TECHNICAL REPORT

ISO/IEC TR 15846

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Information technology — Software life cycle processes — Configuration Management

Technologies de l'information — Procédés de cycle de vie du logiciel — Gestion de configuration

Reference number
ISO/IEC TR 15846:1998(E)

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Contents

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of Technical Reports through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The main task of technical committees is to prepare Technical Reports, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

— type 1, when the required support cannot be obtained for the publication of a Technical Report, despite repeated efforts;

— type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on a Technical Report;

— type 3, when a technical committee has collected data of a different kind from that which is normally published as a Technical Report ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until data they provide are considered to be no longer valid or useful.

ISO/IEC TR 15846, which is a Technical Report of type 1, was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software engineering*.

Annex A forms an integral part of this Technical Report.

Introduction

Relationship with other Technical Reports

This Technical Report presents the requirements for the Software Configuration Management (SCM) Process. SCM is a supporting CM Process to the life cycle of a software product, as described in ISO/IEC 12207, "Information technology - Software life cycle processes". SCM provides continuity across the Operation, Maintenance and Development Processes.
Annex A (informative) of this Technical Report shows the relationship with the clauses of ISO/IEC 12207.
Where text has been quoted from ISO/IEC 12207:1995, that text is enclosed in a box, for ease of identification.
This Technical Report keeps consistency with ISO 10007 "**1995, Quality management — Guidelines for** *configuration management*".   The relationship of the clauses in ISO 10007 to the clauses in this Technical Report is shown in annex A.

Types of software

SCM administers any information that can be stored in a computer, including the software products. For example: specifications, database schema, test cases, user operating instructions, reusable coded objects, source and executable code, or data.
SCM may also administer lists and records about software items of significance stored in other locations. For example: products installed at an operational site, or off-the-shelf products loaded on a network.
Software products used as tools in the software environment to create, maintain, archive or restore the deliverable software product, are also types of software capable of being administered by SCM, as are the instructions and any customization or parameters to operate the tool. The software environment (for example development) may be deliverable or may be proprietary.
SCM can apply to few or to all items of software from a life-cycle activity.

Implementation of the SCM Process

SCM may be performed by a combination of software tools, methods and techniques. This Technical Report does not specify how to implement or perform the activities and tasks in the SCM Process. The SCM requirements remain the same irrespective of the tools by which SCM is implemented.
A number of emerging requirements for SCM (e.g. for product delivery to multiple sites with different product configurations, or for concurrent modification of Configuration Items - CIs) may apply the SCM Process in this Technical Report to assist in controlling these emerging areas. Parties wishing to operate such tasks are advised to define the additional requirements in contract agreements or SCM policy and procedures.
NOTE A procedure may a document, a template, etc.

Benefits

This Technical Report can improve the visibility and accountability within the Operation, Maintenance and Development Processes by:
*   providing an appropriate documented and repeatable scheme for identifying and controlling electronic documents, code, interfaces, databases, etc., to support the software life-cycle processes;
*   supporting a chosen development, maintenance or operations methodology fitting the requirements, standards, policies and directives, organization and management philosophy;
*   producing management and product information concerning the status of baselines, changes, releases, versions, archives, etc.;
*   recursively defining a Software CI (SCI) to the level of individual items of significance to be controlled;
*   controlling the libraries used to store SCIs together with their status and related information;
*   invoking the ISO/IEC 12207 Processes to assure the integrity of the configurations;
*   controlling the software environment to enable a software product to be configured and reconfigured over its useful life, including the software tools used to develop and verify the software product; to assure the integrity of the configuration (e.g. requirements tracker, SCM library guardian, release builder); and to run those tools (e.g. operating system);
*   storing and retrieving information on anomalies for individual SCIs and for software product configurations;
*   reporting the ownership for intellectual property considerations, such as licences or copyright.

SCM in contractual relationships

The SCM requirements are derived from at least three supply chain relationships:
- acquirer placing work on the software product supplier;
- supplier responsible for delivering the software product;
- subcontractor or software technicians to carry out the work.

A fourth relationship may exist where the acquirer and supplier agree to use a third party archive (for escrow). In this relationship, in addition to the bi-directional supply chain between acquirer and supplier, there is a triangular unidirectional flow from the supplier via the third-party archive to the acquirer (see Table 1 and Figure 1).

Benefits to the prime acquirer

For the acquirer some benefits of SCM are:
- assurance of the completeness of the development, operations or maintenance requirements;
- flexibility to enable changes to the requirements to be made under controlled conditions;
- basis to establish evaluation criteria for SCM activities and tasks;
- provision of complete and incomplete (e.g. engineering release) items.

Use of this Technical Report is intended to help ensure:
- project objectives meet customer and organizational constraints;
- criteria and means for determining successful completion of project objectives are defined;
- SCM software life-cycle products and their inter-relationships are defined;
- inter-relationships between processes are defined, where an SCM activity interacts with other software life-cycle process(es), e.g. Software Quality Assurance;
- software baselines are controlled;
- a plan for SCM activities, or related planning document, is created, used, monitored and adjusted;
- SCM interfacing between two or more parties or processes is defined.

Where multiple teams and/or subcontractor relationships require more emphasis on interface management, the configuration control is normally tailored to cater to changes across interfaces rippling through levels of subcontracts or organizations.

Benefits to the software product supplier

Some benefits of SCM to the software product supplier are:
- looking after items fulfilling the requirements and by controlling change;
- support for the Joint Reviews Process by providing the status of SCIs (in this instance, the major software product from a life-cycle process) attached to management milestones;
- support for the Audit Process by concentrating on results which are measurable for compliance checking;
- support for the Quality Assurance, Verification and Validation Processes to the extent they are present in the software life cycle.

Benefits to a subcontractor or software technician

Some benefits of SCM to subcontractors or software technicians are:
- stable baselines with assurance these baselines can be rebuilt;
- consistent communication of status;
- status and interdependence of outstanding requirements;
- notification, analysis and reversal of change;
- delegated change authority;
- consistent method for handling, storing, replicating, packaging and releasing SCIs.

Benefits of any third party archive (escrow)

The status of SCIs may be shared between a supplier, an acquirer and a third-party agent charged with holding items until some contract condition is met, for example, final payment or liquidation of the supplier.

A benefit to the acquirer and supplier of a third-party agent applying SCM is the integrity of the deposited SCIs. This Technical Report provides requirements for guarding and retrieving these SCIs.

| Role	As Acquirer	As Supplier
Acquirer/operator/user	To software product supplier: request product receive SCM managed product	To final client: may supply software product may use software product to deliver information technology service
Software product supplier	To SCM Process supplier: requests SCM Process receives result of SCM activities and tasks	To acquirer/operator/user: supplies software product receives requirements for [tailoring] SCM Process
SCM Process supplier	To subcontractor or vendor: requests subcontractor work or tool receives subcontractor work or tool	To software product supplier: receives request for SCM Process supplies SCM results to software product
subcontractor or vendor	To lower-level subcontractor: may request work or tool [and so ad infinitum]	To SCM Process supplier: receives request for subcontractor work or tool supplies subcontractor work or tool
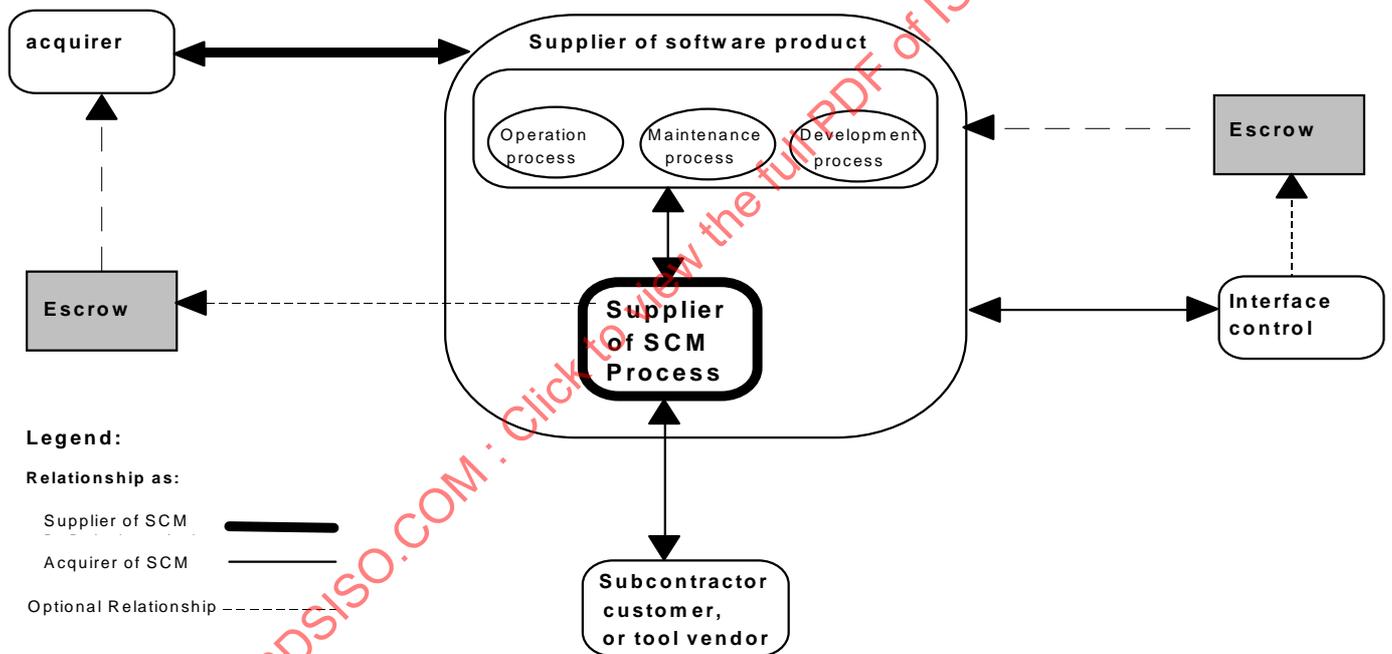
Figure 1 — Role relationship between Supplier of SCM Process and other parties.

Information technology — Software life cycle processes — Configuration Management

1   Scope

This Technical Report establishes the requirements for performance of the configuration management of computer software for development, maintenance and operations. This Technical Report is based on the Configuration Management (CM) Process of ISO/IEC 12207 (hereafter referred to as the Software Configuration Management (SCM) Process).

This Technical Report is applicable to:

—   any software in any form;

—   the entire software product life cycle and to individual development, maintenance and operations projects within that life cycle; software acquired from a subcontractor or vendor;

—   the supplier and the acquirer of the software product.

This Technical Report is applicable for use in a two-party situation and may be equally applied where the two parties are from the same organisation. The situation may range from an informal agreement to a formal contract. This Technical Report may be used by a single party as self-imposed tasks, or be applied to off-the-shelf products.

1.1   Tailoring this Technical Report

Some software products and software life cycles may require requirements set forth in other applicable standards, contracts or to accommodate local practices. The SCM Process may be tailored by adding requirements.

The SCM Process may also be tailored to omit requirements of this Technical Report where specific requirements are identified as not applicable. Tailoring of this Technical Report in accordance with tailoring of ISO/IEC 12207 may be assisted by the mapping provided in this Technical Report (see annex A).

1.2   Process roles

The users of this Technical Report take the acquirer and supplier roles (see Figure1).

The supplier of the software product performing the Maintenance and Development Processes defined in ISO/IEC 12207 is the acquirer of SCM.

For the Operation Process, after acceptance of the software product, the acquirer may take the role of supplier of SCM to the final client or consumer.

The supplier of the SCM Process (hereafter referred to as "the SCM Process") may take the role of acquirer of subcontracted or vendor work.

2   Conformance

Not applicable.

3   Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this Technical Report. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply.

However, parties to agreements based on this Technical Report are encouraged to investigate the possibility of applying the most recent editions of the normative references indicated below. Members of ISO and IEC maintain registers of currently valid Technical Reports.

ISO/IEC 12207:1995, *Information technology — Software life cycle processes.*

ISO/IEC 2382-20:1990, *Information technology — Vocabulary — Part 20: System development.*

ISO/IEC 2382-1:1993, *Information technology — Vocabulary, Part 1: Fundamental terms.*

Informative references are listed in annex B.

4 Definitions

For the purposes of this Technical Report, the definitions given in ISO/IEC 12207 and the following definitions apply.

4.1
approved modification
the disposition of one or more proposed changes authorising change to any SCIs

NOTE There may be a many-to-many relationship of "proposed change" to "approved modification". A proposed change may cause modifications in several SCIs (even if only to the code and its test case). A modification may originate from several proposed changes, approved simultaneously or over a period of time while the modification is still in progress.

4.2
change authority
as "configuration board" in ISO 10007

NOTE Disposition is made by a designated change authority traditionally given the name "Change/Configuration Control Board". This authority may approve a proposed change, thus converting it to an approved modification, or may disapprove a proposed change, or may defer a decision.

4.3
proposed change
a report of anomaly, required or recommended enhancement from the time an idea is recorded until the disposition by a designated change authority

NOTES

1 The disposition may be to reject, to defer for further analysis, or to accept. Upon acceptance the proposed change becomes an approved modification.

2 There may be a one-to-one, one-to-many, or many-to-many relationship between proposed changes and approved modifications.

4.4
Software Configuration Management (SCM)
the process of applying configuration management (see ISO 10007) throughout the software life cycle to ensure the completeness and correctness of SCIs

4.5
software library
a controlled collection of SCIs to aid in development, operation and maintenance

4.6
software tool
a software product providing automatic support for software life-cycle tasks

NOTE Software tools include vendor software and in-house developed tools, whether supported by their creator or not. Tools include software run by the operating system and the operating system itself. Tools also include interpreted programs, such as macros, test scripts, or build instructions.

5   Symbols (and abbreviated terms)

5.1   Abbreviations and acronyms

The following abbreviations and acronyms appear within the text of this Technical Report:

    CI   Configuration Item
    CM   Configuration Management
    SCI   Software Configuration Item
    SCM   Software Configuration Management.

6   SCM Process Implementation

ISO/IEC 12207: 1995

6.2.1 **Process implementation**. This activity consists of the following task:

6.2.1.1 A configuration management plan shall be developed. The plan shall describe: the configuration management activities; procedures and schedule for performing these activities; the organization(s) responsible for performing activities; and their relationship with other organizations, such as software development or maintenance. The plan shall be documented and implemented.

    Note   The plan may be a part of the system configuration management plan.

The SCM Process is implemented to cover the entire, or any specific subset of, the software life cycle for an Operation, Maintenance or Development Process.

6.1   Initiating and defining the scope

6.1.1   Defining the inputs to the SCM Process

The SCM Process shall obtain the SCM requirements as input and ensure the SCM requirements are complete and understandable. These SCM requirements shall include:

- software products to be part of the SCM Process;
- evidence or assurance the SCM Process is carried as stated in a SCM Plan;
- software environment of the SCM Process.

Where the software product contains acquired, customer supplied, subcontracted, or vendor SCIs, the SCM Process shall identify, control changes to, account for the status of, and perform configuration evaluation (also known as "configuration audit") on any externally derived SCIs.

6.1.2   Defining the resources and constraints to the SCM Process

The SCM Process shall establish the organizational context, both technical and managerial, within which the SCM activities are to be implemented by defining:

a)   organizational units affected by SCIs being designated as baseline, participating in or responsible for any SCM activity;

b)   SCM roles and responsibilities of these organizational units;

c)   relationships between organizational units, acquirer supplier.

The SCM Process shall establish and maintain documents defining organizations, activities, tasks, procedures, formats for planning information and reports, and resources.

The SCM Process shall uniquely identify references to SCM procedures, standards, terminology and related documents.

6.1.3   Allocating responsibility and authority

The SCM Process shall plan, acquire and employ the necessary resources for SCM.

The SCM Process shall allocate the SCM activities to organizational units with authority and ability to carry them out, including:

a)   establishing baselines;

b)   approving/disapproving changes to baselines;

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c) releasing software products;

d) approving/disapproving concession for deviation from SCM requirements.

The SCM Process shall identify and appoint a single point of contact.

The SCM Process shall determine the criteria for obtaining approval for changes to a baseline.

The SCM Process shall identify the change authority and assign the sphere of authority.

6.1.4 Criteria for selection of SCIs

The SCM Process shall establish criteria for selecting SCIs based on the software products:

a) required;

b) to be used by the software environment;

c) to be used to derive the release, including instructions and parameters of the tool for the derivation.

The SCM Process shall define criteria to select sufficient SCI to manage the performance parameters and physical characteristics of SCIs.

NOTE The SCM Process should avoid selection of too many SCIs that hamper visibility to management and increase cost.

6.1.5 Defining the outcomes from the SCM Process

As required, the SCM Process shall plan to transfer the following outputs:

a) information to operate the software environment;

b) SCI identification schema;

c) tools and software environment to recreate the SCIs;

d) scheme for SCI version control;

e) documents supporting the SCI structure;

f) meaning of the SCI status;

g) status of SCIs;

h) integrity of the SCI status;

i) SCIs.

6.2 Planning

For a specific software product, the SCM Process shall plan the dependency of SCM activities on the software life-cycle milestones or events (for example, introduction of interface control) affecting the SCM implementation.

The representatives of those performing or interacting with the SCM activities shall review and approve the SCM planning information.

As required, the SCM Process shall provide for transfer of the SCM Process and the advancement of the SCM software products.

The SCM Process shall plan to terminate the SCM activities, as appropriate.

The SCM Process shall update the SCM planning information to reflect changes. The SCM Process shall review and receive approval from those involved before the changed SCM tasks are performed.

The following information shall be included in, or referenced by, the SCM Plan, as appropriate:

a) identification of the contract;

b) scope of SCM support of the specified software life-cycle processes;

c) identification of known software products to be delivered;

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d) identification of other software products required for subsequent maintenance or affecting the integrity of those items identified in c) above;

e) organizational definitions and inter-relationships;

f) roles and responsibilities;

g) list of needed resources, and when the resources are needed;

h) relationship of SCM to any hardware or system CM and the procedures for interfacing the activities including subcontractor SCM control, as appropriate;

i) procedure for status reporting, including format, schedule and distribution;

j) procedure for controlling changes, including proposing a change, and assigned authorities for changing and advancing SCIs;

k) policy for prior version support, including the number of versions to be retained;

l) support for individual customers with multiple versions;

m) review for verifying the baselines;

n) audit for verifying the integrity of the SCM Process to be applied;

o) risk that the SCM Process will be unable to provide the required tasks, thus impacting cost, schedule or performance of SCM tasks;

p) procedure for release management and delivery;

q) interface control.

6.3 Controlling execution

The SCM Process shall provide the software environment with adequate tools, equipment and training in sufficient time for personnel to carry out the SCM tasks as defined in the SCM Plan. The SCM Process shall perform the SCM tasks as documented in the SCM Plan.

6.4 Review and evaluation of the SCM Process

The SCM Process shall ensure the SCM tasks comply with the SCM Plan. The SCM Process shall carry out such processes as the Problem Resolution and/or Process Improvement Processes to rectify any divergence from the SCM Plan.

6.5 Closing

The SCM Process shall terminate the SCM activities, as appropriate.

7 Software configuration identification

> **ISO/IEC 12207: 1995**
> 6.2.2 **Configuration identification**. This activity consists of the following task:
> 6.2.2.1 A scheme shall be established for the identification of software items and their versions to be controlled for the project. For each software item and its versions, the following shall be identified: the documentation that establishes the baseline; the version references; and other identification details.

The SCM Process shall establish an identification scheme for the software products to be controlled as SCIs and as baselines.

7.1 Identifying SCIs

The SCM Process shall provide a unique identification to each SCI. The SCM Process shall document the relationship between SCIs.

The SCM Process shall provide unique identification to the tools used to develop, control, build, verify, load and re-create the SCIs.

7.2 Identifying software configuration baselines

The SCM Process shall uniquely identify each baseline in terms of the:

a) SCIs to be controlled in each baseline, including all off-the-shelf products and proprietary items for which the supplier has usage but not ownership;

b) procedure to be used to enter an SCI into a baseline;

c) procedure to be used to configure and establish a baseline as complete;

d) software products and records required to define a baseline;

e) procedure required to approve a baseline;

f) authority required to approve a baseline;

g) tools used to build a baseline.

NOTE The procedures of b) and c) above should use the Verification Process.

7.3 Identifying software libraries

The SCM Process shall identify uniquely named, controlled software libraries including, as appropriate:

a) location;

b) medium for each library;

c) number of identical libraries and the mechanism for maintaining parallel contents;

d) contents in terms of SCI;

e) contents in terms of SCI status;

f) conditions for entering an SCI, including the minimum status compatible with the contents of a software library;

g) provision for protection from malicious and accidental harm and deterioration, together with effective recovery procedures;

h) conditions for retrieving an SCI, distinguishing between using without copying or removal, taking a copy, and removing an SCI;

i) provision for access for groups or types of person with permission for each function of entering, looking at the list or contents of contained SCIs, evaluating, copying, and deleting SCIs in each library.

NOTE Different access permissions may apply to SCIs with different status.

7.4 Advancement status

The SCM Process shall establish the status for each SCI and baseline.

The SCM Process shall specify the advancement bringing each SCI and baseline under configuration control.

NOTE The SCM Process should identify the status of a proposed change, in particular the meaning of "open" and "closed".

8 Software configuration control

ISO/IEC 12207: 1995
6.2.3 **Configuration control**: This activity consists of the following task:
6.2.3.1 The following shall be performed: identification and recording of change requests; analysis and evaluation of the changes; approval or disapproval of the request; and implementation, verification, and release of the modified software item. An audit trail shall exist, whereby each modification, the reason for the modification, and authorization of the modification can be traced. Control and audit of all accesses to the controlled software items that handle safety or security critical functions shall be performed.

The SCM Process shall establish, maintain and operate procedures to preserve the integrity of the SCIs, baselines and software products defining the status of the SCIs and baselines.

8.1 Proposing changes

The SCM Process shall receive and process proposed changes to a baselined SCI.

Proposed changes to SCIs and baselines under configuration control shall be identified, recorded, approved/disapproved and traced.

8.2   Evaluating the impact of proposed changes

The SCM Process shall support the evaluation of the impact of the proposed change, for example using the Maintenance Process.

The SCM Process shall identify:

a)   the SCIs and related baselines affected by a proposed change;

b)   any approved modifications affecting the identified SCIs or baselines.

The SCM Process shall configure the SCIs to replicate or verify a problem for corrective action.

The SCM Process shall trace and record the cause of the origin of the anomaly, misunderstanding or suggestion for enhancement using the Problem Resolution or Process Improvement Processes.

8.3   Implementing the changes

The SCM Process shall record the sequence of activities and tasks for implementing each approved modification.

The SCM Process shall ensure only approved modifications have been included in baselines.

8.4   Communicating the disposition

The SCM Process shall support the designated change authority decision of approval, disapproval or deferral for each proposed change by notifying everyone impacted by the disposition.

NOTE 1 Where the decision is deferred, the SCM Process should advise the originator on how to proceed to re-consideration.

Where the change is approved, the SCM Process shall notify those using affected SCIs of the approved and pending change.

NOTE 2 Where disapproved, the SCM Process should inform those concerned to disregard the proposed change.

8.5   Closing the changes

The SCM Process shall ensure closure of any approved modification results in a new baseline.

9   Software configuration status accounting

ISO/IEC 12207: 1995
6.2.4 **Configuration status accounting**. This activity consists of the following task:
6.2.4.1 Management records and status reports that show the status and history of controlled software items including baseline shall be prepared. Status reports should include the number of changes for a project, latest software item versions, release identifiers, the number of releases, and comparisons of releases.

The configuration status accounting activity performs the bookkeeping for the other SCM Process activities.

9.1   Recording the identification

The SCM Process shall record the identification and status of each new and modified SCI.

When an SCI comes under configuration control, the SCM Process shall maintain the version and status, at each subsequent advancement.

9.2   Tracing changes

The SCM Process shall trace, record and report the status of proposed changes and the implementation status of approved modifications.

NOTES

1 Tracing a proposed change should start from the first communication of an idea through to either official notice of disapproval or issuance of a requirement to modify one or more SCIs, or withdrawal by the originator.

2 Tracing an approved modification should start from the issuance of a requirement to modify one or more SCIs through to the inclusion into a baseline.

9.3 Reporting status accounting records

The SCM Process shall report, as appropriate:

a) structure of the software product;

b) status of each SCI at the level of significance to the recipient;

c) status of any proposed change;

d) approved modifications and the baseline version;

e) identification of the release.

The SCM Process shall report status for current and past versions of baselines, as appropriate.

Where SCIs contain known anomalies, the SCM Process shall:

a) report these conditions;

b) identify the SCIs;

c) explain the consequences;

d) provide any temporary solution.

As required, the SCM Process shall report any outstanding modifications, deviations or waivers.

NOTE Where the software product uses the Problem Resolution Process to request the acquirer to grant concession, deviation or waiver, the SCM Process should report which, if any, of these concessions have been granted.

Where software products include a procured or acquirer supplied product, the SCM Process shall report traceability of ownership (such as licensing and copyright).

10 Software configuration evaluation

ISO/IEC 12207: 1995
6.2.5 **Configuration evaluation**. This activity consists of the following task:
6.2.5.1 The following shall be determined and ensured: the functional completeness of the software items against their requirements and the physical completeness of the software items (whether their design and code reflects an up-to-date technical description).

SCM configuration evaluation determines:

a) SCIs stored in a controlled library correspond to the SCM records;

b) software products are complete and available with respect to the accumulated status of the SCIs and approved modifications from which they were built;

c) baseline SCIs are composed of related SCIs and the respective approved modifications.

The SCM Process shall support the Verification and Audit Processes to ensure completeness of the SCIs, baselines and software products being evaluated.

The SCM Process shall perform a configuration evaluation to determine the SCIs, making up a baseline, are stored and secured.

The SCM Process shall report the configuration evaluation results.

Where anomalies are found the SCM Process shall conduct the Problem Resolution or Process Improvement Processes.

11 Software release management and delivery

ISO/IEC 12207: 1995
6.2.6 **Release management and delivery**. This activity consists of the following task:
6.2.6.1 The release and delivery of software products and documentation shall be formally controlled. 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.

The SCM Process shall establish, maintain and perform procedures for coordinating multiple approved modifications, establishing completeness and correctness, re-configuring the SCIs and delivering software products.

11.1 Handling

The SCM Process shall control all input to, and output from, release management and delivery.

The SCM Process shall ensure SCIs released from the baseline library are re-configurable at a future time to the extent of the required prior versions retained.

The SCM Process shall be able to re-establish the software environment.

NOTE The procedure to derive the baseline should be considered as part of the baseline. Any instructions and parameters for operating the software tools, or any modifications made to a software tool should be re-established as part of the software tool.

The SCM Process shall retain the baseline software library and software environment, as appropriate.

11.2 Storing

The SCM Process shall ensure the integrity of the stored SCIs, irrespective of the medium or library, by:

a) selecting storage medium to minimize regeneration errors or deterioration;

b) exercising and refreshing archived SCIs at a frequency compatible with the storage life of the medium;

c) storing duplicate copies in controlled locations to minimize the risk of loss.

For reusable SCIs, the SCM Process shall:

a) make available the public name;

b) specify the method, the location and the timing for archiving;

c) identify the organization responsible for making the SCI available.

11.3 Replicating

Replication is the manufacturing stage for software by making copies.

The SCM Process shall establish procedures to ensure consistent and complete replication.

The SCM Process shall ensure the medium for release contains no extraneous items (such as software viruses or test data unfit for demonstration).

The SCM Process shall use suitable medium to ensure a software product arrives as replicated. The medium shall be selected to preserve the integrity of the contents over the expected life of the delivery.

11.4 Packaging

The SCM Process shall ensure the delivered medium is prepared by approved procedures.

The SCM Process shall clearly mark the identification of the release where it may be recognised by the acquirer.

NOTES

1 Releases using physical medium (for example, CD-ROM, or magnetic tape) the mark should be on the medium containing the release (and if any, on its immediate and permanent container). For electronic releases (e.g. download into operational libraries) the mark should be within the release.

2 The SCM Process should include any other material (e.g. licence agreement and copyright statement) traditionally packaged with the software product, and archive a copy with the SCIs.

11.5 Delivering

The SCM Process shall follow delivery procedures.

12   Interface control

The SCM Process shall identify and control interface (such as hardware, system software, support software, incorporated off-the-shelf products, and software produced by parallel/ concurrent development) documents. The interfaces may be adjustable by mutual agreement (for example by a software integrator and a subcontracted software developer) or may be dictated by one party (for example, a supplier of an off-the-shelf software product allowing a licensee to replicate a product).

The SCM Process shall identify, as appropriate:

a)   purpose of the interface;

b)   requirements at the interface;

c)   affected organizations;

d)   interface documents to be controlled;

e)   procedure to inform others of proposed changes affecting the interface and, jointly or separately, to conduct the impact evaluation across the interface;

f)   procedure for the interface documents to be approved, changed and released, including the interface change authority;

g)   procedure to translate changes of interface documents into changes to other SCIs;

h)   roles and responsibilities.

Annex A
(normative)

Mapping of clauses between ISO/IEC TR 15846, ISO/IEC 12207 and ISO 10007

A.1   Mapping ISO/IEC TR 15846 to ISO/IEC 12207 and ISO 10007

Table A.1 can be used to map/trace clauses of this Technical Report (column 1) to clauses in ISO/IEC 12207 (column 2) and ISO 10007 (column 3). Any clauses in columns 2 and 3 that are mapped to a level 1 clause in column 1 (e.g. 5) may also, by default, be mapped to one or more lower level clauses (e.g. 5.1, 5.2, 5.3 and 5.4) in column 1.
Where tailoring has been performed in ISO/IEC 12207, refer to clause A.2.

Table A.1 — Mapping ISO/IEC TR 15846 to ISO/IEC 12207 and to ISO 10007

ISO/IEC TR 15846		ISO/IEC 12207: 1995		ISO 10007: 1995	
4	SCM Process implementation	6.2.1	Process Implementation	5	Configuration management process
				6	Organization of configuration management
				6.1	General
4.1	Initiating and defining the scope	5.1.1	Initiation	6.2	Structure of configuration management
4.2	Planning	5.1.2	Request-for-proposal (-tender) preparation	7.7	Configuration management plan
				Annex A (normative)	Recommended structure and content of a configuration management plan
		5.1.3	Contract preparation and update		
		5.1.4	Supplier monitoring		
		5.2.4	Planning		
		6.2.1	Process implementation		
		7.1.2.1 e)			
		7.2	Infrastructure Process		
		7.3	Improvement process		
4.3			6.1.3.2, 6.1.4.1, 6.4.2.7 c)		
		6.8	Problem Resolution Process		
		7.1.3	Execution and control		
		7.4	Training Process		
4.4	Review and evaluation of the SCM Process	7.3	Improvement Process		
4.5	Closing	7.1.5	Closing		
5	Software configuration identification	6.2.2	Configuration identification	5.2	Configuration identification
				7.2	Configuration identification procedures
5.1	Identifying SCIs	5.3.3.1			
5.2	Identifying software configuration baselines				
5.3	Identifying software libraries				
5.4	Advancement status				
6	Software configuration control	5.3.1.2 b)		5.3	Configuration control
		6.2.3	Configuration control	7.4	Configuration control procedure

ISO/IEC TR 15846		ISO/IEC 12207: 1995		ISO 10007: 1995	
6.1	Proposing changes				
6.2	Evaluating the impact of proposed changes				
6.3	Implementing the change				
6.4	Communicating the disposition			7.3	Configuration board
6.5	Closing the changes				
7	Software configuration status accounting	6.2.4	Configuration status accounting	5.4	Configuration status accounting
				7.5	Configuration status accounting procedures
7.1	Recording the identification				
7.2	Tracing change				
7.3	Reporting status accounting records				
8	Software configuration evaluation	5.2.6	Review and evaluation	5.5	Configuration audit
		5.3.4.3		7.6	Configuration audit procedures
		5.3.9.5 b)			
		5.3.11.4 b)		8	Configuration management system audit
		6.2.5	Configuration evaluation		
		6.4	Verification Process		
		6.5	Validation Process		
		6.6.1.1			
		6.6.3.1 c)			
		6.7.1.1			
		7.1.5	Closure		
		7.3	Improvement Process		
9	Software release management and delivery	5.2.7	Delivery and completion		
		5.4.2.1			
		6.2.6	Release management and delivery		
9.1	Handling	5.3.4.1 e)			
9.2	Storing	5.5.6.1 b)			
9.3	Replicating				
9.4	Packaging	5.4.4.3 5.5.5.3			
9.5	Delivering				