INTERNATIONAL STANDARD

ISO/IEC/ IEEE 24748-5

First edition
2017-06

Systems and software engineering — Life cycle management —

Part 5: Software development planning

Ingénierie des systèmes et du logiciel — Gestion du cycle de vie — Partie 5: Planification de développement de logiciel

Reference number
ISO/IEC/IEEE 24748-5:2017(E)

© ISO/IEC 2017
© IEEE 2017



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2017, Published in Switzerland

© IEEE 2017

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO or IEEE at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Institute of Electrical and Electronics Engineers, Inc
3 Park Avenue, New York
NY 10016-5997, USA

stds.ipr@ieee.org
www.ieee.org

© ISO/IEC 2017 – All rights reserved
© IEEE 2017 – All rights reserved

Contents

1 Scope 1
2 Normative references 1
3 Terms, definitions and abbreviated terms 1
4 Abbreviations 5
5 Conformance 5
5.1 General 5
5.2 Intended usage 6
5.3 Conformance to processes 6
5.4 Conformance to information item content 6
5.5 Full conformance 6
5.6 Tailored conformance 7
6 Concepts 7
6.1 General 7
6.2 System concepts 7
6.3 Life cycle concepts 7
6.4 Process concepts 8
6.5 Project concepts 8
6.6 Information item concepts 8
6.6.1 General 8
6.6.2 Concept of Plans 9
6.6.3 Software development plans 9
6.7 Management concepts 10
6.7.1 General 10
6.7.2 Project management 10
6.7.3 Technical management 10
6.8 Software development model concepts 10
6.8.1 General 10
6.8.2 Once-Through software development model 11
6.8.3 Evolutionary software development model 11
6.8.4 Incremental software development model 11
7 Software life cycle processes and software development planning 12
7.1 General 12
7.2 Agreement processes 12
7.3 Organizational project-enabling processes 12
7.4 Technical management processes 13
7.5 Technical processes 13
8 Software development planning 13
9 Process Execution 14
9.1 Overview 14
9.2 Project planning process 14
9.2.1 General 14
9.2.2 Responsibility for planning 14
9.2.3 Project scope 15
9.2.4 Work Breakdown Structure 16

© ISO/IEC 2017 - All rights reserved
© IEEE 2017 – All rights reserved

9.2.5 Project estimation 16
9.2.6 Relationship management 18
9.2.7 Risk Management 19
9.2.8 Configuration management 19
9.2.9 Information management 19
9.2.10 Quality Assurance 19
9.3 Project and software measurement 19
9.3.1 Measurement overview 19
9.3.2 Project measures 20
9.3.3 Software measures 20
9.4 Project assessment and control 21
9.4.1 Overview 21
9.4.2 General guidance 21
9.4.3 Project assessment and control process 23
9.5 Decision management 25
10 Information items: Technical plans 26
10.1 Software Development Plan related to other plans 26
10.2 Content of the Software Development Plan 27
10.2.1 Content Overview 27
10.2.2 Detailed content of the SDP 27
Annex A (informative) Generic content for a plan 30
Annex B (informative) Sample Software Development Plan outline 31
Annex C (informative) Application of related standards 35
Bibliography 37

© ISO/IEC 2017 - All rights reserved
© IEEE 2017 – All rights reserved

Foreword

Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO 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 nongovernmental, 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.

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

Attention is called to the possibility that implementation of this standard may require the use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. ISO/IEEE is not responsible for identifying essential patents or patent claims for which a license may be required, for conducting inquiries into the legal validity or scope of patents or patent claims or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance or a Patent Statement and Licensing Declaration Form, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. Further information may be obtained from ISO or the IEEE Standards Association.

Use of IEEE Standards documents is wholly voluntary. IEEE documents are made available for use subject to important notices and legal disclaimers (see http://standards.ieee.org/IPR/disclaimers.html for more information).

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

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

© ISO/IEC 2017 - All rights reserved
© IEEE 2017 – All rights reserved

Introduction

ISO/IEC/IEEE 24748 provides unified and consolidated guidance on the life cycle management of systems and software. This document draws on key aspects of the former IEEE J-Std-016 *Standard for information technology software — Software life cycle processes — Software development — Acquirer-supplier agreement*. The IEEE has identified the need for a non-military standard to guide managers of software systems in software development planning.

Taken together, the parts of ISO/IEC/IEEE 24748 are intended to facilitate the joint usage of the process content of ISO/IEC/IEEE FDIS 12207 *Systems and software engineering — Software life cycle processes* and ISO/IEC/IEEE 15288, *Systems and software engineering — System life cycle processes*, which in turn may be used together with related standards, such as for Information Technology (IT) service management and various lower-level process standards.

The acquisition or supply of a software system is usually done within a project. A project prepares and implements the technical plans and schedules necessary to guide the project toward accomplishment of its objectives and proper conclusion. Given the project's authorization and objectives, the project should establish plans for the technical management of activities as necessary for the software development effort.

This document unifies technical and management requirements and guidance from several sources to specify the requirements for software engineering planning, including software development plans or software engineering plans. This document also identifies the processes as defined in ISO/IEC/IEEE FDIS 12207 to perform the necessary project planning activities to accomplish the project's technical effort and to develop the software project's technical management and development plans.

This document focuses on the processes required for successful planning and management of the project's software development effort and for development of the software development plan (SDP) as a vehicle for representing a project's application of software life cycle processes. The SDP is a top level technical planning document for a project which addresses technical management processes established by three principal sources (the project's agreement, applicable organizational and technical management processes, and the software development project team) as necessary to successfully accomplish the software development related tasks of the project.

© ISO/IEC 2017 - All rights reserved
© IEEE 2017 – All rights reserved

Systems and software engineering — Life cycle management — Part 5: Software development planning

1 Scope

This document provides a common framework for planning and controlling the technical processes and activities to produce and sustain software products. The complete life cycle is covered by this document, from idea conception to the retirement of a software product. The framework described by this document provides for best practices in communication and cooperation among parties that plan for, develop, utilize, and manage modern software.

This document:

- specifies the required information items to be produced through the implementation of the required planning and control processes;
- specifies the required content of the required information items;
- gives guidelines for the format and content of the required and related information items; and
- details the processes necessary to develop and implement a software plan.

This document is intended to provide guidance for parties involved in the planning of software engineering at all stages of the software life cycle. It is intended to provide a common framework for two-party and multi-party collaborations and can be applied where the parties are from the same organization. This document can also be used by a single party.

This document is applicable to:

- those who use ISO/IEC/IEEE FDIS 12207 on projects dealing with software products and services related to those products;
- those who are responsible for the technical management of the development of software systems;
- organizations and individuals performing software development activities; and
- organizations and individuals developing information items during the development of software.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC/IEEE FDIS 12207:2017[1], *Systems and software engineering — Software life cycle processes*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms and definitions given in ISO/IEC/IEEE FDIS 12207, ISO/IEC TS 24748-1:2016, and the following apply.

For additional terms and definitions, consult ISO/IEC/IEEE 24765, available at www.computer.org/sevocab.

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

[1] Under preparation. (Stage at time of publication ISO/IEC/IEEE FDIS 12207)

© ISO/IEC 2017 - All rights reserved
© IEEE 2017 – All rights reserved

— IEC Electropedia: available at http://www.electropedia.org/
— ISO Online browsing platform: available at http://www.iso.org/obp
— IEEE Standards Dictionary Online: available at http://dictionary.ieee.org

3.1
acceptance
action by an authorized representative of the acquirer by which the acquirer assumes ownership of products as partial or complete performance of an agreement

3.2
audit
independent examination of a work product or set of work products to assess compliance with specifications, standards, contractual agreements, or other criteria

Note 1 to entry: Independent assessment of software products and processes conducted by an authorized person in order to assess compliance with requirements.

[SOURCE: ISO/IEC/IEEE 15288:2015, 4.1.10]

3.3
configuration item
item or aggregation of hardware, software, or both, that is designated for configuration management and treated as a single entity in the configuration management process

[SOURCE: ISO/IEC/IEEE 15288:2015, 4.1.13]

3.4
document
uniquely identified unit of information for human use, such as a report, specification, manual or book, in printed or electronic form

[SOURCE: ISO/IEC/IEEE 15289:2015, 5.10]

3.5
estimation
process of developing a quantitative assessment of the likely amount or outcome

3.6
evaluation
systematic determination of the extent to which an entity meets its specified criteria

Note 1 to entry: The entity can be an item or activity.

[SOURCE: ISO/IEC 25001:2014, 4.1]

3.7
information item
separately identifiable body of information that is produced, stored, and delivered for human use

[SOURCE: ISO/IEC/IEEE 15289:2015, 5.13]

© ISO/IEC 2017 - All rights reserved
© IEEE 2017 – All rights reserved

3.8

plan

information item that presents a systematic course of action for achieving a declared purpose, including when, where, how, and by whom specific activities are to be performed

Note 1 to entry: The plan can also state artifacts that are to be created.

Note 2 to entry: Annex A provides contents of a generic plan.

[SOURCE: ISO/IEC/IEEE 15289:2011, 5.16]

3.9

planning

activities concerned with the specification of a plan

3.10

project manager

stakeholder with overall responsibility for the planning, execution, and closure of a project

Note 1 to entry: According to ISO/IEC/IEEE FDIS 12207, the project closure is performed in the Portfolio Management process.

3.11

project management plan

information item that describes how the project will be executed, monitored, and controlled

Note 1 to entry : The plan typically describes the work to be done, the resources required, the methods to be used, the procedures to be followed, the schedules to be met, and the way that the project is organized.

[SOURCE: ISO/IEC/IEEE 24765, modified – to distinguish between the technical and management approaches. See also software development plan.]

3.12

record, verb

set down in a manner that can be retrieved and viewed

3.13

record, noun

set of related data items treated as a unit

[SOURCE: ISO/IEC/IEEE 15289:2015, 5.22]

3.14

software development environment

facilities, hardware, software, procedures, and documentation needed to perform software development

Note 1 to entry: Elements can include computer-aided software engineering (CASE) tools, compilers, assemblers, linkers, loaders, operating systems, debuggers, simulators, emulators, documentation tools, and database management systems.

Note 2 to entry: Plans for software development environments can include where the specified environment is to be constructed, when sites provide different environments or facilities. For example, different testing environments can be requested to be constructed at the acquirer's site and the supplier's site.

© ISO/IEC 2017 - All rights reserved
© IEEE 2017 – All rights reserved

3.15

software development plan

SDP

information item that describes the technical approach to be followed for a software development effort

Note 1 to entry: The software development plan presents how the organization or project plans to conduct development activities. A distinction is being made between the technical and management approaches. *See also* project management plan.

3.16

software engineering

systematic application of scientific and technological knowledge, methods, and experience to the design, implementation, testing, and documentation of software

[SOURCE: ISO/IEC/IEEE 24765]

3.17

software item

item

identifiable part of a software product

EXAMPLE Source code, object code, control code, control data, or a collection of these items

Note 1 to entry: A software item can be viewed as a system element of ISO/IEC/IEEE 15288:2015.

[SOURCE: ISO/IEC/IEEE 15289:2015, 5.26]

3.18

software product

set of computer programs, procedures, and possibly associated documentation and data

3.19

software quality characteristic

category of software quality attributes that bears on software quality

[SOURCE: ISO/IEC 25000:2015, 4.52]

3.20

software system

system for which software is of primary importance to the stakeholders

3.21

software unit

atomic software component of the software architecture that can be subjected to stand-alone testing

3.22

technical manager

stakeholder with responsibility for decisions relating to product content and quality achievement

Note 1 to entry: Technical decisions include definition and tailoring of life cycle processes, design of measurement systems, and product implementation decisions

© ISO/IEC 2017 - All rights reserved
© IEEE 2017 – All rights reserved

3.23

work breakdown structure

hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables

Note 1 to entry: It organizes and defines the total scope of the project.

4 Abbreviations

CI	configuration item
CM	configuration management
COTS	commercial off the shelf
ICWG	interface control working group
IT	information technology
LOC	lines of code
SDP	software development plan
SEMP	systems engineering management plan
TPM	technical performance measure
WBS	work breakdown structure

5 Conformance

5.1 General

This document may be used as a conformance or a guidance document for projects and organizations claiming conformance to ISO/IEC/IEEE FDIS 12207.

To claim conformance to this document, having tailored the selected software life cycle processes, the users of this document shall prepare the information items identified in this document applicable to the selected and tailored ISO/IEC/IEEE FDIS 12207 processes.

The generic and specific record and information item contents in Clauses 8 and 9 of this document may be tailored to satisfy requirements of an organization, its projects, or agreements based on the tailored conformance to ISO/IEC/IEEE FDIS 12207. In tailoring, information item titles and contents provided in this document may be modified (added to, combined or retitled). The contents of the information items shall correspond to the selected and tailored processes.

NOTE ISO/IEC/IEEE FDIS 12207:2017, Annex A, provides requirements for the Tailoring process.

Throughout this document, “shall” is used to express a provision that is normative, “should” to express a recommendation among other possibilities, and “may” to indicate a course of action permissible within the limits of this document.

The verb “include” used in this document indicates that either:

a) the information is present; or
b) a reference to the information is listed.

© ISO/IEC 2017 - All rights reserved
© IEEE 2017 – All rights reserved