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(Revision of IEEE Std 828-1998)

IEEE Standards

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IEEE Standard for Software Configuration Management Plans

IEEE Computer Society

Sponsored by the
Software Engineering Standards Committee

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IEEE Standard for Software Configuration Management Plans

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of the
IEEE Computer Society

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Abstract: The minimum required contents of a Software Configuration Management (SCM) Plan are established via this standard. This standard applies to the entire life cycle of critical software (e.g., where failure would impact safety or cause large financial or social losses). It also applies to noncritical software and to software already developed. The application of this standard is not restricted to any form, class, or type of software.
Keywords: configuration control, configuration control board, configuration identification, configuration item, configuration review, configuration status accounting, release management, software configuration management, software configuration management plan

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Introduction

This introduction is not part of IEEE Std 828-2005, IEEE Standard for Software Configuration Management Plans.

Although this standard addresses software configuration management plans, it is primarily concerned with the activity of planning for software configuration management (SCM). It is the intent of the IEEE that the next version of this standard will be a process standard focusing on planning for SCM. SCM activities, whether planned or not, are performed on all software development projects; planning makes these activities more effective. Good planning results in a document that captures the planning information, makes the information the property of the project, communicates to all who are affected, and provides a basis for ongoing planning.

SCM is a formal engineering discipline that, as part of overall system configuration management, provides the methods and tools to identify and control the software throughout its development and use. SCM activities include the identification and establishment of baselines; the review, approval, and control of changes; the tracking and reporting of such changes; the audits and reviews of the evolving software product; the management of software release and delivery activities, and the control of interface documentation and project supplier SCM.

SCM is the means through which the integrity and traceability of the software system are recorded, communicated, and controlled during both development and maintenance. SCM also supports reduction of overall software life cycle cost by providing a foundation for product and project measurement.

SCM constitutes good engineering practice for all software projects, whether phased development, rapid prototyping, or ongoing maintenance. It enhances the reliability and quality of software by

— Providing a structure for identifying and controlling documentation, code, interfaces, and databases to support all life cycle phases

— Supporting a chosen development/maintenance methodology that fits the requirements, standards, policies, organization, and management philosophy

— Producing management and product information concerning the status of baselines, change control, tests, releases, audits, etc.

IEEE Std 828-2005 was prepared by the Life Cycle Data Harmonization Working Group of the Software Engineering Standards Committee of the IEEE Computer Society. This revision is a minor update to IEEE 828-1998 and was done to ensure consistency among the SCM guidance provided by this standard, IEEE/EIA 12207.1™-1997, IEEE/EIA Guide for Information Technology—Software Life Cycle Processes—Life Cycle Data, and the IEEE Software Engineering Body of Knowledge (SWEBOK) project. Information regarding relationships of IEEE 828-2005 to other standards is contained in Annex B.

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Contents

IEEE Standard for Software Configuration Management Plans

1. Overview

1.1 Scope

This standard establishes the minimum required contents of a Software Configuration Management (SCM) Plan (also referred to as "the Plan"). This standard applies to the entire life cycle of critical software; e.g., where failure would impact safety or cause large financial or social losses. It also applies to noncritical software and to software already developed. The application of this standard is not restricted to any form, class, or type of software.

1.2 Purpose

The SCM Plan documents what SCM activities are to be done, how they are to be done, who is responsible for doing specific activities, when they are to happen, and what resources are required. It can address SCM activities over any portion of a software product's life cycle. This standard is consistent with the IEEE Software Engineering Body of Knowledge (SWEBOK) project Stoneman release on the topic of configuration management and with IEEE/EIA Std 12207.0™ [B4][1,2].

The content of the Plan is identified in Clause 3 of this standard. The required information is indicated by the words "shall" and "required." Additional optional information is also identified as appropriate. The user of this standard, however, is expected to expand and supplement the minimum requirements as necessary for the development environment, specific industry, organization, and project. Adapting a plan in conformance with this standard is described in Clause 4.

The primary users of this standard are assumed to be those planning SCM activities or performing SCM audits.

In considering adoption of this standard, regulatory bodies should be aware that specific application of this standard may already be covered by one or more IEEE standards documents relating to quality assurance, definitions, or other matters (see IEEE Std 730™-2002 [B3]). It is not the purpose of this standard to supersede, revise, or amend existing standards directed to specific industries or applications.

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[1]IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA

[2] The numbers in brackets correspond to those of the bibliography in Annex A.

2. Definitions and acronyms

2.1 Definitions

For the purposes of this standard, the following terms and definitions apply. *The Authoritative Dictionary of IEEE Standards,* [B1], should be referenced for terms not defined in this clause.

2.1.1 control point (project control point): a project agreed on point in time or times when specified agreements or controls are applied to the software configuration items being developed, (e.g., an approved baseline or release of a specified document/code or project milestone).

2.1.2 release: (A) a particular version of a configuration item that is made available for a specific purpose (e.g., test release). (B) The formal notification and distribution of an approved version.

The following additional terms are used in a manner consistent with their definition or usage in IEEE/EIA 12207.0: baseline, component, configuration, configuration audit, configuration control, configuration control board, configuration identification, configuration item, configuration management, configuration status accounting, interface, interface control, software, software library, software life cycle, unit, and version.

The term "the Plan" is used throughout this standard to refer to the Software Configuration Management Plan.

2.2 Acronyms

The following acronyms appear within the text of this standard:

CCB	configuration control board
CI	configuration item
SCM	software configuration management
SQA	software quality assurance

3. The Software Configuration Management Plan

SCM planning information shall be partitioned into the six classes described in Table 1. The referenced subclauses of the standard provide the reader with detailed requirements for each class of information.

SCM planning information may be presented in any format, sequence, or location that is meaningful to the intended users of the Plan with the following restrictions:

a) A document with the title "Software Configuration Management Plan" shall exist either in stand-alone form or embedded in another project document.

b) This document shall contain all SCM planning information either by inclusion or by reference to other locations, such as other documents or automated systems.

c) A format for this document shall be defined.

The writer of the Plan shall use the sequence of sections specified in Table 1 unless a different format has been defined in the introduction of the Plan (see 3.1).

Table 1—SCM classes of information

Class of information	Description	IEEE Std 828-2005 reference	Plan reference
Introduction	Describes the Plan's purpose, scope of application, key terms, and references	3.1	1
SCM management	(Who?) Identifies the responsibilities and authorities for managing and accomplishing the planned SCM activities	3.2	2
SCM activities	(What?) Identifies all activities to be performed in applying to the project	3.3	3
SCM schedules	(When?) Identifies the required coordination of SCM activities with the other activities in the project	3.4	4
SCM resources	(How?) Identifies tools and physical and human resources required for execution of the Plan	3.5	5
SCM plan maintenance	Identifies how the Plan will be kept current while in effect	3.6	6

3.1 Introduction

Introduction information provides a simplified overview of the SCM activities so that those approving, those performing, and those interacting with SCM can obtain a clear understanding of the Plan. The introduction shall include four topics: the purpose of the Plan, the scope, the definition of key terms, and references.

The purpose shall briefly address why the Plan exists and describe the intended audience.

The scope shall address SCM applicability, limitations, and assumptions on which the Plan is based. The following items shall be included:

a) Overview description of the software project

b) Identification of the software CI(s) to which SCM will be applied

c) Identification of other software to be included as part of the Plan (e.g., support or test software)

d) Relationship of SCM to the hardware or system configuration management activities for the project

e) The degree of formality, depth of control, and portion of the software life cycle for applying SCM on this project

f) Limitations, such as time constraints, that apply to the Plan

g) Assumptions that might have an impact on the cost, schedule, or ability to perform defined SCM activities (e.g., assumptions of the degree of customer participation in SCM activities or the availability of automated aids).

Key terms shall be defined as they apply to the Plan in order to establish a common terminology among all users of the Plan. The SCM plan shall include a glossary or provide a reference to a project glossary.

All references in the Plan to policies, directives, procedures, standards, terminology, and related documents shall be uniquely identified to enable retrieval by users of the Plan.

3.2 SCM management

SCM management information describes the allocation of responsibilities and authorities for SCM activities, and their management, to organizations and individuals within the project structure.

SCM management information shall include four topics: the project organization(s) within which SCM is to apply, the SCM responsibilities of these organizations, references to the SCM policies and directives that apply to this project, and the management of the SCM process.

3.2.1 Organization

The organizational context, both technical and managerial, within which the planned SCM activities are to be implemented shall be described. The Plan shall identify the following:

a) All organizational units that participate in or are responsible for any SCM activity on the project

b) All organizational units that participate in or are responsible for the problem resolution process (see IEEE/EIA 12207.0 [B4])

c) The functional roles of these organizational units within the project structure

d) Relationships between organizational units and the interfaces implementing the relationships

Organizational units may consist of a vendor and customer, a prime contractor and subcontractors, or different groups within one organization. Organization charts, supplemented by statements of function, roles, and relationships, can be an effective way of presenting this information.

3.2.2 SCM responsibilities

The allocation of SCM activities to organizational units shall be specified. For each activity listed within SCM activities (see 3.3), the name of the organizational unit or job title to perform this activity shall be provided. A matrix that relates the organizations defined above to the SCM functions, activities, and tasks can be useful for documenting the SCM responsibilities.

For any review board or special organization established for performing SCM activities on this project, the Plan shall describe its:

a) Purpose and objectives

b) Membership and affiliations

c) Period of effectivity

d) Scope of authority

e) Operational procedures

3.2.3 Applicable policies, directives, and procedures

Any external constraints placed on the Plan by other policies, directives, and procedures shall be identified. For each, its impact and effect on the Plan shall be stated.

3.2.4 Management of the SCM process

The organizational unit responsible for the overall SCM process shall be specified (see IEEE Std 730 [B3]). Information shall also be provided, or referenced, describing:

a) The anticipated cost of the SCM process and the means for periodic monitoring of planned versus actual costs

b) The means for, and the organizational unit responsible for, independent surveillance of SCM activities to ensure compliance with the SCM Plan

c) The identification, assessment, and plans for the mitigation of risks associated with the performance of the SCM activities. Types of risk include, but are not limited to, technical, economic, schedule, and managerial.

3.3 SCM activities

SCM activities information identifies all functions and tasks required to manage the configuration of the software system as specified in the scope of the Plan. Both technical and managerial SCM activities shall be identified. General project activities that have SCM implications shall be described from the SCM perspective.

SCM activities are traditionally grouped into five functions: configuration identification, configuration control, configuration status accounting, configuration evaluations and reviews, and release management and delivery. The information requirements for each function are identified in 3.3.1, 3.3.2, 3.3.3, 3.3.4, and 3.3.7.

Due to their high risk nature, the requirements for interface control and subcontractor/vendor control activities are identified separately in 3.3.5 and 3.3.6.

3.3.1 Configuration identification

Configuration identification activities shall identify, name, and describe the documented physical and functional characteristics of the code, specifications, design, and data elements to be controlled for the project. The documents are acquired for configuration control. Controlled items may be intermediate and final outputs. These items include outputs of the development process (see IEEE Std 730 [B3]) (such as requirements, design, executable code, source code, user documentation, program listings, databases, test cases, test plans, specifications, and management plans) and elements of the support environment (such as compilers, operating systems, programming tools, maintenance and support items, and test beds).

The Plan shall identify the project configuration items (CI) and their structures at each project control point. The Plan shall state how each CI and its versions are to be uniquely named and describe the activities performed to define, track, store, and retrieve CIs. Information required for configuration identification (see Figure 1) is specified in 3.3.1.1 through 3.3.1.3.

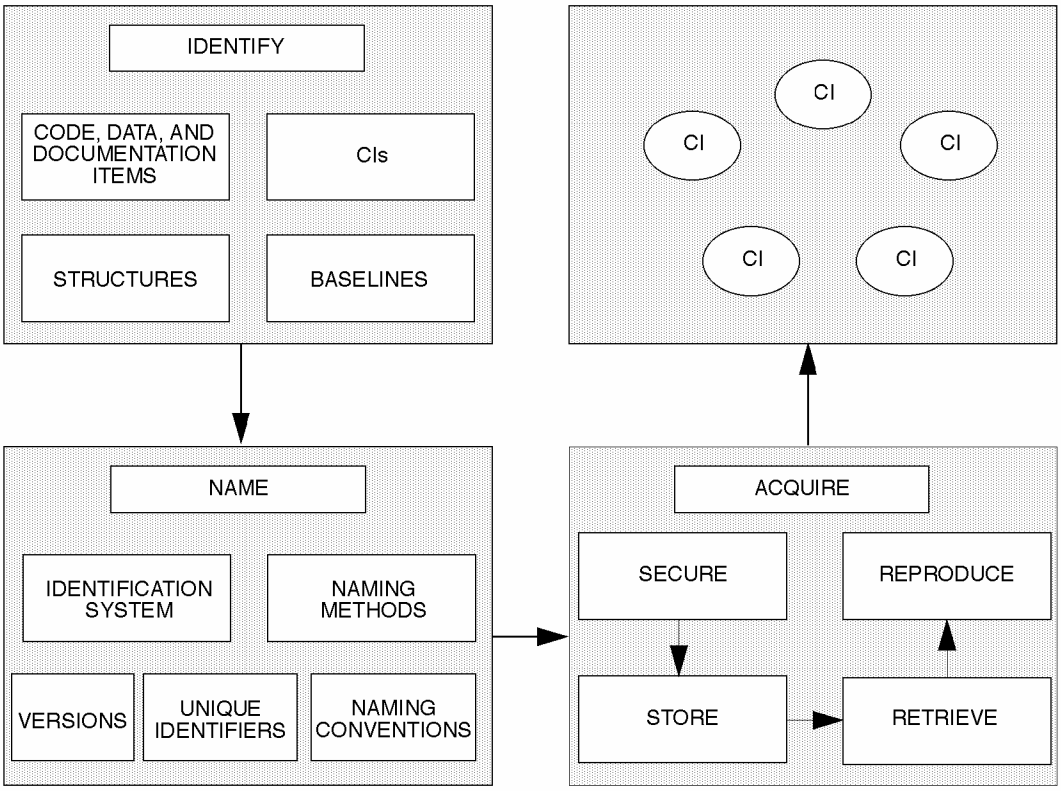

Figure 1—Configuration identification processes

3.3.1.1 Identifying configuration items

The Plan shall record the items to be controlled, the project CIs, and their definitions as they evolve or are selected. The Plan shall also describe how the list of items and the structures are to be maintained for the project.

The plan shall define how baselines are to be created, in terms of the following:

a) The event that creates the baseline

b) The items that are to be controlled in the baseline

c) The procedures used to establish and change the baseline

d) The authority required to approve changes to the approved baselined documents

A means of identifying changes and associating them with the affected CIs and the related baseline shall be specified.

3.3.1.2 Naming configuration items

The Plan shall specify an identification system for assigning unique identifiers to each item to be controlled. It shall also specify how different versions of each are to be uniquely identified. Identification methods could include naming conventions and version numbers and letters.

The Plan shall describe the methods for naming controlled items for purposes of storage, retrieval, tracking, reproduction, and distribution. Activities may include version marking, labeling of

documentation and executable software, serialization and altered item marking for executable code or data embedded on a microchip, and identification of physical packaging.

Subcontracted software, vendor proprietary software, and support software may require special identification schemes and labeling.

3.3.1.3 Acquiring configuration items

The Plan shall identify the controlled software libraries for the project and describe how the code, documentation, and data of the identified baselines are to be physically placed under control in the appropriate library. For each library the format, location, documentation requirements, receiving and inspection requirements, and access control procedures shall be specified.

The Plan shall specify procedures for the actual storage of documents and magnetic media, including the physical marking and labeling of items. Data retention periods and disaster prevention and recovery procedures may also be described.

Procedures shall describe how to retrieve and reproduce controlled items from library storage. These activities include verification of marking and labeling, tracking of controlled copies, and protection of proprietary and security information.

3.3.2 Configuration control

Configuration control activities request, evaluate, approve or disapprove, and implement changes to baselined CIs. Changes encompass both error correction and enhancement. The degree of formality necessary for the change process depends on the project baseline affected and on the impact of the change within the configuration structure. Configuration control activities also apply to the processing of requests for deviations and waivers from the provisions of specifications or acquirer-supplier contracts.

For each project software library identified according to 3.3.1.3, the Plan shall describe the change controls imposed on the baselined CIs. The Plan shall define the following sequence of specific steps:

a) Identification and documentation of the need for a change

b) Analysis and evaluation of a change request

c) Approval or disapproval of a request

d) Verification, implementation, and release of a change

The Plan shall identify the records to be used for tracking and documenting this sequence of steps for each change. Any variations in handling changes based on the origin of the request shall be explicitly documented.

3.3.2.1 Requesting changes

The Plan shall specify the procedures for requesting a change to a baselined CI and the information to be documented for the request. As a minimum, the information recorded for a proposed change shall contain the following:

a) The name(s) and version(s) of the CIs where the change is desired

b) Originator’s name and organization

c) Date of request

d) Indication of urgency

e) The need for the change

f) Description of the requested change

Additional information, such as priority or classification, may be included to clarify the significance of the request and to assist in its analysis and evaluation. Other information, such as change request number, status, and disposition, may be recorded for change tracking.

3.3.2.2 Evaluating changes

The Plan shall specify the analysis required to determine the impact of the proposed change and the procedures for reviewing the results of the analysis. Changes should be evaluated according to their effect on the deliverable and their impact on project resources.

3.3.2.3 Approving or disapproving changes

The Plan shall identify each configuration control board (CCB) and its level of authority for approving proposed changes. A CCB may be an individual or a group. Multiple levels of CCBs may be specified, depending upon the degree of system or project complexity and upon the project baseline involved. When multiple CCBs are used, the Plan shall specify how the proper level is determined for a change request, including any variations during the project life cycle.

For any CCB utilized, the Plan shall indicate its level of authority and its responsibilities as defined in 3.2.2.

3.3.2.4 Implementing changes

The Plan shall specify the activities for verifying and implementing an approved change. The information recorded for the completion of a change shall contain the following as a minimum:

a) The associated change request(s)

b) The names and versions of the affected items

c) Verification date and responsible party

d) Release or installation date and responsible party

e) The identifier of the new version

Additional information, such as software fault measurements or identification of the supporting software used to implement the change, may be included.

The Plan shall also specify activities for release planning and control (e.g., coordinating multiple changes, reconfiguring the CIs, and delivering a new baseline).

3.3.3 Configuration status accounting

Configuration status accounting activities record and report the status of project CIs.

The Plan shall include information on the following:

a) What data elements and SCM metrics are to be tracked and reported for baselines and changes

b) What types of status accounting reports are to be generated and their frequency

c) How information is to be collected, stored, processed, reported, and protected from loss

d) How access to the status data is to be controlled

If an automated system is used for any status accounting activity, its function shall be described or referenced. Status accounting records and reports shall be available that provide the current status and history of controlled items. The following minimum data elements shall be tracked and reported for each CI: its approved versions, the status of requested changes, and the implementation status of approved changes. The level of detail and specific data required may vary according to the information needs of the project and the customer.

Reports and records shall also be available to describe and track that software build, release and delivery information necessary for the formal control of the software release and delivery activity (see 3.3.7).

3.3.4 Configuration evaluation and reviews

Configuration evaluation consists of audits that determine the extent to which the actual CI reflects the required physical and functional characteristics. Configuration reviews are a management mechanism to evaluate a baseline.

The Plan shall identify the configuration audits and reviews to be held for the project. At a minimum, a configuration audit shall be performed on a CI prior to its release.

For each planned configuration audit or review, the Plan shall define the following:

a) Its objective

b) The CIs under audit or review

c) The schedule of audit or review tasks

d) The procedures for conducting the audit or review

e) The participants by job title

f) Documentation required to be available for review or to support the audit or review

g) The procedure for recording any deficiencies and reporting corrective actions

h) The approval criteria and the specific action(s) to occur upon approval

3.3.5 Interface control

Interface control activities coordinate changes to the project CIs with changes to interfacing items outside the scope of the Plan. Hardware, system software and support software, as well as other projects and deliverables, should be examined for potential interfacing effects on the project.

The Plan shall identify the external items to which the project software interfaces. For each interface the Plan shall define the following:

a) The nature of the interface

b) The affected organizations

c) How the interface code, documentation, and data are to be controlled

d) How the interface control documents are approved and released into a specified baseline

For any CCB established to control interfaces, the Plan shall identify its responsibilities and procedures as specified in 3.2.2.

3.3.6 Subcontractor/vendor control

Subcontractor/vendor control activities incorporate items developed outside the project environment into the project CIs. Included are software developed by contract and software acquired in its finished form. Special attention should be directed to these SCM activities due to the added organizational and legal relationships.

For both subcontracted and acquired software, the Plan shall define the activities to incorporate the externally developed items into the project CIs and to coordinate changes to these items with their development organizations.

For subcontracted software, the Plan shall describe the following:

a) What SCM requirements, including an SCM Plan, are to be part of the subcontractor's agreement

b) How the subcontractor will be monitored for compliance

c) What configuration evaluations and reviews of subcontractor items will be held

d) How external code, documentation, and data will be tested, verified, accepted, and merged with the project software

e) How proprietary items will be handled for security of information and traceability of ownership (e.g., copyright and royalties)

f) How changes are to be processed, including the subcontractor's participation

Acquired software items shall be placed under SCM. The Plan shall describe how the software will be received, tested, and placed under SCM; how changes to the supplier's software are to be processed; and whether and how the supplier will participate in the project's change management process. Acquired software can come from a vendor, a subcontractor, a customer, another project, or other source.

3.3.7 Release management and delivery

The SCMP shall describe how the build, release and delivery of software products and documentation will be formally controlled. Procedures for accommodating approved deviations and waivers should be included in the control mechanisms. Master copies of code and documentation shall be maintained for the life of the software product. The code and documentation that contain safety or security critical functions shall be handled, stored, packaged, and delivered in accordance with the policies of the organizations involved.

3.4 SCM schedules

SCM schedule information establishes the sequence and coordination for the identified SCM activities and for all events affecting the Plan's implementation.

The Plan shall state the sequence and dependencies among all SCM activities and the relationship of key SCM activities to project milestones or events. The schedule shall cover the duration of the Plan and contain all major milestones of the project related to SCM activities. Milestones shall include establishment of a configuration baseline, implementation of change control procedures, and the start and completion dates for a configuration audit.

Schedule information shall be expressed as absolute dates, as dates relative to either SCM or project milestones, or as a simple sequence of events. Graphic representation can be particularly appropriate for conveying this information.

3.5 SCM resources

SCM resource information identifies the environment, infrastructure, software tools, techniques, equipment, personnel, and training necessary for the implementation of the specified SCM activities.

SCM can be performed, within an overall environment or infrastructure, by a combination of software tools and manual procedures. Tools can be SCM-specific or embedded in general project aids; they can be standard organizational resources or ones specially acquired or built for this project. Tools can be applied to library structure and access control; documentation development and tracking; code control; baseline system generation; change processing, communication and authorization; change/problem tracking and status reporting; archiving, retention, and retrieval of controlled items; or the SCM planning process itself.

The infrastructure for SCM should be planned and documented considering factors such as functionality, performance, safety, security, availability, space requirements, equipment, costs, and time constraints. The infrastructure shall be maintained, monitored, and modified as necessary to ensure that it continues to satisfy the requirements of the SCM process. The extent to which the infrastructure is under configuration management shall be defined.

For each type of SCM activity identified, the Plan shall specify what tools, techniques, equipment, personnel, and training are required and how each resource will be provided or obtained.

For each software tool, whether developed within the project or brought in from outside the project, the Plan shall describe or reference its functions and shall identify the configuration controls to be placed on the tool.

3.6 SCM plan maintenance

SCM plan maintenance information identifies the activities and responsibilities necessary to ensure continued SCM planning during the life cycle of the project. The Plan shall include a history of changes made to the plan and state the following:

a) Who is responsible for monitoring the Plan

b) How frequently updates are to be performed

c) How changes to the Plan are to be evaluated and approved

d) How changes to the Plan are to be made and communicated

The Plan should be reviewed at the start of each project software phase, changed accordingly, and approved and distributed to the project team.

If the Plan has been constructed with detailed procedures documented elsewhere in appendixes or references, different maintenance mechanisms for those procedures may be appropriate.

4. Adapting the plan

This standard permits significant flexibility in preparing an SCM Plan. A successful Plan reflects its project environment. It should be written in terms familiar to its users and should be consistent with the development and procurement processes of the project.

To conform to the requirements set forth in other applicable standards or to accommodate local practices, a Plan may be adapted upward, to add information, or to use a specified format. The Plan may also be adapted downward, omitting information required by this standard, when specific standard requirements are identified as not applicable to this project.

4.1 Upward adaptation

Some information requirements applicable to a particular project may not be stated in this standard due to its scope of establishing the minimum required contents of an SCM Plan. If additional requirements are applicable to the project, the Plan shall so state these additions as part of the Introduction and indicate the reason for their insertion. A cost-benefits analysis should be completed for each additional requirement. Requirements that are additional should be agreed on by all affected project functions and the parties responsible for approval of the plan.

4.2 Downward adaptation

Some information requirements stated in this standard may not apply to a particular project due to the project's limited scope, low complexity, or unusual environment. If a requirement is not applicable to the project, the Plan shall so state this deletion as part of the Introduction and indicate the reason for removal. Requirements that are inapplicable should be agreed upon by all affected project functions and all parties responsible for approval of the Plan.

The Plan shall omit none of the six major classes of information. Detailed information may be omitted as indicated above but within the limits of the consistency criteria stated in Clause 5.

If certain information has not been decided on or is unavailable at the time the Plan is initially approved, the Plan shall mark those areas or sections as "to be determined" and shall indicate, as part of Plan maintenance, information on how and when further information will be provided.

4.3 Format

The information may be presented in the Plan in any sequence or presentation style deemed suitable for the Plan's users. To achieve consistency and convenience within a single organization or industry segment, a standard format for SCM plans is desirable and appropriate. To customize this standard for a particular group of users, a supplement to the standard specifying Plan structure and standard terminology may be used.

5. Conformance to the standard

An SCM Plan shall satisfy the criteria in 5.1 through 5.4 in order to conform with this standard.

5.1 Minimum information

The Plan shall include the six classes of SCM information identified in Clause 3: introduction, management, activities, schedules, resources, and plan maintenance. Within each class, all of the required information stated in Clause 3 of this standard, as indicated by the words "shall" and "required," shall be documented within the Plan. If certain required information is not applicable, the reasons shall be so stated (see 4.2). If a sequence of information other than the sequence of this standard is used, an explicit cross-reference between the Plan and the standard shall be provided.

5.2 Presentation format

One document, section title, or such reference shall exist that is specifically labeled "Software Configuration Management Plan." Within this document, each of the six classes of information shall be included. While the information may be provided in a number of presentation styles, the requirement is to provide all Plan information and references in a single document.

5.3 Consistency criteria

The documented information shall satisfy the following consistency criteria:

a) All activities defined in the Plan (see 3.3.1 through 3.3.7) shall be assigned to an organizational unit (see 3.2.2).

b) All activities defined shall have resources identified to accomplish the activities (see 3.5).

c) All CIs identified in the Plan (see 3.3.1) shall have defined processes for baseline establishment and change control (see 3.3.2).

5.4 Conformance declaration

If the preceding criteria are met, then the conformance of any SCM planning documentation with this standard may be stated accordingly: “This SCM Plan conforms with the requirements of IEEE Std 828-2005.”

Annex A

(informative)

Bibliography

[B1] IEEE 100™, The Authoritative Dictionary of IEEE Standards Terms, Seventh Edition[3,4]

[B2] IEEE Std 610.12™-1990, IEEE Standard Glossary of Software Engineering Terminology.

[B3] IEEE Std 730™-2002, IEEE Standard for Software Quality Assurance Plans.

[B4] IEEE/EIA 12207.0™-1996, Industry Implementation of International Standard ISO/IEC 12207:1995, (ISO/IEC 12207) Standard for Information Technology—Software Life Cycle Processes.

[B5] IEEE/EIA 12207.1™-1997, IEEE/EIA Guide for Information Technology, Software Life Cycle Processes—Life Cycle Data.

[B6] IEEE/EIA 12207.2™-1997, IEEE/EIA Guide, Software Life Cycle Processes—Implementation Considerations.

[3] The IEEE standards or products referred to in the annex(es) are trademarks of the Institute of Electrical and Electronics Engineers, Inc.
[4] IEEE publications are available from the Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Lane, Piscataway, NJ 08854, USA (http://standards.ieee.org/).

Annex B

(informative)

Relationship of IEEE 828-2005 to other standards

B.1 Relationship of ISO/IEC 12207 to IEEE/EIA 12207

In 1995, the international standard, ISO/IEC 12207, Standard for Information Technology—Software life cycle processes, was completed. The standard establishes a common framework for software life cycle processes, with well-defined terminology, that can be referenced by the software industry. The IEEE adaptation of ISO/IEC 12207 is IEEE/EIA 12207.0-1996 [B4]. It contains ISO/IEC 12207 and the following additions: improved compliance approach, life cycle process objectives, life cycle data objectives, and errata.

The implementation of ISO/IEC 12207 within the IEEE also includes the following:

— IEEE/EIA 12207.1-1997 [B5], IEEE/EIA Guide for Information Technology—Software life cycle processes— Life cycle data

— IEEE/EIA 12207.2-1997 [B6], IEEE/EIA Guide for Information Technology—Software life cycle processes— Implementation considerations

— Additions to 11 SESC standards (e.g., IEEE Std 730 [B3], IEEE Std 828, IEE Std 829™, IEEE Std 830™, IEEE Std 1012™, IEEE Std 1016™, IEEE Std 1058™, IEEE Std 1062™, IEEE Std 1219™, IEEE Std 1233™, and IEEE 1362™) to define the correlation between the data produced by existing SESC standards and the data produced by the application of IEEE/EIA 12207.1-1997 [B5]

NOTE—Although IEEE/EIA 12207.1-1997 [B5] is a guide, it also contains provisions for application as a standard with specific compliance requirements. This annex treats IEEE/EIA 12207.1-1997 [B5] as a standard.[5]

B.2 Consistency of IEEE 828-2005 with IEEE/EIA 12207.0 and ISO/IEC TR-19759

This standard is fully consistent with:

a) The configuration management process provided by IEEE/EIA 12207.0 [B4] and the configuration management process provided by ISO/IEC 12207

b) The requirements for the Software Configuration Management Plan provided by IEEE/EIA 12207.1 [B5]

c) The Software Quality Assurance activities and plans provided by IEEE Std 730 [B3]

This standard has been harmonized with the IEEE Computer Society's Guide to the Software Engineering Body of Knowledge, ISO/IEC TR-19759.

[5] Notes in text, tables, and figures are given for information only, and do not contain requirements needed to implement the standard.

B.3 Correlation

Both this standard and IEEE/EIA 12207.1-1997 [B5] place requirements on a Software Configuration Management Plan (SCMP). The purpose of this clause is to explain the relationship between the requirements of this standard and IEEE/EIA 12207.0-1996 [B4] in the following areas: terminology, process, and life cycle data.

B.3.1 Terminology correlation

The two standards use similar terms in similar ways. First published in the early 1980s, this standard retains some of the flavor of its time and the assumptions then prevalent about software engineering, but for the most part this does not affect the use or meaning of terms. Some of the underlying assumptions may differ between the two standards, but the terms are similar.

B.3.2 Process correlation

This standard places no explicit requirements on process. However, the information required by its SCMP makes implicit assumptions regarding process that is more prescriptive than that of IEEE/EIA 12207.0-1996 [B4]. IEEE/EIA 12207.0-1996 [B4] requires a certain body of information without stipulating any particular sequence of events or documents. Generally, fulfilling the implied process requirements of this standard would go beyond the requirements of IEEE/EIA 12207.0-1996 [B4] but would not violate its requirements.

B.3.3 Life cycle data correlation

The information required in an SCMP by this standard and the information required in an SCMP by IEEE/EIA 12207.1-1997 [B5] are similar. The main difference is that this standard specifies a particular format, while IEEE/EIA 12207.1-1997 [B5] does not. Details are provided in the clause below.

The requirements in IEEE/EIA 12207.1-1997 [B5] for change request, software configuration index record, and software configuration management records pertain to records and requests associated with SCM but are not discussed in detail in this annex since they relate to the implementation of SCM plans. The IEEE/EIA 12207.1-1997 [B5] requirements for records (see 5.4 of IEEE/EIA 12207.1-1997 [B5]) should be considered when implementing an SCMP. The IEEE/EIA 12207.1-1997 [B5] requirements for change request information are largely the same as those described in this standard.

B.4 Document compliance

This clause provides details bearing on the statement that an SCMP complying with this standard also achieves “document compliance” with the SCMP as prescribed in IEEE/EIA 12207.1-1997 [B5]. The requirements for document compliance are summarized in a single row of Table 1 of IEEE/EIA 12207.1-1997 [B5]. That row is reproduced here in Table B.1.

Table B.1—Summary of requirements for an SCMP excerpted from Table 1 of IEEE/EIA 12207.1-1997

Information item	IEEE/EIA 12207.0-1996 subclause	Kind	IEEE/EIA 12207.1-1997 subclause	References
Software configuration management plan	6.2.1.1	Plan	6.14	IEEE Std 828 IEEE Std 1042™[6] ISO 10007

[6] IEEE Std 1042 has since been withdrawn.

The requirements for document compliance are discussed in the following subclauses:

— B.4.1 discusses compliance with the information requirements noted in column 2 of Table B.1 as prescribed by 6.2.1.1 of IEEE/EIA 12207.0-1996 [B4].

— B.4.2 discusses compliance with the generic content guideline (the "kind" of document) noted in column 3 of Table B.1 as a "plan." The generic content guidelines for a "plan" appear in 5.2 of IEEE/EIA 12207.1-1997 [B5].

— B.4.3discusses compliance with the specific requirements for an SCMP noted in column 4 of Table B.1 as prescribed by 6.14 of IEEE/EIA 12207.1-1997 [B5].

— B.4.4 discusses compliance with the life cycle data objectives of Annex H of IEEE/EIA 12207.0-1996 [B4] as described in 4.2 of IEEE/EIA 12207.1-1997 [B5].

B.4.1 Compliance with information requirements of IEEE/EIA 12207.0-1996

The information requirements for an SCMP are those prescribed by 6.2.1.1 of IEEE/EIA 12207.0-1996 [B4], which are substantively identical to those considered in B.4.3 of this standard. An SCMP that conforms with this standard will contain all of the information required by subclause 6.2.1.1 of IEEE/EIA 12207.0 [B4].

B.4.2 Compliance with generic content guidelines of IEEE/EIA 12207.1-1997

The generic content guidelines for a "plan" in IEEE/EIA 12207.1-1997 [B5] are prescribed by 5.2 of IEEE/EIA 12207.1-1997 [B5]. A complying plan shall achieve the purpose stated in 5.2.1 and include the information listed in 5.2.2 of IEEE/EIA 12207.1-1997 [B5].

The purpose of a plan is:

> IEEE/EIA 12207.1-1997 [B5], subclause 5.2.1: Purpose: Define when, how, and by whom specific activities are to be performed, including options and alternatives, as required.

An SCMP complying with this standard would achieve the stated purpose.

Any plan complying with IEEE/EIA 12207.1-1997 [B5] shall satisfy the generic content requirements provided in 5.2.2 of that standard. An SCMP conforming with this standard would comply with the generic content requirements of IEEE/EIA 12207.1-1997 [B5]. Table B.2 of this standard lists the generic content items and references the clause of this standard that requires the same information.

B.4.3 Compliance with specific content requirements of IEEE/EIA 12207.1-1997

The specific content requirements for an SCMP in IEEE/EIA 12207.1-1997 [B5] are prescribed by 6.14 of IEEE/EIA 12207.1-1997 [B5]. A complying SCMP shall achieve the purpose stated in 6.14.1 and include the information listed in 6.14.3 of IEEE/EIA 12207.1-1997 [B5].

The purpose of the SCMP is:

> IEEE/EIA 12207.1-1997 [B5], subclause 6.14.1: Purpose: Define the software configuration management activities to be performed during the life cycle of the software. Describe the responsibilities and authorities for accomplishing the planned software configuration management activities. Identify the required coordination of software configuration management activities with other activities of the project. Identify the tools and the physical and human resources required for the execution of the plan.

A SCMP complying with this standard would achieve the stated purpose.

A SCMP complying with IEEE/EIA12207.1-1997 [B5] shall satisfy the specific content requirements provided in 6.14.3 of that standard. The specific content requirements of 6.14.3 reiterate the generic content requirements and specify the generic requirements that shall be satisfied for each of several activities. A SCMP conforming to this standard would comply with the specific content requirements in clause 6.14.3 of IEEE/EIA 12207.1-1997 [B5]. Table B.3 of this standard lists the activities along with the reference to the clause of this standard that specifically covers the activity.

B.4.4 Compliance with life cycle data characteristics objectives

In addition to the content requirements, life cycle data shall be managed in accordance with the objectives provided in Annex H of IEEE/EIA 12207.0-1996 [B4].

Table B.2—Coverage of generic plan requirements by IEEE Std 828-2005

IEEE/EIA 12207.1-1997 generic content	Corresponding clauses of IEEE Std 828-2005
a) Date of issue and status	3.6 SCM plan maintenance and 3.3.1Configuration identification (by implication, assuming the SCMP is among the documents controlled)
b) Scope	3.1 Introduction
c) Issuing organization	3.2.2 SCM responsibilities
d) References	3.1 Introduction (last paragraph) 3.2.3 Applicable policies, directives, and procedures
e) Approval authority	3.6 SCM plan maintenance (item c)
f) Planned activities and tasks	3.3 SCM activities
g) Macro references (policies or laws that give rise to the need for this plan)	3.2.3 Applicable policies, directives, and procedures
h) Micro references (other plans or task descriptions that elaborate details of this plan)	3.2.3 Applicable policies, directives, and procedures
i) Schedules	3.4 SCM schedules
j) Estimates	3.5 SCM resources
k) Resources and their allocation	3.2.1 Organization 3.5 SCM resources
l) Responsibilities and authority	3.2.2 SCM responsibilities
m) Risks	3.2.4 Management of the SCM process
n) Quality control measures (NOTE 1—This includes quality control of the SCMP itself.)	3.6 SCM plan maintenance and 5.3 Consistency criteria (for the SCM Plan itself) 3.3.2.4 Implementing changes (“The Plan shall specify activities for verifying ...an approved change.”) 3.3.4 Configuration evaluations and reviews (“The procedures for conducting the audit or review.”) 3.3.5 Interface control (“How the interface control documents are approved...”) 3.3.6 Subcontractor/vendor control (“How external code, documentation, and data will be tested, verified, and accepted...”)
o) Cost	3.2.4 Management of the SCM process
p) Interfaces among parties involved	3.2.1 Organization 3.3.6 Subcontractor/vendor control
q) Environment / infrastructure (including safety needs)	3.5 SCM resources
r) Training	3.5 SCM resources

Table B.2—Coverage of generic plan requirements by IEEE Std 828-2005 (continued)

s) Glossary	3.1 Introduction
t) Change procedures and history (NOTE 2—This includes the change procedures for the SCMP itself.)	3.6 SCM plan maintenance

Table B.3—Coverage of specific SCMP requirements by IEEE Std 828-2005

IEEE/EIA 12207.1-1997 specific content	Corresponding clauses of IEEE Std 828-2005
a) Generic plan information	Table B.2
i) Configuration management process implementation	3.2 SCM management
ii) Configuration identification	3.3.1 Configuration identification
iii) Configuration control	3.3.2 Configuration control
iv) Configuration status accounting	3.3.3 Configuration status accounting
v) Configuration evaluation	3.3.4 Configuration evaluations and reviews
vi) Release management and delivery	3.3.2.4 Implementing changes 3.3.7 Release management and delivery
b) Relationship with organizations (such as software development or maintenance)	3.2.1 Organization