

# INTERNATIONAL STANDARD

# ISO/IEC 14764

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*Technologies de l'information — Maintenance du logiciel*

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**Information technology — Software  
maintenance**

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## 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 International Standards 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 14764 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software engineering*.

Annex A of this International Standard is for information only.

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## Introduction

This International Standard clarifies requirements for the Software Maintenance Process. Software Maintenance is a primary process in the life cycle of a software product, as described in ISO/IEC 12207, "Information Technology - Software - Part 1: Software life cycle processes." The Maintenance Process contains the activities and tasks of the maintainer. This International Standard is part of the ISO/IEC 12207 family of documents and provides guidance. This International Standard elaborates the Maintenance Process contained in ISO/IEC 12207. The only mandatory clauses in this International Standard come from ISO/IEC 12207. The mandatory clauses contain shalls and each shall from ISO/IEC 12207 that is duplicated in this International Standard is boxed. The related ISO/IEC 12207 clause number is listed after the boxed ISO/IEC 12207 shalls.

In many projects, especially those having a long life, software maintenance will almost certainly be an important project consideration.

Due to product cost and time-frame constraints, as well as not following the best practices of ISO/IEC 12207, software is often delivered in an imperfect state. It is then necessary to be able to correct faults that are found during operation. It is frequently necessary to make improvements to the software to meet changed user requirements. Software maintenance may be a significant portion of life cycle costs.

This International Standard addresses readers who are familiar with Software Maintenance. It is recommended that readers who are unfamiliar with Software Maintenance study textbooks or obtain training before applying this International Standard.

Software Maintenance may be performed by a combination of software tools, methods and techniques. This International Standard does not specify how to implement or perform the activities and tasks in the Software Maintenance Process since this is agreement and organizationally dependent. The Software Maintenance requirements remain the same irrespective of the tools by which Software Maintenance is implemented.

Clause 1 provides the scope. Clause 2 provides conformance information. Clause 3 provides normative references. Clause 4 provides terms and definitions. Clause 5 provides the application of this International Standard. Clause 6 provides implementation considerations for the maintenance process. Clause 7 provides the software maintenance strategy. Clause 8 provides the details of the maintenance process. Annex A provides a cross reference between clauses in this International Standard and ISO/IEC 12207.

A major contributor to this International Standard was IEC/TC 56.



# Information technology – Software maintenance

## 1 Scope

This International Standard describes in greater detail management of the Maintenance Process described in ISO/IEC 12207. This International Standard also establishes definitions for the various types of maintenance. This International Standard provides guidance that applies to planning, execution and control, review and evaluation, and closure of the maintenance process. The scope includes maintenance for multiple software products with the same maintenance resources. "Maintenance" in this International Standard means software maintenance unless otherwise stated.

This International Standard provides the framework within which generic and specific software maintenance plans may be executed, evaluated, and tailored to the scope and magnitude of given software products.

This International Standard provides the framework, precise terminology, and processes to allow the consistent application of technology (tools, techniques, and methods) to software maintenance.

This International Standard provides guidance for the maintenance of software. The basis for the Maintenance Process and its activities comes from the definitions of ISO/IEC 12207. It defines the activities and tasks of software maintenance, and provides maintenance planning requirements. It does not address the operation of software and the operational functions, e.g., backup, recovery, system administration, which are normally performed by those who operate the software.

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This International Standard is written primarily for maintainers of software and additionally for those responsible for development and quality assurance. It may also be used by acquirers and users of systems containing software who may provide inputs to the maintenance plan.

### 1.1 Purpose

This International Standard provides guidance on the management of (or how to perform) the maintenance process. It identifies how the Maintenance Process can be invoked during acquisition and operation.

### 1.2 Field of application

This International Standard is intended to provide guidance for the planning for and maintenance of software products or services, whether performed internally or externally to an organization. It is not intended to apply to the operation of the software.

This International Standard is intended to provide guidance for two-party situations and may be equally applied where the two parties are from the same organization. This International Standard is intended to also be used by a single party as self-imposed tasks (ISO/IEC 12207).

This International Standard is not intended for users of off-the-shelf software products unless incorporated into a deliverable product (ISO/IEC 12207). For example, organizations may wish to use this International Standard when maintaining word processing templates or macros used across the organization.

This International Standard is not intended for software products that are “throw-away” or a “short-term” solution.

It is intended for self-imposition by developers of off-the-shelf software products to maintain such products. It is not intended for software products customized by users and products maintained as end-user applications. Maintenance is applied to computer programs, code, data, and documentation. It is intended to apply to software products created during the development of the software product. This may include such things as the test software, test databases, the Software Test Environment (STE), or the Software Engineering Environment (SEE).

This International Standard is intended for use in all maintenance efforts, regardless of the life cycle model (e.g., incremental, waterfall, evolutionary) or the approach used in development (e.g., Rapid Application, prototype, mock-up).

### 1.3 Limitations

This International Standard describes the framework of the Software Maintenance Process but does not specify the details of how to implement or perform the activities and tasks included in the process.

In this International Standard, there are a number of lists. None of these is presumed to be exhaustive. They are intended as examples.

The steps to apply this International Standard are contained in ISO/IEC TR 15271.

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## 2 Conformance

Compliance with this International Standard is satisfied by complying with the requirements of ISO/IEC 12207.

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## 3 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

ISO 5807, *Information processing — Documentation symbols and conventions for data, program and system flowcharts, program network charts and system resources charts.*

ISO 8402, *Quality management and quality assurance — Vocabulary.*

ISO/IEC 9126, *Information technology — Software product evaluation — Quality characteristics and guidelines for their use.*

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

## 4 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO/IEC 12207, ISO 8402, ISO/IEC 2382-1 and ISO/IEC 2382-20, and the following apply.

### 4.1

#### **adaptive maintenance**

the modification of a software product, performed after delivery, to keep a software product usable in a changed or changing environment

NOTE Adaptive maintenance provides enhancements necessary to accommodate changes in the environment in which a software product must operate. These changes are those that must be made to keep pace with the changing environment. For example, the operating system might be upgraded and some changes may be made to accommodate the new operating system.

### 4.2

#### **baseline**

a formally approved version of a Configuration Item, regardless of media, formally designated and fixed at a specific time during the Configuration Item's life cycle [ISO/IEC 12207]

NOTE Sometimes a new baseline is referred to as a new release.

### 4.3

#### **corrective maintenance**

the reactive modification of a software product performed after delivery to correct discovered problems

NOTE The modification repairs the software product to satisfy requirements.

### 4.4

#### **Maintainability Plan**

a document setting out the specific maintainability practices, resources and sequence of activities relevant to software

NOTE The developer prepares the Maintainability Plan.

### 4.5

#### **maintenance enhancement**

a maintenance enhancement is a software change which is not a software correction

NOTE There are two types of software enhancements, adaptive and perfective.

### 4.6

#### **Maintenance Plan**

a document setting out the specific maintenance practices, resources, and sequence of activities relevant to maintaining a software product

NOTE The maintainer prepares the Maintenance Plan. The Plan should be activated once a product transitions to the maintenance phase.

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4.7

**Maintenance Process**

the Maintenance Process contains the activities and tasks of the maintainer

NOTE This process is activated when the software product undergoes modifications to code and associated documentation due to a problem or the need for improvement adaptation. The objective is to modify existing software product preserving its integrity. This process includes the migration and retirement of the software product.

4.8

**maintenance programme**

the organizational structure, responsibilities, procedures, processes, and resources used for implementing the Maintenance Plan

NOTE The term “programme” is synonymous with “infrastructure.”

4.9

**Modification Request (MR)**

a generic term used to identify proposed changes to a software product that is being maintained

NOTE The MR may later be classified as a correction or enhancement and identified as corrective, preventive, adaptive, or perfective type maintenance. MRs are also referred to as change requests.

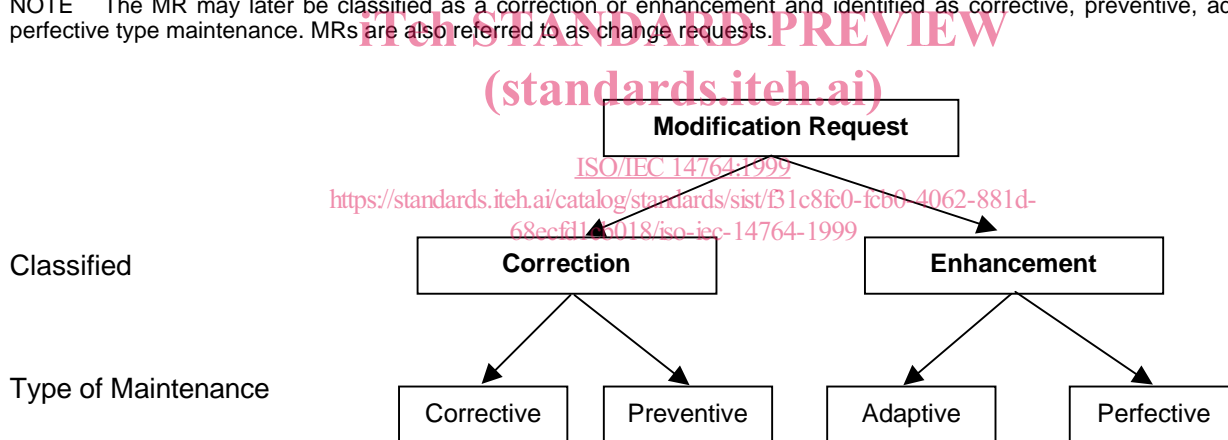


Figure 1 — Modification Request

4.10

**perfective maintenance**

the modification of a software product after delivery to improve performance or maintainability

NOTE Perfective maintenance provides enhancements (improvements) for users, improvement of program documentation, and recoding to improve software performance, maintainability, or other software attributes.

4.11

**preventive maintenance**

the modification of a software product after delivery to detect and correct latent faults in the software product before they become effective faults

#### 4.12

##### **Problem Report (PR)**

a term used to identify and describe problems detected in a software product

#### 4.13

##### **Software Engineering Environment (SEE)**

the set of automated tools, firmware devices, and hardware necessary to perform the software engineering effort

NOTE The automated tools may include but are not limited to compilers, assemblers, linkers, loaders operating systems, debuggers, simulators, emulators, test tools, documentation tools, and database management systems.

#### 4.14

##### **Software Test Environment (STE)**

the facilities, hardware, software, firmware, procedures, and documentation needed to perform qualification, and possibly other, testing of software

NOTE Elements may include but are not limited to simulators, code analyzers, test case generators, and path analyzers, and may also include elements used in the software engineering environment. [MIL-HDBK-347]

#### 4.15

##### **software transition**

a controlled and coordinated sequence of actions wherein software development passes from the organization performing initial software development to the organization performing software maintenance.

## 5 Application of this International Standard

This clause presents the Maintenance Process that is required to maintain software products.

### 5.1 Maintenance process

Software Maintenance is one of the five primary life cycle processes that may be performed during the life cycle of software (ISO/IEC 12207). The Acquisition and Supply primary life cycle processes of ISO/IEC 12207 may initiate the Process Implementation activity of the Software Maintenance primary life cycle process through an agreement or contract. The Operation primary life cycle process of ISO/IEC 12207 may initiate the Software Maintenance life cycle process through submission of a Modification Request or Problem Report. The Software Maintenance primary life cycle process invokes the Development primary life cycle process of ISO/IEC 12207. The supporting processes of Documentation, Configuration Management, Quality Assurance, Verification, Validation, Joint Review, Audit, and Problem Resolution of ISO/IEC 12207 are used by the Software Maintenance life cycle process.

The organizational life cycle processes of ISO/IEC 12207 consist of four processes. The Management, Infrastructure, and Training organizational life cycle processes of ISO/IEC 12207 are employed by the maintainer when initiating each maintenance project. The Improvement Process of ISO/IEC 12207 is invoked to effect software maintenance process improvement.

Tailoring of this International Standard is addressed in ISO/IEC 12207. Tailoring is appropriate for non-routine events such as emergency maintenance.