

The Operational Framework, Continued

Rationale for the operation framework, continued

- *Identify and use only the relevant information for each part:* Only relevant information needs to be in each part of the operational framework. For example, training information should only be in training documents, and policies should contain information that does not change frequently. By placing only relevant information in each part of the operational framework, people will learn where to look for information.
 - *Manage changes and improvements:* Changes and improvements to the operational parts will be easier to manage because the information is well defined. For example, once defined, policies should not frequently change. Processes probably do not need to change if a step by step procedure changes. Training changes can be isolated to training documents. Only the necessary and important relationships between the operational parts need to be managed.
 - *Manage and improve communication:* Communication improves because people know where to look for certain types of information, and they know the relationships between the information. Since the changes are isolated to the operational parts, less communication is needed and only the relevant changes need to be managed and communicated.
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Impact on SPF organization

Within each maturity level of the CMM, the SPF is organized according to the operational framework. Therefore, each maturity level is presented with separate sections for:

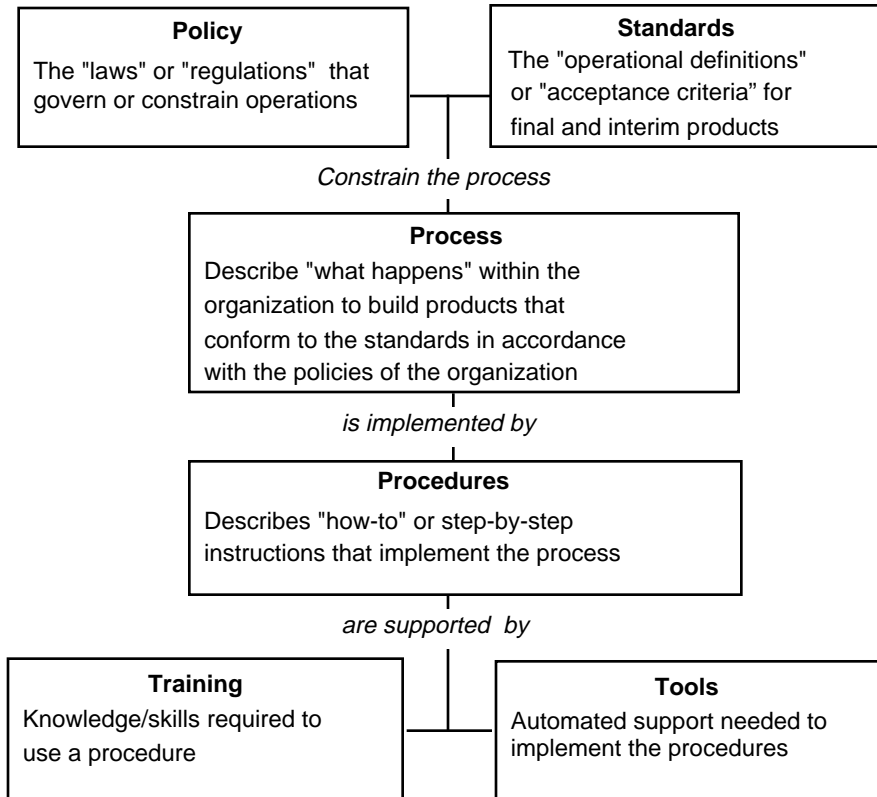
- policies
- standards,
- processes, and
- procedures.

Note: Training and tools are closely related to processes and are presented as checklists with the process they support.

The Operational Framework

Introduction This section describes the operational framework and its relation to the SPF.

Operational framework and the SPF The SPF separates information within a CMM maturity level into an organizational structure for software process documentation called the *operational framework*. The operational framework contains the following process information types:



Rationale for the operation framework Software process documentation must be usable for people. Process documentation that is organized poorly will inhibit people from using it and reduce its effectiveness. The operational framework helps to eliminate this problem because it helps to:

- *Separate information into usable parts:* The operational framework separates information into usable parts used for different purposes. For example, if you want to see an organizational policy, detailed training information included with the policy is irrelevant information (meaning either wasted time or ignoring the policy).

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Relation to the CMM

Introduction This section describes the relationship between the CMM and the SPF.

Relation between the CMM and the SPF In the previous section, we discussed the types of information that must be included in a software process description. This lead to a set of basic questions to ask regarding a software process description.

Once the basic set of questions has been asked, the next challenge is to find the answers. The CMM is a normative model of best practice from the software engineering community and is a source of one set of answers.

Definition The recommendations made by the CMM are presented as checklists. A *process element checklist* contains the information recommended by the CMM for a particular process element.

Example: A *roles* checklist describes the roles recommended by the CMM for a particular key process area.

Process element checklists Using the CMM as a source of answers to the basic set of process questions, we developed a series of process element checklists for each key process area. These checklists are described in the table below.

Checklist	Description
Roles	List of roles participating in process activities
Entry Criteria	Description of when the process can start
Inputs	Description of the work products used by the process
Activities	Description of the activities of the process
Outputs	Description of the work products produced by the process
Exit Criteria	Description of when the process is complete
Reviews and Audits	List of reviews and audits performed during the process
Work Products Managed and Controlled	List of work products to be managed and controlled
Measurements	Description of process measurements
Documented Procedures	List of the activities to be completed according to a documented procedure
Training	List of training for the process
Tools	List of tools to support the process

Process Definition Criteria, Continued

Additional process elements

In addition to the process elements shown above, there are several other pieces of information that are useful to include in process descriptions. They are:

- Reviews and audits performed.
 - Work products that are to be managed and controlled (or placed under configuration management).
 - Measurements to be made.
 - Training.
 - Tools.
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Process elements and the SPF

Every CMM key process area is presented as a series of checklists (see Chapter 2, Features of the SPF). There is one checklist for each process element (except purpose). For example, the software project planning KPA has checklists for inputs, outputs, roles, activities, and so on.

The content of these checklists is derived from the recommendations made by the CMM (see the next section, Relation to the CMM).

Process Definition Criteria

Introduction This section describes process definition criteria and their relationship to the SPF.

Definition: Process definition criteria *Process definition criteria* are the set of information that must be included in a software process description for it to be usable by the people performing the process.

Rationale for the criteria Determining the appropriate process definition criteria answers the question, “What software process information do I need to document?”

Satisfying the criteria Satisfying the process definition criteria requires developing and maintaining process descriptions that contain the information necessary for the software process description to be usable by the people performing the process. The process definition criteria can be satisfied by answering the basic set of questions given below.

Process elements Each basic question is answered by an associated *process element*. The set of basic process questions and their associated process elements are shown in the table below.

This process element...	Answers this basic question...
Purpose	Why is a process performed?
Input	What work products are used?
Output	What work products are produced?
Role	Who (or what) performs the activities?
Activity	What is done?
Entry criteria	When (under what circumstances) can processes begin?
Exit criteria	When (under what circumstances) can processes be considered complete?
Procedure	How are activities implemented?

Questions Addressed by the SPF

Introduction

This section presents the questions facing process definers that the SPF has been developed to address.

Relationship between the SPF and CMM

The CMM contains many of the best practices for developing and maintaining software. People defining software processes consistent with the CMM require the information in the CMM to be presented in a format that helps them to analyze and structure their process information.

The SEI Software Process Definition Project has developed the SPF to support the definition of software processes. It accomplishes this by examining the CMM from the perspective of process definition and presenting the results as a series of checklists.

Questions facing process definers

When developing software process documentation, process definers are faced with three challenging questions:

- What software process information do I need to document?
 - What recommendations does the CMM make about this process information?
 - How do I effectively organize the process information once I have found it?
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The SPF addresses these questions

The SPF was developed to address these questions. In other words, it serves as a bridge from current practice to defined software processes that are consistent with what the CMM recommends.

Each question facing a process definer is addressed by a different aspect of the SPF. The aspects of the SPF that address the questions presented above are shown in the table below.

This question...	Is answered by this aspect of the SPF...
What software process information do I need to document?	Process definition criteria
What does the CMM say about this process information?	Relation to the CMM
How do I organize the process information once I have found it?	Operational framework

Organization of this Document

Introduction	This section provides an overview of the organization of this document.
CMM maturity levels	Each level of the CMM is presented as a separate chapter in the SPF. Gray tabs are used to delimit individual maturity levels. Example: Maturity level 2 is presented in chapter 4 of the SPF.
Organization of each maturity level	Each maturity level of the CMM is presented with separate sections for software policies, standards, processes, and procedures. Example: Chapter 4 contains sections for the policies, standards, processes, and procedures recommended by the CMM for maturity level 2.
Division of KPAs	Each section within a maturity level (i.e., policies) is further divided by key process area (KPA). Example: The policy section of chapter 4 contains a separate entry for each level 2 KPA (e.g., requirements management policy information).

About this Document, Continued

In this document

This document contains the following chapters and appendices.

Chapter	Title	Description
1	Introduction	Rationale for development of the SPF
2	Features of the SPF	Descriptions and examples of SPF features
3	How to use the SPF	Guidance and examples of using the SPF
4	Repeatable Level (Level 2)	Checklists of CMM recommended information for maturity level 2
5	Defined Level (Level 3)	Checklists of CMM recommended information for maturity level 3
6	Managed Level (Level 4)	Checklists of CMM recommended information for maturity level 4
7	Optimizing Level (Level 5)	Checklists of CMM recommended information for maturity level 5
Appendix A	List of Acronyms	Acronyms used in the SPF
Appendix B	Glossary of Terms	CMM glossary, with additional terms that have been introduced in the SPF
Appendix C	Role Translation Table	A tool to translate generic CMM roles into organization specific roles
Appendix D	General Term Translation Table	A tool to translate generic terms used in the CMM into equivalent organization terms
Appendix E	References	References upon which the SPF is based

About this Document

Introduction This section provides an overview of this document.

Purpose The purpose of the SPF is to provide guidance for designing, analyzing, and reviewing software processes for consistency with the CMM.

To fulfill its purpose, the SPF:

- Is based on the CMM and the principles of quality and process management.
 - Presents information recommended by the CMM in a format suitable for software process definition and improvement.
 - Identifies policies, standards, processes, procedures, training, and tools recommended by the CMM.
 - Provides checklists for designing, analyzing, and reviewing software policies, standards, processes, procedures, training, and tools so that they can be consistent with the CMM.
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Scope The SPF addresses levels 2 through 5 of the CMM, version 1.1.

The SPF is not...

The Software Process Framework *is not*:

- *A procedure for reaching a particular maturity level.*
The SPF doesn't tell you how to get to a particular maturity level, but rather what the "goal state" looks like from a process definition and improvement perspective.
 - *Process definition training.*
The SPF does not provide all the needed knowledge and skills for defining a software process.
 - *A method or process.*
The SPF does not provide a method or process for defining a software process.
 - *A replacement for the CMM.*
The CMM contains information about organizational software process maturity; the SPF contains similar information but it is organized for the purpose of designing, analyzing, and reviewing software processes for consistency with the CMM.
 - *A process model or process guide.*
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Tailoring the SPF

We recommend that organizations tailor the checklists for their own use by restating and adding terminology that is organization specific.

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Chapter 1. Introduction

Overview

Introduction This chapter will provide the rationale for the development of the Software Process Framework (SPF). This chapter also describes the major concepts underlying the development of the SPF.

In this chapter This chapter contains the following topics:

Topic	See page
About this document	Introduction-2
Organization of this document	Introduction-4
Questions addressed by the SPF	Introduction-5
Process definition criteria	Introduction-6
Relation to the CMM	Introduction-8
The operational framework	Introduction-9
