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Systems Engineering Capability Model Appraisal Method		

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Systems Engineering Capability Model Appraisal Method

EIA/IS-731.2

DECEMBER 1998

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SYSTEMS ENGINEERING CAPABILITY MODEL APPRAISAL METHOD

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Foreword

Purpose

This document describes the Appraisal Method (AM) for the Systems Engineering Capability Model (SECM). An appraisal compares an organization's Systems Engineering capabilities against the Specific Practices of the Focus Areas and the Generic Characteristics defined in EIA/IS 731, Part 1.

Who Should Use the Appraisal Method

Executives and process owners in organizations, enterprises, or programs performing just about any kind of Systems Engineering product life cycle activities may use the Appraisal Method. Organizations already engaged in process improvement efforts may use this Appraisal Method and the SECM to baseline their efforts and success to date.

Why the Appraisal Method was developed

The problem that EPIC, the SECM Working Group, EIA, and INCOSE intends to solve is to reduce the barriers to enterprise-wide process improvement. As part of this, a consistent Appraisal Method is needed to provide a publicly accessible method to prepare for and acquire capability baselines and industry/product-independent, comparative appraisals.

Appraisal Method Scope

The scope of the Appraisal Method is designed specifically to support continuous process improvement. The Appraisal Method activities are the same basic set used by the SEI CMM-Based Appraisal for Internal Process Improvement (CBA-IPI) method for staged architecture CMM@s. Some differences exist due to the different model architectures.

This document is a process description for the Appraisal Method, not a training manual. Some materials are included that support appraisal training; however, it is *not* the intent of this document to be a substitute for appraisal training materials.

How this Appraisal Method should be used

This Appraisal Method description was written to support an appraisal using the SECM as a reference model. This Appraisal Method description was not written to meet the needs of a third-party evaluation or audit. An appraisal of an organization's systems engineering capabilities primarily provides information useful for improving those capabilities vis-à-vis the SECM. This Appraisal Method can be performed as a self-appraisal or conducted by or with the assistance of an outside organization or consultant.

Appraisal Method developers

This Appraisal Method was developed by the EIA G47 SECM Working Group that developed EIA/IS 731, Part 1.

Acknowledgments

The acknowledgments are given in Part 1 of this document.

1 Introduction

1.1 Overview

This document contains basic information on the continuous architecture Appraisal Method. It is broken into six Sections with Annexes A through H.

- Section 1 contains introductory information and assumptions used in creating the Appraisal Method.
- Section 2 contains a brief overview of the important aspects of initiating, preparing for, and conducting an appraisal.
- Sections 3, 4, and 5 contain summaries of each of the major phases and process activities of the Appraisal Method. They begin with activity objectives, expected duration, brief descriptions of what to do and how to do it, and end with closure criteria. One page summary checklists for most activities are included in Annex E.
- Section 6 contains guidance information that is helpful in preparing for and conducting an appraisal.
- The Annexes contain templates and instructions for using support tools, including the Appraisal Method questionnaire.

Sections 1 and 2 are informative. Sections 3, 4, and 5 are normative but tailorable. Section 6 is informative, and all annexes are informative except the questionnaire, which is normative but tailorable in format and media.

1.2 Assumptions

The Appraisal Method description is based on the following assumptions, both procedural and model-based, that are relevant to using the Appraisal Method:

- The SECM is the reference model for the Appraisal Method.
- Readers are familiar with the content and concepts of *Systems Engineering Capability Model*.
- Facilitators intending to use the Appraisal Method have been trained in basic organizational appraisal techniques.
- The focus and tone of the Appraisal Method is self-improvement versus audit.

1.2.1 Facilitator Training

This Appraisal Method makes heavy use of informal knowledge that practitioners provide through a series of interviews and feedback sessions. There are many methods for interviewing and synthesizing data from these types of data sources. Although it is not necessary for all members of the appraisal team to be thoroughly versed in the concepts of organizational appraisal, the appraisal will proceed more smoothly, and is likely to produce better results, if at least one, and preferably two, of the appraisal team members are skilled in the facilitator role for organizational appraisals. The facilitators are included as members of the appraisal team.

1.2.2 Focus on Self-Improvement

The actual character of each appraisal will differ based on differences in organizations' cultures and other business contexts. The process described concentrates on a feedback loop that includes multiple levels of the entity being appraised. This is one of the ways in which the Appraisal Method contributes to an overall process improvement activity in the organization. There are many other models for organizational improvement, and most include a diagnostic step that serves to determine the current state of the organization. Diagnostic appraisals steer the attention and resources of the improvement effort.

2 Summary of the Appraisal Method

2.1 Overview

This section provides a brief overview of the important aspects of initiating, preparing for, and conducting an appraisal. Each of these issues is treated in more depth in Sections 3 - 6.

2.2 Appraisal Method

2.2.1 Purpose

The purpose of an appraisal is typically one of the following:

- Identify specific areas for improvement, based upon known, general areas of deficiency (i.e., establish a baseline and Focus Areas for improvements),
- Obtain buy-in for change from the organization,
- Confirm process improvement progress and determine a new baseline during second or subsequent appraisals.

2.2.2 Tailoring Appraisal Based on Objectives

An appraisal should be tailored to meet the objectives of the sponsor's organization. In different industries and situations, various Focus Areas provide greater value if done well than others, so the Appraisal Method should be tailored by selecting the Focus Areas of greatest significance. In addition, an appraisal may concentrate on almost any cohesive engineering unit of an enterprise, including specific projects or programs. The appraisal scope is based upon the sponsor's influence and goals. The appraisal may include all of the Focus Areas (typical for an initial appraisal), or it may concentrate on specific Focus Areas that may have been targeted for process improvement. Tailoring the set of Focus Areas and selecting the organizational units included in the appraisal (programs, functional units, etc.) are the two primary choices that have a significant impact on the duration of and resources required by an appraisal.

Specific aspects of the appraisal that may be tailored are addressed in the "Tailorable Parameters" block of each Focus Area element described in Sections 3 - 5.

2.2.3 Flow Diagram

The flow diagram of activities for a complete, facilitated appraisal is provided in Figure 2-1. Details for each activity and decision point are provided in Sections 3 - 5.

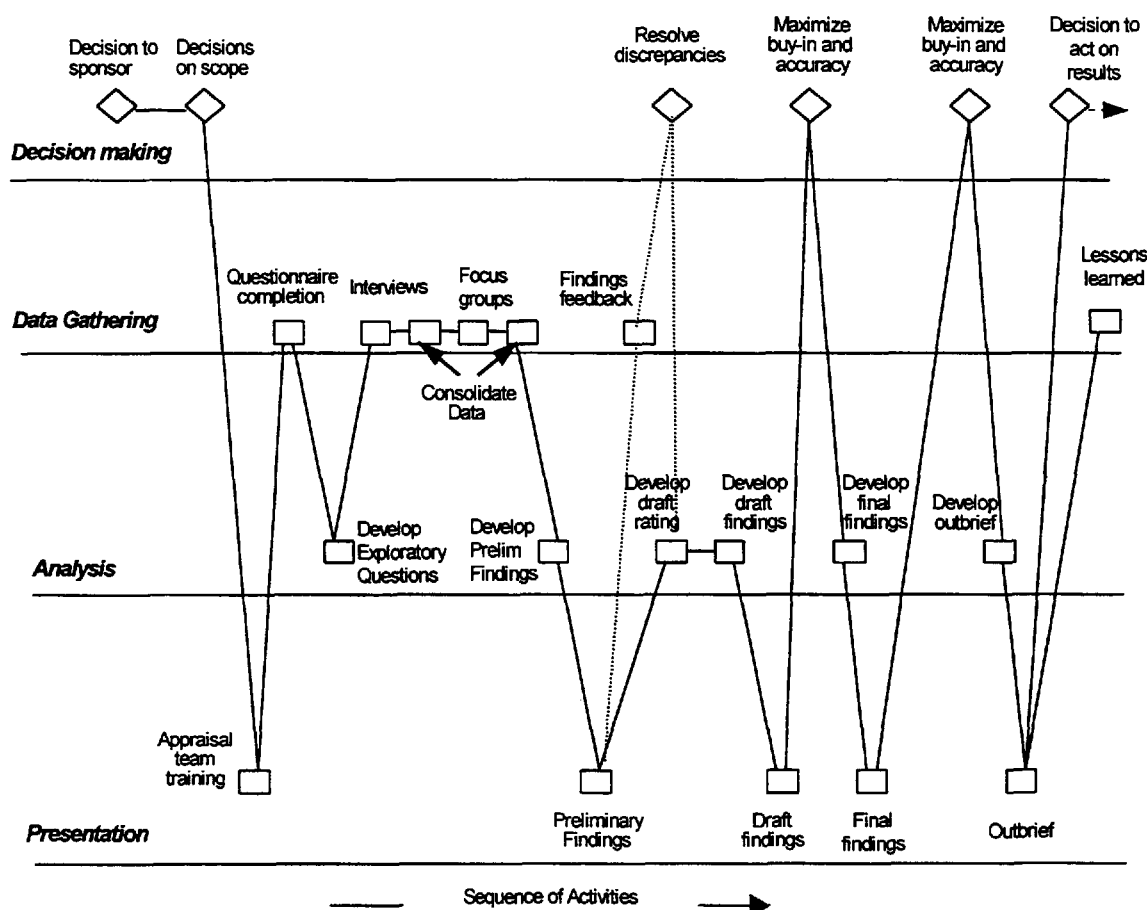


Figure 2-1. Flow Diagram for a Complete Appraisal

2.2.4 Results

The primary outputs of an appraisal are a findings briefing and an appraisal report. The findings briefing is presented at the end of the On-Site period of data collection, and includes a capability level for each Focus Area, capability profile and findings. The findings address both strengths of, and things to improve in, the appraised organization. The things to improve are typically limited to approximately seven synthesized findings to keep the focus on a smaller set of critical issues. The appraisal report is written by the appraisal team after the On-Site period. It includes details on each of the findings and specific recommendations for process improvement based on the findings.

Section 6 discusses the Focus Area capability profile and other aspects of developing and using appraisal results.

2.2.5 Labor Requirements

Table 2-1 defines the typical labor requirements for a complete appraisal (e.g., all SECM Focus Areas applied to three to five programs or equivalent). Labor requirements are tailored as a function of the scope of the appraisal. Typical schedule and labor templates are included in Annex C.

Table 2-1 - Labor Requirements for a Complete Appraisal

Role	Recommended number of people	Hours per person	Total hours for this role
Facilitator	2	66-92	132-184
Coordinator	1	60-100	60-100
Appraisal team members	4-6	65-91	260-546
Product leader interviewees	3-5 (1 per product line or life cycle)	7-10	21-50
Practitioners	3 groups of 8-10	7-10	168-300
TOTAL			641-1180

2.2.6 Phases

Table 2-2 lists the phases of the appraisal process. The activities for each phase are fully described in the indicated sections of this document.

Table 2-2 - Appraisal Phases

Section	Phase	Description
3	Preparation	The activities done in preparation for an appraisal
4	On-Site	The activities done at the site of the entity being appraised
5	Post-Appraisal	The activities done after the On-Site appraisal period

2.3 Appraisal Roles

2.3.1 Personnel Roles

Table 2-3 defines the personnel and associated roles that are typically involved in an appraisal. The responsibilities and functions performed by each of the roles is further defined in Sections 3 - 5. Note that multiple roles may be assigned to one person as appropriate.

Table 2-3 - Appraisal Roles

Role Name	Description
Appraisal team	The appraisal team consists of those who conduct the appraisal. <i>All of the personnel on the appraisal team should be familiar with the SECM prior to the On-Site phase.</i> This group includes the following roles: • Facilitator, • Appraisal team leader, • Site coordinator, and • Appraisers.
Facilitator	Member of the appraisal team who is responsible for: • Facilitating the appraisal process during the On-Site phase, and • Providing SECM expertise. The facilitator may be drawn from outside the sponsoring organization.
Appraisal Advocate	Individual who is responsible for championing the SECM process and obtaining resources and sponsor commitment.
Appraisal team leader	Individual who is responsible for: • Familiarizing the appraisal team with the Appraisal Method, • Presenting the appraisal findings and developing the appraisal report.
Site coordinator	Individual who is responsible for: • Obtaining facilities for the On-Site phase, • Scheduling activities during the On-Site phase, • Administering and collecting questionnaires, and • Ensuring personnel attendance, as appropriate.
Moderator	An appraisal team member who is responsible for keeping interview sessions focused and on schedule.
Appraisal team member	Anyone who participates in the data collection, analysis, findings generation, and communication with the participants from the appraised organization.
Appraisal participants	The appraisal participants are the subjects of data gathering in an appraisal. This group includes: • Product life cycle leaders (who know all or most of what is performed in the organization; i.e., interviewees that complete a questionnaire), and • Practitioners (technical, support, and management). Participants are the primary sources of data via questionnaires, interviews, and focus groups. Guidance on participant selection is found in Section 6.
Product life cycle leaders (may be called project leaders)	Appraisal participants identified as having responsibility for all or much of a product life cycle as defined by the organization. Each leader: • Completes the Appraisal Method questionnaire, • Participates in an interview, or question and answer session, and • Is a primary source of feedback on the validity of the findings.
Practitioners	Individuals who perform or support product life cycle (direct and indirect; e.g., training, customers, and suppliers). Practitioners are a source of data, primarily via the focus groups, and also as a feedback validation check of the appraisal findings. Practitioners complete all or parts of the questionnaire.
Model Maintenance Group	The group that is responsible for defining and maintaining engineering processes and assessment methods within the organization being appraised. This term also includes the external organization responsible for maintaining the SECM standard (EIA.)
Sponsor	Individual providing the resources for the appraisal and the commitment to the process improvement effort. It is particularly important for the sponsor to show commitment by attending both the opening and closing briefings of the On-Site phase, and especially accepting and indicating action that will occur as a result of the outbrief findings.

2.4 Appraisal Instruments

2.4.1 Findings

The goal of developing the findings is to accurately represent the most important organizational opportunities for process improvement. Data are sampled from the organization using the following check and balance mechanisms: questionnaires, interviews, and feedback sessions.

The findings evolve throughout the appraisal, beginning with the large amount of data from the questionnaire, as illustrated in Figure 2-2. From this data and data from the interviews, a set of preliminary findings is distilled. After reviewing them with the organization or program leaders, the preliminary findings are synthesized into a smaller set of draft findings. After reviewing these draft findings with both the leaders and the practitioners, the appraisal team generates the final findings. Note that the quantity of findings at each stage vary considerably with the capability of the organization.

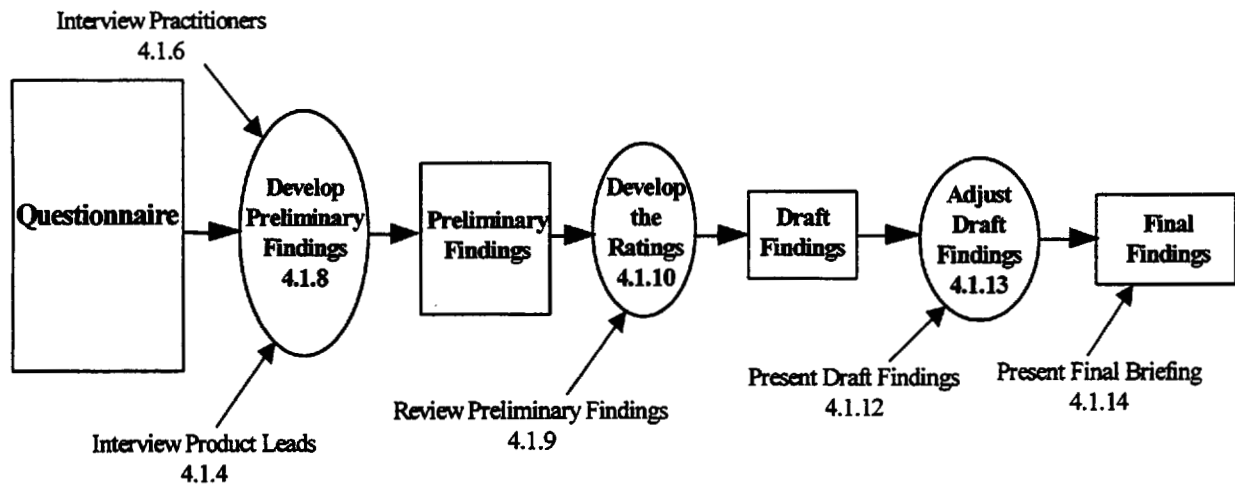


Figure 2-2. Findings Flow

2.4.2 Findings and Ratings Development

As the findings evolve throughout the appraisal, four identifiable products are created. These are described in Table 2-4. Each of the products leads to improving the ratings estimate. The table shows the estimates related to the products and how they are developed throughout the appraisal. The thrust of this process is to converge on a set of final ratings that fairly represent the team consensus of the organization's capability profile that will be presented in the format shown in Figure 2-3.

Table 2-4 - Findings and Ratings Development

Product	Role in Appraisal Process	Ratings
Questionnaires	The questionnaires, representing data from 3 to 5 product life cycle programs, serve as a starting point for the data gathering process. The questionnaire (see Annex H) provides a direct link to the SECM model. [This large volume of data is entered into the Data Tracking Sheet.] Analysis of the questionnaire leads to the exploratory questions for the product leaders and practitioners.	Questionnaire Rating: Exploratory questions are developed to resolve discrepancies or inconsistencies in the data from the questionnaires.
Preliminary Findings	The preliminary findings are the appraisal team's first attempt to reduce the information that it has gathered (i.e., from the questionnaire, interviews, and practitioner focus groups) into a set of corroborated observations.	Preliminary Rating: The second estimate incorporates preliminary findings as validation of non-satisfied practices. Each incorporated answer is intended to address a discrepancy or inconsistency with the original questionnaire data.
Draft Findings	The draft findings are developed based on feedback that the product leaders supply during their review of the preliminary findings. The draft findings are the appraisal team's consensus description of the opportunities the organization has for process improvement. They are carefully worded, and include the finding, a set of observations underlying it, and a business consequence.	Draft Rating: The third estimate is derived after incorporating feedback from the product leaders, based on their review of the Preliminary Findings.
Final Findings	The final findings are developed based on feedback that the practitioners and the product leaders supply during their independent reviews of the draft findings. The typical kinds of changes between the draft and final findings are wording changes for community acceptance, or clarifications of causes or consequences.	Final Rating: The final estimate is derived by adjustments from team knowledge and consensus changes to practice satisfaction based on algorithms.

Technical Category	Level 1		Level 2		Level 3		Level 4		Level 5					
	Level 1 Specific Practices are performed	Results are at least of marginal utility	Level 2 Specific Practices are performed	Level 2 Generic Practices are performed	Results are at least of adequate utility	Level 3 Specific Practices are performed	Level 3 Generic Practices performed	Results are of at least significant utility	Level 4 Specific Practices are performed	Level 4 Generic Practices performed	Results are at least of measurably significant utility	Level 5 Specific Practices are performed	Level 5 Generic Practices performed	Results are of optimum utility
1.1 Define Stakeholder & System Level Reqts														
1.2 Define Technical Problem														
1.3 Define Solution														
1.4 Assess and Select														
1.5 Integrate system														
1.6 Verify System														
1.7 Validate System														
	Level 1		Level 2			Level 3			Level 4			Level 5		

Figure 2-3. Sample Format for Depicting Focus Area Ratings (Technical Category)

2.5 How to Read the Process Activity Summaries

All process activity descriptions are similarly formatted, and contain some or all of the information blocks described in Table 2-5. For each major phase (Preparation, On-Site, Post-Appraisal), the summary description contains the process activities that comprise that phase; for the process activities, the summary description contains the actual description of that activity.

Table 2-5 - Process Activity Summaries Organization

Paragraph Title	Description
Purpose	The purpose for this process activity within the Appraisal Method.
Summary Description	An overall summary of the tasks associated with the process activity.
Major Participants	The major roles involved and a summary of their responsibilities associated with the process activity.
Typical Duration	A range of the typical time duration (e.g., number of hours) expected for the process activity.
Steps	The detailed normative steps for the activity, along with informative guidance for performance, if appropriate.
Tailorable Parameters	The parameters associated with this process activity that are expected to be tailored for different appraisal goals.
Exit Criteria	A description of the decision-making criteria to determine if the process activity has been completed.
Notes	Notes on the process activities that do not fit in any of the other categories.

3 Preparation Phase Activities

3.1 Preparation Phase Overview

Purpose:

The Preparation phase prepares the sponsor, the appraisal team, and the organizational units being appraised for the On-Site period. Figure 3-1 illustrates the activities in this phase. Major prerequisites of the preparation phase include:

- The sponsor must commit to provide the resources and actions required for the appraisal process,
- The team must be selected to perform the appraisal,
- The organizational units being appraised must provide preliminary data to the team for analysis, and
- The team must analyze the data prior to arriving On-Site.

3.2 Preparation Phase Activities

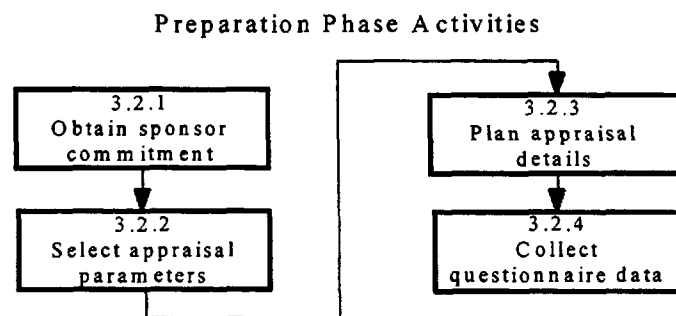


Figure 3-1. Diagram of Preparation Phase

Summary Description:

Table 3-1 lists the major activities of the Preparation phase and the expected output of each. Each element is described more fully in the summaries that follow.

Table 3-1 - Summary Description of Preparation Phase

ID	Activity	Description	Output
3.2.1	Obtain sponsor commitment	Verify that the sponsor: - understands the concept of the appraisal, - defines goals of the appraisal in relation to the sponsor's business goals, - agrees to provide necessary resources, including funding, and - understands his/her visible sponsorship role.	- Appraisal resources - Agreement to proceed and expend resources for the planning and conduct of the appraisal - Appraisal goals related to business goals - Sponsor role understood
3.2.2	Select appraisal parameters	Designate organization units to be appraised and appraisal team, and tailor appraisal method as required (e.g., team size, site time, ratings to produce, number of programs, program characteristics).	Preliminary appraisal plan that defines appraisal parameters based on appraisal goals
3.2.3	Plan appraisal details	Use appraisal parameters to develop schedule, training requirements, and appraisal support materials; select training materials; and train appraisal team.	- Approved appraisal plan - Identified extent of necessary appraisal team training - Appraisal tools and materials
3.2.4	Collect questionnaire data	Administer questionnaire; review any appropriate documents and artifacts; complete initial practice baseline on spreadsheet.	- Practice baseline - Document and artifact review notes

Table 3-2 lists the primary roles involved in the preparation phase and a summary of their activity during this phase.

Table 3-2 - Participants for Preparation

Role	Summary
Sponsor	Makes the decision to commit to appraisal, provides resource commitments and tailoring guidelines for the appraisal.
Facilitator/site coordinator	Interacts with the management and personnel at the site to obtain commitment for the appraisal, and ensures that the planning for the appraisal is successfully completed.
Appraisal Team Leader/Moderator	Leads the team in planning, leads meetings related to data collection, and assesses the team training requirements
Appraisal team	Interacts with management and the appraisal moderator to assist the planning and learn how to perform the appraisal.

Typical Duration:

Preparation requires two to eight weeks, depending on the complexity of the appraisal selected and other site parameters.

Tailorable Parameters:

- Number of site visits prior to On-Site period
- Number of meetings with sponsor(s)
- Duration of On-Site visit(s)
- Number of meetings with appraisal team
- Appraisal goals
- Number of product examples and support units to appraise
- Number of appraisal team members
- Process area/capability level focus for the appraisal

Exit Criteria:

- Appraisal goals established
- Appraisal resources committed
- Sponsorship visibility ensured
- Product line, team member, and participant selection completed
- Appraisal plan approved
- Preliminary data gathering completed

Notes:

This is where the focus and context for the appraisal are established. The decisions made here will have an impact on the rest of the appraisal activities. All relevant decisions from this phase should be documented in the appraisal plan. The plan may serve as the basis for future activities, including re-appraisals.

3.2.1 Obtain Sponsor Commitment**Purpose:**

Obtain Sponsor Commitment establishes the sponsor's commitment to the appraisal and determines the major goals of the appraisal. These goals guide the selection of appraisal parameters.

Summary Description:

Obtain Sponsor Commitment involves meeting with the sponsors of the appraisal to provide an understanding of the concepts of the model (reference model) and the Appraisal Method; engaging the sponsor in dialogue to determine his/her goals for the appraisal; and negotiating a commitment for resources, including personnel and funding for the appraisal activities. A primary aspect of obtaining sponsor commitment is ensuring that the sponsor understands his/her role in the appraisal.

For tailoring guidance, read the related paragraphs in Section 6. For checklist and recommended approach, see Annex F.

Major Participants:

Table 3-3 lists the primary roles involved in this process activity and a summary of their tasks during this process.

Table 3-3 - Participants for Obtain Sponsor Commitment

Role	Summary
Sponsor	Engages in dialogue with appraisal advocate and moderator to understand appraisal context and set appraisal goals; commits resources for the appraisal.
Facilitator	Engages sponsor in dialogue to understand the appraisal method, outcomes, and expected sponsorship activities.
Site coordinator or appraisal advocate	Provides sponsor with information needed to make a commitment decision on the appraisal. Provides a link between the appraisal sponsor and participants.

Typical Duration:

This activity typically takes 1 to 3 hours.

Tailable Parameters:

- Method of interaction with sponsor:
 - All face-to-face meetings,
 - Combination of telephone/video and face to face meetings,
 - Combination of written communication and face-to-face meetings,
 - Etc.
- Number of interactions with sponsor

Exit Criteria:

- Appraisal goals established
- Sponsor commitment to provide appraisal resources obtained
- Sponsor commitment to appropriate behavior during the appraisal obtained

Notes:

This is a go/no-go decision point. If sponsor commitment for the appraisal is not obtained, no further process activities related to the Appraisal Method will be performed. In particular, the sponsor must agree to accept the findings, thank the team and participants, and indicate what he/she intends to do to act on one or more of the findings.

Guidance on using business goals and organization context for tailoring the appraisal is addressed in Section 6.

3.2.2 Select Appraisal Parameters**Purpose:**

Select Appraisal Parameters determines how the Appraisal Method needs to be tailored to meet the goals established for the appraisal with the sponsor.

Summary Description:

Select Appraisal Parameters involves determining the membership of the appraisal team, the profile of product lines from which to select the organizational units being appraised, and the key appraisal participants. In addition, a preliminary appraisal outline is produced that documents the tailoring of the Appraisal Method process activities and approximate schedule. For tailoring guidance, read the related paragraphs in Section 6.

Major Participants:

Table 3-4 lists the primary roles involved in this process activity and the summary of their tasks during this process.

Table 3-4 - Participants for Select Appraisal Parameters

Role	Summary
Site coordinator and/or appraisal advocate or facilitator	Engages in dialogue with management to determine the scope of the appraisal (who should be involved); engages the organization to determine the makeup of the appraisal team and key appraisal participants. Produces appraisal outline.
Sponsor	Engages in dialogue with site coordinator and/or facilitator and provides appropriate input on characteristics of team and organizational units to be included in appraisal.

Typical Duration:

Tailoring requires one to two weeks, depending on the complexity of tailoring.

Tailorable Parameters:

- Extent of appraisal plan documentation

Exit Criteria:

- Appraisal team selected
- Product lines and organizational units to be included are selected
- Key appraisal participants selected
- Preliminary appraisal outline developed

Notes:

This is the activity where tailoring decisions are made and documented, based on the goals of the appraisal. Guidance on tailoring the appraisal to support the organization's business goals is addressed in Section 6.

3.2.3 Plan Appraisal Details**Purpose:**

The purpose of Plan Appraisal Details is to produce and obtain approval for the final appraisal plan, which documents the parameters and details of the appraisal. For tailoring guidance, read the related paragraphs in Section 6.

Summary Description:

Plan Appraisal Details involves establishing the availability of planned interviewees during the On-Site period, planning the logistics of the appraisal (meeting rooms, support staff availability, etc.), and verifying the schedule for the appraisal with all affected parties. It also involves verifying who will receive data on the appraisal and establishing feedback mechanisms for lessons learned. For tailoring guidance, read the related paragraphs in Section 6. The appraisal team's training needs with regard to the appraisal method and model should be identified. Training is addressed in Section 4.2.2.

Major Participants:

Table 3-5 lists the primary roles involved in this process activity and the summary of their tasks during this process.

Table 3-5 - Participants for Plan Appraisal Details

Role	Summary
Appraisal team leader	Oversees production of, and approval for, final appraisal plan.
Appraisal team	Produces assigned sections of appraisal plan.
Sponsor	Approves final appraisal plan.
Site coordinator	Verifies the schedules of the intended participants, arranges logistics details for the appraisal. May collect some documentation.

Typical Duration:

Planning an appraisal takes two to six weeks, depending on the organizational work and complexity of the appraisal plan.

Tailorable Parameters:

- Degree to which details are planned (depends on the complexity of the appraisal)
- Number of key participants needed
- Appraisal team size
- Actual schedule
- Activity participants

Exit Criteria:

- Appraisal schedule established
- Appraisal participant availability confirmed
- Appraisal plan approved
- Appraisal preparations completed

Notes:

This is when the actual arrangements and schedule for the On-Site period is produced. Key participants must be identified and committed to the scheduled activities. In volatile organizations, one to three backups should be identified for interviewees, and a set of appraisal team replacements or a somewhat larger appraisal team than needed should be selected to ensure continuity during the appraisal.

Interviews may be separate or combined, but should include persons who know the whole product life cycle. There is no requirement that interviews be conducted before the focus groups, just that all practice data collection occur before the preliminary findings are developed.

Practitioners may be grouped according to life-cycle phase (product selection, including marketing, finance, training, labs, hiring, etc.; requirements/designers; production/integration/testers; and product field support/disposal), organizational boundaries (organizational support elements together; engineering/production; and marketing/delivery and retirement), or in other ways that will provide synergy of the information obtained. Groups that have feuds probably should not be grouped together. A program manager group might be set up if they cross organizational boundaries. The point is to use the particular organizational context to the best advantage to corroborate data obtained via the questionnaires and interviews.

Middle manager buy-in may be obtained by having a focus group before the On-Site period, to provide an opportunity to engage them as “owners” of the action plan recommendations. In addition, in some organizations, marketing or business development will “own” product line evolution, and should be included in practitioner groups or formed into a mini-focus group.

Any useful documents, such as policies, process descriptions (often in training materials), standards, even meeting minutes or action item lists, may be requested, collected, and stored for use by the appraisal team. External appraisal teams typically sign non-disclosure agreements with the appraised organization.

A team may request and use documentation generated for or by Focus Area activities before or during the appraisal On-Site period. Sufficient time should be allocated for this task. To the extent possible, pre-On-Site reading of summaries or documentation should be accomplished. Templates or outlines for what information to capture and how to capture it should be determined with the facilitator and communicated to team members and those providing the information.

See Section 6 and Annex F, Site Coordination Checklist, for details on preparing for the logistics of an appraisal.

3.2.4 Collect Questionnaire Data

Purpose:

Collect Questionnaire Data obtains and records profile information on the appraised organizational units.

Summary Description:

Collect Questionnaire Data involves administering and collecting results from the questionnaire and organization profile instruments. The appraisal team leader provides training for the appraisal participants and administers the questionnaire. The questionnaire rephrases the Specific and Generic Practices of the reference model into questions that can be answered with: yes; no; don't know; or not applicable. The questionnaire responses are transferred to the Data Tracking Sheet, either in this activity or in the “Analyze Questionnaire” activity (paragraph 4.1.3). For tailoring guidance, read the related paragraphs in Section 6.

Major Participants:

Table 3-6 lists the primary roles involved in this process activity and the summary of their tasks during this process.

Table 3-6 - Participants for Collect Questionnaire Data

Role	Summary
Appraisal participants	The selected participants provide data on programs and the organization via the questionnaire. The questionnaire may be administered in various ways, e.g., all participants together in a face-to-face meeting, as an on-line response activity, or mail-ins. It is recommended that the questionnaire be administered to the group, with a moderator, site coordinator, or other person with knowledge about the model present to answer questions of terminology, etc.
Site Coordinator	Determines respondents of the questionnaires, makes arrangements for them to complete the questionnaire, and may oversee administration.
Appraisal team leader or moderator	Conducts any meetings related to introducing the data collection activity.
Sponsor	Ensures that all participants are made available for data collection.

Typical Duration:

Collect Questionnaire Data requires two to three hours per participant.

Tailorable Parameters:

- Method of administering questionnaires
- Contents of questionnaire, based on appraisal goals (e.g., if only appraising the management Focus Areas, only use those questionnaire items)
- Who completes what parts of the questionnaire
- Amount of analysis performed prior to On-Site phase
- Transference of questionnaire responses to the Data Tracking Sheet (DTS)

Exit Criteria:

- Appraisal scope information (what different parts of the organization provide, tailored model to be appraised against, participants, etc.) received by appraisal team
- Filled-in questionnaires received by site coordinator
- *Optional:* If it is decided to transfer questionnaire responses to the Data Tracking Sheet prior to the On-Site phase, the transfer should be completed at the end of this process step

Notes:

See the questionnaire distribution table in Section 6.6 and the Appraisal Method questionnaire instructions in Annex F (Site Coordination Checklist) and Annex I (Appraisal Questionnaire) for information on using the questionnaire to collect data. See paragraph 4.1.5 for details on transferring the questionnaire responses to the Data Tracking Sheet (DTS).

4 On-Site Phase Activities

4.1 On-Site Phase Overview

Purpose:

The On-Site phase explores the results of the preliminary data analysis, provides an opportunity for practitioners at the organizational units being appraised to participate in the data gathering and validation process, and provides practitioners and management with input on the results of the appraisal.

Figure 4-1 shows the activities in the on-site phase in a sequential manner. In some cases, the team may be able to perform some activities in parallel. The On-Site phase may occur as several site visits. Annex C shows some alternative On-Site schedules that may be followed.

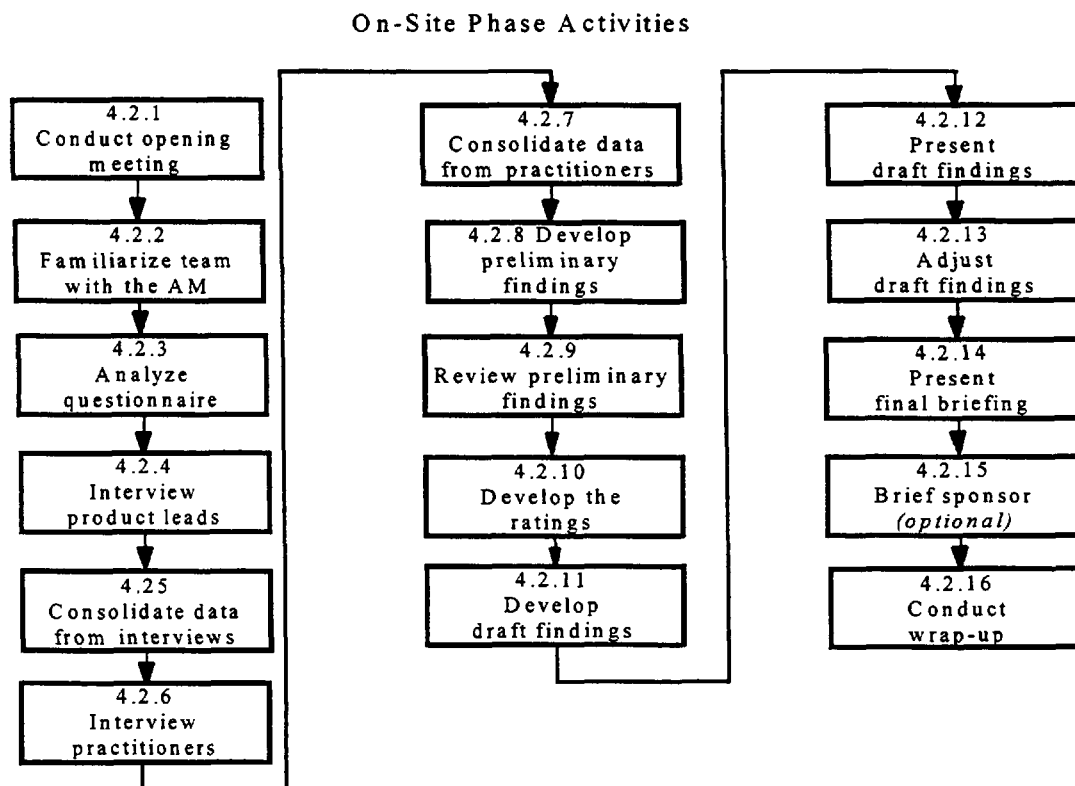


Figure 4-1. Diagram of On-Site Phase

Summary Description:

Table 4-1 lists the major activities of the On-Site phase and the expected output of each. Each element is described more fully in the summaries that follow.

Table 4-1 - Summary Description of the On-Site Phase

ID	Activity	Description	Outputs
4.2.1	Conduct opening meeting	The opening meeting provides participants with an overview of the appraisal and the context of the appraisal (e.g., schedule and confidentiality). The sponsor expresses support of the appraisal and subsequent process improvement activities.	- Appraisal effort described - Questions answered
4.2.2	Familiarize team with the AM	The team leader instructs the appraisal team on the detailed conduct of the appraisal activities and introduces the model as tailored for this appraisal.	Team prepared
4.2.3	Analyze questionnaire	The appraisal team analyzes the responses to the questionnaire and formulates a set of follow-on, exploratory questions for the interviews and focus groups.	Exploratory questions
4.2.4	Interview product life cycle leaders or project leaders	Through structured interview techniques using the exploratory questions, the appraisal team gathers corroborating data regarding the project practices.	- Practices described in interview notes - Data requests
4.2.5	Consolidate data from interviews	The team members update the Data Tracking Sheets (DTS) for each practice.	- Practice records updated - Updated DTS
4.2.6	Interview practitioners	Through open-ended, facilitated discussion, the team gathers corroborating data on overall organizational and specific organizational unit practices from different types of practitioners.	Interview notes
4.2.7	Consolidate data from practitioners	The team members update the Data Tracking Sheets(DTS) for each practice.	- Practice records updated - Updated DTS
4.2.8	Develop preliminary findings	Using all data sources available, the team generates a preliminary list of findings with regard to the tailored set of focus areas and capability levels appropriate for this assessment.	Preliminary findings worksheet
4.2.9	Review preliminary findings	The team provides preliminary findings to the product leaders who provided questionnaire and interview data, in order to validate that the team's synthesis is correct.	Validated/Corrected preliminary findings
4.2.10	Develop the ratings	The team members review the Data Tracking Sheet, preliminary findings, and formulate draft ratings.	- Updated DTS - Draft ratings
4.2.11	Develop draft findings	The team synthesizes and prioritizes draft findings from valid preliminary findings.	Prioritized draft findings

Table 4-1 - Summary Description of the On-Site Phase (continued)

ID	Activity	Description	Outputs
4.2.12	Present draft findings	The team reports draft findings to the practitioners and leaders.	- Practitioner feedback - Feedback from leaders
4.2.13	Adjust draft findings	Based on participants' feedback, the findings are adjusted for final presentation. The ratings and other briefing materials are reviewed for team consensus.	- Final briefing - Findings - FA ratings - Method overview - Other info
4.2.14	Present final briefing	The final findings and process capability profile are presented to all participants in the presence of the sponsor. Future activities are discussed.	- Participant buy-in - Participant expectations
4.2.15	Brief sponsor (<i>optional</i>)	The team provides the sponsor with the opportunity to discuss the results with the team or team leader and moderator privately.	- Sponsor buy-in - Sponsor expectations
4.2.16	Conduct wrap-up	The appraisal team discusses post On-Site activities. They should capture lessons-learned regarding the model and the appraisal method for later feedback to their organization's model maintenance group and if appropriate to the organization responsible for maintaining the EIA/IS 731 standard.	- Follow-on plans - Model feedback

Typical Duration:

See Annex E for the sample schedules for the On-Site phase.

Tailorable Parameters:

- Number of interviews
- Number of focus groups
- Number of visits
- Number and type of document reviews
- Amount of directed questioning in interviews

Exit Criteria:

- Interviews completed
- Document reviews completed
- Findings briefing delivered
- Appraisal report planned
- Feedback on reference model and the Appraisal Method captured

4.2 On-Site Phase Activities

4.2.1 Conduct Opening Meeting

Purpose:

Conduct Opening Meeting presents the appraisal process and schedule to the sponsor and all appraisal participants. This also allows the sponsor to express visible support for the appraisal activities.

Summary Description:

Conduct Opening Meeting gathers all the appraisal participants together, along with the sponsor, to describe the appraisal process and reaffirm the sponsor's commitment to the appraisal.

Major Participants:

Table 4-2 lists the primary roles involved in this process activity and a summary of their tasks during this process.

Table 4-2 - Participants for Conduct Opening Meeting

Role	Summary
Sponsor	Shows management support for the appraisal and subsequent process improvement activities.
Facilitator	Presents brief overview of the model and appraisal.
Site coordinator	Presents schedules and locations.
Appraisal participants	Become familiarized with the appraisal process, its outcomes, and their roles.

Typical Duration:

Typical duration is 1.5 hours.

Steps:

Table 4-3 shows the steps for this process activity.

Table 4-3 - Steps for Conduct Opening Meeting

Step	Guidance
Sponsor comments	The sponsor expresses support for the appraisal and commitment to the resulting process improvement recommendations. Sponsor expresses expectation that everyone will be candid and provide both good and bad, so that the best approach to improvement will be identified.
Model introduction	The moderator gives a brief introduction to the model.
Appraisal process	The moderator presents an overview of the appraisal process. Confidentiality rules are explained.
Schedule review	The site coordinator reviews the schedule and locations for the week's activities and stresses the necessity of being on time.
Question & answer	The sponsor, moderator, and site coordinator answer any questions from the appraisal participants.

Tailorable Parameters:

The presentation will vary based on the purpose of the appraisal. The presentation needs to provide information explaining the way in which the results will be used.

Exit Criteria:

- Opening briefing delivered
- Questions of appraisal participants answered or assigned to be answered by a specific date and person

Notes:

The appraisal goals and use of results is established in the Preparation phase as part of Select Appraisal Parameters. Refer to Annex A for a sample opening briefing.

4.2.2 Familiarize Team with the Appraisal Method**Purpose:**

Familiarize Team with the Appraisal Method prepares the appraisal team for performing its role in the appraisal process.

Summary Description:

This is an opportunity for the appraisal team to begin to work together. The briefing begins with a review of the model. The appraisal steps are then presented in greater detail than at the opening meeting, and the team's role in each step is clarified, with examples of the activities provided or demonstrated by the moderator.

Major Participants:

Table 4-4 lists the primary roles involved in this process step and a summary of their activity during this process.

Table 4-4 - Participants for Familiarize Team with the Appraisal Method

Role	Summary
Facilitator	Presents the familiarization briefing and answers any questions.
Appraisal team	Brings up any questions on the model and appraisal method.

Typical Duration:

Familiarization requires two to eight hours.

Steps:

Table 4-5 shows the steps for this process activity.

Table 4-5 - Steps for Familiarize Team with the Appraisal Method

Step	Guidance
Team building	The moderator leads the team in a team-building exercise; at the very least, all team members introduce themselves.
Review model	The moderator presents the salient features of the model, its use in appraisal, and discusses them with the team.
Review the AM	The moderator explains each step in the appraisal process. The team's role is described, with particular emphasis on behavior and note-taking procedures to be followed during interviews. The moderator presents the techniques that will be followed to collect and manage data, develop results, and reach decisions including consensus.
Question and answer	The moderator responds to the team's questions concerning the model and the appraisal process.

Tailorable Parameters:

- Depth of instruction on model
- Depth of instruction on the Appraisal Method
- Types of tools to use to support the appraisal

Exit Criteria:**The Appraisal Team:**

- understands use of model in appraisal,
- understands its role in appraisal activities, and
- commits to performing the appraisal as structured in Preparation phase.

Notes:

The appraisal team should understand the basic flow of the appraisal activities and their personal responsibilities throughout the On-Site period and afterwards. See Annexes C and D for some support materials useful in familiarizing the appraisal team with the Appraisal Method.

4.2.3 Analyze Questionnaire

Purpose:

Analyze Questionnaire develops a set of exploratory questions for use in the interviews with the product line leaders.

Summary Description:

The appraisal team analyzes the participants' responses to the questionnaire to determine areas for practice validation and potential discrepancy, and to perform a gap analysis against the model. If not completed previously, the questionnaire responses are transcribed to a Data Tracking Sheet (DTS). This process activity results in a set of candidate exploratory questions (EQ) and "listen for's" to use during the interviews with the product leaders and at practitioner focus groups. Operational documentation, such as plans, templates, training materials, meeting minutes, or action item lists that have been collected, may be reviewed and used to support EQ development or to corroborate questionnaire answers when completing the DTS or initial rating profile.

Major Participants:

Table 4-6 lists the primary roles involved in this process activity and a summary of their tasks during this process.

Table 4-6 - Participants for Analyze Questionnaire

Role	Summary
Facilitator	Provides guidance in the formulation of exploratory questions and, if necessary, transcription of the questionnaire responses to the Data Tracking Sheet (DTS).
Appraisal team	Develops and agrees upon the set of follow-up questions for each of the interviewees and practitioner focus groups.

Typical Duration:

Analyze Questionnaire requires four hours.

Steps:

Table 4-7 shows the steps for this process activity.

Table 4-7 - Steps for Analyze Questionnaire

Step	Guidance
Review responses	The appraisal team reviews the questionnaires and the Data Tracking Sheets.
Transcribe to DTS (if necessary)	The moderator and site coordinator or site coordinator and helper, or appraisal team, with guidance from the moderator, transcribe the questionnaire responses from the original questionnaires to the DTS. A DTS is any form that permits a practice-by-respondent view of the questionnaire data. The transcription is most easily accomplished with 2-person teams, one calling out question number and response, and the other recording data in the appropriate spot in the DTS. With a 6-person appraisal team (three 2-person teams), all Focus Areas may be fairly easily transcribed in two hours (assuming 3-5 respondents per questionnaire). The handwritten DTS may then be transcribed by support staff into a spreadsheet or other electronic file for rating profile use.
Generate exploratory questions	The appraisal team, with guidance from the moderator and using the EQ templates based on the model, generates 20-40 exploratory questions for each interview and may develop 5 to 20 or so for focus groups as well. Questions should be used to refine questionnaire answers or explore inconsistencies. There is a separate set of questions for each interview and focus group, but there is usually overlap. The questions are designed to elicit more than just a yes/no response. Questions typically begin with, "Would you please describe" The templates included in Annex D provide easy "listen for" follow-up questions that the moderator uses as a cues to elicit details when the interview or focus group participants don't mention practices. Some questions may be accompanied by a request for relevant or supporting documents. A template-based approach is described next, with a general EQ development approach in the paragraph following it.
Template approach for Exploratory Questions (EQs)	The questions should be on an appropriate form, and copies should be made for each team member. The form should list each question, any "listen for's," document requests, and room for notes. The EQ templates provide all Specific Practices for the reference model by Focus Areas, and a set of GPs as well. The moderator merely orders the FA sheets for each interview, and initiates an EQ with "Would you please describe how you/your program or product line perform (add FA practice name here from template page)." The follow-up/"listen for" items are also checked on the sheet, asked in the same manner: "Tell me more about how you (insert practice)."
General EQ development approach	If the exploratory question generation process is not well managed, it may easily exceed the typical four hour duration. A method for quickly generating a pool of questions follows: • Facilitator leads exploratory question generation with one Focus Area example to get team oriented to using the data embedded in the questionnaire. • Process areas are split up between the appraisal team members according to their specialty areas and to provide balance in workload. • For each Focus Area, the team member uses the initial DTS to scan for inconsistencies between programs and within a program. • Where probe points are discovered, the team member formulates a candidate question on a sticky note pad, marked with the team member's initials, the interview or focus group for which the question is intended, and the FA and practice(s) that led to the question. • The stickies may be laid out in a matrix, with FAs across the top and sessions down the side, to get a picture of the sample space represented by the initial question pool. • The team reconvenes and comes to consensus on which items to ask project leaders and practitioners.

Tailorable Parameters:

- When analysis is performed (may be done before On-Site period)

Exit Criteria:

- Exploratory questions are prepared for each interview session

Notes:

When sending participants their schedule, the site coordinator may attach a large mail bag with the invitation to enclose example documentation of both good and bad process information, such as plans, QA, CM, leadership, communications, decision making, etc. These are returned and kept in a box for use during interviews or focus groups if someone wants to make a point, and may be reviewed before or during the On-Site period to create another instance of practices demonstrated or not demonstrated.

4.2.4 Interview Product Leads

Purpose:

The purpose of Interview Product Leads is to resolve any misunderstandings about the responses to the questionnaire, and to explore areas that the appraisal team wishes to have clarified.

Summary Description:

The session is managed by a moderator. The moderator may be any appraisal team member. The first session should be moderated by the moderator, unless others have previous experience performing the moderator role, in which case they may moderate. The moderator introduces the team, explains the purpose of the session, and asks the leader(s) the exploratory questions. See Annex E for a checklist, often taped to a table in front of the moderator, next to the EQ sheets (see Annex G).

Team members record the responses in a notebook or on sticky note pads. If on stickies, they should be placed on the EQ template page to facilitate later allocation to the correct Focus Area. As a result of some responses, the leader may be asked to supply certain documents for later review.

There may be a separate session for each leader, or a combined session for all of them. If separate, generally an hour should be scheduled for each, while if three or more leaders are combined, the session should be scheduled for two hours. For two leaders, an hour and a half to two hours should be scheduled.

Major Participants:

Table 4-8 lists the primary roles involved in this process activity and a summary of their tasks during this process.

Table 4-8 - Participants for Interview Product Leads

Role	Summary
Moderator	Conducts session and asks exploratory questions. Usually, the moderator takes no notes, but practices active listening and eye contact.
Appraisal team	Take notes of responses and occasionally ask for clarification, or follow-up to clarify what is being asked or responses.
Product leader(s)	Responds to questions with information about how the product line life cycles work, that he/she has been involved with.

Typical Duration:

One leader sessions typically consist of a one hour interview, 15 minutes for team discussion and a 15minute break. Multi-leader sessions typically consist of two hours for question/answer plus a 15 to 30 minute break.

Steps:

Table 4-9 shows the steps for this process activity.

Table 4-9 - Steps for Interview Product Leaders

Step	Guidance
Introduction	The moderator welcomes the product leader and introduces the appraisal team. The moderator then explains the purpose of the session and how it will be conducted. He/She also reminds the product leader about the confidentiality rules and encourages frank responses to the questions.
Exploratory questions	The moderator asks each exploratory question while keeping track of the time and any document requests. Any team member may ask a question, though the moderator should be allowed to lead the questioning to ensure that all high-priority questions are covered. The moderator should follow-up on the "listen for's" and make any document requests.
Data capture	All other team members take notes. This may be into a notebook for later summary and transfer to Focus Area worksheets, or direct to a mobile medium such as sticky note pads that may be allocated immediately to worksheets.
Closing	At the end of the questions (or when time has expired), the moderator concludes the session by reminding the product leader of the time and location of their next meeting for reviewing the preliminary findings. The session recorder reminds the product leader of any document requests and arranges for collecting them. The moderator thanks the product leader for his/her cooperation. The moderator then asks in round robin each practitioner the following question: <i>If you could change one thing in your organization other than your boss or your paycheck, what would it be?</i> Next, the moderator asks each product leader (perhaps going around the group in the opposite direction): <i>Other than the people, what do you think is this organization's major strength?</i>

Tailorable Parameters:

- Moderator assignments
- Extent of follow-up on individual issues
- Use of notebooks or recording of interviews directly to mobile medium
- Colors and sizes of sticky note pads
- Multiple persons or one per interview
- Number of interviews

Exit Criteria:

- As many exploratory questions as possible are covered

Notes:

Exploratory questions are ordered by priority to ensure that the most important questions (to the team) are asked. It is uncommon for all scripted questions to be addressed in any session. A team may request and use documentation generated for or by a Focus Area to demonstrate a capability level.

If stickies are used, each interview and focus group may be more easily identified by using a different color or size of stickie. Subteams developing preliminary findings may immediately see if they are corroborated across groups by the mix of colors. Only one issue or statement should be recorded per stickie. Using 3x3 inch stickies for data collection works well, since then summary findings may be recorded on 3x5 inch stickies to distinguish them. Pads of 100 stickies seem sufficient for most recorders, but a few spare pads should be accessible at the interview, especially if more than one hour is scheduled. If each team member has a copy of the Focus Areas, one FA per hardcopy page, in EQ order, the team may stick the stickies they generate on the appropriate FA for very rapid allocation to Focus Area worksheets later.

Depending on the acceptability in the appraisal organization's culture, it is very useful to have one team member use a laptop or other workstation to enter responses and dialogue from EQs as they are happening. If the EQs have been prepared electronically, and responses are recorded in spaces between, this permits much more rapid consolidation of post-interviews. More than one laptop in use seems daunting to most interviewees, however. Ask the interviewee(s) before using a laptop or other recording instrument. Manual note taking using stickies (one practice or fact per stickie) is recommended for team members.

4.2.5 Consolidate Data from Interviews

Purpose:

The purpose of Consolidate Data from Interviews is to allocate the information to Focus Areas, from notes taken during the interviews.

Summary Description:

Consolidate Data from Interviews involves allocating the data, gained in the interviews with the product line leaders, to Focus Area worksheets. It also verifies or clarifies the understanding of the information obtained from the questionnaires. This data consolidation step allows the team to re-prioritize any data requests in the ensuing schedule or to change other aspects of the remaining data-gathering period.

Major Participants:

Table 4-10 lists the primary roles involved in this process step and the summary of their activity during this process.

Table 4-10 - Participants for Consolidate Data from Interviews

Role	Summary
Facilitator	Provides guidance and model expertise for the team's allocation of data to Focus Areas.
Appraisal team	Review their notes, discuss any issues; may translate notebook data to stickies or electronic media, but always allocate data to Focus Area worksheets.

Typical Duration:

Consolidating data takes 15 minutes to one hour.

Steps:

Table 4-11 shows the steps for this process activity.

Table 4-11 - Steps for Consolidate Data from Interviews

Step	Guidance
Review notes (option if notebooks used)	Each team member privately reviews his/her notes from the interviews. Practice or performance issues and strengths noted are copied to stickies or marked for copying to electronic media.
Allocate data	Each team member allocates stickies, or enters on common electronic medium, the issues and strengths identified for each Focus Area to the Focus Area worksheet. The Focus Area worksheet may be a flip chart, a space on the wall or a table top, or a practice-by-practice electronic copy or subset of the model's practices in database or flat file format. All data captured should be allocated as one of these types: (a) issue or weakness (e.g., a delta, "Δ," symbol), (b) strength (e.g., a plus, "+," symbol), (c) comments or "check the box" for performing a practice but not a strength or issue (leave the symbol zone blank), or (d) duplicates (note during allocation and place in duplicates pile).
Discuss issues	Team members may raise issues that they have encountered during the interviews and update steps. The moderator moderates the discussions to give each issue time to be heard and acted on.
Preparation	The team notes remaining activities and proposes any alterations that they may wish to make, either in whom to include or exclude, what to ask which groups or individuals, or what other information sources could be tapped and how to include them. In particular, the team may want the moderators to guide the discussions into certain areas during one or more of the practitioner interviews. This direction should be carefully limited, as too much direction of the practitioner discussions will stifle spontaneity.

Tailorable Parameters:

- Medium for Focus Area worksheets
- Translate notebook data to Focus Area worksheets or medium

Exit Criteria:

- Team members complete update of their DTS

- Agreement on changes to schedule and other data gathering mechanisms

Notes:

Remember to record only one issue or strength per stickie or line entry in electronic medium. Remember to use different colored stickies or record a unique symbol for each interview session to ensure corroboration may be easily determined during preliminary findings. When a team copies interview statements directly to stickies, there tend to be 20% to 60% duplicates recorded.

The Focus Area worksheets may be just flip charts, with one Focus Area name per flip chart, hung up around the walls of the team work room. They may be blank except for FA title, have practices listed on them, or have marked zones for base and capability level stickies to be applied.

4.2.6 Interview Practitioners

Purpose:

Interview Practitioners ensures meetings with the actual practitioners of the domain's processes and support processes (e.g., quality assurance, manufacturing, marketing, finance, field service, etc.); obtains corroboration of the issues previously collected; and identifies new issues.

Summary Description:

Interview Practitioners involves facilitating a relatively free-form discussion centered around the question, "What works and what doesn't work so well in your (domain, product life cycle, systems engineering, software, etc.) processes?" This discussion typically provides corroborating and clarifying data, and sometimes references to additional data sources.

The moderator should have a set of 2-10 Exploratory Questions prepared to ask the practitioners, that focus on the processes the participants in this focus group should practice. It is usually best to let a free-form discussion begin the session; otherwise, participants may get the impression that the session is an audit, and cease volunteering the issues that are important to them. In particular, if the session appears to be degenerating into a gripe session, the moderator should introduce one or more Exploratory Questions.

Major Participants:

Table 4-12 lists the primary roles involved in this process activity and the summary of their tasks during this process.

Table 4-12 - Participants for Interview Practitioners

Role	Summary
Moderator	Sets participant expectations about the session (see Annex E summary sheet). Keeps discussion moving with minimal influence on its direction. Ensures all practitioners have a chance to speak by starting with round robin introductions, and continuing with round robin answers to the “what’s working and not working” question.
Appraisal team	Take notes on statements made by practitioners. Different colored, 3x3 inch stickies are recommended for recording statements by practitioners, one statement per stickie.
Practitioners	Present issues from their perspective.

Typical Duration:

Two hours per practitioner group.

Steps:

Table 4-13 shows the steps for this process activity.

Table 4-13 - Steps for Interview Practitioners

Step	Guidance
Preparation	Arrange the focus group area before the practitioners’ arrival. The setup may be around a table or in a circle without a table. The team should occupy every other seat, forcing the practitioners to spread out around the circle. The team members should be in their seats before the practitioners arrive. It is important to begin the meeting on time. If possible, have someone not on the team call any late-comers or no-shows.
Introduction	The moderator: • Welcomes the practitioners and introduces the session’s topic (if appropriate). • Explains the purpose of the session and how it will be conducted, i.e., an unstructured discussion of the overall product life cycle (or other model domain) process and the practitioners’ processes from their viewpoint. • Lets the practitioners know that the team will listen and take notes, but that the direction of the discussions will be up to them. • Notes that, at the end of the session, each participant will be asked for a strength of, and one important improvement needed by, the organization being appraised. • Encourages frank discussions. • Reminds the practitioners about the confidentiality rules, and cautions the participants about repeating comments outside of the session. The team and practitioners then introduce themselves, giving their name and role (team members should identify themselves as “members of the appraisal team”). The moderator then turns the meeting over to the practitioners.

Discussion	The moderator keeps the conversation moving with as little intrusion as possible. Team members should not participate in the conversations. The moderator should note non-participating practitioners and try to bring them into the conversation in a non-directed manner (e.g., "What do you think about that, Tom?"). If the discussions lag, or EQs have been identified, the moderator may either gently "nudge" the discussion in the desired direction or ask them again as open questions to the group, such as "What's going well and not so well in (insert Focus Area name)?" If this is not done carefully, the participants will continually look to the moderator for direction and the focus group will lose its spontaneity and buy-in. The moderator should use leading comments (e.g., "How about quality assurance . . .?"), and avoid direct yes/no questions (e.g., "Do you do quality assurance?"), or judgmental questions (e.g., "What's wrong with quality assurance?").
Closing	Near the end of the session, the moderator brings the conversation to an end, and asks two questions of each practitioner. If the moderator senses that the discussions have reached the end of their usefulness, he/she may end the session before the end of the full time period. The moderator then asks in round robin each practitioner the following question: <i>If you could change one thing in your organization other than your boss or your paycheck, what would it be?</i> Next, the moderator asks each practitioner (perhaps going around the group in the opposite direction): <i>Other than the people, what do you think is this organization's major strength?</i> (The word "organization" should be customized for the situation.) Finally, the moderator thanks the practitioners for their participation and reminds them of the confidentiality rule, and the time and location for their review of the draft findings.
Process check	In the interval between practitioner focus groups, the team should perform a brief process check of how the last session went, and discuss any changes or special situations anticipated with the next focus group. The sessions are long, so be sure to leave time for 15 to 30 minute breaks before the next group arrives.

Table 4-13 - Steps for Interview Practitioners (continued)

Tailorable Parameters:

- Number and makeup of practitioner focus groups
- Data collection on stickies, electronic medium, or in notebooks

Exit Criteria:

- Session completed

Notes:

Groups are defined above in the Preparation phase. This activity may be performed before the formal On-Site period for special groups, to reduce the On-Site period somewhat.

Stickies, notebooks, or electronic media may be used to collect statements that are issues or weaknesses, strengths, or comments, "just doing it" statements. Use of stickies should include different colored pads of 100 for each session. Recorders write only one statement per stickie. Extra pads should be accessible in the focus group area, as some will generate more than 100 in a two-hour session. Special symbols should be used on recorded statements for "one big improvement" and major strength of the organization.

A session recorder may use a laptop or other workstation if the organization's culture permits it. This greatly facilitates consolidation of data and collection of "golden quotes," or key phrases, into draft and final findings. Ask before using a laptop or other recording equipment. No more than one or two team members should use laptops or workstations for recording data.

4.2.7 Consolidate Data from Practitioners

Purpose:

Consolidate Data from Practitioners allocates data collected from the practitioners to Focus Area worksheets, so that preliminary findings may be generated.

Summary Description:

Consolidate Data from Practitioners involves allocating data to Focus Area worksheets. It also allows the members of the appraisal team to verify their understanding of the information, obtained in the sessions with the other team members, and consider and request additional data sources.

Major Participants:

Table 4-14 lists the primary roles involved in this process step and a summary of their activity during this process.

Table 4-14 - Participants for Consolidate Data from Practitioners

Role	Summary
Facilitator	Provides guidance and model expertise for the team's deliberations.
Appraisal team	Optional if notebooks used: review notes and transfer to mobile medium, allocate data to Focus Area worksheets, discuss any issues, and identify and attempt to fill any gaps in coverage of the Focus Areas.

Typical Duration:

15 minutes to one hour.

Steps:

Table 4-15 shows the steps for this process activity.

Table 4-15 - Steps for Consolidate Data from Practitioners

Step	Guidance
Review notes (optional if notebooks used)	Each team member privately reviews his/her notes from the practitioner focus groups, committing issues to stickies or electronic medium for transfer to Focus Area worksheets.
Allocate data	Each team member allocates data on stickies or media to Focus Area worksheets where they apply.
Discuss issues	Team members raise issues that they have encountered during the review, and may propose alternative data sources to corroborate or refute data collected. The facilitator moderates the discussions to give each issue a chance to be aired. Any actions are recorded and requests communicated to the site coordinator for action.
Preparation	The team discusses the upcoming events and any alterations that they may wish to make, based on the discussions. In particular, the team may wish to add a few exploratory questions or “challenge” findings to the preliminary findings in order to resolve conflicting evidence, especially where the ratings are affected.

Tailorable Parameters:

- Media for allocation of data

Exit Criteria:

- Scheduling and data gathering changes are agreed to where appropriate
- Process Area worksheets have data allocated

Notes:

A typical team member generates 30-100+ issues per session, and the team may generate 500 to 2000 total, 400 to 1200 after duplicates are removed. Some teams have called the team work room “feathered,” after its appearance with 24 flip charts (23 FAs and one for strengths) covered with stickies hanging on the walls.

4.2.8 Develop Preliminary Findings**Purpose:**

Develop Preliminary Findings synthesizes the accumulated data from all data sources used in the appraisal.

Summary Description:

During Develop Preliminary Findings, the appraisal team systematically analyzes the data from all sources to generate a list of preliminary findings related to the Focus Areas and capability levels under investigation.

Major Participants:

Table 4-16 lists the primary roles involved in this process activity and a summary of their tasks during this process.

Table 4-16 - Participants for Develop Preliminary Findings

Role	Summary
Facilitator	Leads team in an example activity, coaches subteam work, and oversees the preparation of the preliminary findings.
Appraisal team	Synthesizes the accumulated data by FA into preliminary findings, including both strengths and weaknesses.

Typical Duration:

Developing preliminary findings may require three to five hours.

Steps:

Table 4-17 shows the steps for this process activity.

Table 4-17 - Steps for Develop Preliminary Findings

Step	Guidance
Demonstration	Appraisal team members (and sometimes observers) are assigned or self-select into subteams of 2 or 3. Divide up the Focus Areas among them, keeping one Focus Area that has close to the median number of stickies for use as an initial example to be worked by the entire team. Separate the selected FA's issues, strengths, and comments or "check the box" items, and duplicates if not done during allocation. Record total number of stickies, issues and duplicates on the Focus Area worksheet. Demonstrate affinity diagram technique on the selected FA's issues (option: also on strengths if 10 or more stickies on strengths). The target is 2 to 3 preliminary findings per FA, but they will actually run 0 to 7 findings. Wordsmithing is NOT appropriate - emphasize getting the meaning or underlying factor or theme of the stickies in each cluster. Record the preliminary findings titles on the preliminary findings form. Check for questions.
Sub-teams develop preliminary findings	Sub-teams perform the separation into types of stickies, affinity diagram, and may also perform the initial rating of the FA process capability. The findings titles by FA are reported to the facilitator or person completing the preliminary findings form, as each subteam finishes an FA. If initial ratings are done, these should also be reported and recorded on the rating template. Subteams should change membership during the FA changes and work on a FA in which at least one of them has some knowledge or experience.

Table 4-17 - Steps for Develop Preliminary Findings (continued)

Team review	The team walks around and reviews the findings and clusters under them as individuals. Some teams assign each member primary and secondary responsibility for FAs, in which case they would use this opportunity to perform a QA role on their secondary FA findings, having helped develop their primary FA findings. Any alternative finding representations may be posted on different colored stickies as counter-proposals on the FA worksheet. Not all the findings will be validated by the preliminary finding feedback respondents, so challenge them with multiple alternatives if the team cannot quickly agree on one or build a better consensus statement of a finding.
Update preliminary findings form	A word processor or spreadsheet is a fine tool to record the preliminary findings and print the form for those who took the questionnaire or are selected to provide preliminary findings feedback. Leave room for notes on the form.

Tailorable Parameters:

- Subteam assignments
- Method for developing preliminary findings
- Number of preliminary findings presented for validation
- Method to separate affinity diagram strength stickies - don't do comments set or duplicates, just tape them down securely to the worksheet

Exit Criteria:

- 40-60 preliminary findings that may be verified with those selected to review them. They will indicate whether they are valid for their product operations or not, and whether perceived as true in general for the organization or not. These are usually the interviewed product line leaders.

Notes:

Time: The first FA by the whole team may take 15-45 minutes, and should be middle sized in terms of numbers of issues. Subteams will likely take 30 minutes on the first FA they do alone (encourage them to start with middle-sized FAs, then do small ones in terms of numbers of stickies, and lastly the large ones). By the end, most subteams take about 15 minutes to generate 2-5 preliminary findings per FA after separating them into the four types. Depending on the number of appraisal team members and observers who participate (teams of 2 are better than of 3), the time from the starting demonstration to finishing the last FA will be 2.5 to 4 hours. Walk-around review and agreements may be done during lunch. The form may be generated and updated so that the exercise may be done in a half day.

Subteam assignments: Match an organizational or process insider with an outsider to the extent possible. The insider provides context and interpretation of the issues, while the outsider maintains objective reality. Many teams will have people on them who have or perceive a need for a particular finding or rating to occur. They may inadvertently try to bend results to their need. The outsider is present to question when statements sound like a real stretch or a political spin, often asking, "Where's the data that says that?"

Affinity diagram technique:

1. Place all issue stickies on a surface where the subteam can see them. Rotating between the subteam members, place stickies that have an affinity for each other (some common theme, factor, cause, or meaning) together in clusters or sets, or separate a cluster or set into subsets if that seems appropriate. Typically, no discussion about the theme, or why one is placing issues, is permitted until clusters or sets are established.

2. If a stickie appears to belong in more than one set or cluster, duplicate it and put it in both or all - there is no requirement for unique allocation of an issue to a single finding. It might be a symptom for several potential causes. If an item seems to move back and forth, in and out of a cluster or set, have each person moving it write on a new stickie (same color!) what it means to them, and replace the ambiguous stickie with the alternatives. If one or the other alternatives seems a stretch, try to reconstruct the dialogue from which it originated and determine whether it is valid.
3. If the cluster or set has two or more colors, then it is a candidate for a preliminary finding. If only one color of stickie, then read through them and see if they represent the problems of one program, group, or product line, or more than one organizational entity. If one, then the cluster should not be a candidate for a finding because it does not have organization-wide application. Those clusters determined to be valid organizational issues are retained, while the others are taped to the worksheet with a note about specific, not general, applicability.
4. For each valid organizational issue cluster, the subteam brainstorms preliminary findings statements that capture the underlying cause or theme of the cluster. The subteam agrees on a preferred statement (not wordsmithing!) as a preliminary finding proposal, and places it on top of the cluster, taping the cluster to the worksheet so team members can read the preliminary finding proposal and cluster stickies when they review the FA.

4.2.9 Review Preliminary Findings

Purpose:

Review Preliminary Findings obtains feedback on the preliminary findings from the product line leaders who provided the original data. If a product line leader will not be available during the on-site phase, a capable alternate should be designated for this review.

Summary Description:

Review Preliminary Findings involves providing the synthesized data in the form of weaknesses (sometimes strengths are included on the form) to the same product line leaders who were the original sources of questionnaire and interview data. They then agree or disagree for their own operations or processes and their perception of organization wide operations or processes. This may be done via form or question and answer interview.

Major Participants:

Table 4-18 lists the primary roles involved in this process activity and a summary of their tasks during this process.

Table 4-18 - Participants for Review Preliminary Findings

Role	Summary
Moderator	<u>If interview format:</u> Reads preliminary findings to the product line leaders for their comment. If possible, the moderator role should be filled by the appraisal team leader to increase his/her comfort with explaining the findings. <u>If form completion format:</u> Provides and collects form, and provides explanation of preliminary findings statements as needed.
Product line leader	Provides feedback on preliminary findings.

Typical Duration:

Reviewing preliminary findings takes one hour per product leader, if interviews are sequential, one hour if interview is combined or done in parallel by individual team members, or 15-30 minutes if product line leaders come to a common area and write out complete forms.

Steps:

Table 4-19 shows the steps for this process activity.

Table 4-19 - Steps for Review Preliminary Findings

Step	Guidance
Introduction	The moderator greets the product leader(s) and describes what the team has done since the last meeting. He/She describes the purpose of this session (or form) and explains that the findings are preliminary and will likely change; therefore, it is especially important not to discuss this version of the findings outside of this review. The moderator also tells the leader(s) that at the end of the session or form he/she will ask for a strength and an important change in the organizational units being appraised.
Review findings	<u>Interview format:</u> The moderator reads each preliminary finding to the product leader(s) and asks whether he/she believes that the finding is true on his/her program or current operation and whether he/she believes it is generally true for the organization being appraised. The moderator or members of the team may ask for clarification, or a follow-on question. However, <i>all</i> preliminary findings need to be presented in the allocated time. Therefore, the moderator needs to keep a tight rein on the time, and not let follow-up questions jeopardize the schedule. <u>Form completion format:</u> The preliminary findings are reviewed one by one by the product leaders, which they mark yes/no for true or not true for their particular operations, and then for the organization as a whole, in cells provided on the form. When done, each respondent gets 20 points to divide up among 1 to 20 preliminary findings as the most important findings to improve in the coming year. Any points allocated to a finding are written into a cell attached to each finding statement.
Closing	<u>Interview format:</u> The moderator closes the session by asking the product leader the following question: <i>If you could change one thing in your organization other than your boss or your paycheck, what would it be?</i> Next the moderator asks: <i>Other than the people, what do you think is this organization's major strength?</i> (Note the word "organization" should be customized for the situation.) <u>Form completion format:</u> The form has the two questions above at the bottom of the table of preliminary findings, yes/no for product/organization, and points for most important findings to improve. In both cases, the moderator thanks the product leader for participating and reminds him/her of the time and location for presenting the draft findings.
Validate preliminary findings list	A designated team member combines the feedback onto one form. Those preliminary findings with at least 50% "yes" marks for <u>either</u> program or organization are considered validated and retained, but may be reworded based on feedback or clarifications. Those with all but one respondent saying "no" are considered invalid (only one program rather than the whole organization). Those with answer patterns between the two listed alternatives should be consensus voted by the organization's members on the appraisal team only, to be retained or deleted. The set resulting is the validated preliminary findings.
Process check	<u>Interview format:</u> In the interval between interviews, the team should perform a brief process check of how the last interview went, and discuss any changes or special situations anticipated with the next product leader. Again, be sure to leave time for breaks before the next lead arrives.

Tailorable Parameters:

- Documentation may be requested and reviewed
- Selection of those to provide feedback (referred to as product leaders but not necessary - just those who would know the whole product life cycle)
- Format for review of preliminary findings

Exit Criteria:

- Feedback on the applicability of the preliminary findings has been obtained
- Valid preliminary findings set established

Notes:

Typically, the more homogeneous the respondents are, the fewer the invalidated preliminary findings. Homogeneous respondents generally validate 90% or more of preliminary findings. Non-homogeneous respondents may only validate 80%. A group of all software project leaders are fairly homogeneous for example, in contrast to a Management PC software product line, a construction automated design tools product line, and a telecommunications tool product line set of product line leaders, or a mixture of practitioners, support process, and product line leaders. As the scope of information in an appraisal gets larger, the agreement on any one symptom or cause of a problem tends to get smaller.

The form completion approach is faster and offers additional data that may be used later to prioritize draft findings. It is recommended for re-appraisals at a minimum, but has been used successfully in initial appraisals as well.

Form completion format: Moderator role: The site coordinator may do this activity off-line with the appraisal team, or the appraisal team may break up and go to product leader offices to provide the form in parallel, or the product leaders may be invited to a room together to complete the form.

4.2.10 Develop the Ratings**Purpose:**

One of the results of the On-Site phase is a rating profile covering the appraised focus areas. The rating profile must correlate with the appraisal findings, and the two are developed in a closely coupled process.

The rating profile is developed and refined at specific points in the appraisal process, as detailed in the process step summaries in Section 2.4. Ratings are based on the degree to which the appraised entity performs all of the requirements at a given level, in the judgment of the appraisal team.

Summary Description:

Develop the Ratings involves synthesizing the data gathered from the questionnaire, interviews, and artifact reviews into a rating profile.

Major Participants:

Table 4-20 lists the primary roles involved in this process step and the summary of their activity during this process.

Table 4-20 - Participants for Develop the Ratings

Role	Summary
Facilitator	Provides guidance on rules for rating and model expertise for the team's deliberations.
Appraisal team	Select granularity to be used for scoring (whole point, half point or quarter point). Review the data and preliminary findings, allocate them to FA practices, and formulate ratings. Review the proposed ratings and come to consensus on the FA rating profile.

Typical Duration:

Two to three hours.

Steps:

Table 4-21 shows the steps for this process activity.

Table 4-21 - Steps for Develop the Ratings

Step	Guidance
Review rating procedure	The facilitator walks through the scoring rules (see Notes below) and answers any questions.
Review questionnaire data	The appraisal team reviews the questionnaire results for each Focus Area.
Review interview data	The appraisal team reviews the data collected during the interview process for each Focus Area.
Review process artifacts and work products	The appraisal team reviews the data collected during the review of the organization's process artifacts and work products.
Discuss issues	The full team walks through each Focus Area and the facilitator moderates a discussion to give everyone a chance to be heard. Based on the data collected, the team must reach consensus on whether each Specific and Generic Practice has been achieved, as well as the utility of the process being applied to the Focus Area.
Establish rating	Using the results of the previous discussion, the appraisal team completes the scoring charts (see Annex F) based on the scoring rules described in the Notes below. As the final findings are being determined, the ratings are reviewed against the findings and strengths to ensure there is continuity between these two parts of the report.

Scoring Rules:

The Scoring Template is completed one Focus Area at a time using the following rules.

- At each level, the number of Specific Practices achieved is compared to the number of Specific Practices at that level.
 - ◆ If there are four or fewer Specific Practices, all Specific Practices must be achieved to get credit.
 - ◆ If there are five to seven Specific Practices, no more than one Specific Practice may be deficient to get credit.
 - ◆ If there are eight or more Specific Practices, no more than two Specific Practices may be deficient to get credit.

- At each level, all Generic Practices at that level must be achieved to get credit.
- Utility is calculated by averaging the combined responses for value and effectiveness with “Marginal” responses awarded 1 point, “Adequate” awarded 2 points, “Significant” awarded 3 points, “Measurably Significant” awarded 4 points, and “Optimal” awarded 5 points.
 - ◆ If the average is < 0.75 , no credit is given.
 - ◆ If the average is ≥ 0.75 and < 1.75 , credit is given for Marginal Utility.
 - ◆ If the average is ≥ 1.75 and < 2.75 , credit is given for Marginal and Adequate Utility.
 - ◆ If the average is ≥ 2.75 and < 3.75 , credit is given for Marginal, Adequate and Significant Utility.
 - ◆ If the average is ≥ 3.75 and < 4.75 , credit is given for Marginal, Adequate, Significant and Measurably Significant Utility.
 - ◆ If the average is ≥ 4.75 , credit is given for Marginal, Adequate, Significant, Measurably Significant and Optimal Utility.
- The Focus Area rating is determined by the number of boxes completed on the scoring template. The Specific Practices account for 50% at each level, the Generic Practices account for 25% at each level, and utility accounts for 25%. (Note: since there are no Generic Practices at level 1, utility accounts for 50% at this level. For Focus Areas that do not have Specific Practices at level 5, the Generic Practices account for 50% of the score and utility accounts for the other 50% of the score.)
 - ◆ If scoring on whole points, the rating is the highest level that has all boxes filled and all lower level boxes filled. If there is an unfilled box at a lower level, the appraisal team may award the score for the highest level with all boxes filled, if at least 50% of the practices associated with the unfilled box have been achieved.
 - ◆ If scoring on the half point scale, the rating is the highest level with all boxes filled (and all lower boxes filled), plus a half point is awarded if either the Specific Practices are satisfied at the next level or the Generic Practices and utility are satisfied at the next level. Credit for Specific or Generic Practices may be given at the highest level satisfied, if at least 50% of the Specific or Generic Practices associated with an unfilled box at a lower level have been achieved.
 - ◆ If scoring on the quarter point scale, the rating is the highest level with all boxes filled (and all lower boxes filled), plus a half point is awarded if the Specific Practices are satisfied at the next level, a quarter point is awarded if the Generic Practices are performed at the next level, and a quarter point is awarded if the utility is satisfied at the next higher level. Credit for Specific or Generic Practices may be given at the highest level satisfied, if at least 50% of the Specific or Generic Practices associated with an unfilled box at a lower level have been achieved.

Tailorable Parameters:

- Ratings development may not be performed if the appraisal excludes the rating profile from the appraisal results. That is, findings are all that was desired as an objective of the appraisal.
- Rating granularity - Scores may be presented as whole numbers, on a half point scale (0.5, 1, 1.5, 2, ...), or a quarter point scale (0.25, 0.5, 0.75, 1, 1.25, ...). The level of granularity will affect the scoring process, since it determines if and how “partial credit” will be indicated.

Exit Criteria:

- Consensus is obtained on the rating profile.