the organizational unit level as either Largely Implemented or Fully Implemented.
- The aggregation of weaknesses associated with the goal does not have a significant negative impact on goal achievement.

For a goal to be rated as Unsatisfied, the team must be able to describe how the set of documented weaknesses (or single weakness) led to this rating.

2.6.1 Derive Findings and Rate Goals

Implementation Guidance Any endeavor that results in producing a score, grade, or rating is by definition an area of sensitivity to those affected by the outcome. An objective and clear basis for assigning a rating lessens this sensitivity and results in a more consistent basis of comparison among the organizational units and goals rated.

Judgments made prior to and during the rating process should be based on observable facts and should be made at the lowest level of abstraction that makes sense. In the case of SCAMPI A appraisals, the lowest level of abstraction is characterizing the extent of practice implementation for each basic unit or support function within the representative sample.

Characterizations made at the instantiation level are aggregated into a characterization of the extent of practice implementation throughout the organizational unit, as described earlier in process 2.4, Verify Objective Evidence. The judgment of goal satisfaction is then based on, and directly traceable to, the extent of implementation of practices associated with that goal. (See Appendix B, Alternative Practice Identification and Characterization Guidance, for information regarding the judgment of goal satisfaction when acceptable alternative practices are involved.)

Findings should be phrased in terms that best support the appraisal sponsor's decision making and taking and taking action to address appraisal results.



2.6.2 Determine Process Area Ratings

Activity Description

The appraisal team may produce ratings for process areas. Assigning process area ratings is an optional activity that is selected at the discretion of the appraisal sponsor and documented in the appraisal plan. Depending on the reference model chosen, the process area ratings may reflect a staged architecture (satisfied vs. unsatisfied) or a continuous architecture (capability levels 0 to 3).

Required Practices

If process area ratings are selected as an appraisal output by the sponsor, the appraisal team shall do the following:

- If using a continuous representation, assign a capability level to each process area within the scope of the appraisal, based on the highest level for which all specific goals and generic goals within the appraisal scope have been satisfied. (See the parameters and limits section that follows for a more specific discussion.)
 - If using a staged representation, rate the satisfaction of each process area within the scope of the appraisal, based on the satisfaction ratings assigned to all goals included in that process area. See the parameters and limits section (below) for a more specific discussion.
 - If any of the goals are rated Not Rated and none of the other goals are rated Unsatisfied, then the process area is rated Not Rated.
 - When a process area is determined to be outside of the organizational unit's scope of work, the process area is designated as "not applicable" and is not rated.
 - When an applicable process area is outside of the scope of the model used for the appraisal, the process area is designated as "out of scope" and is not rated.
-

2.6.2 Determine Process Area Ratings

Parameters and Limits	For an appraisal using a continuous representation, the following table defines the basis for capability level ratings:	
	Capability Level	Process Areas
	0	Default Rating
	1	Generic goal for capability level 1 is rated Satisfied. (All specific goals are rated Satisfied.)
	2	Generic goals for capability levels 1 and 2 are rated Satisfied. (All specific goals are rated Satisfied.)
	3	Generic goals for capability levels 1, 2, and 3 are rated Satisfied. (All specific goals are rated Satisfied.)
	<p>For an appraisal using a staged representation model, the “satisfied” rating for a process area may depend on the target maturity level for the appraisal – if performing the maturity level rating was selected by the appraisal sponsor.</p> <p>For CMMI models, rating a process area “staged at maturity level 2” as satisfied would require a satisfied rating for generic goal 2 in order to support a maturity level 2 outcome for the appraisal. If the target maturity level for the appraisal is level 3, then generic goal 3 must be satisfied in order for the process area to be rated as satisfied.</p>	
Implementation Guidance	None	
	◆	

2.6.3 Determine Process Area Profile

Activity Description The appraisal team may create a process area profile (called “capability level profile” or “achievement profile” in CMMI models) that graphically depicts the ratings assigned to each process area within the scope of the appraisal. The generation of a process area profile is an optional activity, selected at the discretion of the appraisal sponsor and documented in the appraisal plan.

Required Practices If a process area profile was selected as an output by the sponsor, the appraisal team shall generate a process area profile depicting the ratings for each process area within the scope of the appraisal.

Parameters and Limits A simple bar chart can be used for the display. Each process area is represented in a single bar along the horizontal axis, and the vertical axis represents the rating dimension (i.e., ‘Satisfied’ vs. ‘Unsatisfied’ or a capability level of 0, 1, 2 or 3). The height of each bar communicates the rating for the process area represented.

Capability levels take only the values 0, 1, 2, or 3. Intermediate values (e.g., 2.7) are not defined for this appraisal outcome, and any embellishment of the Capability Profile with such values is outside the boundaries of SCAMPI A.

Satisfaction ratings, which may take on one of two values “Satisfied” or “Unsatisfied” for each process area, are used when the appraisal is using the staged representation.

Implementation Guidance Process area profiles are typically used to communicate the rating results to the sponsor and others designated by the sponsor.

Comparing different process areas with respect to their satisfaction status or capability level may be informative in discussing trends or patterns in the organization.

This activity may be omitted entirely: it is a tailoring option.



2.6.4 Determine Maturity Level

Activity Description Historically, one of the most visible outcomes of an appraisal has been the maturity level rating. The determination of a maturity level rating is straightforward and is derived mechanically from the ratings assigned to process areas. Assigning a maturity level rating is an optional activity, selected at the discretion of the appraisal sponsor and documented in the appraisal plan.

Required Practices If a maturity level rating was selected as an output by the sponsor, the appraisal team shall assign the maturity level based on the ratings assigned to process areas.

Parameters and Limits When using the staged representation, the maturity level determined is the highest level at which all process areas contained within the maturity level, and within all lower maturity levels, are rated as Satisfied or Not Applicable. (Note: as explained in the parameters and limits for rating processes areas, to achieve maturity level 3, CMMI models also require satisfaction of generic goal 3 for process areas staged at maturity level 2.

When using the continuous representation, please consult the discussion of equivalent staging in the reference model for an explanation of the capability level profiles required for each maturity level rating.

To determine a maturity level as an output of the appraisal, the model scope of the appraisal must include the minimum set of process areas required by the appraisal reference model.

Implementation Guidance This activity may be omitted entirely, as it is a tailoring option. If a maturity level is to be reported, the process area ratings that form the basis for the maturity level rating are derived as described in activity 2.6.2, Determine Process Area Ratings.



2.6.5 Document Appraisal Results

Activity Description The results of conducting the appraisal are documented for reporting. Verbal reports of the rating outcomes or oral explanations of implementation weaknesses discovered by the team are not sufficient to communicate appraisal results.

Required Practices The appraisal team shall document the following:

- document the final findings
- document the rating outcome(s)
- document the appraisal disclosure statement

Parameters and Limits The appraisal disclosure statement and the set of appraisal outputs agreed on with the appraisal sponsor must be documented.

The appraisal disclosure statement, the goal ratings, and the associated findings must be documented as a part of the appraisal information returned to the SEI.

Implementation Guidance This activity is focused on collecting and documenting the results of activities related to the generation of findings and ratings. Depending on who will receive the results, multiple forms of the results may be needed. Certain data may not be appropriate for all audiences, or the style and language of the results may need to be adjusted to best fit the needs of the recipients.

The documented appraisal results are typically provided in a final findings presentation, described in activity 3.1.1, Deliver Final Findings.



3 Report Results

3.1 Deliver Appraisal Results

Purpose	Provide credible appraisal results that can be used to guide actions. Represent the strengths and weaknesses of the processes in use at the time. Provide ratings (if planned for) that accurately reflect the capability level or maturity level of the processes in use.
Entry Criteria	<ul style="list-style-type: none">• Objective evidence has been verified (through the team process).• Preliminary findings have been validated.• Ratings have been determined (for model components selected for rating).• Final findings have been created and reviewed by the team.
Inputs	<ul style="list-style-type: none">• appraisal data• final findings• ratings• appraisal artifacts• appraisal plan
Activities	3.1.1 Deliver Final Findings 3.1.2 Conduct Executive Session(s) 3.1.3 Plan for Next Steps
Outputs	<ul style="list-style-type: none">• documented final findings• final report (if requested)• recommendations report (if requested)• process improvement action plan (if requested)
Outcome	<ul style="list-style-type: none">• The sponsor and the appraised organizational unit are provided with the results of the appraisal.• A valid and reliable characterization of the current state of the processes in use across the organizational unit is documented.
Exit Criteria	<ul style="list-style-type: none">• Appraisal results are delivered to the appraisal sponsor and organizational unit.• An executive session is conducted, if appropriate.

3.1 Deliver Appraisal Results

Key Points	The appraisal results are intended to support decision making, and should be delivered in a way that promotes appropriate actions. Whether the appraisal was conducted for internal process improvement, supplier selection, or process monitoring purposes, the delivery of results should facilitate the actions that will be driven by the information.
Tools and Techniques	Templates containing standard information for use in a final findings briefing are provided to all SCAMPI Lead Appraisers. Experienced appraisal team leaders frequently use electronic (database) tools that support the transformation of raw appraisal data into appraisal results. These tools may be useful in real time as appraisal results are presented. Strategies for presenting and packaging the results should leverage presentation and documentation techniques that best suit the audience.
Metrics	It is highly recommended that the attendance at the final briefing (if one is held) be recorded. Significant absenteeism of key stakeholders is likely to be an indication of risk for future success in addressing the appraisal findings.
Verification and Validation	The required elements of appraisal results are specified in the activity description found here, and a checklist can support verification that these elements are present. Validation of this activity can only occur after the appraisal is complete.
Records	<ul style="list-style-type: none">• final findings• final report (if requested)• recommendations report (if requested)• process improvement action plan (if requested)

3.1 Deliver Appraisal Results

Interfaces with Other Processes

Upon completion of the Generate Appraisal Results process, the ratings and findings generated are used to prepare and deliver the final appraisal results to the appraisal sponsor and organizational unit. The appraisal results become part of the appraisal record, which is discussed in process 3.2, Package and Archive Appraisal Assets.

Summary of Activities

The final findings contain the validated strengths, weaknesses, and ratings (as defined by the appraisal plan), reflecting the organizational process capability and/or maturity level for process areas within the appraisal scope. Other appraisal outputs, as requested by the appraisal sponsor and documented in the appraisal plan, are generated and provided. Optionally, a separate executive session may also be held to clarify and discuss the appraisal results from a senior management perspective that facilitates decision making. Plans are established for acting on the appraisal results.



3.1.1 Deliver Final Findings

Activity Description

The final findings contain a summary of the documented strengths and weaknesses for each process area within the appraisal scope, as well as additional information that provides context for the findings. The generation of the findings is addressed in activity 2.6.1, Derive Findings and Rate Goals; this activity relates to the delivery of these findings to the appraisal sponsor and appraised organization. These findings may be in a summarized form, with the detailed findings provided as backup information, and is often presented using view graphs in a meeting room or auditorium.

In addition to the final findings, a draft appraisal disclosure statement summarizing the results of the appraisal is provided to the appraisal sponsor.

Required Practices

The appraisal team shall

- provide appraisal final findings, signed by the appraisal team leader and all appraisal team members, to the appraisal sponsor
- provide an appraisal disclosure statement to the appraisal sponsor summarizing the appraisal results and conditions under which the appraisal was performed. Use the appraisal disclosure statement template provided by the SEI. The appraisal disclosure statement must be signed by the appraisal team leader and appraisal sponsor.

Parameters and Limits

Required elements of the final findings include

- a summary of the appraisal process
- the findings (i.e., summary of documented strengths and weaknesses)
- signed verification that the appraisal team leader and all appraisal team members agree with the findings and any ratings reported

Appraisal team consensus must be obtained on the wording of the final findings, to ensure that the whole team supports the accuracy of the described appraisal results.

The team, when delivering the final findings, must adhere to some important principles:

- If a model component is reported as Unsatisfied, the corresponding findings of weaknesses that caused the team to make that judgment must also be reported.
 - Confidentiality and non-attribution principles apply to statements made in the presentation of final findings.
-

3.1.1 Deliver Final Findings

Implementation Guidance The appraisal disclosure statement is a summary statement describing the appraisal results that includes the conditions and constraints under which the appraisal was performed. It contains information considered essential to adequately interpret the meaning of assigned maturity level or capability level ratings. The appraisal disclosure statement is prepared by the appraisal team leader and provided to the appraisal sponsor.

The appraisal disclosure statement is considered a draft at this stage of the appraisal process, in that it also contains an affirmation that all appraisal requirements have been satisfied, which cannot be claimed until the completion of all appraisal activities.

A template for a final findings briefing, describing its typical contents and format, is provided to SCAMPI Lead Appraisers as a work aid by the SEI.

Findings include a summary of strengths and weaknesses determined for each process area within the appraisal reference model scope. This summary may also include global findings that apply across multiple process areas, and non-reference model findings that affect the implementation (positively or negatively) of associated processes within the organizational unit.

Normally, the appraisal team leader presents the final findings. In some applications of the method for internal process improvement, the team may elect to have an appraisal team member from the organizational unit provide the briefing to encourage the acceptance of the final findings and ownership of the appraisal results for follow-on action.

As a courtesy, the appraisal team can consider informing the appraisal sponsor and/or the senior site manager of the appraisal results prior to presenting them publicly in the final findings briefing. This private briefing may help them avoid surprises and obtain feedback on ways to present the findings that best meet the needs of the sponsor, appraisal participants, and the organizational unit. See activity 3.1.2, Conduct Executive Session(s) for a description of topics for discussion.

If virtual methods, such as video conferences, teleconferences, or other similar technology are used for the final findings presentation, the appraisal team leader should ensure that these methods in no way compromise the integrity of the appraisal.

The number and scope of findings reported will affect the impact of appraisal results, whether or not the team intends for it to happen. There are times when providing a long list of details is beneficial. Other times, high-level summaries are more appropriate.



3.1.2 Conduct Executive Session(s)

Activity Description The executive session is an optional activity that may be performed at the discretion of the appraisal sponsor or senior site manager. The executive session provides the appraisal sponsor, senior site manager, and invited staff a private opportunity to (a) discuss with the appraisal team leader any issues with the appraisal, (b) obtain clarification of the appraisal results, (c) confirm understanding of the process issues, and (d) provide guidance regarding focus, timing, and priorities of the recommendations report and follow-on activities.

Required Practices If the option is selected, hold a private meeting between the appraisal team leader and the sponsor, including any participants invited by the sponsor.

Parameters and Limits If an executive session is conducted, the confidentiality and non-attribution of data sources must be maintained.

Implementation Guidance The intent of the executive sessions is to ensure that the appraisal sponsor and/or the senior site manager have a sound understanding of the appraisal results. Any feedback obtained from these executive sessions should be recorded. All rules for confidentiality and non-attribution are still in effect.



3.1.3 Plan for Next Steps

Activity Description	<p>Following the delivery of the appraisal results, a plan for follow-on activities is determined. The planned follow-on activities are typically defined in the appraisal plan, reflecting sponsor requests for additional appraisal tasks and products necessary to meet appraisal objectives, or for a commitment to take action on the appraisal results. Follow-on activities may include</p> <ul style="list-style-type: none">• development of a final report• development of a recommendations report or briefing• generation or update of a process improvement plan
Required Practices	None
Parameters and Limits	None
Implementation Guidance	<p>Planning for next steps includes optional activities such as</p> <ul style="list-style-type: none">• development of a final report by the appraisal team, summarizing the appraisal results for delivery to the appraisal sponsor• submission of appraisal team recommendations report for action on the appraisal findings• generation of a process improvement action plan for the organizational unit to act on the appraisal findings <p>In addition to specifying the activities to be performed, these plans usually include the assignment of responsibility, schedule, and estimated resources for the implementation of the follow-on actions. The plans established can be used to track the progress of the follow-on activities over time.</p>
Implementation Guidance	<p>Findings and recommendations from the appraisal team can be used by the organizational unit to establish action plans for process improvement. This use of findings and recommendations is an optional output most often used in internal process improvement or process-monitoring applications of the appraisal method.</p>
Process Improvement Action Planning	<p>Recommendations reports often include a prioritized list of improvement activities, including the development of an improvement plan that defines the tasks, schedules, and resources necessary for implementation.</p> <p>Follow-on appraisals are usually performed to verify improvement progress. A follow-on appraisal might include a combination of Class A, Class B, and Class C appraisals (refer to the ARC for additional details).</p>

3.1.3 Plan for Next Steps

Implementation Guidance

Final Report

The purpose of the final report is to provide details or explanations beyond what was contained in the final findings. The generation of an appraisal final report is an optional activity that, if requested by the appraisal sponsor, documents the execution of the appraisal, contains detailed appraisal findings, and forms a basis for action planning. This baseline is used for subsequent reports and follow-on actions, and also may be an input for use in subsequent appraisals.

Items contained or referenced in the final report, either in their entirety or as a subset, might include

- executive summary of the appraisal process and results
- appraisal plan (see process 1.2, Develop Appraisal Plan)
- appraisal record (see process 3.2, Package and Archive Appraisal Assets)

The final report should be completed as soon after the appraisal as possible, preferably within four weeks. The appraisal team leader usually generates the final report; other team members may also contribute.

The format and content of the final report may vary according to its intended use by the appraisal sponsor. In its simplest form, this final report could be a set of notes annotated to the final findings, elaborating on some aspect of the findings or capturing essential comments or recommendations from the appraisal team.

Implementation Guidance

Recommendations Report

If requested by the appraisal sponsor, appraisal team recommendations for taking action on the appraisal results can be provided in a report. These recommendations can provide momentum to the appraisal follow-up by serving as a link between the appraisal findings and subsequent decision making or action plans. The emphasis of these recommendations depends on the appraisal sponsor's objectives and planned use of the appraisal results, as defined in the appraisal plan. This emphasis can vary widely based on the context in which the appraisal method is applied (i.e., internal process improvement, supplier selection, or process monitoring).

The recommendations report should be completed as soon after the Conduct Appraisal phase as possible. Depending on the nature, complexity, and use of the recommendations, this report may take as long as two months to produce.

Rather than generate a separate recommendations report, a common alternative is to include these recommendations in the final findings or final report.

It is important to consider the possibility that the expertise needed for making the appropriate recommendations may be beyond the level of expertise reflected on the team.



3.2 Package and Archive Appraisal Assets

Purpose	Preserve important data and records from the appraisal, and dispose of sensitive materials in an appropriate manner.
Entry Criteria	<ul style="list-style-type: none">• The appraisal has been conducted.• Results have been delivered to the sponsor.• All appropriate data have been collected and retained during the appraisal.
Inputs	<ul style="list-style-type: none">• appraisal data<ul style="list-style-type: none">– appraisal plan– final findings– objective evidence– signed appraisal disclosure statement• appraisal team artifacts<ul style="list-style-type: none">– notes– documented practice implementation gaps– preliminary findings– objective evidence
Activities	<ul style="list-style-type: none">3.2.1 Collect Lessons Learned3.2.2 Generate Appraisal Record3.2.3 Provide Appraisal Feedback to the SEI3.2.4 Archive and/or Dispose of Key Artifacts
Outputs	<hr/> <ul style="list-style-type: none">• appraisal data package• appraisal record• completed forms and checklists• sanitized data (as appropriate and agreed upon during planning)• lessons learned (appraisal team, organization)
Outcome	Data and artifacts are appropriately archived or destroyed. The team has captured lessons and data to help improve the appraisal process. Requirements for providing appraisal artifacts to stakeholders and the SEI are met.
Exit Criteria	<ul style="list-style-type: none">• Appraisal assets are baselined and archived.• Required reports are delivered to the appropriate stakeholders.• Artifacts containing sensitive information are disposed of in an appropriate manner.

3.2 Package and Archive Appraisal Assets

Key Points	Protect the confidentiality of sensitive data while distributing and archiving appraisal assets. Bundle related information together whenever appropriate.
Tools and Techniques	<p>The use of electronic (database) tools for managing appraisal data often provides assistance in ensuring the integrity of baselines, as well as repackaging information for archival purposes. Electronic tools allow the appraisal team leader to remove traceability information so that data can be provided to the appropriate people while preserving the anonymity of the data sources.</p> <p>Electronic tools also support the submission of appraisal data to the SEI. This use of electronic tools reduces the administrative burden and facilitates the analysis of appraisal method performance data. These tools also provide feedback on the consolidated analysis results to the appraisal community.</p>
Metrics	While archiving and reporting the metrics associated with the conduct of the appraisal is an important element of this activity, the metrics associated with the conduct of this activity itself are limited. The effort and calendar time consumed are collected and compared to the plan. Some appraisal team leaders will choose to maintain personal metrics associated with the artifacts described in this activity.
Verification and Validation	<p>The Required Practices section of activity 3.2.2, Generate Appraisal Record, guides the verification of the list of artifacts provided to the sponsor.</p> <p>The Required Practices section of activity 3.2.3, Provide Appraisal Feedback to the SEI to the SEI, guides the verification of the list of artifacts provided to the SEI. Validation is provided by the SEI upon receipt of the appraisal data package.</p>
Records	<ul style="list-style-type: none">• appraisal record• appraisal data package• lessons learned

3.2 Package and Archive Appraisal Assets

Interfaces with Other Processes

As the final process in the appraisal, this process is about collecting, packaging, and archiving those results and artifacts produced by previous processes that become part of the appraisal record. Most notably, this collection of information includes the appraisal plan and appraisal results. Additionally, sensitive or proprietary data produced by other appraisal processes must be returned to the organizational unit or destroyed.

Summary of Activities

This process performs the data collection, data management, and reporting activities necessary to close out the appraisal. Data collected throughout the appraisal is consolidated and baselined, becoming a permanent part of the appraisal record.



3.2.1 Collect Lessons Learned

Activity Description As one of the final activities in wrapping up an appraisal, teams typically record lessons learned from their experience. The purpose of these lessons learned is to document what went right, what went wrong, and any suggestions or recommendations for improving the method or its execution. The collection of lessons learned is a recommended activity for the improvement of future appraisals, but is not a method requirement.

Required Practices None

Parameters and Limits Lessons learned must adhere to the same principles of confidentiality and non-attribution applicable to other appraisal results.

Implementation Guidance Capturing lessons learned is often done as a group at the end of the appraisal, while the appraisal activities are fresh in team members' minds. This collection of lessons learned can be supplemented with additional inputs from team members upon further reflection, if necessary. Appraisal team leaders forward these aggregate lessons learned, as appropriate, to various stakeholders, but always to the other team members. Appraisal team leaders and members often maintain summary lists of appraisal best practices and lessons learned as a mechanism for continuous learning and improvement, and these lists are used as a resource for planning subsequent appraisals.



3.2.2 Generate Appraisal Record

Activity Description Appraisal data collected throughout the appraisal is aggregated and summarized into a permanent record documenting the appraisal conduct and results. This collection of data is referred to as the appraisal record and is delivered to the appraisal sponsor for retention.

Required Practices

The appraisal team leader shall

- collect and baseline appraisal data that becomes part of the permanent records provided to appraisal stakeholders
 - document the satisfaction of all SCAMPI A requirements
 - generate the appraisal record from baselined planning and execution data collected throughout the appraisal
 - deliver the appraisal record to the appraisal sponsor
-

3.2.2 Generate Appraisal Record

Parameters and Limits

Required contents of the appraisal record include the following:

- appraisal plan
- objective evidence, or identification thereof, sufficient to substantiate goal-rating judgments
- characterizations of practice implementation determined at the instantiation level and aggregated at the organizational unit level
- identification of the appraisal method (and version) used along with any tailoring options
- final findings
- goal level ratings
- all optional ratings rendered during the appraisal (Process Area ratings, capability levels, maturity levels, etc.)
- appraisal disclosure statement

Appraisal data must comply with rules for non-attribution, confidentiality, protection of proprietary information, and applicable laws, regulations, or standards (e.g., acquisition regulations or security classification). Recipients are expected to place the appropriate limitations on the access and use of the provided appraisal data.

The appraisal team leader documents in the appraisal disclosure statement that all SCAMPI A requirements were satisfied.

3.2.2 Generate Appraisal Record

Implementation Guidance The actual objective evidence (artifacts or portions of artifacts) need not be part of the appraisal record, but an identification of the objective evidence is required. This identification may be implemented by providing the database of objective evidence mapped to model practices that were used as the basis for characterizing practice implementation.

Guidance on the protection of appraisal data can be summarized based on the recipient of the data as follows:

- appraisal sponsor: Replacement of specific sources (persons, basic units, support functions) with non-attributable, general identifiers (e.g., numeric codes assigned to basic units, support functions, roles, or data-gathering sessions). If the sponsor is separate from the appraised organization (e.g., in the case of a supplier selection context), there may be situations where confidential or proprietary data relating to the appraised organization must be removed.
- SEI: Same as for appraisal sponsor, for data that is shared by both. For data that is provided only to the SEI, the data collection vehicles (e.g., forms) are already designed to observe non-attribution and confidentiality rules. Additionally, supplied data may be subject to further sanitization to comply with acquisition or security-related restrictions.
- senior site manager: In cases where the appraised organizational unit is separate from the appraisal sponsor, the appraised organization is typically provided only with appraisal results and not data related to planning and decision making, or data that makes use of the results.



3.2.3 Provide Appraisal Feedback to the SEI

Activity Description	Appraisal data required by the SEI is collected and reported. This data includes a subset of the contents of the appraisal record, as well other data used by the SEI to aggregate and analyze appraisal performance data for reporting to the community and monitoring the quality of performed appraisals.
Required Practices	<p>The appraisal team leader shall</p> <ul style="list-style-type: none">• submit the completed appraisal data package as required by the SEI <p>The appraisal data package consists of</p> <ul style="list-style-type: none">• approved appraisal disclosure statement• approved appraisal plan• the final findings presentation or report
Parameters and Limits	The SEI defines the specific set of data required for submission at the completion of an appraisal. Submission of the appraisal data package is required for the appraisal to be recorded in the SEI’s database of appraisal results. This data is also a requirement established by the SEI to maintain SCAMPI Lead Appraiser authorization.
Implementation Guidance	<p>The appraisal team leader is responsible for ensuring that the appraisal data package is collected and reported. The SEI, as custodian of the product suite and the Appraisal Program, has several objectives in seeking appraisal feedback:</p> <ul style="list-style-type: none">• characterization of the state of the practice in the appraisal community, for the collection and distribution of effective appraisal techniques• analysis of reported appraisal data to obtain an understanding of appraisal performance for continuous improvement• quality control within the Appraisal Program, to ensure a high level of confidence in the accuracy of appraisal results <p>The SEI provides approved information within the bounds of confidentiality to the community, based on results from the appraisal data collected. The SEI establishes the format and mechanisms for the presentation of this information.</p>



3.2.4 Archive and/or Dispose of Key Artifacts

Activity Description After the various reports are delivered to the appropriate stakeholders and the appraisal assets have been baselined, the appraisal team leader is responsible for properly archiving and/or disposing of the appraisal data, in accordance with agreements made with the sponsor and documented in the appraisal plan. The team librarian (if one is used) ensures that all organization-provided documentation and objective evidence is returned or disposed of properly. Any remaining team artifacts or notes are disposed of properly.

- Required Practices** The appraisal team leader shall
- archive or dispose of key artifacts collected by the appraisal team
 - return objective evidence provided by the organizational unit

Parameters and Limits In all usage modes of SCAMPI A, strict non-attribution policies apply. Confidentiality and non-disclosure agreements established with the appraisal team members remain in effect.

3.2.4 Archive and/or Dispose of Key Artifacts

Implementation Guidance How the records will be preserved or disposed of is dependent on the usage mode of the method and the appraisal objectives that shape the current application. Confidentiality rules may differ by application. In a supplier selection usage, the results are not proprietary in that the sponsor is not a member of the appraised organization. However, results are only known to the sponsor and the recipient; competing organizations do not see the results. Confidentiality of results can be characterized as one of the following:

- known only to the recipient organization
- known to the recipient and sponsor, when they are from different organizations
- known to anyone

The sponsor is solely responsible for determining the confidentiality with which the appraisal results will be maintained. The non-attribution of data to specific individuals is the responsibility of the appraisal team. The recipient organization, if the sponsor agrees and it is planned for, may always choose to make the results known outside the organization. At a high level, this disclosure might be done for marketing and public relations reasons. Disclosures of results include the context and constraints under which the appraisal was performed (e.g., appraisal reference model scope and organizational scope), as defined by the appraisal disclosure statement described in process 3.1, Deliver Appraisal Results.

Any annotations related to the objective evidence provided to the organization by the appraisal team should be recorded and archived for use in process improvement actions or for reuse in subsequent appraisals.



Part III: Appendices, References, and Glossary

Appendix A The Role of Objective Evidence in Verifying Practice Implementation

Purpose

This appendix provides a conceptual overview of the process of verifying practice implementation and the role of objective evidence in that process. Verification of practice implementation is an essential element of appraising the implementation of processes relative to models of best practices such as the CMMI constellations and the People CMM.

Verifying Practice Implementation

In this discussion, verifying practice implementation means the substantiation of practice implementation based on a review of objective evidence. For example, one might inquire as to whether a practice implemented by multiple basic units is substantiated by objective evidence for each basic unit. Alternatively, one might inquire as to whether an organization-specific practice is implemented within an organization.

Having a well-defined approach for verifying practice implementation is of critical importance from several perspectives. For the process improvement sponsor, it provides some assurance that the resources applied to the improvement effort will result in the desired outcome and that the resultant benefits can therefore be expected. For process improvement agents or champions, it enables them to know when they have succeeded with the implementation activity, and to informally monitor whether the practice continues to be implemented over time. For appraisal teams, a well-defined verification approach is essential for determining what capability level or maturity level ratings are warranted. Goal satisfaction is predicated on implementation of the relevant practices (or acceptable alternatives). Hence verification of practice implementation is a crucial appraisal task.

Determining Practice Implementation

The conduct of an activity or the implementation of a practice will result in “footprints”—evidence that the activity was conducted or the practice was implemented.

For example, if one balances one’s checkbook at the end of the month, there are several potential ways to confirm that this activity has indeed taken place. First, the person who engaged in the checkbook balancing activity can affirm that this activity was conducted. Second, there will likely be an entry in the checkbook register for each check or transaction to indicate that it matches with a corresponding entry in the bank’s statement. Additional artifacts could be identified.

The general idea is clear: the actual conduct of an activity leaves footprints that provide a basis for verification.

Objective evidence refers to the footprints that are the necessary and unavoidable consequence of practice implementation. They include information contained in artifacts and affirmation gathered from interviews with managers and practitioners.

The Role of Objective Evidence

ARC-compliant appraisal methods employ one or more types of objective evidence¹. An appraisal team bases its decisions about practice implementation on examination of this objective evidence.

Once a basic unit or support function has an understanding of how its processes relate to the reference model, the stage is set for capturing the objective evidence of implementation. The work of establishing the collection of objective evidence for basic units and the support functions mapped to model practices provides assurance to the process improvement sponsor that the expected implementation activities have in fact resulted in alignment of the organization's activities with the reference model.

This database of objective evidence is itself an important organizational process asset that has a number of potential uses, most notably providing an appraisal team a head start in understanding the organization's implementation of the reference model. This approach leaves the appraisal team the task of verifying whether the objective evidence provided is adequate for substantiation of practice implementation, rather than the more difficult, error prone, and time-consuming task of investigating each practice to discover the objective evidence needed to substantiate implementation.

Both the appraised organization and the appraisal team have a clearer picture of what artifacts must be provided to substantiate implementation of the practices, thereby minimizing the amount of further investigation necessary in the form of affirmations and additional artifact requests. The extent to which the appraised organization can provide this information becomes a principal factor in how much further investigation may be required.

Another benefit of this approach is significantly greater reliability and accuracy of appraisal.

Populating a database of objective evidence mapped to model practices is not meant to turn the appraisal into an artifact review exercise. It merely allows for more focused and effective use of the on-site phase and potentially a shorter on-site phase than would otherwise be the case.

Finally, the populated database is not intended to tie the hands of model implementers or process appraisal teams. The primary value of the populated database lies in making explicit what has heretofore been implicit and therefore subject to wide variations in interpretation and understanding. Over time, sharing of populated databases will result in a set of practice implementation scenarios (e.g., small, medium, and large organizations, work groups or projects) and a standard set of populated databases that could be used as a starting point for further customization. The particular process implementation context and the specifics of the instantiation would determine which objective evidence makes sense for that implementation. Appraisal teams would be obliged to inquire into the existence of the agreed-upon objective evidence, while still having the freedom to make judgments based on the facts and circumstances of the implementation.

¹ The ARC defines objective evidence as "qualitative or quantitative information, records, or statements of fact pertaining to the characteristics of an item or service or to the existence and implementation of a process element, which are based on observation, measurement, or test and are verifiable."

A standard set of objective evidence could establish norms within which most implementations will fall, thereby allowing efficiencies to be realized in implementation and appraisal, while at the same time recognizing that alternative implementations may be possible using alternative practices.

Types of Objective Evidence

An appraisal team bases its decisions about practice implementation on the existence of objective evidence available to it. This objective evidence can take on one or more of the following types:

- **artifacts:** tangible forms of objective evidence indicative of work being performed that represents either the primary output of a model practice or a consequence of implementing a model practice
- **affirmations:** oral or written statement confirming or supporting implementation (or lack of implementation) of a model practice provided by the implementers of the practice, provided via an interactive forum in which the appraisal team has control over the interaction. demonstrations or presentations (e.g., the demonstration of capability of a tool or other mechanism as it relates to the implementation of a practice, or a presentation explaining some aspect of the organization or one or more of its basic units)

Objective Evidence Database

An objective evidence database is a structure or schema defined to provide a repository, or links to a repository, for the objective evidence and corresponding mapping to model practices. Table 12 shows an example of such a structure. Note that this example is a notional description of the content, not a physical definition of the format.

Table 12: An Objective Evidence Database Schema

Attribute	Synopsis	Remarks
Practice ID	This ID identifies the process area, goal, and practice that the objective evidence is associated with.	Acronyms are found in the reference models.
Objective Evidence ID	This ID identifies the type of objective evidence.	Types are artifact and affirmation.
Description	This attribute is a description of the objective evidence as applied to this practice.	
Examples	These attributes are examples of artifacts or affirmations that would exemplify the intent of the objective evidence and/or exploratory questions (EQs) or “look fors” (LFs). They assist appraisers in identifying relevant artifacts or eliciting relevant information.	Aim to minimize any overlap with such information that is already in the model document.
Organizational Implementation	This attribute would be filled in by the organization as part of its implementation program and provided to the appraisal team as a resource.	

Table 13 shows an example objective evidence database entry for specific practice 1.1 for CMMI-DEV of the Project Planning process area:

Table 13: Sample Database Record Structure

Attribute	Value
Practice ID	PP SP 1.1
Objective Evidence ID	Artifact
Objective Evidence Description	Work product(s) that reflect (document the information content of) the establishment of a top-level work breakdown structure (WBS) to estimate of the scope of the project.
Organizational Implementation	To be provided by the organization for a specific implementation

These descriptions have a number of uses in addition to their utility during process appraisal. They can be used during the model implementation phase, after model implementation as a training vehicle for new personnel, for internal monitoring of practice implementation, etc.

Application of Objective Evidence Databases in Model Implementation

The use of objective evidence has significant utility for an organization that is committed to model-based process improvement. Typically, organizations will either implement model practices directly or will ensure that the practices used in the organization affect goal achievement (through the mechanism of alternative practices).

Since models are necessarily expressed in an implementation-independent manner, the implementation of a model will require that an understanding of how the model intent (as expressed through goals, practices, and other model material) is to be realized in the organization be developed, documented, and operationalized. The model intent is made real through its impact on the way people work; if there is no relation between how they work and the model, the organization has not implemented the model. Thus, having an understanding of the ways in which implementation of the model relates to what people are doing in the organization is a necessary and unavoidable prerequisite to implementing the model. Objective evidence databases provide a mechanism by which the implementation of a model practice can be described.

Application of Objective Evidence Databases in Process Appraisal

During the course of process appraisal, the appraisal team's primary focus is on verifying practice implementation. This verification is accomplished by (1) obtaining objective evidence relevant to the implementation of a practice, (2) comparing the objective evidence available with what is expected, and then (3) making a determination of practice implementation based on the difference between actual and expected evidence.

The database assists the appraisal team (as well as the implementing organization) with task 1 by *providing a framework or structure that makes explicit the types of objective evidence that should be considered*. In concert with the reference model documentation, this framework provides the model basis against which the organization's actual operating practices are compared.

Note that the database does not prescribe what objective evidence must be present for practice implementation determinations to be made; they only make explicit what is reasonable for an appraisal team to consider. The particular circumstances and attributes of the instantiation must be taken into consideration when making determinations of practice implementation.

The database structure assists the appraisal team with task 2 to the extent that the team has agreed in advance on the objective evidence it *expects* to see for each process instantiation examined. In some cases it may be difficult or impossible to have completely developed a team consensus on what objective evidence must be seen (in advance). But sooner or later the appraisal team must establish a consensus view on what is reasonable to expect, since it is only the presence of that consensus view that permits a determination of practice implementation to be made.

The final practice implementation determination task is that of developing a team consensus on whether the practice is implemented for the process instantiation being examined. This decision is based on the difference between what is expected and what is observed.

Appendix B Alternative Practice Identification and Characterization Guidance

Concept Description

This appendix provides guidance on how to identify acceptable alternatives to practices documented in the reference models and how to perform practice characterization at the instantiation and organizational unit levels when acceptable alternative practices are implemented in lieu of model practices.

The MDD Glossary includes the following definition of “alternative practice”:

A practice that is a substitute for one or more practices contained in a reference model that achieves an equivalent effect toward satisfying the goal associated with the model practice. Alternative practices are not necessarily one-for-one replacements for the model practices.

Analysis and use of alternative practices in SCAMPI A appraisals involves the following activities:

- identifying which model practices appear to be implemented using an alternative practice, and analyzing whether or not the alternative practice does indeed achieve an effect equivalent to that achieved by the model practices toward satisfying the associated goal
- developing an instantiation-level characterization of the implementation of the alternative practice by determining whether the provided evidence includes appropriate artifact(s) or affirmations for the practice
- applying the instantiation-level characterization of the alternative practice to the model practice(s) addressed
- aggregating all of the instantiation-level characterizations to derive the organizational unit-level characterizations and generating findings and goal ratings, just as is performed when an alternative practice has not been used

Identification of Acceptable Alternative Practices

Technically, alternative practices can be discovered at any time during an appraisal, up to and including when the appraisal team is analyzing feedback from validation of the preliminary findings. However, in most cases, alternative practices are uncovered during the appraisal planning and preparation activities. Typically, they are either communicated to the appraisal team lead by the organizational unit during appraisal planning discussions or are discovered by the appraisal team in the early examinations of objective evidence. For example, little or no evidence might be found for a given model practice or set of related model practices, but evidence for an alternative practice might be uncovered when the initial data set is analyzed (activity 1.4.2, Inventory Objective Evidence) or when a readiness review is conducted (activity 1.5.1, Perform Readiness Review).

The alternative practice is not acceptable until the appraisal team agrees that it does indeed achieve an effect equivalent to one or more model practices. To do so, the team must first analyze the alternative practice for its content to identify which model practice(s) it addresses. The appraisal team then must determine what effect is achieved by the implementation of the addressed model practice(s) toward goal satisfaction. This determination is more than simply what work product(s) might be developed as a result of implementation of the model practice(s).

What is achieved, supported, and/or enabled as a result of implementation of the practice(s) and generation of the work product(s)? What information becomes available, when, and to whom? Once these questions and any others the team deems appropriate are answered, the team would need to decide whether the alternative practice achieves the same or similar results or just-as-effective results for the given business environment. If it does, then it achieves an equivalent effect toward satisfying the goal associated with the original model practice(s) and can be considered an acceptable alternative.

As noted above, an alternative practice is not necessarily a one-for-one replacement for a given model practice. In some cases, an alternative practice might only partially address one or more model practices. In such cases, the alternative practice should be analyzed in conjunction with the associated model practice. The combined implementation could be acceptable. In other cases, an alternative practice might consist of multiple elements, all or some of which appear to address one or more related model practices. The separate elements would need to be examined to ensure that the aggregate of those elements achieves effect(s) toward goal satisfaction equivalent to the effect(s) achieved by the addressed model practice(s).

Instantiation-Level Characterization of Alternative Practices

Once an alternative practice has been approved as acceptable by the appraisal team, its implementation can be characterized at the instantiation level. The same rules are used for alternative practices as those applied to model practices (see the first table in the Parameters and Limits section for activity 2.4.2, Characterize Implementation of Model Practices and Generate Preliminary Findings). However, the team must determine what artifacts should logically be expected from implementation of the alternative practice. Particular attention needs to be paid to whether more than one type of objective evidence might be needed to cover the complete implementation approach. This situation could occur especially when an alternative practice

- addresses more than one model practice
- provides only partial coverage of a model practice and is combined with the remaining aspects of that model practice to create an acceptable alternative practice
- consists of multiple elements

After the appraisal team decides what artifacts it should expect to see, the team can examine the evidence provided to determine its adequacy and coverage of the alternative practice to characterize the implementation of that practice.

Instantiation-Level Characterization of the Associated Model Practice(s)

Typically, the characterization of the alternative practice is applied directly to the addressed model practices. This characterization is straightforward in cases where the alternative practice addresses a single model practice. However, in cases where an alternative practice addresses more than one model practice, the characterizations of the model practices may vary depending on the weaknesses documented for the alternative practice and whether the evidence provided fully covers the alternative practice or not. The weaknesses associated with the alternative practice might apply to only some of the addressed model practices. For example, in a case where an alternative practice is characterized as Largely Implemented or Partially Implemented, some of the addressed model practices could still be characterized higher if none of the weaknesses apply to those model practice(s) and the provided evidence is adequate for those practices.

Organizational Unit-Level Characterization and Goal Rating

Once the addressed model practices have been characterized at the instantiation level, aggregation of the instantiation-level practice characterizations proceeds just as is documented in the second table in the Parameters and Limits for activity 2.4.2, Characterize Implementation of Model Practices and Generate Preliminary Findings. In addition, goal rating is performed just as is documented in activity 2.6.1, Derive Findings and Rate Goals.

Appendix C Roles and Responsibilities

Appraisal Team Lead and Members

Appraisal team members are individuals who are on the appraisal team during the onsite period. “R” indicates the responsibility is required. “O” indicates the responsibility is optional. During appraisal planning, the appraisal team leader should determine which optional roles and responsibilities will be required for the appraisal. Mini-teams, facilitator and time keeper roles are not specifically required by name, however, the responsibilities associated with the roles (as indicated by R) are required to be performed by the appraisal team.

Table 14: Appraisal Team Roles and Responsibilities

Role	Responsibility	Required/Optional
Appraisal Team Leader	For each appraisal, there is exactly one appraisal team leader. The appraisal team leader must be an SEI-certified SCAMPI leader appraiser for each reference model in scope, and must be affiliated to the SEI partner that is responsible for the appraisal.	R
	Has overall responsibility for the appraisal	R
	Meets with the sponsor prior to the appraisal to discuss appraisal scope and other appraisal planning parameters	R
	With the support of the appraisal coordinator, determines process areas that are not applicable or out of scope	R
	With the support of the appraisal coordinator, selects basic units from sub-groups	R
	With the support of the appraisal coordinator, creates and completes the appraisal plan and detailed schedule	R
	Signs the appraisal plan	R
	Meets with the sponsor to discuss outcomes of the readiness review and jointly decides whether the appraisal should proceed as planned, be re-scheduled, or be cancelled	R
	Provides appraisal participants an overview of the appraisal process and schedule	R
	Assigns team roles	R
	May be a member of a mini-team; however, due to additional responsibilities as the appraisal team leader, mini-team responsibilities may be reduced or delegated to other appraisal team members	O
	Facilitates team resolution of conflicts and impasses	R
	Monitors schedule and performance	R
	Votes on appraisal outcomes	R
Ensures the SCAMPI appraisal process is followed	R	

Role	Responsibility	Required/ Optional
	Delivers the preliminary findings	R
	Ensures the final findings are delivered	R
	Signs the final findings and the appraisal disclosure statement	R
	Reports results to the SEI	R
Mini-Teams or appraisal team members	The appraisal team members are typically assigned to mini-teams in groups of two to three members each. Mini-teams are typically organized by related process areas (e.g., process area categories), organizational entities or by discipline and appraisal experience.	O (use of mini-teams is optional)
	Reviews evidence for their assigned process area or basic unit/support function	R
	Requests additional evidence needed relative to their process areas or basic units/support function	R
	Records review results pertaining to their process areas or basic units/support functions	R
	Consolidates findings prior to full team consolidation	R
	Votes on appraisal outcomes	R
	Signs the final findings	R
Facilitator	This role is typically assigned to the appraisal team lead or an appraisal team member for each affirmation session. The individual may differ between affirmation sessions.	R
	Ensures interviewees are aware of confidentiality and non-attribution rules	R
	Conducts affirmations	R
	Ensures appraisal team members take notes during the affirmations	R
Timekeeper	This role is typically assigned to an appraisal team member.	O
	Tracks time and schedule constraints during affirmations and other activities	O

Other Appraisal Participants

Other appraisal participants are individuals who may support the appraisal prior to, during, and after the onsite period; however, they are not on the appraisal team. “R” indicates the responsibility is required. “O” indicates the responsibility is optional. During appraisal planning, the appraisal team leader and “appraisal coordinator” should determine which optional responsibilities will be required for the appraisal. The responsibilities of the Appraisal Coordinator may be fulfilled by more than one individual and may be referred to by other titles (e.g., site coordinator, librarian).

Table 15: Other Appraisal Participants - Roles and Responsibilities

Role	Responsibility	Required/Optional
Appraisal Coordinator	This role is typically performed by an individual or group within the organizational unit who supports planning of the appraisal and prepares basic units/support functions for the appraisal. However, the appraisal team leader may perform any of these responsibilities.	R
	1. Defines activities and schedules to prepare basic units/support functions for the appraisal	O
	2. Supports the appraisal team leader to determine process areas that are not applicable or out of scope	O
	3. Works with the Appraisal Lead to determine appraisal dates	O
	4. Assists in selection of any internal appraisal team members	O
	5. Supports the appraisal team leader to select basic units and support functions	O
	6. Assists the appraisal team leader in completing the appraisal plan and detailed schedule	R
	7. Assists the basic units/support functions in selecting appraisal participants	O
	8. Ensures interviewees arrive to affirmations on time	O
	9. Assists basic units/support functions to address appraisal findings after the appraisal	O
10. Uses the strengths and weaknesses from appraisals to improve processes	O	
Appraisal Sponsor	This role is assigned to the individual who sponsors the appraisal and approves the appraisal plan.	R
	1. Defines the initial organizational unit to be appraised	R
	2. Explains the value of process improvements to upper management	O
	3. Ensures budget is provided to support the appraisal	R
	4. Meets with the appraisal team leader prior to the appraisal to discuss appraisal scope and other appraisal planning parameters	R
	5. Selects the appraisal team leader	R
	6. Selects the appraisal coordinator	O
	7. Reviews and approves the appraisal plan	R
	8. Meets with the appraisal team leader to discuss outcomes of the readiness review and jointly decides whether the appraisal should proceed as planned, be re-scheduled, or be cancelled	R
	9. Attends an executive briefing	O
10. Attends the final findings presentation	R	

Role	Responsibility	Required/ Optional
	11. Signs the appraisal disclosure statement	R
Appraisal Participant	The appraisal participant role applies to members of basic units or support functions who provide artifacts or participate in affirmation activities such as interviews, or demonstrations.	R
	1. Attends the participant briefing	R
	2. Works with the appraisal coordinator or appraisal team leader to provide artifacts in support of the appraisal prior to and during the conduct appraisal phase	R
	3. Attends affirmation sessions as initially scheduled and as requested for follow-up	R
	4. At least one individual from each support function and basic unit participates in the validation of preliminary findings and provides additional evidence to resolve preliminary finding issues	R
	5. Attends the final findings presentation	O

Role Obligations and Access Rights

“R” indicates the role is required to participate in the activity. “O” indicates the role may participate in the activity at their discretion, or delegate the activity to another individual. “N” indicates the role is not allowed to participate in the activity (no access) unless requested by the appraisal team leader.

Table 16: Appraisal Team – Role Obligations and Access Rights

	Team Training	Perform Readiness Review	Readiness Decision	Participant Briefing	Evidence Review Activities	Mini-Team Consolidation (if used)	Affirmations	Team Consensus	Preliminary Findings Validation	Final Findings Delivery
Appraisal Team Leader	R	R	R	R	R	O1	O1	R	R	R
Appraisal Team Member	R	O	O	R	R	R	R2	R	R	O
Appraisal Coordinator	N	O	O	O	N	N	N	N	N	O
Sponsor	N	O	R	O	N	N	N	N	N	R
Appraisal Participant	N	O	O	R3	N	N	R3	N	R3	O

¹ The appraisal team leader has additional responsibilities and may or may not be able to support mini-team team consolidation and all affirmations.

² At least two team members are required to attend their affirmations. Team members are not required to attend all affirmations unless requested by the appraisal team leader.

³ Applies to at least one person from each support function and basic unit.

Appendix D Reporting Requirements and Options

The reporting requirements for SCAMPI appraisals are documented throughout Part II of the Method Definition Document. The following table provides lead appraisers with a concise picture of what needs to be submitted, when it needs to be submitted, to whom it needs to be submitted, and the relevant sections in the MDD where its content and submittal is discussed. In some cases, items are required to be submitted in accordance with policy set by the SEI rather than required practices in the MDD.

Table 17: Submissions Requirements for SCAMPI Appraisals

Item	When Due	Recipient(s)	Relevant MDD Section
Appraisal plan	May be generated incrementally throughout planning, but must be approved prior to the start of Conduct Appraisal phase. Portions must be submitted with the initial SAS record for the appraisal 30 days prior to the Conduct Appraisal phase.	SEI	1.2.7 Obtain Commitment to Appraisal Plan
Final findings	Presented or provided to the sponsor prior to the conclusion of the Conduct Appraisal phase	Sponsor SEI	2.6.5 Document Appraisal Results 3.1 Deliver Appraisal Results 3.1.1 Deliver Final Findings
Appraisal Disclosure Statement	A draft is provided to the sponsor with the final findings. The final appraisal disclosure statement is created with the closure of the SAS record for the appraisal and is included with the appraisal record and the package of appraisal data provided to the SEI within 30 days of the conclusion of the Conduct Appraisal phase.	Sponsor SEI	3.1.1 Deliver Final Findings 3.1.2 Conduct Executive Session(s) 3.2.2 Generate Appraisal Record 3.2.3 Provide Appraisal Feedback to the SEI
Appraisal Record	Prior to the completion of the Report Results phase	Sponsor	3.2 Package and Archive Appraisal Assets 3.2.2 Generate Appraisal Record
Package of Appraisal Data for the SEI	Within 30 days of the conclusion of the Conduct Appraisal phase	SEI	3.2.3 Provide Appraisal Feedback to the SEI

Appendix E Managed Discovery

“Managed Discovery” is a phased data collection approach beginning with an initial data call for a pre-determined set of artifacts, followed by a set of iterative calls based on the appraisal team’s evaluation of the work products and remaining evidence gaps. This approach can be employed to efficiently use the resources required to prepare data in support of SCAMPI and minimize the overall data collection effort. It represents a “middle ground” between the legacy “discovery” and “verification” approaches that have been part of SCAMPI since its inception.

Background

Many organizations invest a significant amount of time, effort and funds in preparing the data required to conduct a SCAMPI appraisal. In fact, it appears that some organizations spend more resources in preparing the data for SCAMPI than in supporting all of the other appraisal activities. This is often true for organizations that are performing SCAMPI for the first time, or are trying to achieve higher levels of maturity or capability. Over-emphasis on the idea of “verification” has, in many cases, led to the belief that all appraisal data must be identified and prepared by the organization in advance of the appraisal event itself – rather than relying on the appraisal team to be diligent in seeking out any additional information needed to support the appraisal. The concept of “discovery” by the appraisal team has become synonymous with “risk of failure” to many senior managers in appraised organizations. As a consequence, many organizations over-prepare for a “verification-based” appraisal. With this verification approach, artifacts may be supplied that are not applicable and/or are never reviewed by the appraisal team. This can generally be attributed to the organization misinterpreting the appraisal reference model and/or the perceived appraisal team’s need for artifacts. The overall result is typically a significant expense in terms of time, effort and funds to support the data collection activities of the appraisal.

Summary of Approach

Managed Discovery attempts to balance verification and discovery activities by using an interactive, phased approach to data collection to mitigate the risk of the organization failing to provide the needed data or providing inappropriate data. The key is starting with an initial set of artifacts that have the most general reference model applicability. This allows the organization to efficiently provide data that have the greatest likelihood of being useful to the appraisal team. The appraisal team reviews the provided artifacts and maps them to the appropriate appraisal reference model practices. The appraisal team then enters into an iterative set of data calls which continue until the full set of relevant data are examined (per the appraisal scope). This approach shifts the responsibility to focus the data collection and mapping activity to the appraisal team – rather than potentially leaving the organization guessing at what the team needs. The initial series of data calls may occur during initial planning activities, during readiness reviews, or during class C and class B appraisals that lead up to the class A event.

The key to successful implementation of this approach is interaction between the appraisal team and the organization. The team works with experts from the organization who understand the contents of the products being provided to ensure coverage of the practices in the model. This leads to a greater understanding of the organization and its work by appraisal team members, and can serve to further highlight the connection between “doing the work” and the practices in the model for the organization’s staff.

Defining and Reviewing the Initial Data Call

The initial data call is organized around key products with high model leverage (e.g., one-to-many relationships across practices, such as plans, schedules, financial reports, and reviews). A list of example “high yield” work products is provided at the end of this appendix. This product-centric approach allows the organization to align the data more closely with the way they actually do business. For example, any CMMI-DEV appraisal that includes the Project Planning process area would likely find value in reviewing the “Project Plan.” Based upon past experiences, advanced organizations can scale-up this initial data increment to gain greater efficiency. For the less experienced organizations, the choice to limit the initial increment is made in order to reduce the risk of spending effort to gather artifacts that provide little or no value to the appraisal process.

The appraisal team leader would be responsible for providing the target contents of this initial data call to the organization. The organization focuses on providing the data requested, centering on the work performed, and not on the model practices. The appraisal team, in whole or in part, is responsible for mapping the contents of this data to the model practices. The appraisal team, working with experts from within the organization, reviews their mapping of the data to model practices and identifies areas where evidence is missing, or where additional support might be needed. These results are documented and used to prepare the next data call.

In this approach to data collection, the initial call and at least one initial review should be done prior to the beginning of the Conduct Appraisal phase, before the “90 day clock” starts.

Specifying the Subsequent Data Calls

Based on the results of processing the initial data set, another, more focused data call can be specified. This allows the team to refine the wording used to describe what is needed, based on what was learned from reviewing the initial data set. As well, the team can sharpen their focus on topics that appear to be potentially problematic or implemented in a unique way in the organization. Prioritizing these areas to be investigated early will provide the organization with more opportunities to supply the right information. It will also allow the appraisal team members to identify areas requiring follow-up through interviews or demonstrations, thus further refining the data collection plan.

Earlier calls will tend to focus primarily on data that might be missing from the evidence database. Later calls may focus more on the appropriateness of the information. These data calls can be repeated until the appraisal team feels the data provides sufficient coverage of the reference model scope and that the data is sufficient for them to be able to characterize the practices. These review sessions might coincide with readiness reviews, and possibly early verification of the artifacts, which would begin the Conduct Appraisal phase and the 90 day clock.

Risk of Employing Managed Discovery

It is important to remember that the objective of data collection for the appraisal is to ensure that the data provided by the organization adequately covers the reference model practices in scope. Therefore, it is important that the objective evidence database clearly map to the appropriate practices. The use of product-centered data collection without prior development of a mapping to the reference model (i.e., Managed Discovery) can increase the risk of missing areas of concern to the organization from the perspective of model compliance. Effective use of interviews by the appraisal team can mitigate this risk.

There will also be organizations for which maturity level ratings risk is the primary concern. Such organizations may find that creating their own model-based data structures across the sampled basic units and support functions best mitigates this risk, despite the resources and costs involved.

Summary

Managed Discovery represents a third data collection approach in addition to discovery and verification. It allows the organization to efficiently provide key artifacts that will demonstrate implementation of multiple reference model practices. It allows the appraisal team to identify specific data needed to enable them to make judgments on that implementation. This is in contrast to “verification only” appraisals where the organization provides “everything” and the team must try to pick out, from all the data provided, the “few critical things” that require follow-up actions. It can help minimize the negative perception of “discovery” in appraisals, by providing an interactive build-up of the organization’s objective evidence database. The concepts of continuous consolidation and triage of appraisal data have been a part of SCAMPI from its earliest versions. The use of a Managed Discovery approach can support the organization more completely.

Example High-Yield Work Products

The following table is intended to provide some examples of key work products that can provide one-to-many relationships to multiple practices in the reference model in scope. These products could be considered as part of the initial data call for use by the appraisal team.

This list is not intended to be exhaustive, nor does it represent any requirement for specific products the organization and its sampled units must provide.

Table 18: Examples of Key Work Products

Category	CMM-DEV	CMMI-SVC	CMMI-ACQ	People CMM
Planning Products	<ul style="list-style-type: none"> • Program Management Plan (PMP) • Integrated Master Plan and Integrated Master Schedules (IMP, IMS) • Configuration Management Plan (CMP) • Systems Engineering Management Plan (SEMP) • Software Development Plan (SDP) • Quality Assurance Plans • Training Plans • Measurement Plans • Estimating records • Release planning • Workflow planning • Kanban boards 	<ul style="list-style-type: none"> • Service Catalogue • Service strategy • Work Plan • Staffing and Capacity Plans • Quality Assurance Plans • Training Plans • Measurement Plans • Estimating records • Orders • Proposals • Architectural/ building /interior layout diagrams • Customer instructions • Posted policies and flow-diagrams • Work flow planning • Kanban boards 	<ul style="list-style-type: none"> • Acquisition Strategy Documents • Supplier Evaluation Criteria • Requests for Proposal • Specific acquisition plans • Evaluation plans 	<ul style="list-style-type: none"> • Workgroup Plan • Workgroup Training Plan • Individual Training and Development Plan • Organization schedule for performance management activities • Business Plan • Staffing Plan • Work Environment Plans

Category	CMM-DEV	CMMI-SVC	CMMI-ACQ	People CMM
Financial Management Products	<ul style="list-style-type: none"> • Budget records • Earned Value reports • Cycle time • Takt time • Lead time • Other financial reports 	<ul style="list-style-type: none"> • Budget vs. actual records • Timesheets • Personnel schedules • Inventory/ Supply management • Invoices • Accounts payable/accounts receivable • Cycle time • Takt time • Lead time • Other financial reports 	<ul style="list-style-type: none"> • Budget records • Earned Value reports • Supplier invoices • Operations and support costs • Other financial reports 	<ul style="list-style-type: none"> • Workgroup budget and actual records • Compensation and Compensation Adjustment Reports
Management Products	<ul style="list-style-type: none"> • Regular program status reports (i.e., daily/ weekly/ monthly/quarterly reviews) • Records of major project milestones (e.g., Preliminary Design Reviews, deliveries) • QA Audit records/reports • Measurement reports/repository • Kanban board • Continuous/Cumulative Flow diagrams and analysis 	<ul style="list-style-type: none"> • Service Agreements/SLAs • Performance Reports, such as capacity and availability tools, customer praise/ complaints, • QA Audit records/reports • Measurement reports/repository • Timesheets • Personnel schedules • Kanban board • Continuous/ Cumulative Flow diagrams and analysis 	<ul style="list-style-type: none"> • Supplier agreements • QA Audit records/reports • Measurement reports/repository 	<ul style="list-style-type: none"> • Process Verification Reports • Process Measurements • Individual Performance Management records • Workgroup Goals and Measures of Success • Individual Goals and Measures of Success

Category	CMM-DEV	CMMI-SVC	CMMI-ACQ	People CMM
Execution Products	<ul style="list-style-type: none"> • Requirements Documents or reports from requirements tools • Concept of Operations documents (CONOPS) • Interface Control Documents or equivalent • Design Documents • Verification Plans • Validation Plans • Integration Plans and Procedures • Test Plans, Procedures, Reports • Change Control Board records • Completed tasks / products/components • Tasks being tracked • Burn-down/up charts • Kanban board • Continuous/ Cumulative Flow Diagram • Peer review results 	<ul style="list-style-type: none"> • These are likely to be quite specific to the service type. That is, training records, for training service, diagnostic metrics in health care, completed orders, served food, order/service/ request tracking systems, Kanban board, etc. 	<ul style="list-style-type: none"> • Customer and contractual requirements • Supplier design documents • Completed supplier evaluations • Supplier status reports/meeting minutes • Product/Service validation reports • QA audit reports/records • Acceptance documents for delivered products or services • Verification Plans • Validation Plans 	<ul style="list-style-type: none"> • Sales Reports • Records of performance discussions with Manager • Training Records • Status of Performance Management Activities • Status of New Hire requisitions • Communication and Coordination Reports
Tools/Repositories	<ul style="list-style-type: none"> • Requirements tools • Configuration Management tools • Kanban board • Wikis 	<ul style="list-style-type: none"> • Incident tracking tools • Service Request processing tools • Kanban board • Wikis 	<ul style="list-style-type: none"> • Supplier databases (preferred supplier tools, etc.) 	<ul style="list-style-type: none"> • Metrics Tools • Performance Management Tools/Systems • Skills Databases • Education and Training tracking tools

Appendix F Scoping and Sampling in SCAMPI A Appraisals

Introduction

The sampling process for appraisals must provide clear operational definitions, be robust to a variety of different applications, and promote confidence in appraisal results. The expectation that appraisals are based on a representative sample requires a clear definition for what is meant by “representative.” Use of the appraisal method with organizations of various sizes and types requires the terminology and definitions have broad applicability to these contexts. Confidence in the results of appraisals is enhanced through visibility of the breadth and depth of involvement from different parts of the organization. These goals are addressed in the process described here.

The process of defining a representative sample relies on the skilled analysis of the way people are organized, the contextual factors that can lead to diversity in the way work is performed, and use of a standard method for establishing a balanced set of examples for the appraisal team to examine. Requirements for prerequisite experience and training confirm the capability of lead appraisers to apply the SCAMPI method in the settings appropriate to their certifications. Required analysis of contextual factors is guided by the definition of *Sampling Factors* in the method, which is reinforced through the required training provided to lead appraisers. The process of establishing a representative (or balanced) sample relies on an objectively verifiable computation, which is also defined in the method and addressed in required training.

Successful use of the sampling process relies on adequate understanding of core concepts by all parties who have a stake in the appraisal process. The lead appraiser is responsible for assuring that the appraisal sponsor has this understanding, and operating within the requirements of the method.

Defining the Organizational Unit

The concept of an “organizational unit” defines boundaries within the organization to which the appraisal results apply. The lead appraiser works with the appraisal sponsor to establish an appropriate specification of this boundary. The appraisal sponsor ensures the scope defined represents the needs of the business for establishing a credible benchmark. The lead appraiser ensures the requirements of the SCAMPI process are satisfied to support accurate and credible statements of appraisal results.

The sponsor typically has an initial expectation about the scope of the appraisal. If the organization has participated in appraisals in the past, the sponsor may request a re-appraisal of the same organizational unit. While the work underway (products and services being delivered at that time) may differ from the previous appraisal, the definition of the organizational unit used in the previous appraisal is a good starting point for the sampling process.

The process of defining the organizational unit (OU) is often carried out in an iterative fashion, in which tradeoffs between breadth of scope and data collection costs drive key decisions. The lower boundary for the size of an organizational unit is determined by the model scope of the appraisal, because the model scope determines the minimum set of examples of work that must be included

(the minimum model scope is a single process area). The upper boundary for the size of an organizational unit is determined by the requirement to complete Phase II of the appraisal process within 90 days (without compromising the data coverage requirements of the method).

As the appraisal sponsor and the lead appraiser define the sampling necessary to meet requirements for a representative sample with adequate coverage within the organizational unit, the definition of organizational unit may need to be adjusted to fit the cost, resource and schedule constraints for the appraisal.

Basic Units and Support Functions

The sampling process used in SCAMPI relies on a key distinction between groups of people who perform work which is typically visible to customers (basic units) and groups of people who perform work that enables or supports the work which is ultimately visible to the customers of the organization (support functions). The Appraisal Reference Model (e.g., CMMI-DEV, CMMI-SVC, CMMI-ACQ, People CMM) used will determine the types of basic units or support functions which are appropriate for the work performed in the organizational unit. When multiple Appraisal Reference Models are used, the same staff may perform work across multiple representations. Examples of basic units include projects, work groups, and teams. Examples of support functions include Quality Assurance, Configuration Management, Training and Engineering Process Groups. The lead appraiser works with the organization to understand the basic units and support functions into which people are organized to perform work.

Sampling Factors

Sampling factors serve to identify meaningful differences in the conditions under which work is performed in the organizational unit. Based on a thorough understanding of the organization, the lead appraiser determines the sampling factors that define different clusters of process implementation for the organization unit. Tiers of the organization chart often provide an initial view of these potential groupings. The Method Definition Document, Section 1.1.4, contains a list of potential sampling factors which must be evaluated. In addition, the lead appraiser seeks information about other potential sampling factors.

Subgroups

Sampling factors are used to define subgroups in the organizational unit. Subgroups consist of sets of basic units which share the attributes identified by the sampling factors. Subgroups are defined by determining all potential combinations for each value of the sampling factors. In the example below the sampling factors ‘location’ and ‘customer’ are used to illustrate the formation of subgroups into which 30 basic units are classified:

Table 19: Example of Sampling Factors - Customer

	Commercial Customers	Government Customers
New York	7	2
Cincinnati	5	0
Denver	11	5

The six subgroups defined above show the count of basic units in each possible combination of the two sampling factors used in the illustration. Notice that there are no basic units in Cincinnati that have government customers.

Determine Sample

A representative sample of basic units is determined using the computation defined below.

Sampling formula:

$$\text{Minimum number of basic units to be selected from a given subgroup} = \frac{\text{Number of subgroups} \times \text{Number of basic units in the given subgroup}}{\text{Total number of basic units}}$$

The result of this computation is the minimum acceptable sample for the appraisal with at least one basic unit sampled from each subgroup. The computed value of the formula may generate a fractional number. If the computed value using this formula is less than 1, then the required number of basic units will be 1. Fractional units over 1 are subject to normal rounding rules (e.g. 1.49 would become 1; 1.5 would become 2).

Applying the formula above to the simple example introduced earlier yields the results in the table below:

Table 20: Example of Sampling Factors – Basic Units

	Total Number of Basic Units	Basic Units Sampled
New York, Commercial	7	1
New York, Government	2	1
Cincinnati, Commercial	5	1
Denver, Commercial	11	2
Denver, Government	5	1

The lead appraiser and sponsor may agree on the involvement of additional basic units as appropriate (e.g., if the sponsor chooses to include specific work efforts in order to address expectations of customers who want to see appraisal results for work delivered under a given contract). As well, the discussion between the sponsor and the lead appraiser may lead to reducing the breadth of the organizational unit involved in the appraisal—for example, omitting the Cincinnati location altogether—leading to a smaller scope for the appraisal activity. This fact would be documented with the appraisal results, which would not apply to the status of the processes used by basic units in the Cincinnati location.

Plan Data Collection

Artifacts and affirmations are required to satisfy the data coverage rules specified in the MDD. The initial data collection plan identifies how the data coverage rules will be satisfied. This initial plan provides an added level of detail for the appraisal sponsor and lead appraiser to understand the effort required to perform the appraisal. At this point in the process, before data collection has begun, the organizational unit may again be redefined in order to achieve a more desirable balance between the cost of the appraisal and the breadth of applicability for the appraisal results.

Data Coverage Rules

The data coverage rules defined in SCAMPI, in concert with the sampling process, promote a balance between breadth and depth of data collection during an appraisal. These rules must be interpreted in combination to define the data collection plan for an appraisal, rather than addressed one rule at a time. In most applications of the appraisal method, many different ways to meet the set of data coverage rules will be possible. This flexibility allows the lead appraiser and appraisal sponsor to collaborate to devise an efficient sampling and data collection strategy, where cost-value tradeoffs can be made within an objective framework that promotes credibility of the appraisal results. At the end of the appraisal, the qualified and trained appraisal team must come to consensus on the adequacy of the information considered to render decisions.

The sampling process sets a scope for this decision process, and the data coverage rules provide a minimum threshold for inputs to the team decisions. Depending on what is found during the examination of the required data, the team may determine that additional information is required to make a fair and balanced judgment. For example, if weaknesses are found through examination of some artifacts, additional affirmations may be sought to ensure the team is interpreting the artifacts correctly. Similarly, if affirmations indicate greater strength of implementation than the initial set of artifacts support, the team may seek other artifacts to corroborate the information supplied.

Introduction to Case Studies

The three case studies described in this appendix provide illustrations of the sampling and data coverage concepts in order to foster understanding. These case studies are not intended to provide specific templates to be emulated in practice; rather they provide examples of the kinds of analyses that are to be employed in planning a SCAMPI V1.3. As summaries of real situations, note that none of these case studies reflect the entire set of information expected to be considered by appraisal team leaders who apply the process described in the MDD.

While the formats of the three case studies are similar, they intentionally present various levels of detail that would be appropriate given the focus of each case study. Each case study has the following major section headings:

- The Organization and Initial Identification of Sampling Factors
- Identification of Subgroups
- Scoping the Organizational Unit and Associated Sample Size
- Evaluating the Tradeoffs
- Apply the Data Coverage Requirements
- Case Study Summary

Case 1: Large Development Organization

The Organization and Initial Identification of Sampling Factors

The appraisal team leader has started to work with a large aerospace and defense corporation to perform a Maturity Level 2 appraisal. The organization has been improving process for over 10 years. Based on conversations with the sponsor, the appraisal team leader initially determines the organizational unit should be the Blue Business Unit. The Blue Business Unit is comprised of 30 projects.

The documented analysis resulted in the following sampling factors with their associated relevant values:

- Location (Los Angeles, Dayton, Other)
- Customer (DOD, Commercial)
- Size (Large >15 people, Small <15 people)
- Duration (Long > 1yr, Short <1yr)

The potential sampling factors ‘Organizational Structure’ and ‘Type of Work’ were also evaluated, and found not to play an important role in the organization. Detailed analysis of the organization found that the sampling factors ‘Location’ and ‘Customer’ accounted for all differences associated with these other potential sampling factors. It was documented that the organizational structure was partitioned by location, and the type of work was completely accounted for by the customer. That is, each company location contained only one part of the organizational structure, and different types of work were not performed for a given customer.

The sampling factor ‘Duration’ was added to the sampling process because the threshold of 1 year in project duration was found to have a notable influence on the process.

Identification of Subgroups

From this the appraisal team leader determines the number of subgroups by applying the sampling factors to the projects in the organizational unit. This analysis results in the table of subgroups identified below. Note that there are 24 possible subgroups given the sampling factors and associated possible values shown above.

Only eight subgroups are identified below because all of the organization’s basic units exist in only these eight subgroups.

Table 21: Subgroups Defined by Sampling Factors

Location	Customer	Size	Duration	# Basic Units
LA	Commercial	Large	Short	2
LA	Commercial	Small	Short	1
LA	DoD	Large	Long	4
LA	DoD	Small	Long	8
Dayton	DoD	Large	Long	2
Dayton	DoD	Small	Long	6
Other	DoD	Large	Long	3
Other	DoD	Small	Long	4
				30

Scoping the Organizational Unit and Associated Sample Size

Several different scenarios are developed to show the impact on the organizational unit and organizational scope. Refer to the formula in MDD Section 1.1.4 to determine the “minimum number of basic units to be selected from a given subgroup.

OU: Blue Business Unit

(i.e., the full organizational unit)

Table 22: Subgroups and Sample Size (Blue Business Unit)

Subgroup Attributes (Sampling Factor Values)	Count of Basic Units	Result from Applying the Formula	Number of Basic Units to Sample
LA, Commercial, Large, Short	2	0.533	1
LA, Commercial, Small, Short	1	0.267	1
LA, DoD, Large, Long	4	1.067	1
LA, DoD, Small, Long	8	2.133	2
Dayton, DoD, Large, Long	2	0.533	1
Dayton, DoD, Small, Long	6	1.600	2
Other, DoD, Large, Long	3	0.800	1
Other, DoD, Small, Long	4	1.067	1
			10

OU: Blue Business Unit LA and Dayton Locations

(i.e., limiting organizational unit to two locations - omitting the “other location”)

Table 23: Subgroups and Sample Size (Blue Business Unit LA and Dayton Locations)

Subgroup Attributes (Sampling Factor Values)	Count of Basic Units	Result from Applying the Formula	Number of Basic Units to Sample
LA, Commercial, Large, Short	2	0.522	1
LA, Commercial, Small, Short	1	0.261	1
LA, DoD, Large, Long	4	1.043	1
LA, DoD, Small, Long	8	2.087	2
Dayton, DoD, Large, Long	2	0.522	1
Dayton, DoD, Small, Long	6	1.565	2
			8

OU: Blue Business Unit LA and Dayton Locations/Large Projects

(i.e., limiting organizational unit further - also omitting “small projects” from the organizational unit)

Table 24: Subgroups and Sample Size (Blue Business Unit LA and Dayton Locations/Large Projects)

Subgroup Attributes (Sampling Factor Values)	Count of Basic Units	Result from Applying the Formula	Number of Basic Units to Sample
LA, Commercial, Large, Short	2	0.750	1
LA, DoD, Large, Long	4	1.500	2
Dayton, DoD, Large, Long	2	0.750	1
			4

Evaluating the Tradeoffs

The appraisal sponsor and appraisal team leader can work with the alternative scenarios above (and others as they wish) to evaluate the tradeoff between the scope and the magnitude of the appraisal event. Each organizational unit definition and accompanying organizational scope alternative would present a different scenario in planning data collection for the appraisal event. A summary the alternatives, associated number of subgroups and number of samples is provided in the following table.

Table 25: Summary of the Blue Business Unit's Organizational Unit and Scope Alternatives

Organizational Unit Name and Scenario	Comments	# Subgroups	# Sampled Basic Units
The Blue Business Unit	All elements of the Blue Business Unit are included, so stakeholders in the appraisal outcome will expect the results to apply to all of the different types of work done within the Business Unit.	8	10
The Blue Business Unit/LA and Dayton Locations only	The scope of the appraisal would be limited to the LA and Dayton locations. Assertions about the results of this appraisal would apply only to the work in these two locations.	6	8
The Blue Business Unit/LA and Dayton Locations/Large Projects only	The scope of the appraisal would be limited to the part of the organization that conducts large projects in the LA and Dayton locations. Assertions about the results of this appraisal would apply only to large projects in these two locations.	3	4

Applying the Data Coverage Requirements

The data coverage rules are applied to each of the scenarios developed earlier. Further assumptions made based on analyzing the organization are as follows:

- A centralized QA support function operates at each location, sharing staff and using location-specific infrastructure and personnel. The function is applied uniformly, with shared staff, common templates, and reporting expectations. The customer, size and duration of the project do not affect the behavior of the staff performing the work. The following tables demonstrate application of coverage rule 3 for support functions. At least one sample of PPQA is required for each location.
- A Project Management Office was established to manage all DoD projects, and the management structure overseeing those projects operates as a cross-site function. Standard planning and monitoring processes are implemented, and personnel who perform that work have responsibility for multiple DoD projects. The location, duration and size of the project do not affect the behavior of the staff doing planning and monitoring on DoD projects. In this instance, PMO is a support function for DoD projects. The following tables demonstrate application of coverage rule 3 for support functions. At least one sample of PP and PMC is required for DoD projects. For commercial projects however, data covering PP and PMC are required from each subgroup in accordance with coverage rule 1 for basic units.

- Small projects share a common infrastructure for configuration management, including CM tools and personnel – who are assigned from a larger pool. For large projects, project-specific infrastructure and staffing are established. In this instance, CM is a support function for small projects. The following tables demonstrate application of coverage rule 3 for support functions. At least one sample is required for small projects. For large projects however, data covering CM is required from each subgroup in accordance with coverage rule 1 for basic units.
- DoD projects do not use suppliers – as a matter of policy. SAM is not applicable for DoD projects.

OU: Blue Business Unit

(i.e., the full business unit)

The Data Collection Plan depicted below conforms to the rules, with:

- One unit providing PP and PMC data from DoD programs
- One unit each providing PPQA data from the LA and Dayton locations

Cells containing an “x” signify a requirement to collect data (affirmations or artifacts) sufficient to cover the process area represented by that column, for the basic unit represented by that row. Cells containing an “o” signify a process area – basic unit combination for which data are not required, according to the minimum coverage requirements of the method.

Table 26: Subgroups and Sampled Process Areas (Blue Business Unit)

Relevant Sampling Factors	Sample	REQM		PP		PMC		MA		CM		PPQA		SAM		
		Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Doc	Aff	
LA, Commercial, Large, Short	1	x	x	x	x	x	x	x	x	x	x	x			x	x
LA, Commercial, Small, Short	1	x	x	x	x	x	x	x	x	x	x	x			x	x
LA, DoD, Large, Long	1	x	x						x	x	x	x	x	x		
LA, DoD, Small, Long	2	x	x						x	x	o	o				
		o	o						o	x	o	o				
Dayton, DoD, Large, Long	1	x	x						x	x	x	x				
Dayton, DoD, Small, Long	2	x	x	x	x	x	x		x	x	o	o	x	x		
		o	x						o	o	o	o				
Other, DoD, Large, Long	1	x	x						x	x	x	x	x	x		
Other, DoD, Small, Long	1	x	x						x	x	o	o	x	x		
	10	8	9	3	3	3	3	8	9	5	5	4	4	2	2	

OU: Blue Business Unit LA and Dayton Locations

(i.e., limiting organizational unit to two locations - omitting the “other location”)

Only major difference is the omission of “other location” from the scope of the organizational unit. The appraisal results would apply to only the LA and Dayton locations. (Note that if the process did not vary that much between the “other locations” and LA/Dayton, the organizational unit could be considered to be the full organization – this would be left up to the discretion of the appraisal team leader.)

As in the first alternative, the Data Collection Plan depicted below conforms to the rules, with:

- One unit providing PP and PMC data from DoD programs
- One unit providing PPQA data from the LA location

Cells containing an “x” signify a requirement to collect data (affirmations or artifacts) sufficient to cover the process area represented by that column, for the basic unit represented by that row. Cells containing an “o” signify a process area – basic unit combination for which data are not required, according to the minimum coverage requirements of the method.

Table 27: Subgroups and Sampled Process Areas (LA and Dayton Locations Only)

Relevant Sampling Factors	Sample	REQM		PP		PMC		MA		CM		PPQA		SAM	
		Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff
LA, Commercial, Large, Short	1	x	x	x	x	x	x	x	x	x	x			x	x
LA, Commercial, Small, Short	1	x	x	x	x	x	x	x	x	x	x			x	x
LA, DoD, Large, Long	1	x	x					x	x	x	x	x	x		
LA, DoD, Small, Long	2	x	x					x	x	o	o				
		x	o					o	o	o	o				
Dayton, DoD, Large, Long	1	x	x	x	x	x	x	x	x	x	x				
Dayton, DoD, Small, Long	2	x	x					x	x	o	o	x	x		
		o	o					x	o	o	o				
	8	7	6	3	3	3	3	7	6	4	4	2	2	2	2

OU: Blue Business Unit LA and Dayton Locations/Large Projects

(i.e., limiting organizational unit further - also omitting “small projects” from organizational unit)

This alternative further limits the organizational unit to large projects. Consistent with the alternative presented above, the Data Collection Plan depicted below conforms to the rules, with:

- One unit providing PP and PMC data from DoD programs
- One unit providing PPQA data from the LA location

Cells containing an “x” signify a requirement to collect data (affirmations or artifacts) sufficient to cover the process area represented by that column, for the basic unit represented by that row. Cells containing an “o” signify a process area – basic unit combination for which data are not required, according to the minimum coverage requirements of the method.

Table 28: Subgroups and Sampled process areas (LA and Dayton Locations/Large Projects Only)

Relevant Sampling Factors	Sample	REQM		PP		PMC		MA		CM		PPQA		SAM	
		Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff
LA, Commercial, Large, Short	1	x	x	x	x	x	x	x	x	x	x			x	x
LA, DoD, Large, Long	2	x	x					x	x	x	x	x	x		
		o	x	x	x	x	x	o	o	o	o				
Dayton, DoD, Large, Long	1	x	x					x	x	x	x	x	x		
	4	3	4	2	2	2	2	3	3	3	3	2	2	1	1

Case 1 (Large Development Organization) Summary

Under the rules of SCAMPI V1.3, the Blue Business Unit will be able to explore many alternatives pertaining to the definition of the organizational unit and associated organizational scope, as appropriate. This will allow the Blue Business Unit to conduct an appraisal that satisfies the needs of the appraisal sponsor while assuring the quality of the appraisal result.

Case 2: Services Organization

The Organization and Initial Identification of Sampling Factors

The appraisal team leader is working with a well-established firm providing staff-augmentation services for a diverse set of software and systems engineering programs in the defense and intelligence industries. The organization has been engaged in process improvement for a number of years, and is now interested in establishing a Maturity Level 2 benchmark using CMMI-SVC to enhance their reputation among their customer base. Following conversations with the sponsor, the appraisal team leader initially determines the appropriate organizational unit should include the entire company – because of the integrated nature of the processes and the company-wide focus of the improvement program. The basic unit for organizing the work in this organization is ‘the contract’ – because each contract has the potential to present some unique needs and constraints on various processes used in allocating staff and managing their ongoing service. Analysis of the organization results in the following sampling factors (with relevant value):

- Assignment Duration (Short-Term = less than 6 months; Medium-Term = 6 months to 1 year; Long-Term = more than 1 year; Semi-Permanent = no end-date specified)
- Technical Competency Required (Requirements Specification and Analysis; Systems Feasibility Study and Proof Of Concept/Prototype Development; Software Engineering/Development; Systems Integration/Testing; Documentation/Training Development)
- Program Domain (Communications, Command, Control and Intelligence; Advance Weapons Systems; Aeronautical Engineering; Logistics and Supply Chain Management) (Note this is considered an example of the “customer” sampling factor)
- Security/Classification Requirements (Non-Classified Environment; Classification-Level 1; Classification-Level 2; Unique Classification Requirement)

The potential sampling factors which the SCAMPI method requires to be analyzed (refer to Section 1.1.4) were ruled out from consideration based on the analysis summarized below:

- Location: the service being delivered by the company is executed from a single centralized location, though the assignments of the technical staff take them all around the world.
- Customer: the combination of technical competency required and program domain define the range of customers served by the company. Defining subgroups using ‘customer’ would be redundant with these two sampling factors.
- Size: the size of the programs being staffed overlap (in terms of categories) with the assignment duration.
- Organizational Structure: there is no effect on the behavior or practices used by the assigned staff that can be traced back to an aspect of the organizational structure of the company providing staff augmentation.
- Type of Work: the sampling factor ‘program domain’ essentially represents this sampling factor as described in the MDD, but the label ‘program domain’ is more readily understood in the organization.

Identification of Subgroups

During the process of determining the implementation of support functions, a greater degree of understanding for sampling factors is established. The lead appraiser learns that differences in the performance of technical work may have been over-emphasized in determining sampling factors that relate to the performance of the CMMI-SVC-related work within the organization.

Consequently, the following two sampling factors have been modified:

- **Assignment Duration:** Two levels have been combined resulting in three values (Short-Term = less than 6 months; Medium-Term = 6 months to 1 year; Long-Term = more than 1 year). The processes that govern staff assignments on a semi-permanent basis do not differ substantially from those used to assign staff on a long-term basis. All semi-permanent assignments have last more than 1 year. Differences in the content of the service level agreement for these contracts do not impact the practices used to identify, assign, and manage the service level agreement.
- **Security/Classification Requirements:** Two levels have been combined resulting in three values (Non-Classified Environment; Classification-Level 1 or 2; Unique Classification Requirement). The qualifications of each staff member are identified with respect to 4 levels of security clearance (with the first level signifying that the staff holds no clearance of any type). Each assignment filled by a staff member is categorized in the same manner. The processes associated with the ‘middle two’ classification levels have no meaningful difference. In addition, most staff assigned to positions requiring “Classification-Level 1” have a higher level of clearance.

The appraisal team leader determines the relevant subgroups by applying the sampling factors to the staff augmentation contracts in the organizational unit. This analysis is documented in the table below. The table captures the diversity of the work in the organizational unit, in terms of the differences among **contracts** that are thought to lead to potential differences in process implementation. The subgroups below represent different potential challenging conditions (process contexts) that may at times test the robustness of the policies and practices of the organization. Note that there are 180 possible subgroups given the sampling factors and associated possible values shown above.

Only 11 subgroups are identified below because all of the organization’s basic units exist in only these 11 subgroups.

Table 29: Subgroups Defined by Sampling Factors

Duration	Technical Competency	Domain	Classification	# Basic Units
Short	Requirements	C3I	None	1
Short	Requirements	Weapons	None	1
Short	Feasibility	Log	None	1
Short	Document	Log	None	2
Long	Integration	Aero	None	3
Long	Software	C3I	1 or 2	8
Medium	Requirements	C3I	Unique	3
Medium	Feasibility	Weapons	1 or 2	2
Medium	Feasibility	Aero	1 or 2	2
Long	Feasibility	Weapons	Unique	3
Long	Software	C3I	Unique	4
				30

Scoping the Organizational Unit and Associated Sample Size

Working with the sponsor, the lead appraiser develops different scenarios to show how alternative definitions of the organizational unit lead to various samples that make up the organizational scope. Refer to the formula in MDD Section 1.1.4 to determine the minimum number of basic units to be selected from a given subgroup.

OU: The Whole Company

(i.e., all contracts)

Table 30: Subgroups and Sample Size (The Whole Company)

Subgroup Attributes (Sampling Factor Values)	Count of Basic Units	Result from Applying the Formula	Number of Basic Units to Sample
Short, Requirements, C3I, No Classification	1	0.333	1
Short, Requirements, Weapons, No Classification	1	0.333	1
Short, Feasibility, Logistics, No Classification	1	0.333	1
Short, Documentation, Logistics, No Classification	2	0.667	1
Long, Integration, Aerospace, No Classification	3	1.000	1
Long, Software, C3I, Classification 1 or 2	8	2.667	3
Medium, Requirements, C3I, Unique Classification	3	1.000	1
Medium, Feasibility, Weapons, Classification 1 or 2	2	0.667	1
Medium, Feasibility, Aerospace, Classification 1 or 2	2	0.667	1
Long, Feasibility, Weapons, Unique Classification	3	1.000	1
Long, Software, C3I, Unique Classification	4	1.333	1
			13

OU: C3 I Contracts Only

(i.e., limiting organizational unit to only C3I contracts)

Table 31: Subgroups and Sample Size (The Red Company/C3I Contracts)

Subgroup Attributes (Sampling Factor Values)	Count of Basic Units	Result from Applying the Formula	Number of Basic Units to Sample
Short, Requirements, C3I, No Classification	1	0.250	1
Long, Software, C3I, Classification 1 or 2	8	2.000	2
Medium, Requirements, C3I, Unique Classification	3	0.750	1
Long, Software, C3I, Unique Classification	4	1.000	1
			5

OU: Non-Classified Contracts Only

(i.e., limiting organizational unit to exclude classified contracts)

Table 32: Subgroups and Sample Size (The Red Company/Non-Classified Contracts)

Subgroup Attributes (Sampling Factor Values)	Count of Basic Units	Result from Applying the Formula	Number of Basic Units to Sample
Short, Requirements, C3I, No Classification	1	0.625	1
Short, Requirements, Weapons, No Classification	1	0.625	1
Short, Feasibility, Logistics, No Classification	1	0.625	1
Short, Documentation, Logistics, No Classification	2	1.250	1
Long, Integration, Aerospace, No Classification	3	1.875	2
			6

Evaluating the Tradeoffs

The appraisal sponsor and appraisal team leader work with the alternative scenarios above (and others as deemed relevant) to evaluate the tradeoff between the **scope** and the **magnitude of the appraisal event**.

Each organizational unit definition and accompanying organizational scope presents a different scenario in planning data collection for the appraisal event. As well, each candidate definition of organizational unit leads to a different scope of generalization which can be made with appraisal results. The table below summarizes these differences at a high level:

Table 33: Summary of Organizational Unit and Scope Alternatives

Organizational Unit Name and Scenario	Comments	# Subgroups	# Samples
The Whole Company	All elements of the organizational unit are included, so stakeholders in the appraisal outcome will expect the results to apply to all of the different types of work done within the organization.	11	13
C3I Contracts Only	If the organization is competing for staff augmentation contracts in this domain, a benchmark that applies only to their C3I-related portfolio of work might be an ideal scoping for the appraisal.	4	5
Un-Classified Contracts Only	If the classification restrictions associated with the staffing assignments limits the accessibility of data, then an appraisal focused on only the un-classified contracts may present a simpler event from a logistics perspective.	5	6

Applying the Data Coverage Requirements

The data coverage rules are applied to each scenario, to illustrate the ramifications of the scoping and sampling decisions for the magnitude of the appraisal event. The numbers presented represent minimum acceptable sampling values for consideration. In order to assert that the data collected is sufficient to represent the organization, the lead appraiser must use professional judgment to ensure no sampling factors –or other unforeseen influences on the process context– have been overlooked.

In addition to the sampling factors identified above, the following information relating to the allocation of support functions within the organization is documented during planning.

- A highly secure Configuration Management support function has been established for managing assets related to on-going contracts as well as the staff and their capabilities. Assets maintained include Proposals and Bids for classified work, as well as resumes and personnel files for those who perform this work. The following tables demonstrate application of coverage rule 1 for support functions. At least one sample of CM is required across the organizational unit.
- The organization's measurement program has been defined 'across the organization.' It is staffed by a group of professionals that (collectively) have experience with all types of work done in the organization. The following tables demonstrate application of coverage rule 1 for support functions. At least one sample of MA is required across the organizational unit.
- A Project Management Office (PMO) structure is defined to separate management of classified and unclassified work. All activities relating to Work Planning and Work Monitoring and Control are handled by a centralized function – one for unclassified work, and a separate one for classified work. The following tables demonstrate application of coverage rule 3 for support functions. A sample of WP and WMC are required from each instance of PMO, one for classified and one for unclassified work.
- All other ML2 process areas (PPQA, REQM, SD, SAM) have potentially 'contract-unique implementations.' The tables below demonstrate coverage rule 1 for basic units. For the subgroup with three sampled basic units, coverage rules 2 and 3 apply as well.

OU: The Whole Company

(i.e., all contracts)

Including all basic units and support functions in the organization, the data collection planning begins with the matrix depicted below. The coverage rules guide more detailed data collection planning. Note that this will affect the number of pieces of data required for the sixth subgroup in the table – for the columns labeled PPQA, REQM, SD, and SAM – because 3 units are sampled for this subgroup.

Table 34: Subgroups and Sampled Process Areas (The Red Company)

Relevant Sampling Factors	Sample	CM		MA		WMC		WP		PPQA		REQM		SD		SAM		
		Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Doc	Aff	
Short, REQ, C3I, Non-Class	1									x	x	x	x	x	x	x	x	
Short, REQ, Weap, Non-Class	1									x	x	x	x	x	x	x	x	
Short, Feas, LOG, Non-Class	1					x	x	x	x	x	x	x	x	x	x	x	x	
Short, DOC, LOC, Non-Class	1									x	x	x	x	x	x	x	x	
Long, INT, Aero, Non-Class	1									x	x	x	x	x	x	x	x	
Long, SW, C3I, Class 1 or 2	3	x	x	x	x					o	o	o	o	x	o	o	o	
										x	x	x	x	x	x	x	x	x
										o	o	x	x	o	o	o	o	o
Med, REQ, C3I, Unique-Class	1									x	x	x	x	x	x	x	x	
Med, Feas, Weap, Cass 1 or 2	1					x	x	x	x	x	x	x	x	x	x	x	x	
Med, Feas, Aero, Class 1 or 2	1									x	x	x	x	x	x	x	x	
Lng, Feas, Weap, Unique-Class	1									x	x	x	x	x	x	x	x	
Lng, SW, C3I, Unique-Class	1									x	x	x	x	x	x	x	x	
	13	1	1	1	1	2	2	2	2	11	11	12	12	12	11	11	11	

The columns associated with CM and MA process areas are depicted as single cells because these practices are performed by support functions, and not by basic units. This implies that an appraisal team examining the practices associated with these process areas would examine data that applies equivalently across all basic units in the organizational unit. This is not to say that data tracing to individual basic units would not be examined.

In contrast, the columns for WMC and WP process areas are depicted with cells for two different implementations – one for non-classified contracts, and the other for classified contracts. This reflects the organization’s choice to define two different PMO functions for the two types of contracts (non-classified vs. classified).

OU: C3 I Contracts Only

(i.e., limiting organizational unit to only C3I contracts)

Including only the basic units tied to C3I contracts and associated support functions in the organization, the data collection planning begins with the matrix depicted below. Again, the coverage and corroboration rules affect the number of pieces of data required for the row labeled G6 – for the columns labeled PPQA, REQM, SD, and SAM – because two units are sampled for this subgroup. All other cells in the matrix would have at least one item of data (Art = Artifacts, Aff = Affirmations).

Table 35: Subgroups and Sampled Process Areas (The Red Company/C3I Contracts)

Relevant Sampling Factors	Sample	CM		MA		WMC		WP		PPQA		REQM		SD		SAM	
		Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Doc	Aff
Short, REQ, C3I, Non-Class	1					x	x	x	x	x	x	x	x	x	x	x	x
Long, SW, C3I, Class 1 or 2	2									o	o	o	o	x	o	o	o
		x	x	x	x					x	x	x	x	x	x	x	x
Med, REQ, C3I, Unique-Class	1					x	x	x	x	x	x	x	x	x	x	x	x
Lng, SW, C3I, Unique-Class	1									x	x	x	x	x	x	x	x
	5	1	1	1	1	2	2	2	2	4	4	4	4	5	4	4	4

OU: Non-Classified Contracts Only

(i.e., limiting organizational unit to exclude classified contracts)

Including only the basic units tied to non-classified contracts and associated support functions in the organization, the data collection planning begins with the matrix depicted below. In this case, the coverage and corroboration rules affect the number of pieces of data required for the row labeled “Long, INT, Aero, Non-Class” – for the columns labeled PPQA, REQM, SD, and SAM – because two units are sampled for this subgroup.

In the context of non-classified contracts, this subgroup has a larger number of basic units than the other subgroups, so the minimum sample size is larger. All other cells in the matrix would have at least one item of data (Art = Artifacts, Aff = Affirmations).

Table 36: Subgroups and Sampled Process Areas (The Red Company/Non-Classified Contracts)

Relevant Sampling Factors	Sample	CM		MA		WMC		WP		PPQA		REQM		SD		SAM	
		Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Doc	Aff
Short, REQ, C3I, Non-Class	1									x	x	x	x	x	x	x	x
Short, REQ, Weap, Non-Class	1									x	x	x	x	x	x	x	x
Short, Feas, LOG, Non-Class	1									x	x	x	x	x	x	x	x
Short, DOC, LOC, Non-Class	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Long, INT, Aero, Non-Class	2									o	o	x	o	o	o	o	o
										x	x	x	x	x	x	x	x
	6	1	1	1	1	1	1	1	1	5	5	6	5	5	5	5	5

Case 2 (Services Organization) Summary

Under the rules of SCAMPI V1.3, the sponsor for this company will be able to explore many different alternatives pertaining to the definition of the organizational unit and associated organizational scope, as appropriate. This will allow the company to conduct an appraisal that satisfies the needs of the appraisal sponsor while assuring the quality of the appraisal result.

Case 3: Small Development Organization

The Organization and Initial Identification of Sampling Factors

The appraisal team leader has started to work with a small organization that is working to achieve CMMI-DEV Maturity Level 3. The company is comprised of approximately 125 staff, with an engineering workforce of 80 maintaining three very large information systems. They were a fledgling start up 20 years ago when five hard-working engineers developed a niche product to service a government program dispensing funds through the Small Business Administration to other small companies. As the system grew to serve local offices in municipalities throughout the US and a wider range of recipients, the company expanded the sphere of their work. The system that launched the company is now an established product in the industry. The company has ventured into developing new systems based on the architecture of their flagship product. This success has brought the attention of the major corporate player in the region, who is working on a buy-out of the company. Management believes a successful CMMI-based process improvement program will be appealing to the potential buyer, as they compete for contracts in a market where these credentials are highly valued.

The engineering practices used on projects – two to four annual releases for each system and “special projects” as needed – tend to fall into two different categories. The flagship product is primarily a mainframe, back-office, batch-oriented system written in Cobol73. While training and tools have greatly influenced the support environment used to maintain this system, the testing and operating platforms tend to differ substantially from the other two (more modern) systems. This leads to notable differences in processes relating to Technical Solution, Verification, Validation, Product Integration as well as Integrated Project Management process areas. The two newer systems have adopted modern design methodologies, higher level programming languages and more modern tools that integrate easily with the development and testing environments they use.

Through the hard work of the EPG, as well as many long working sessions with first line managers and senior engineers, a common approach to managing releases/projects and providing support functions has been established. A well-established lifecycle model had existed for over a decade, and common approaches to planning and monitoring releases is in place. Disciplined approaches to configuration and release management are supported by a company-wide quality assurance and measurement system. While the expertise required to develop and maintain good requirements differs according to the history of the customer-base (and the experience of the staff) the fundamental approach is the same across the company.

The documented analysis resulted in the following sampling factors with their associated relevant values:

- Type of Project/Work (Release, Special Project): There is a distinction made between regular releases of systems, and special projects. Special projects are carried out to handle enhancements, fixes, or special features out of cycle. Changes in regulatory constraints, major security threats, or significant defect reports may initiate a special project.

These tend to be smaller in scope and shorter in duration. While the fundamental elements of the development and management processes are still used on the special projects, there is a distinct “tailoring-down” of the activities to accommodate a shorter time window. Everything

from requirements development to release management – and the project planning and oversight that occurs in between – is done with abbreviated timetables and a different level of formality.

- Management Structure (Flagship Division, Other Divisions). The work done on the flagship product has provided a great deal of opportunity for advancement of the staff in that division. The new divisions were seeded with the innovative members of that division. Consequently, there is a larger management structure – accompanied at times by an unreasonable allegiance to the status quo – in that division. The other two divisions are more amenable to the introduction of new practices, and therefore able to institutionalize improvements in a shorter timeframe. In particular, the acceptance of new ways of performing the practices in Decision Analysis and Resolution, as well as Risk Management process area may be an issue.
- Technology Base (Legacy Technology, Modern Technology): The legacy system identified as the flagship product leads to notable differences in the implementation of some process areas – including Technical Solution, Verification, Validation, Product Integration as well as Integrated Project Management.
- Depth of Product History (Flagship Division, Other Divisions): Work on the flagship system over the years has resulted in a wealth of historical information which is not yet available for the other products. While the divisions make an effort to share historical experience and data, their usefulness is viewed to be limited. The depth of experience also leads to a greater preference to rely on intuition and engineering judgment at times. This has affected the acceptance of Risk Management and Decision Analysis and Resolution.
- Though not described in detail here, other potential sampling factors (including the required list in Section 1.1.4) were analyzed in detail, and the results of that analysis were documented by the lead appraiser in the appraisal plan.

Identification of Subgroups

Subgroups within the organizational unit: The table below summarizes the current inventory of releases and projects in the organization, according to the organizational structure. The sampling factors identified and the subsequent analysis performed on them will lead to the identification of subgroups and the basic units they contain.

Table 37: Number of Projects in the Green Company Divisions

Division	Work Type	Release or Project Name	Count
Flagship Division	Release	<i>Rel2010.3, Rel2011.1</i>	2*
	Special Project	-	0
New Division A	Release	<i>Rel2010.3, Rel2010.4, Rel2011.1</i>	3*
	Special Project	<i>DataWarehouse2011</i>	1
New Division B	Release	<i>Rel2010.2, Rel2011.1</i>	2*
	Special Project	<i>SecurityReportingABC, FirmwareTester2011</i>	2

* At any given time, there will be more than one release in progress, at different points in the lifecycle. These are each counted as one basic unit.

There may be times when no special projects are underway in a given division. The definition of the subgroups is provided below.

Table 38: Definition of Subgroups

Type of Work	Management Structure	Technology Base	Depth of History	# Basic Units
Release	Flagship Division	Legacy	Deep	1
Release	New Divisions	Next Gen	New	2
Special Projects	New Divisions	Next Gen	New	3
				6

Scoping the Organizational Unit and Associated Sample Size

Follow-up discussions with the Engineering Process Group leader, interviews of first line managers, and examination of past appraisal records reveals some additional information:

- Overlapping Releases
 - Given the strategy for rolling releases, at any given point in time recent examples of artifacts and activities for each lifecycle phase are available. However, only during certain times (just after a release) will those current examples all relate to the same release.
 - All releases underway at the current time are based on the same version of the company process. No major process changes – other than minor revisions to templates or work instructions – have occurred since the completion of the last release in each division.
 - The staff working on releases in each division is drawn from the same pool – the assignments to different releases can potentially change from day to day.
 - The EPG suggests that it is reasonable to pool all the releases within each division – rather than considering them separately for the purpose of the appraisal. This was the approach taken in the last class B appraisal performed in the company.
- Special Projects
 - At any given time, there are typically two to six special projects underway in the organization. At present there are three going on.

Refer to the formula in MDD Section 1.1.4 to determine the minimum number of basic units to be selected from a given subgroup. The result of applying this computation is shown in the table below.

Table 39: Subgroups and Number of Sampled Basic Units

Subgroup Attributes (Sampling Factor Values)	# Basic Units	Result from Applying the Formula	Number of Basic Units to Sample
Releases in Flagship Division	1	0.500	1
Releases in New Divisions	2	1.000	1
Special Projects in New Divisions	3	1.500	2
			4

* There is no sampling factor for “release id” and rather than treating each release as a basic unit, *the set of releases within a division, supported by a common pool of staff in the division, is treated as a single basic unit.* Therefore, each division is a basic unit in this case.

Evaluating the Tradeoffs

Although less likely than in the first two case studies, Green Company can also perform an analysis of alternative scenarios relative to the organization unit and scope. Performing this tradeoff analysis is less likely because the sample size (organizational scope) for the entire organizational unit is four basic units for this case study. An appraisal with this sample size is generally thought of as a reasonable sized appraisal given that it can be for the entire company. Refer to Case Study 1 and 2 for examples of how this type of tradeoff analysis could be performed.

Applying the Data Coverage Requirements

After interviewing Green Company management, process and quality personnel, the following support functions were found to exist in the organizational unit

- Engineering Process Group
- Configuration/Release Management
- Quality Assurance
- Measurement Specialists
- Procurement and Training

The table below shows the mapping of process areas to the basic units and support functions that perform the related work. This is a level of detail not specifically illustrated in the previous case studies, though obviously this type of understanding is necessary to support data collection planning in all cases.

Table 40: Process Areas and Basic Units/Support Functions

Process Area Name	Work Done By...
Requirements Management	Basic Units: Releases and Special Projects
Project Planning	Basic Units: Releases and Special Projects
Project Monitoring and Control	Basic Units: Releases and Special Projects
Supplier Agreement Management	Support Function: Procurement
Measurement and Analysis	Support Function: Measurement Specialists
Process and Product Quality Assurance	Support Function: Quality Assurance
Configuration Management	Support Function: Configuration/Release Management
Requirements Development	Basic Units: Releases and Special Projects
Technical Solution	Basic Units: Releases and Special Projects
Product Integration	Basic Units: Releases and Special Projects
Verification	Basic Units: Releases and Special Projects
Validation	Basic Units: Releases and Special Projects
Organizational Process Focus	Support Function: Engineering Process Group
Organizational Process Definition	Support Function: Engineering Process Group
Organizational Training	Support Function: Procurement
Integrated Project Management	Basic Units: Releases and Special Projects
Risk Management	Basic Units: Releases and Special Projects
Decision Analysis and Resolution	Basic Units: Releases and Special Projects

Data collection planning for each process area in scope of the appraisal is driven by the data coverage rules found in activity 2.4.1, Verify Objective Evidence. A high-level view of the data coverage requirements for this scenario appears in the matrices below. In each matrix, “ART” stands for artifacts and “AFF” stands for affirmations. Cells that are not shaded in grey represent areas where data collection would be required. Note, there are alternative allowable configurations, but the number of cells in the matrices depicts the data coverage requirements.

Table 41: Basic Unit/Support Function versus Process Area Map

	REQM		PP		PMC		RD		TS		PI		VER		VAL		IPM	
	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff
Relevant Sampling Factors																		
Flagship Releases	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
New Division A Releases	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
New Division B Releases	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Data Warehouse 2011	o	x	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
SecurityReporting ABC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Firmware Tester 2011	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Procurement	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Measurement Specialist	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Quality Assurance	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Configuration Management	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Engineering Process Group	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Table 42: Basic Unit/Support Function versus Process Area Map (continued)

Relevant Sampling Factors	RSKM		DAR		SAM		MA		PPQA		CM		OPF		OPD		OT	
	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff	Art	Aff
Flagship Releases	x	x	x	x	x	x	o	o	o	o	o	o	o	o	o	o	o	o
New Division A Releases	x	x	x	x	x	x	o	o	o	o	o	o	o	o	o	o	o	o
New Division B Releases	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Data Warehouse 2011	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
SecurityReporting ABC	x	x	x	x	x	x	o	o	o	o	o	o	o	o	o	o	o	o
Firmware Tester 2011	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Procurement	o	o	o	o	x	x	o	o	o	o	o	o	o	o	o	o	x	x
Measurement Specialist	o	o	o	o	o	o	x	x	o	o	o	o	o	o	o	o	o	o
Quality Assurance	o	o	o	o	o	o	o	o	x	x	o	o	o	o	o	o	o	o
Configuration Management	o	o	o	o	o	o	o	o	o	o	x	x	o	o	o	o	o	o
Engineering Process Group	o	o	o	o	o	o	o	o	o	o	o	o	x	x	x	x	o	o
	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1

Notes:

- The single basic unit for the first subgroup (Flagship Division System Releases) supplies both artifacts and affirmations for all process areas applicable to basic units. This is in accordance with the data in Coverage Rule 1 for basic units.
- In the next subgroup (Releases in New Division A or B) only one of the two basic units is sampled. In accordance with Coverage Rule 1 for basic units, artifacts and affirmations are supplied for all process areas applicable to basic units here as well.
- The next subgroup consists of three basic units (DataWarehouse2011, SecurityReportingABC and FirmwareTester2011), and only two of these are sampled. In this subgroup, Coverage Rule 1 for basic units is satisfied by the fact that “SecurityReportingABC” provides artifacts and affirmations for all process areas applicable to basic units. Due to the small size of the sample, this also meets the data coverage rule Coverage Rule 2 for basic units. According to Coverage Rule 3 for basic units, additional data (artifacts OR affirmations) must be provided by the second sampled basic unit for at least one process area – here the plan exceeds this minimum by seeking affirmations for the basic unit “DataWarehouse2011” on a number of process areas (including RD, TS, PI, VER and VAL).

Case 3 (Small Development Organization) Summary

Under the rules of SCAMPI V1.3, this company will be able to explore many different alternatives pertaining to the definition of the organizational unit and associated organizational scope, as appropriate. At this point, the lead appraiser and representatives from the organization can establish reliable estimates for the detailed data collection activities that follow, and consider a variety of trade-offs in the scope and sample of the appraisal. Based on ‘sanity checks’ looking at the variation in process implementation (perhaps through examination of PPQA records) the adequacy of the above minimum sample can be evaluated. Costs associated with alternative scenarios that result from reconsidering other assumptions can also be evaluated.

Summary of Case Studies

Many different permutations of the organizational unit are supported by SCAMPI V1.3.

The analysis of sampling factors, and examination of sampling trade-offs, helps the appraisal team leader to work with the appraisal sponsor to seek the most efficient appraisal for a given scope of the organizational unit. If the magnitude of the organizational scope of the appraisal exceeds the constraints of the sponsor, then eliminating one or another source of diversity in the organizational unit can provide needed de-scoping.

Appendix G SCAMPI A Appraisals Including Multiple Models

Purpose

The purpose of this appendix is to provide guidance for SCAMPI As that incorporate more than one reference model (e.g., a CMMI constellation with the People CMM). The first area for guidance that sets the stage and underlies all of the other considerations is scoping. When scoping an appraisal involving more than one reference model the lead appraiser needs to remember that the requirements for each reference model included in the appraisal scope must be satisfied. The description of the organizational unit needs to be specified uniquely for each reference model. There may be overlap, at times substantial, among the organizational units for the reference models. This is necessary because some organizations may have very tightly integrated basic units that implement processes that span multiple reference models (e.g., configuration management), while others may have sister organizations that fall under the same management structure but implement different process sets with only limited overlap (e.g., they share infrastructure, but use very different business practices).

Single Event

An appraisal addressing more than one reference model is considered to be a single appraisal from an appraisal-planning and record-keeping perspective. The planning will cover all reference models involved with a single appraisal plan (or single collection of planning documents. A single SAS entry and one appraisal disclosure statement are to be generated. A single data package will be submitted to the SEI upon completion of the appraisal. There will be one lead appraiser. The lead appraiser and appraisal team members will be recognized as having participated in a single appraisal for the purpose of satisfying pre-requisites to attend training or renewing credentials. Conducting an appraisal of more than one reference model at a single event will save some costs over having separate appraisal teams and separate events (e.g., common appraisal planning, team training, preparation and conduct).

Planning

Overview

A key step to planning the appraisal is analyzing the organizational structure to determine the appropriate organizational unit for each of the included reference model. During this analysis the appraisal team leader in consultation with the sponsor determines which business objectives are appropriate to each reference model and how these align with the appraisal objectives. The appraisal team leader will then work with the sponsor to identify and document the organizational unit and organizational scope for each reference model through selection of the basic units and groups providing support functions that will participate in the appraisal. Throughout the planning process various tailoring options for the different reference models will be exercised and documented.

An integrated organizational process architecture will provide opportunities for appraisal optimization. Some efficiency may be achieved in the data collection for process management and possibly support process areas based on the process architecture structure for the organization.

Three Organization Types

This high-level example will consider three organizations that are performing maintenance and help desk functions. All three of the organizations are using CMMI-DEV for the maintenance processes and CMMI-SVC for the help desk processes.

Organization A: Organization A has closely integrated maintenance and help desk functions with each team providing both maintenance and help desk support for one or more customers. There will be an almost complete overlap between the organizational unit for CMMI-DEV and the organizational unit for CMMI-SVC.

Organization B: Organization B has a centralized help desk team that handles all customers. It has maintenance teams either for each customer or set of customers (some of the maintenance is for custom systems and some is for product lines). There will be little to no overlap between the organizational units between CMMI-DEV and CMMI-SVC functions.

Organization C: Organization C is a hybrid of Organization A and Organization B with a mix of centralized and dispersed functions depending upon the product line. Some product lines keep the maintenance and help desk functions separated and some have them intermingled, depending upon which seems most appropriate for that particular product line.

There are many other options with varying degrees of centralization versus dispersal. One aspect in analyzing the organization for planning the appraisal is to understand the interfaces between the processes and the organizational structure and use that understanding to determine the basic units. This will then determine the organizational scoping, data collection, and practice characterizations for the organization. Selection of basic units and support functions during the appraisal planning process begins the organizational scoping process. The sections below describe the impacts of having more than one reference model in an appraisal.

Scoping

The description of the organizational unit as well as the description of the organizational scope must be specified uniquely for each reference model. The identification of the ‘basic units’ to be sampled may differ depending upon the reference models in scope, and must be documented for each. For example, CMMI-DEV and CMMI-ACQ have “projects” while CMMI-SVC has “work units” and People CMM has “units”. The appraisal team leader needs to evaluate the characteristics of the basic units to understand how processes may be implemented differently across basic units. For example if the basic unit is executing both DEV and SVC based processes, do we need to examine it from both perspectives or are the implementations similar enough that they can be treated as one?

Additionally, there may be support functions that exist and relate to multiple reference models, or may be defined in reference model-specific structures or a combination of both. For example, for process management process areas, an organization may have one process group for all reference models, or an over-arching process group followed by reference model specific process groups, or

structure process groups along organization lines (as some organization currently do with division-specific process groups).

Sampling Factors

A key consideration in scoping is analyzing sampling factors that affect the way people do the work in different basic units for each organizational unit defined for each reference model. Some sampling factors will have the same implication for all reference models while other sampling factors may have reference model-specific implications, and not be relevant to all reference models in scope. This analysis is used to form a representative sample of the organizational unit to identify the organizational scope of the appraisal. The analysis of the sampling factors needs to be documented clearly for each reference model since they may

- be different for each reference model
- have the same implication for all reference models
- have reference model-specific implications, and not be relevant to all reference models in scope

Subgroups and Basic Units

Next, subgroups are defined for each organizational unit based on the analysis of the sampling factors. Subgroups defined using the sampling factors represent clusters of similar process implementations. Basic units within these subgroups are sampled to form the organizational scope for each organizational unit. If there is overlap in the organizational units defined for each reference model there may be overlap in the organizational scope for each reference model as well, depending on how work is performed by different basic units. Subgroups that are the basis for the final sampling decisions may take on different forms such as:

- Reference model-specific subgroups (e.g., Service Level Agreement (SLA)-based services within a given service category vs. non-SLA-based services in that same service category)
- Common subgroups (e.g., Measurement and Analysis staff who support all government work (e.g., Development (DEV) and Services (SVC) related work)

Process Area Mapping

The business organization and organization structure determine the extent to which data sufficiency (process area mapping) analysis can be optimized. Mapping of process areas to basic units and support functions is established to support data collection planning for each organizational unit for each reference model within the appraisal scope. This mapping varies depending on the way processes are implemented in each organizational unit. For core process areas, sampling of objective evidence is needed for each reference model where implementation of these processes is unique to each reference model. Some organizations however, may share resources to perform support functions like Configuration Management (CM) across both development and services activities. In this instance, mapping of the core process area CM is at the organizational level for both reference models. In this case, objective evidence may be reused to support each practice for each reference model for CM since CM resources support both

development and services efforts. Other organizations may establish separate Configuration Management functions for development and services efforts. While still performed at the organizational level for each reference model, the mapping of CM would be unique for each organizational unit. Reference model unique process areas may be instantiated in each and every basic unit and therefore objective evidence would be collected uniquely for each process area. It is also possible that a given process area is instantiated in parallel support functions that exist within given subgroups, or are shared across a number of subgroups. The mapping of process areas to basic units and support functions will show how each reference model scope relates to each organizational scope. The appraisal team leader needs to evaluate and determine the process area mapping applicable to the organizational scope of the appraisal working closely with the sponsor.

Data Collection Planning

The data collection plan will document which artifacts and affirmations apply to each practice, in each process area, in each reference model. Differences in the way people are organized to perform the work within each organizational unit for each reference model affects the sources of data which must be considered to appraise each process area depending on the analysis of the process area mapping. Approaches for collection of shared data across reference models (e.g., common affirmations and artifacts) are addressed in detail in the data collection plan. Planning for common affirmations (e.g., interviews, demonstrations, and presentations) across organizational units when common processes are used across each reference model will improve the efficiency of the Conduct Appraisal phase. Care must be taken to balance the use of common affirmations and artifacts to ensure that sufficient objective evidence is collected to verify implementation of each practice in each reference model within the appraisal scope based on the process area mapping. This requires a detailed understanding of how processes are implemented in each organizational unit for each reference model.

Risk Management

Examples of risks specific to appraisals of more than one reference models include:

- Team size and work load imbalance
- Managing a larger team with extended period of on-site phase
- Managing the individual experience level of appraisal team members specific to each reference model affecting the team's ability to reach consensus
- Managing the data collection planning (e.g., determining objective evidence needed to support core process areas vs. reference model unique process areas or common implementation of support functions across more than one reference model)
- Inefficient or incorrect reuse of objective evidence to support practices across more than one reference model
- Unclear appraisal objectives due to multiple sponsors with different business objectives and maturity levels

Appraisal Team

Team Training

In order to support team consensus, each and every appraisal team member must meet the requirements associated with each and every reference model included in the scope of the appraisal. The appraisal team leader must be certified in each reference model (except for People-CMM) in the scope of the appraisal. At the discretion of the lead appraiser individuals who fall short of the minimum requirements can participate as long as the team meets the overall requirements. Enough reference model-specific experience for each mini-team is needed to properly judge reference model compliance and adequacy of objective evidence to demonstrate practice instantiations.

Teams, Sub-teams, and Mini-Teams

Team size may increase as compared to an appraisal of one reference model to meet the increased training and expertise requirements as well as the increase of model scope. During the planning of the appraisal, the lead appraiser (in collaboration with the sponsor) will explicitly document the appraisal team structure. Some of the options are:

- Identify reference model-specific sub-teams – with further assignment of mini-teams to organizational entities or groups of process areas
- Identify mini-teams assigned to organizational entities or groups of process areas, without differentiating reference models
- Use neither sub-teams nor mini-teams, in which case the entire team works as a whole on all organizational entities and process areas (though this is not very common)

Each of these options have advantages and disadvantages and the appraisal team leader needs to take into consideration the experience levels of the team members in the domain areas, assigned process areas, appraisal experience, etc. The more people on each team, the longer it takes to build consensus, however it means more individuals are examining and judging the data which tends to lead to more thorough results

Examining Objective Evidence

Depending on the differences or similarities in the way processes are implemented for each reference model, one piece of objective evidence may support more than one practice across more than one reference model. The details of this requirement are provided in the Data Sufficiency section. The lead appraiser will analyze and document the result in the plan.

Verification

Data sufficiency

Data sufficiency rules shall be applied to each practice within each included reference model which will in some cases require:

- Reference model-unique data (e.g., SCON in CMMI-SVC must have enough data from all work groups included)

- Common organizational data that may be evaluated as it applies to each reference model in turn (e.g., OPF evidence for a common implementation that spans multiple reference models)
- ‘parallel data sets’ for reference model-specific implementations of process areas (e.g., data used to evaluate Risk Management for CMMI-DEV could be a completely different data set than what the team examines regarding Risk Management for CMMI-SVC - there must be sufficient data for each implementation of Risk Management)

Practice Characterizations

Each practice is characterized separately for each reference model, with the possible exception of common process areas. For core process areas that are implemented at the organizational level for each reference model, the characterizations could be same when based on the same objective evidence. For example, when shared resources support Configuration Management across the defined organizational units and their process implementation is the same the resulting characterizations will likely be the same for each reference model. When core process areas are implemented differently for each reference model, objective evidence is assessed for each unique implementation of the practice and characterizations are unique to the organizational unit. This could result in a characterization of Partially Implemented (PI) for Project Planning (PP) for CMMI- DEV while Fully Implemented (FI) for Project Planning (PP) for CMMI-SVC. Reference model unique process areas will result in unique characterizations. Process management process areas common implementation that spans multiple reference models would likely result in single characterization of model practices for each reference model.

Data Validation

Multiple validation activities can be conducted for reference model specific findings depending on how the work is organized across each organizational unit within the appraisal scope.

Ratings

Separate goal ratings (and process area or maturity level ratings, if produced) are required for each reference model in the appraisal. There is no mechanism provided for deriving a combined rating (combined ratings are explicitly prohibited). This does not prohibit a continuous appraisal from being performed and then equivalent staging being applied to the selected organizational unit for each CMMI reference model separately. For core process areas that are implemented at the organizational level for each reference model, the ratings could be common when based on the same objective evidence.

Findings

There may be an integrated final finding or multiple final findings (a tailoring option). All findings shall be reviewed and affirmed using a consensus decision process involving the entire appraisal team. Findings may be generated separately for core process areas for each CMMI reference model in scope. Separate findings may be beneficial when there is limited overlap in organizational units for each reference model. Combined findings would be appropriate for core process areas especially when there is significant overlap in organizational units for each reference model. If integrated findings are provided, the findings must be traceable to each reference model within the appraisal scope.

Appendix H SCAMPI A Tailoring Checklist

Table 43: Tailoring Checklist

MDD Process	Tailoring Options	Option Chosen (Y/N)	Tailoring Rationale (Provide a brief explanation if this option was chosen)
1.1.1 Determine Appraisal Objectives	Appraisal usage mode		Internal Process Improvement, Supplier Selection, or Process Monitoring
1.1.2 Determine Data Collection Strategy	Collection of objective evidence during the planning or conduct phase or combinations of both approaches		Discovery, managed discovery, verification
1.1.4 Determine Appraisal Scope	Use of incremental appraisals		
1.1.5 Determine Appraisal Outputs	Selection of optional ratings and findings		Optional findings: non-model findings, final report, recommendations, process improvement action plan, basic unit specific findings Optional ratings: process area, maturity level,
1.3.2 Prepare Team	Deliver Appraisal Method training to more than a single team at the same event		Reference waiver
1.3.2 Select Team Members	Accept one team member with no field experience		
1.3.4 Prepare Team	Teams involved in U.S. government source selection or process monitoring		Specify additional training to be provided
1.4.2 Inventory Objective Evidence	Collection of objective evidence during the planning or conduct phase or combinations of both approaches		Discovery, managed discovery, verification
1.5.1 Perform Readiness Review	Practice characterizations are done before or during the readiness review		Conduct Appraisal phase begins
1.5.1 Perform Readiness Review	Class B or C (SCAMPI B or C) used as readiness review		Conduct Appraisal phase begins

MDD Process	Tailoring Options	Option Chosen (Y/N)	Tailoring Rationale (Provide a brief explanation if this option was chosen)
1.5.1 Perform Readiness Review	Used as one of the iterative data collection activities in a Managed Discovery approach.		
2.2.1 Examine Objective Evidence from Artifacts	Evaluate the content of artifacts to determine how it supports model practice implementation during readiness review or other appraisal preparation activity		Conduct Appraisal phase begins
2.2.2 Examine Objective Evidence from Affirmations	Evaluate the information from affirmations to determine how it supports model practice implementation during readiness review or other appraisal preparation activity		Conduct Appraisal phase begins
2.2.2 Examine Objective Evidence from Affirmations	Use of virtual methods for affirmations		Risk mitigation plan
2.6.2 Determine Process Area Ratings	This is an optional activity selected at the discretion of the appraisal sponsor		
2.6.3 Determine Process Area Profile	This is an optional activity selected at the discretion of the appraisal sponsor		
2.6.4 Determine Maturity Level	This is an optional activity selected at the discretion of the appraisal sponsor		
3.1.2 Conduct Executive Session(s)	This is an optional activity selected at the discretion of the appraisal sponsor		
3.1.3 Plan for Next Steps	This is an optional activity selected at the discretion of the appraisal sponsor		
3.2.1 Collect Lessons Learned	This is an optional activity selected at the discretion of the appraisal sponsor		

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Glossary

The MDD glossary defines many, but not all, terms used in this document. Consult the following additional sources for terms and definitions supplementary to the MDD glossary:

- CMMI model glossary and terminology
- Appraisal Requirements for CMMI (ARC) glossary

Terms that are important in order to understand this document are duplicated from the model document or from the ARC for convenience.

affirmation

An oral or written statement confirming or supporting implementation (or lack of implementation) of a model practice provided by the implementers of the practice, provided via an interactive forum in which the appraisal team has control over the interaction.

Examples of oral affirmations include interview responses, presentations, and demonstrations of a tool or mechanism related to implementation of a CMMI model practice, as long as these presentations and demonstrations are provided in an interactive setting.

Examples of written affirmations include written statements provided by the implementers of the practice to the appraisal team via an interactive forum (e.g., email) in which the appraisal team has the ability to ask questions either orally or written. Presentation and demonstration materials provided in an interactive setting to the appraisal team can also be written affirmations if they are not outputs of the process, in which case they could be artifacts instead.

alternative practice

A practice that is a substitute for one or more practices contained in a reference model that achieves an equivalent effect toward satisfying the goal associated with the model practice. Alternative practices are not necessarily one-for-one replacements for the model practices.

appraisal

An examination of one or more processes by a trained team of professionals using an appraisal reference model as the basis for determining, as a minimum, strengths and weaknesses.

Appraisal Disclosure Statement (ADS)

A summary statement describing the ratings generated as outputs of the appraisal, and the conditions and constraints under which the appraisal was performed. The ADS should be used for public disclosures of maturity level or capability level ratings so they can be interpreted accurately.

appraisal findings

The results of an appraisal that identify, as a minimum, any strengths and weaknesses within the appraisal scope. Appraisal findings are inferences drawn from corroborated objective evidence.

appraisal method class

A family of appraisal methods that satisfy a defined subset of requirements in the Appraisal Requirements for CMMI (ARC). These classes are defined so as to align with typical usage modes of appraisal methods.

appraisal modes of usage

The contexts in which an appraisal method might be utilized. Appraisal modes of usage identified for the SCAMPI method include internal process improvement, supplier selection, and process monitoring.

appraisal objectives

The desired outcome(s) of an appraisal process.

appraisal output

All of the tangible results from an appraisal (see *appraisal record*).

appraisal participants

Members of the organizational unit who participate in providing information during the appraisal.

appraisal rating

The value assigned by an appraisal team to (a) a goal or process area, (b) the capability level of a process area, or (c) the maturity level of an organizational unit. The rating is determined by enacting the defined rating process for the appraisal method being employed.

appraisal record

An orderly, documented collection of information that is pertinent to the appraisal and adds to the understanding and verification of the appraisal findings and ratings generated. Provided to the sponsor prior to the report results phase of the appraisal.

appraisal reference model

The CMMI or other model to which an appraisal team correlates implemented process activities.

appraisal scope

The definition of the boundaries of the appraisal encompassing the organizational limits and the model limits within which the processes to be investigated operate. The appraisal scope includes the reference model scope, organizational unit and organizational scope.

appraisal sponsor

The individual, internal or external to the organization being appraised, who requires the appraisal to be performed, and provides financial or other resources to carry it out.

appraisal tailoring

Selection of options within the appraisal method for use in a specific instance. The intent of tailoring is to assist an organization in aligning application of the method with its business needs and objectives.

appraisal team leader

The person who leads the activities of an appraisal and has satisfied the qualification criteria for experience, knowledge, and skills defined by the appraisal method.

artifact

A tangible form of objective evidence indicative of work being performed that represents either the primary output of a model practice or a consequence of implementing a model practice.

assessment

An appraisal that an organization does internally for the purposes of process improvement. The word assessment is also used in the CMMI Product Suite in an everyday English sense (e.g., risk assessment).

basic unit

A managed set of interrelated resources which delivers one or more products or services to a customer or end user and typically operates according to a plan. Such a plan is frequently documented and specifies the products or services to be delivered or implemented, the resources and funds to be used, the work to be done, and the schedule or doing the work.

capability evaluation

An appraisal by a trained team of professionals used as a discriminator to select suppliers, to monitor suppliers against the contract, or to determine and enforce incentives. Evaluations are used to gain insight into the process capability of a supplier organization and are intended to help decision makers make better acquisition decisions, improve subcontractor performance, and provide insight to a purchasing organization.

consensus

A method of decision making that allows team members to develop a common basis of understanding and develop general agreement concerning a decision that all team members are willing to support.

consolidation

The activity of collecting and summarizing the information provided into a manageable set of data to (a) determine the extent to which the data are corroborated and cover the areas being investigated, (b) determine the data's sufficiency for making judgments, and (c) revise the data-gathering plan as necessary to achieve this sufficiency.

corroboration

The activity of considering multiple pieces of objective evidence in support of a judgment regarding an individual CMMI model practice.

coverage criteria

The specific criterion that must be satisfied in order for coverage to be claimed.

data collection session

An activity during which objective evidence is gathered. Data collection sessions (or activities) include artifact reviews and affirmations.

discovery-based appraisal

An appraisal in which limited objective evidence is provided by the appraised organization prior to the appraisal, and the appraisal team must probe and uncover a majority of the objective evidence necessary to obtain sufficient coverage of reference model practices. Discovery-based appraisals typically involve substantially greater appraisal team effort than verification-based appraisals, in which much of the objective evidence is provided by the appraised organization. (See *verification-based appraisal* for contrast.)

document

A collection of data, regardless of the medium on which it is recorded, that generally has permanence and can be read by humans or machines. Documents can be work products reflecting the implementation of one or more model practices. These documents typically include work products such as organizational policies, procedures, and implementation-level work products. Documents may be available in hardcopy, softcopy, or accessible via hyperlinks in a web-based environment.

focused investigation

A technique to prioritize appraisal team effort based on the continuous collection and consolidation of appraisal data, and monitoring of progress toward achieving sufficient coverage of reference model practices. Appraisal resources are targeted toward those areas for which further investigation is needed to collect additional data or verify the collected set of objective evidence.

fully implemented (FI)

A practice characterization value assigned to a process instantiation when (1) sufficient artifacts are present and judged to be adequate, (2) affirmation exists to confirm the implementation, and (3) no weaknesses are noted.

instantiation

The implementation of a model practice used in the appropriate context within the boundaries of an organizational unit.

institutionalization

The ingrained way of doing business that an organization follows routinely as part of its corporate culture.

internal process improvement (IPI)

An appraisal mode of usage in which organizations appraise internal processes, generally to either baseline their process capability, to establish or update a process improvement program, or to measure progress in implementing such a program.

interviews

A meeting of appraisal team members with appraisal participants for the purpose of gathering information relative to work processes in place. In SCAMPI, this includes face-to-face interaction with those implementing or using the processes within the organizational unit. Interviews are typically held with various groups or individuals, such as project or work group leaders, managers, and practitioners. A combination of formal and informal interviews may be held and interview scripts or exploratory questions developed to elicit the information needed.

largely implemented (LI)

A practice characterization value assigned to a process instantiation when (1) sufficient artifacts are present and judged to be adequate, (2) affirmation exists to confirm the implementation, and (3) one or more weaknesses are noted.

lead appraiser

A person who has achieved recognition from an authorizing body to perform as an appraisal team leader for a particular appraisal method.

managed discovery

A phased data collection approach beginning with an initial data call for a pre-determined set of artifacts, followed by a set of iterative calls based on the appraisal team's evaluation of the work products and remaining evidence gaps. Managed Discovery attempts to balance verification and discovery activities by using a phased approach to data collection to mitigate the risk of the organization failing to provide the needed data or providing inappropriate data.

mini-team

A subset of the appraisal team members, typically two or three, assigned primary responsibility for collection of sufficient appraisal data to ensure coverage of their assigned reference model process areas or basic units.

non-model findings

Findings that have significant positive or negative impact on the enactment of processes within the organizational unit that do not directly relate to model practices.

not implemented (NI)

A practice characterization value assigned when the appraisal team determines insufficient objective evidence exists to state that the practice is implemented. That is, artifacts are absent or judged to be inadequate, no other evidence (affirmations) supports the practice implementation, and one or more weaknesses are noted.

not yet (NY)

A practice characterization value assigned when the basic unit has not yet reached the phase in the lifecycle within the appraisal scope to have implemented the practice.

objective evidence

Artifacts or affirmations used as indicators of the implementation or institutionalization of model practices.

organizational scope

The collection of basic units and support functions that provides instantiations of practices used within, and representative of, an organizational unit.

organizational unit

That part of an organization that is the subject of an appraisal and to which the appraisal result will be generalized. An organizational unit deploys one or more processes that have a coherent process context and operates within a coherent set of business objectives. An organizational unit is typically part of a larger organization, although in a small organization, the organizational unit may be the whole organization.

partially implemented (PI)

A practice characterization value assigned to a process instantiation when (1) artifacts are absent or judged to be inadequate, (2) affirmations suggest that some aspects of the practice are implemented, and (3) one or more weaknesses are noted; or (1) sufficient artifacts is present and judged to be adequate, (2) no other evidence (affirmations) supports the artifact(s), and (3) one or more weaknesses are noted.

practice characterization

The assignment of a value describing the extent to which a CMMI model practice is implemented. It is used as a mechanism to reach appraisal team consensus. The range of values for practice characterization values include Fully Implemented (FI), Largely Implemented (LI), Partially Implemented (PI), Not Implemented (NI), and Not Yet (NY). Practice characterization values are assigned to each reference model practice for each process instantiation within the organizational scope, and aggregated to the organizational unit level.

preliminary findings

Strengths and weakness statements created after synthesizing corroborated objective evidence. Preliminary findings are provided to appraisal participants for validation. (See also *appraisal findings*.)

presentations

In SCAMPI, a source of objective evidence that includes information prepared by the organization and delivered visually or verbally to the appraisal team to aid in understanding the organizational processes and implementation of reference model practices. This typically includes such mechanisms as orientation or overview briefings, and demonstrations of tools or capabilities.

process context

The set of factors documented in the appraisal input that influences the judgment and comparability of appraisal ratings. These include, but are not limited to, (a) the size of the organizational unit to be appraised, (b) the demographics of the organizational unit, (c) the application domain of the products or services, (d) the size, criticality, and complexity of the products or services, and (e) the quality characteristics of the products or services.

process monitoring

An appraisal mode of usage in which appraisals are used to monitor process implementation (for example, after contract award by serving as an input for an incentive/award fee decision or a risk management plan). The appraisal results are used to help the sponsoring organization tailor its contract or process monitoring efforts by allowing it to prioritize efforts based on the observed strengths and weaknesses of the organization's processes. This usage mode focuses on a long-term teaming relationship between the sponsoring organization and the development organization (buyer and supplier).

process profile

The set of goal ratings assigned to the process areas in the scope of the appraisal. In CMMI, "process profile" is also known as the "process area profile."

rating

See appraisal rating.

recommendation

Suggestions to resolve a weakness or to propagate a strength

sampling factor

Organizational or work context that reflects meaningful differences in the way work is performed across different basic units within the organizational unit. Examples of sampling factors include location, customer, and type of work.

satisfied

Rating given to a goal when the aggregate of validated findings does not negatively impact achievement of the goal. Rating given to a process area in the staged representation of the reference model when all of its goals are rated "satisfied."

strength

Exemplary or noteworthy implementation of a reference model practice

subgroup

Cluster of basic units that share common sampling factor alternatives and exhibit similar process implementations.

sufficient data coverage

A determination that the coverage requirements have been met. See *coverage* and *coverage criteria*.

supplier selection

An appraisal mode of usage in which appraisal results are used as a high value discriminator to select suppliers. The results are used in characterizing the process-related risk of awarding a contract to a supplier.

support function

An organizational group that provides products and/or services for a bounded set of activities needed by other portions of the organization. Examples of support functions include a configuration management group or an engineering process group.

tailoring

See appraisal tailoring.

verification-based appraisal

An appraisal in which the focus of the appraisal team is on verifying the set of objective evidence provided by the appraised organization in advance of the appraisal, in order to reduce the amount of probing and discovery of objective evidence during the appraisal on-site period. (See *discovery-based appraisal* for contrast.)

weakness

The ineffective, or lack of, implementation of one or more reference model practices.

REPORT DOCUMENTATION PAGE			<i>Form Approved OMB No. 0704-0188</i>
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.			
1. AGENCY USE ONLY (Leave Blank)	2. REPORT DATE March 2011	3. REPORT TYPE AND DATES COVERED Final	
4. TITLE AND SUBTITLE Standard CMMI Appraisal Method for Process Improvement (SCAMPI) A, Version 1.3: Method Definition Document		5. FUNDING NUMBERS FA8721-05-C-0003	
6. AUTHOR(S) SCAMPI Upgrade Team			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Software Engineering Institute Carnegie Mellon University Pittsburgh, PA 15213		8. PERFORMING ORGANIZATION REPORT NUMBER CMU/SEI-2011-HB-001	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) HQ ESC/XPK 5 Eglin Street Hanscom AFB, MA 01731-2116		10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES			
12A DISTRIBUTION/AVAILABILITY STATEMENT Unclassified/Unlimited, DTIC, NTIS		12B DISTRIBUTION CODE	
13. ABSTRACT (MAXIMUM 200 WORDS) The Standard CMMI Appraisal Method for Process Improvement (SCAMPI) is designed to provide benchmark quality ratings relative to Capability Maturity Model Integration (CMMI) models and the People CMM. The SCAMPI Method Definition Document (MDD) describes the requirements, activities, and practices associated with the processes that compose the SCAMPI method. The MDD also contains precise descriptions of the method's context, concepts, and architecture.			
14. SUBJECT TERMS appraisal, CMMI, appraisal method, Class A method, SCAMPI A, Method Document Description, MDD		15. NUMBER OF PAGES 276	
16. PRICE CODE			
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL

