INTERNATIONAL STANDARD

# ISO/IEC/IEEE 24748-3

First edition
2020-10

# Systems and software engineering — Life cycle management —

## Part 3: Guidelines for the application of ISO/IEC/IEEE 12207 (software life cycle processes)

*Ingénierie des systèmes et du logiciel — Gestion du cycle de vie —*

*Partie 3: Lignes directrices pour l'application de l'ISO/IEC/IEEE 12207 (processus du cycle de vie du logiciel)*

Reference number
ISO/IEC/IEEE 24748-3:2020(E)

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Published in Switzerland



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

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. The IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. While the IEEE administers the process and establishes rules to promote fairness in the consensus development process, the IEEE does not independently evaluate, test, or verify the accuracy of any of the information contained in its standards.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by ISO/IEC JTC 1, *Information technology*, SC 7, *Systems and software engineering*, in cooperation with the Systems and Software Engineering Standards Committee of the IEEE Computer Society, under the Partner Standards Development Organization cooperation agreement between ISO and IEEE.

This document cancels and replaces ISO/IEC TR 24748-3:2011, which has been technically revised.

The main changes compared to ISO/IEC TR 24748-3:2011 are as follows:

— revised presentation of concepts, consistent with ISO/IEC/IEEE 12207:2017;

— completely updated presentation of guidance for each life cycle process, including aspects of purpose; outcomes and outputs; activities, tasks, and approaches;

— identified closely related processes;

— identified related international standards for each process, which offer more detailed requirements and guidance.

A list of all parts in the ISO/IEC/IEEE 24748 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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# Introduction

The purpose of this document is to provide guidance on the application of the software life cycle processes standard, ISO/IEC/IEEE 12207:2017. Taken together, the parts of the ISO/IEC/IEEE 24748 series are intended to facilitate the joint usage of the process content of the two high-level life cycle process standards (ISO/IEC/IEEE 12207:2017 and ISO/IEC/IEEE 15288:2015), which in turn may be used together with various more specialized lower-level process standards. In this way, ISO/IEC/IEEE 24748 (all parts) provides unified and consolidated guidance on the life cycle management of systems and software engineering. Its purpose is to help ensure consistency in system concepts and life cycle concepts, models, stages, processes, process application, key points of view, adaptation and use in various domains as the two standards (and others) are used in combination. It should help an organization to design, develop, and sustain software systems using a life cycle model.

ISO/IEC/IEEE 24748-1 provides guidance for the concepts of life cycle management applicable to both systems and software engineering. It covers fundamental concepts such as system-of-interest, stages, processes, projects, and organizations. This document focuses on and expands the coverage of those aspects and processes most relevant to software systems. A companion guidance document, ISO/IEC/IEEE 24748-2, provides similar guidance for the application of ISO/IEC/IEEE 15288:2015.

In conjunction with ISO/IEC/IEEE 24748-1, this document aids in identifying and planning the use of the life cycle processes described in ISO/IEC/IEEE 12207:2017. Since in many respects the Organizational Project Enabling processes and the Technical Management processes are quite similar for software systems to those used for any type of system, this document concentrates on specific guidance for the Technical processes and how they can be effectively used during the software life cycle. ISO/IEC/IEEE 24748-5 focuses on the Technical Management processes, especially Project Planning and Project Assessment and Control, as applied to software projects. The proper use of these processes can contribute to a project being completed successfully, meeting its objectives and requirements for each stage and for the overall project.

This document elaborates on factors, 'best-practice' or typical approaches and methods that should be considered when applying ISO/IEC/IEEE 12207:2017. It does this in the context of the various ways in which ISO/IEC/IEEE 12207:2017 can be applied. It is intended to be useful in a variety of software life cycle situations, including the use of agile methods, which are the most widely used on all types and sizes of projects.

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# Systems and software engineering — Life cycle management —

# Part 3: Guidelines for the application of ISO/IEC/IEEE 12207 (software life cycle processes)

## 1 Scope

This document is a guideline for the application of ISO/IEC/IEEE 12207:2017. This document establishes guidance to implement a common framework for software life cycle processes, with well-defined terminology, that can be referenced by the software industry. This document provides guidance on defining, controlling, and improving software life cycle processes within an organization or a project. This document recommends methods and approaches suitable for a variety of life cycle models. The guidance emphasizes the importance of establishing a strategy, planning, and the involvement of stakeholders, with the ultimate goal of achieving customer satisfaction.

This document applies to the acquisition, supply, design and development, transition, operation, maintenance, and disposal (whether performed internally or externally to an organization) of software systems, products, and services (including software as a service (SaaS)), and the software portion of any system. Software includes the software portion of firmware. The guidance on processes, activities, and tasks in this document can also be applied during the acquisition of a system that contains software. The guidance in this document can also be used as a basis for selecting, establishing, and improving organizational environments, e.g., methods, procedures, techniques, tools, and trained personnel.

In the context of this document, there is a continuum of human-made systems from those that use little or no software to those in which software is the primary interest. It is rare to encounter a complex system without software, and all software systems require physical system components (hardware) to operate, either as part of the software system-of-interest (SoI) or as an enabling system or infrastructure. Thus, the choice of whether to apply this document for guidance to the software life cycle processes, or ISO/IEC/IEEE 24748-2, depends on the SoI. At a high level, both documents have the same life cycle process framework, but differ in guidance for activities and tasks to perform software engineering or systems engineering, respectively.

The processes and process groups in this document are identical in their purpose and outcomes with those in ISO/IEC/IEEE 12207:2017 and in ISO/IEC/IEEE 15288:2015, with one exception: the System/Software Requirements Definition process of ISO/IEC/IEEE 12207:2017 and this document has a different name from the System Requirements Definition process of ISO/IEC/IEEE 15288:2015.

Use of the guidance in this document is appropriate regardless of software system size or complexity or organizational size. The process outcomes from the ISO/IEC/IEEE 12207:2017 life cycle processes are meant to be generic and applicable to the engineering of any software system in any size organization.

This document does not prescribe nor detail a specific software life cycle model, development methodology, method, modelling approach, or technique and method. The variety of ways for implementing software (e.g., development of new code, integration of existing open source components and commercial products, or modifications to existing software, including transition to new platforms) make it impossible to detail specific procedures.

This document does not establish a management system or provide guidance on the use of any management system standard. However, it is intended to be compatible with the quality management system specified by ISO 9001, the service management system specified by ISO/IEC 20000-1, the

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IT asset management system specified by ISO/IEC 19770 (all parts), and the information security management system specified by ISO/IEC 27000.

Clause 6 provides guidance on aspects of purposes, outcomes, activities, and tasks in ISO/IEC/IEEE 12207:2017. However, this document does not repeat the detailed requirements and recommendations for purposes, outcomes, activities, and tasks for each life cycle process found in ISO/IEC/IEEE 12207:2017. Clause 6 also provides references to specialized standards that provide more detailed requirements and guidance for the various processes and information products (information items). This document does not detail information items (process inputs and outputs) in terms of name, format, explicit content and recording media.

NOTE ISO/IEC/IEEE 15289 addresses the content for life cycle process information items (documentation).

## 2 Normative references

There are no normative references in this document.

## 3 Terms, definitions, and abbreviated terms

### 3.1 Terms and definitions

No terms and definitions are listed in this document.

ISO, IEC, and IEEE maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/

— IEC Electropedia: available at http://www.electropedia.org/

— IEEE Standards Dictionary Online: available at: http://dictionary.ieee.org

NOTE For additional terms and definitions in the field of systems and software engineering, see ISO/IEC/IEEE 24765, which is published periodically as a "snapshot" of the SEVOCAB (Systems and software Engineering Vocabulary) database and is publicly accessible at www.computer.org/sevocab.

### 3.2 Abbreviated terms

API application program interface

CM configuration management

COTS commercial-off-the-shelf

FCA functional configuration audit

IDEF Integration DEFinition

MOE measure of effectiveness

MOP measure of performance

NDI non-developmental item

PCA physical configuration audit

PII personally identifiable information

PRM process reference model


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