Corporation XYZ
Software Process Center / Process Improvement Department

SPC Process Handbook: Product Requirements

Preface

Purpose: *To define the* product requirements *for the* SPC Process Handbook.

Audience: *SPC PID staff.*

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1. Introduction

The PID group in SPC has wanted to provide how-to information—the *SPC Process Handbook*— to project teams within SPC for some time. This handbook would be the primary SPC resource for help with CMMI-related procedures needed when setting up and running projects, so that the project teams do not have to reference any of the SPC CMMI *process description* documents (PDs) in the Document Libary on the KOP.

1.1 Background

After a survey and a series of interviews of both internal PID staff within the directorates and project leaders across SPC, the PIO organization produced a *Customer Requirements* document for an *SPC Process Handbook*. This document defined the needs, expectations, and constraints that this cross-section of customers had for such handbook, expressed in non-technical terms. The product requirements in this document are written to define a handbook product and process that will meet those customer requirements, in somewhat more technical and specific terms. This document will be the basis for more detailed requirements and the technical solution developed to meet these requirements.

1.2 CMMI Requirements Development (RD) Process

Both this document and the previous *Customer Requirements* document have been created, as instructed, by following the practices of the CMMI Requirements Definition process area. The creation of product requirements is addressed by Specific Goal 2 (SG2), Develop Product Requirements: "Customer requirements are refined and elaborated to develop product and product component requirements." Three specific practices are described for this goal:

- SP 2.1 / Establish Product and Product Component Requirements: Establish and maintain product and product component requirements, which are based on the customer requirements.

  ADDITIONAL EXPLANATORY TEXT:
  "…product requirements are the expression of customer requirements in technical terms that can be used for design decisions… Develop architecture requirements addressing critical product qualities and performance necessary for product architecture design…"

- SP 2.2 / Allocate Product Component Requirements: Allocate the requirements for each product component.

  ADDITIONAL EXPLANATORY TEXT:
  "…The requirements are allocated to product functions and product components including objects, people, and processes…"

- SP 2.3 / Identify Interface Requirements: Identify Interface Requirements.

  ADDITIONAL EXPLANATORY TEXT:
  "…Interfaces with product-related lifecycle processes should also be identified…"

The final SG of the RD process area is SG3 / Analyze and Validate Requirements: "The requirements are analyzed and validated, and a definition of required functionality is developed." It has five SPs associated with it. These will be addressed in a later document.

1.3 Related CMMI Material

The handbook is one mechanism to deliver process assets to our customer base. Therefore, two other parts of CMMI are of direct relevance to these requirements:

- Organizational Process Focus (OPF) process area:
  SP 3.1 / Deploy Organizational Process Assets:
  "Deploy organizational process assets across the organization."
- Organizational Process Description (OPD) process area:
  SP 1.5: Establish the Organization's Process Asset Library:
  "Establish and maintain the organization'ps process asset library."

2. Operational Concept

CMMI's RD Goal SG 2 elaborates on its description with the statement "Customer requirements are analyzed in conjunction with the development of the *operational concept* to derive more detailed and precise sets of requirements." Developing an operational concept is part of the product requirements process, and flows naturally out of an analysis of the customer requirements. (Anecdotally, when I'd hear an interviewee mention some need or desire that I could relate to similar comments from others, my mind would often hear thoughts like "it seems they want to be able to do this, and if the book was structured like *xyz*, we might be able to satisfy that need." This is one way an operational concept develops.) The ongoing process of understanding and synthesizing the customer requirements can naturally yield the operational concept.

For the SPC Process Handbook, the needed operational concept appears to be:

> an electronic delivery mechanism that provides what feels (and looks) like a single standard handbook but which is actually dynamically configured to reflect the varying needs of any particular SPC customer, along these dimensions:
>
> - project size → minimal, partial, full (or other relevant categories)
> - project type → development, PPSS, IAVA, … (and other relevant categories)
> - view of information → role-based, life-cycle based, PA-based
>
> And ideally, the handbook as configured for a particular customer should also be provided as a single PDF file, to allow partial or complete printing, and easy searching.

To help clarify the concept, assume for a moment that a piece of how-to information needs to be written about the Requirements Definition (RD) process area, and that the authors believe a bullet list of steps needs to be described for each of the 10 *specific practices* (SP 1.1 and 1.2, SP 2.1 thru 2.3, and SP3.1 thru 3.5) of that PA. A master, generic how-to module could be written to address those 10 SPs, as in the box at left. But the authors need to consider that this module needs variants that are appropriate for the different project sizes and project types that they have defined as being appropriate to categorize all the projects at SPC that will be trying to use the handbook. For example, for a minimal project, maybe some of the bullet lists will reduce to a single item; for a combination of a minimal project and one of the project type categories, the specific practice might be omitted entirely.

SP 1.1:
- do this…
- do that…

SP 1.2:
- do this…
- do that…

. . .

This customization means that the maximum number of variants for the module of how-to material is the product of the number of size and type categories (in practice, it is likely to be less than this maximum). Assuming the 3 size and 3 type categories above, there are 9 potential module variants:

	Minimal	Partial	Full
IAVA	SP 1.1: • do this… • do that… SP 1.2: • do	SP 1.1: • do this… • do that… SP 1.2: • do	SP 1.1: • do this… • do that… SP 1.2: • do
PPSS	SP 1.1: • do this… • do that… SP 1.2: • do	SP 1.1: • do this… • do that… SP 1.2: • do	SP 1.1: • do this… • do that… SP 1.2: • do
development	SP 1.1: • do this… • do that… SP 1.2: • do	SP 1.1: • do this… • do that… SP 1.2: • do	SP 1.1: • do this… • do that… SP 1.2: • do

And in the dynamic presentation, these modules could be presented in different orders, depending on the view that the customer wants to have of the material (role-based, PA-based, etc).

3. Product Requirements

This section describes the product requirements for the *SPC Process Handbook* derived from the customer requirements previously defined. It is a refinement and elaboration of those customer requirements, taking into consideration the operational concept described in the previous section. These requirements suggest a process and functional architecture for producing and presenting the handbook and are separated into two groups:

1. requirements on the content and logical structure—hence on the authors—of the handbook's content
2. requirements on the physical format, access, and delivery mechanisms for the handbook

Requirements in this document are numbered sequentially, using two notations:

1. **PR-C**<*n*> *for requirements on the product's content and authors*
2. **PR-M**<*n*> *for requirements on the product's delivery mechanisms*

Each prefix is numbered separately (i.e., requirements **PR-C1** and **PR-M1** are different).

The requirements are presented in the 3 broad categories that were used for the customer requirements, broken down into sub-sections for content and for mechanism. At the end of each requirement is the notation

[Addresses CR-<*n*>]

that indicates the number of the *customer requirement* that this product requirement addresses.

3.1 Requirements: Scope & Applicability

3.1.1 Requirements on the Content

PR-C1:
The handbook authors must clearly describe, both in the handbook itself and in communication to customers during the handbook development process, fundamental aspects of the scope of the handbook:

- the purpose of the handbook
- the audience of the handbook, and how it is to be used by each part of the audience
- the sources of content for the handbook
- the particular relationship of the handbook to existing content:
  a) directorate or division how-to material;
  b) SOPs affecting process;
  c) SPC Document Libary jump start kits; and
  d) the handbooks being developed by various IPTs

➔ [*Addresses CR-1, CR-5, CR-8*]

PR-C2:
The handbook authors must, when designing the logical content of the handbook, allow for the use of existing material from the directorates and divisions that is actively used and compatible with the tailoring guidelines of CMMI. This requirement means:

a) The organization of the handbook content must allow existing material to be used as a tailored piece replacing SPC corporate material.
b) The organization of the handbook content must allow for future tailored material from the directorates to be used instead of SPC corporate material, when appropriate.

➔ [*Addresses CR-2, CR-7, CR-8*]

PR-C3:
The content of the handbook must be tailored for customers based on both their project size and their project type, so that it is relevant on those dimensions alone. This requirement means:

a) The authors must define the relevant *project size* categories that all projects can belong to. This may be the current categories of *minimal*, *partial*, and *full*, or may be different. These categories must be able to adequately represent all projects to which the handbook is targeted, and need to be defined and explained clearly in the prefatory material to the handbook.

b) The authors must write separate versions of the content, as appropriate, for each *project size* category.
c) The authors must define the relevant *project type* categories that all projects can belong to. This may include some of the current categories of *development*, *PPSS*, and *IAVA*, but may be different and/or include others. These categories must be able to adequately represent all projects to which the handbook is targeted, and need to be defined and explained clearly in the prefatory material to the handbook.
d) The authors must write separate versions of the content, as appropriate, for each *project type* category.
e) If requirement **PR-C1** or requirement **PR-C7** results in an audience segment that is not covered by the categories of project size and project type used in parts a) through d), further versions must be considered. For instance, if the requirement about making the content relevant to "projects like mine" on project attributes like goals, resources, budget, and customer type result in further ways to dynamically adjust the content to the customer, then this targeting of an additional customer segment must be defined and documented clearly, and used in the design of the content.

[*Addresses CR-3*, CR-*4*, *CR-7, CR-8*]

3.1.2 Requirements on the Mechanism

PR-M1:
The handbook must include prefatory sections, before the main body of content, that describe Purpose, Audience, Scope, and Relationship to Existing Division and Division Material
➔ [*Addresses CR-1*]

PR-M2:
The handbook delivery mechanism must be designed to allow content modules from current and future directorate- and division-level material to replace SPC corporate content. This means:
a) The basic format for content of the handbooks must be done in a way to seamlessly support replacement of SPC corporate material with division-level material.
b) The reader of the handbook must have the same experience whether a module's content is from corporate or from a division—the location in the handbook should be the same.
c) The source of the material in the current module must be identified (corporate, division, etc), such as "This module is a standard SPC procedure" or "This module is an ISR Division procedure that replaces an SPC corporate procedure."
➔ [*Addresses CR-2, CR-8*]

PR-M3:
The handbook delivery mechanism must be designed to allow for customers with projects of different size and different type to see only handbook material that is relevant to their project's size and type. This means:
a) The mechanism must support a customer's selection of both project size and project type as a choice governing the dynamic delivery of the handbook content.
b) The format of any piece of the handbook need to convey to the user what its source is and whether it applies to the current handbook because of size or project type choices made by the user.

[*Addresses CR-3*, *CR-4, CR-8*]

3.2 Requirements: Content

3.2.1 Requirements on the Content

PR-C4:
The authors of the handbook material need to make the content as short and succinct as possible, e.g., using checklists of things to be done with links to further information where useful. They should keep in mind "What does the user of this information need when doing it for the *n*th time vs. doing it for the first time?" and use that to structure the information usefully.
➔ [*Addresses CR-6*]

PR-C5:
The authors of the handbook material must ensure that each module of the handbook contains standard sections with information on or links to:

- people resources: POC's within SPC and the local organization that can help with that particular module's content when the handbook is being used on a project
- blank templates and forms that can be used as is
- examples of templates and forms filled out
- training available that covers this module's material

➔ [*Addresses CR-9, CR-10, CR-11*]

3.2.2 Requirements on the Mechanism

PR-M4:
The handbook must consist of modules that can be customized along a number of dimensions:

- project size
- project type
- directorate- or division-specific material

in a way that the modules can be combined dynamically to create a common user experience of "the SPC Process Handbook."
➔ [*Addresses CR-2, CR- 3, CR- 4, CR- 7, CR- 8, CR-12, CR-13, CR-15*]

PR-M5:
Each handbook module must be written starting from a common template that is part of the overall look and feel of the handbook. The prefatory material for each module must include fields to identify the current module along any dimension on which it can customized: project size, project type, tailored directorate- or division-specific material, etc, so that the user knows both what module it is in the overall handbook framework and how that material is different from some "generic" SPC handbook, if it is.
[*Addresses CR-2, CR- 3, CR- 4, CR- 7, CR- 8, CR-12, CR-13, CR-15*]

PR-M6:
The template for a handbook module must contain standard fields or table entries for:
a) identifying POC resources for users to get questions answered about that module's contents;
b) identifying tools and tool instructions relevant to the module';
c) linking to forms and templates relevant to the module, both blank and filled out;
d) identifying and linking to related training materials or classes.
➔ [*Addresses CR-9, CR-10, CR-11*]

3.3 Requirements: Format, Access, Updates

3.3.1 Requirements on the Content

PR-C6:
The authors need to ensure that the first module or two of the handbook, whichever dynamic version is presented to the user, gives an overview and roadmap to the entire handbook, so that the user has a feel for the scope and range of the material contained. Additionally, each module should take the form of a roadmap to further information if that is a helpful and succinct way to present the content to the user.
➔ [*Addresses CR-12*]

PR-C7:
The authors of the content need to ensure that the design and architecture of the content modules allow the user to have a coherent user experience reading & using the handbook, not only for project size and project type variants, but also for view variants (role-based view, PA-based view, etc). The content needs to be written in a way that mixing and matching modules in a dynamically generated view does not cause the overall text or flow of the material to be confusing or inconsistent for the user.
➔ [*Addresses CR-13*]

3.3.2 Requirements on the Mechanism

PR-M7:
The design of the electronic handbook delivery mechanism must allow for the dynamic creation of different views of the handbook material —something we can call a *virtual view* of the handbook—for different user needs, based on user-specified criteria along two dimensions:

- project characteristics (primarily *size* and *type*) that will affect the volume and nature of the actual content presented
- user point-of-view (role-based view, process area-based view, life cycle view, etc)

This mechanism must provide a consistent user experience no matter which view of the content is presented. And if an ability to generate a single PDF file of a particular virtual view is provided, the printable PDF file of any handbook view should resemble in overall appearance and layout the printable PDF file of all other handbook views, with the actual content being the only thing that differs.
➔ [*Addresses CR-2, CR- 3, CR- 4, CR- 7, CR- 8, CR- 13, CR-17*]

PR-M8 [stretch requirement]:
The handbook delivery mechanism should provide a wiki-like capability that allows appropriately authorized users to contribute to, modify, and comment on material in any given module, such that all subsequent users of that module can see and benefit from the prior user's contributions.
➔ [*Addresses CR-13*]

PR-M9:
The platform used for the handbook delivery mechanism should allow easy printing of a single page, single module, group of modules, or an entire virtual view of the handbook. This requirement may be met by an integrated ability to generate a single PDF file of any virtual view. Printing of pages via any browser-based delivery mechanism is not considered sufficient to meet this requirement.
➔ [*Addresses CR-15, CR-17*]

PR-M10:
The platform used for the handbook delivery mechanism should allow full-text and other types of searching on the entire virtual view that a user is using, not just the basic "find a string within the current window/page" of typical browser-based search capabilities. And nothing about the PDF file that can be generated of any virtual view should preclude the usability of the built-in search capability of Acrobat Reader for PDF files.

➔ [*Addresses CR-14, CR-17*]

PR-M11:
The platform used for the handbook delivery mechanism must allow links from one module of the handbook to another as well as to external sources (files anywhere on the intranet or internet). In addition, the links must be able to use the standard link open parameters possible with URLs, parameters that begin with the pound sign # (such as `#page=5` or `#Section3`), to cause the target of the link to open to an internal destination in the document (an *anchor* in an HTML page, a *bookmark* in Word, or a *named destination* in a PDF file).
➔ [*Addresses CR-16*]

3.4 Mapping from Customer Requirements

The table below shows which customer requirements generated product requirements in this document.

CR-1	PR-C1 PR-M1
CR-2	PR-C2 PR-M2, PR-M4, PR-M5, PR-M7
CR-3	PR-C3 PR-M3, PR-M4, PR-M5, PR-M7
CR-4	PR-C3 PR-M3, PR-M4, PR-M5, PR-M7
CR-5	PR-C1
CR-6	PR-C4
CR-7	PR-C2, PR-C3 PR-M4, PR-M5, PR-M7
CR-8	PR-C1, PR-C2, PR-C3 PR-M2, PR-M3, PR-M4, PR-M5, PR-M7
CR-9	PR-C5 PR-M6
CR-10	PR-C5 PR-M6
CR-11	PR-C5 PR-M6
CR-12	PR-C6 PR-M4, PR-M5
CR-13	PR-C7 PR-M4, PR-M5, PR-M7, PR-M8
CR-14	PR-M10
CR-15	PR-M4, PR-M5, PR-M9
CR-16	PR-M11
CR-17	PR-M7, PR-M9, PR-M10
CR-18	
CR-19	PR-M8