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## Systems and software engineering — Life cycle management — Specification for process description

*Ingénierie du logiciel et des systèmes — Gestion du cycle de vie —  
Spécification pour la description des processus*

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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.

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 ISO/IEC documents should be noted. This document was drafted in accordance with the rules given in the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives) or [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs)).

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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](http://www.iso.org/patents)) or the IEC list of patent declarations received (see <https://patents.iec.ch>).

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

For an explanation of the voluntary nature of standards, 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](http://www.iso.org/iso/foreword.html). In the IEC, see [www.iec.ch/understanding-standards](http://www.iec.ch/understanding-standards).

ISO/IEC/IEEE 24774 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems 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 first edition cancels and replaces ISO/IEC TR 24774:2010, which has been technically revised.

The main changes compared to ISO/IEC TR 24774:2010 are as follows:

- process definition and examples have been updated to reflect SC 7 latest standards;
- the former ISO/IEC Technical Report has been jointly revised with IEEE as an International Standard.

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](http://www.iso.org/members.html) and [www.iec.ch/national-committees](http://www.iec.ch/national-committees).

## Introduction

For an organization to function effectively, the organization has to determine and manage numerous interrelated activities and tasks to achieve its goals. An activity or a set of activities using resources and managed in order to enable the achievement of outcomes through the transformation of inputs into outputs can be considered a process. Often the output from one process forms the input to other processes. When processes are explicitly described and performed in a systematic manner, the likelihood of consistent quality in the results is improved. Thus, process descriptions and process models (frameworks of related processes) enable consistent performance and delivery of expected results.

A number of international, national and industry standards describe processes and process reference models. The process descriptions vary in format, content and level of prescription. The purpose of this document is to encourage uniformity in the description of processes. Uniform description of processes facilitates adoption, adaptation and improvement of standardized processes, as well as process assessment. The combination of processes and the development of process views from different reference models eases the development of new models and facilitates comparison of processes.

In order for users of standards to select the appropriate forms of process description and apply them in a consistent fashion, it is desirable to develop a common characterization of all of these forms of process description. This document presents requirements for the description of processes in terms of their format, content and level of prescription. The requirements of this document can be applied to any process model developed for any purpose.

This document is intended for use by all parties that define process models, for example systems and software engineers, sector or special interest groups, professional standards groups, researchers, and process assessors.

## Document Preview

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# Systems and software engineering — Life cycle management — Specification for process description

## 1 Scope

This document provides an explanation of considerations involved in defining a process. This document gives requirements and recommendations for the description of processes by identifying elements and rules for their formulation.

This document also describes the use of process views.

This document explains how conformance to a process can be defined, when the process is described in accordance with this document.

This document does not describe how processes are composed or otherwise aggregated into larger frameworks or life cycle models. Nor does the document cover how to assess or evaluate the performance of a process, or the output (products) of a process.

**NOTE** Two prominent International Standards in process description for software and system engineering are ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15288. These two standards have very similar process models. The information items associated with their process definitions are given in ISO/IEC/IEEE 15289. Other International Standards provide further characterization of a single life cycle process by elaborating the process elements and levying specific requirements on the execution of the process.

This document is applicable when processes are described for various process definitions in any party, organization or standard relating to systems and software engineering processes.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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/obp>
- IEC Electropedia: available at <http://www.electropedia.org>
- IEEE Standards Dictionary Online: available at <http://dictionary.ieee.org>

**NOTE 1** 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 [computer.org/sevocab](http://computer.org/sevocab).

### 3.1 activity

set of cohesive *tasks* (3.20) of a *process* (3.8)

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.3]

### 3.2

#### **base practice**

*activity* (3.1) that, when consistently performed, contributes to achieving a specific *process purpose* (3.12)

[SOURCE: ISO/IEC 33001:2015, 3.3.2]

### 3.3

#### **information item**

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

[SOURCE: ISO/IEC/IEEE 15289:2019, 3.1.12, modified — The preferred term "information product" has been removed; notes 1 and 2 to entry have been removed.]

### 3.4

#### **life cycle**

evolution of a *system* (3.18), *product* (3.16), service, project or other human-made entity from conception through retirement

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.26]

### 3.5

#### **life cycle model**

framework of *processes* (3.8) and *activities* (3.1) concerned with the *life cycle* (3.4), which can be organized into *stages* (3.17), acting as a common reference for communication and understanding

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.27]

### 3.6

#### **output**

*product* (3.16), result, or service generated by a *process* (3.8)

### 3.7

#### **procedure**

*information item* (3.3) that presents an ordered series of steps to perform a *process* (3.8), *activity* (3.1), or *task* (3.20)

[SOURCE: ISO/IEC/IEEE 15289:2019, 3.1.19, modified — Notes 1 and 2 to entry have been removed.]

### 3.8

#### **process**

set of interrelated or interacting *activities* (3.1) that transforms inputs into *outputs* (3.6)

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.33]

### 3.9

#### **process improvement**

actions taken to improve the quality of the organization's *processes* (3.8) aligned with the business needs and the needs of other concerned parties

[SOURCE: ISO/IEC 33001:2015, 3.1.7]

### 3.10

#### **process maturity**

extent to which an organizational unit consistently implements *processes* (3.8) within a defined scope that contribute to the achievement of its business needs (current or projected)

Note 1 to entry: This term is "organizational process maturity" with the same definition in ISO/IEC 33001.

[SOURCE: ISO/IEC/IEEE 26511:2018, 3.1.23, modified — Note 1 to entry has been added.]



**3.11****process outcome**

observable result of the successful achievement of the *process purpose* (3.12)

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.34]

**3.12****process purpose**

high-level objective of performing the *process* (3.8) and the likely outcomes of effective implementation of the process

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.35, modified — Note 1 to entry has been removed.]

**3.13****process reference model**

model comprising definitions of *processes* (3.8) in a domain of application described in terms of *process purpose* (3.12) and outcomes, together with an architecture describing the relationships between the processes

[SOURCE: ISO/IEC 33001:2015, 3.3.16]

**3.14****process tailoring**

making, altering, or adapting a *process* (3.8) description for a particular end

EXAMPLE A project tailors its defined process from the organization's set of standard processes to meet the objectives, constraints, and environment of the project.

**3.15****process view**

description of how a specified purpose and set of outcomes can be achieved by employing the *activities* (3.1) and *tasks* (3.20) of existing *processes* (3.8)

[SOURCE: ISO/IEC/IEEE 15026-1:2019, 3.2.2, modified — "may" has been changed to "can"; note 1 to entry has been removed.]

**3.16****product**

result of a *process* (3.8)

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.36, modified — Note 1 to entry has been removed.]

**3.17****stage**

period within the *life cycle* (3.4) of an entity that relates to the state of its description or realization

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.58, modified — Notes 1 and 2 to entry have been removed.]

**3.18****system**

combination of interacting elements organized to achieve one or more stated purposes

[SOURCE: ISO/IEC/IEEE 15288:2015, 4.1.46, modified — Notes 1, 2 and 3 to entry have been removed.]

**3.19****tailoring**

*process* (3.8) by which individual requirements in specifications, standards, and related documents are evaluated and made applicable to a specific project by selection, and in some exceptional cases, modification of existing or addition of new requirements

[SOURCE: ISO/IEC/IEEE 26513:2017, 3.38]

### 3.20

#### task

required, recommended, or permissible action, intended to contribute to the achievement of one or more outcomes of a *process* (3.8)

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.66]

### 3.21

#### view

representation of a whole *system* (3.18) from the perspective of a related set of concerns

Note 1 to entry: For further details, refer to ISO/IEC/IEEE 42020:2019, 3.24.

### 3.22

#### viewpoint

specification of the conventions for constructing and using a *view* (3.21)

Note 1 to entry: A viewpoint is a pattern or template from which to develop individual views by establishing the purposes and audiences for a view, and the techniques for its creation and analysis.

Note 2 to entry: For a detailed explanation of view and viewpoint and how they can be defined and used, see ISO/IEC/IEEE 42010.

Note 3 to entry: For further details, refer to ISO/IEC/IEEE 42020:2019, 3.25.

## 4 Conformance

Full conformance to this document can be claimed if process descriptions defined using the requirements of this document clearly cover the required elements (5.2). Any of the optional elements (5.3) may also be included either as requirements, recommendations, examples or suggestions.

## 5 Specification of a process description and its elements

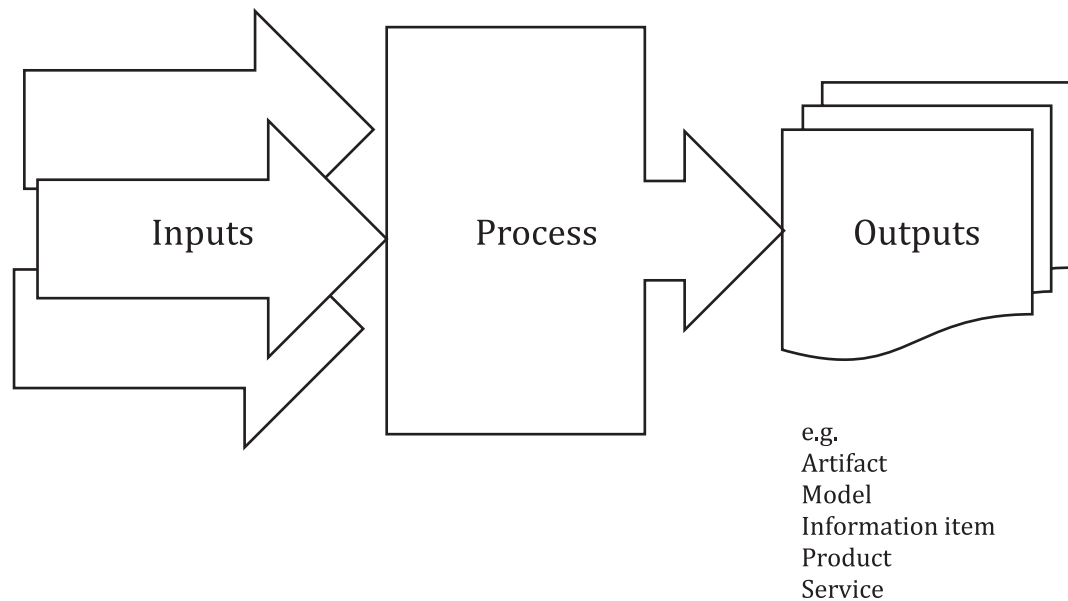
### 5.1 Elements of process description

This document characterizes the following elements of process description:

- name;
- purpose;
- outcomes;
- activities;
- tasks;
- inputs;
- outputs;
- controls and constraints.

### 5.2 Process and related concepts

As defined in 3.7, a process is a set of interrelated or interacting activities that transforms inputs into outputs. Figure 1 shows a typical representation of this transformation.



**Figure 1 — Basic process**

There is no fixed dividing line between what constitutes a process and what is considered as a sub-process or an activity within a process. Typically, processes are achieved through the performance of activities comprising groups of related tasks. A significant activity of interest with numerous tasks can also be described as a process if it were useful to treat the activity of interest in detail. The limits of a process generally are determined by the production of a major output and outcomes, rather than the intermediate outputs produced by activities within the process. Additionally, if processes are highly automated and require little human control or intervention, it can be appropriate to combine several processes into one process description.

**NOTE 1** Often a set of processes are developed; and some processes are decomposed into more than one level. However, decomposition of processes into more than three levels is likely to be confusing and hard for humans to use.

Procedures differ from process descriptions in that procedures are written in steps to be followed in order. Procedures can be written as instructions to the persons performing the procedure. Procedures can also be written to assist an evaluator or auditor to understand the procedure, especially its controls or outputs.

**NOTE 2** ISO/IEC/IEEE 82079-1 provides detailed requirements for writing instructions.

Required activities are stated in process descriptions using either the imperative (as a command), or as a 'shall' statement.

**NOTE 3** [Annex A](#) shows different examples of the expression of mandatory/required process elements as used in sample process descriptions.

Complete processes generally involve several types of generic activities ([Table 1](#)).

**Table 1 — Model of generic activities within a process**

Generic activity	Example activities in the design definition process	Example activities/task in the implementation process
<b>Strategize and plan (Plan)</b>	Prepare for software system design definition	Prepare for implementation
<b>Perform (Do)</b>	Establish designs related to each software system element.	Perform implementation
NOTE Adapted from ISO/IEC/IEEE 24748-3:2020, Table 1.		