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Systems and software engineering — Life cycle profiles for very small entities (VSEs)

Part 5-1-2: Software engineering guidelines for the generic Basic profile

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National foreword

This British Standard is the UK implementation of ISO/IEC 29110-5-1-2:2025.

The UK participation in its preparation was entrusted to Technical Committee IST/15, Software and systems engineering.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Systems and software engineering — Life cycle profiles for very small entities (VSEs) —

Part 5-1-2: Software engineering guidelines for the generic Basic profile

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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 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 or www.iec.ch/members_experts/refdocs).

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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. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

This first edition replaces the ISO/IEC TR 29110-5-1-2:2011, which has been technically revised.

The main changes are as follows:

— Many task statements have been reworded to facilitate their understanding.

— Conditional tasks have been added to develop optional work products (e.g. operation guide) that have been requested by a customer. This notation replaces the 'Optional' notation [e.g. *(optional)] used in the TR that caused ambiguities.

— Terms have been added to Clause 3 such that this document is self-contained.

— A few terms have been modified to align this document with the updated version of standards such as the ISO/IEC/IEEE 12207 and the ISO/IEC/IEEE 15289.

— Texts have been added for giving additional information intended to assist the understanding or use of the text of the document.

— Annex A has been added to describe a process, which can be added to the software Basic profile, to enable VSEs to support the software product which they developed.

— Annex B has been added to describe a set of tasks which can be added to the software Basic profile for VSEs with the aim to better support software testing.

— Annex C has been added to describe a set of tasks, which can be added to the software Basic profile, to enable VSEs to add accessibility tasks to the software implementation process.

— Annex D has been added to describe a set of tasks which can be added to the Basic profile to integrate security related tasks.

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A list of all parts in the ISO/IEC 29110 series can be found on the ISO and IEC websites.

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 and www.iec.ch/national-committees.

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Introduction

0.1 Introduction to the ISO/IEC 29110 series

For the purpose of the ISO/IEC 29110 series, a very small entity VSE is an enterprise, organization (e.g. government agency, non-profit organization), department or project having up to 25 people. Many VSEs develop and/or maintain systems and the software components used in those systems, either as independent products or incorporated into the larger system. Due to this, a recognition of VSEs as suppliers of high-quality products is required.

VSEs around the world are creating valuable products and services. According to the World Bank, small and medium enterprises (SMEs) account for about 90 % of enterprises worldwide. According to the Organisation for Economic Co-operation and Development (OECD), SMEs represent 99 % of all businesses and generate about 60 % of employment. Almost one person out of three is employed in a micro firm with less than 10 employees. The European Union reports that micro firms, with fewer than 10 persons, account for 93,5 % of all enterprises and small firms, with 10 to 49 employees, account for 5,5 % of all enterprises. The challenge facing OECD governments is to provide a business environment that supports the competitiveness of this large heterogeneous business population and that promotes a vibrant entrepreneurial culture.

From studies and surveys conducted, it is clear that the majority of International Standards do not address the needs of VSEs. Implementation of and conformity with these standards is difficult, if not impossible.

Consequently, VSEs have no, or very limited, ways to be recognized as entities that produce quality systems/system elements including software in their domain. Therefore, VSEs are excluded from some economic activities.

It has been found that VSEs find it difficult to relate International Standards to their business needs and to justify the effort required to apply standards to their business practices. Most VSEs can neither afford the resources, in terms of number of employees, expertise, budget and time, nor do they see a net benefit in establishing over-complex systems or software life cycle processes. To address some of these difficulties, a set of guidelines has been developed based on a set of VSE characteristics. The guidelines are based on subsets of appropriate standards processes, activities, tasks, and outcomes, referred to as Profiles. The purpose of a profile is to define a subset of International Standards relevant to the VSEs' context; for example, processes, activities, tasks, and outcomes of ISO/IEC/IEEE 12207 for software; and processes, activities, tasks, and outcomes of ISO/IEC/IEEE 15288 for systems; and information products (documentation) of ISO/IEC/IEEE 15289 for software and systems.

VSEs can achieve recognition through implementing a profile and by being audited against ISO/IEC 29110 specifications.

The ISO/IEC 29110 series can be applied at any phase of system or software development within a life cycle. The ISO/IEC 29110 series is intended to be used by VSEs that do not have experience or expertise in adapting/tailoring ISO/IEC/IEEE 12207 or ISO/IEC/IEEE 15288 standards to the needs of a specific project. VSEs that have expertise in adapting/tailoring ISO/IEC/IEEE 12207 or ISO/IEC/IEEE 15288 are encouraged to use those standards instead of the ISO/IEC 29110 series.

The ISO/IEC 29110 series is intended to be used with any life cycle, such as waterfall, iterative, incremental, evolutionary or agile.

Systems, in the context of the ISO/IEC 29110 series, are typically composed of hardware and software components.

The ISO/IEC 29110 series, targeted by audience, has been developed to improve system or software and/or service quality, and process performance. Figure 1 describes the ISO/IEC 29110 series and positions the parts within the framework of reference.

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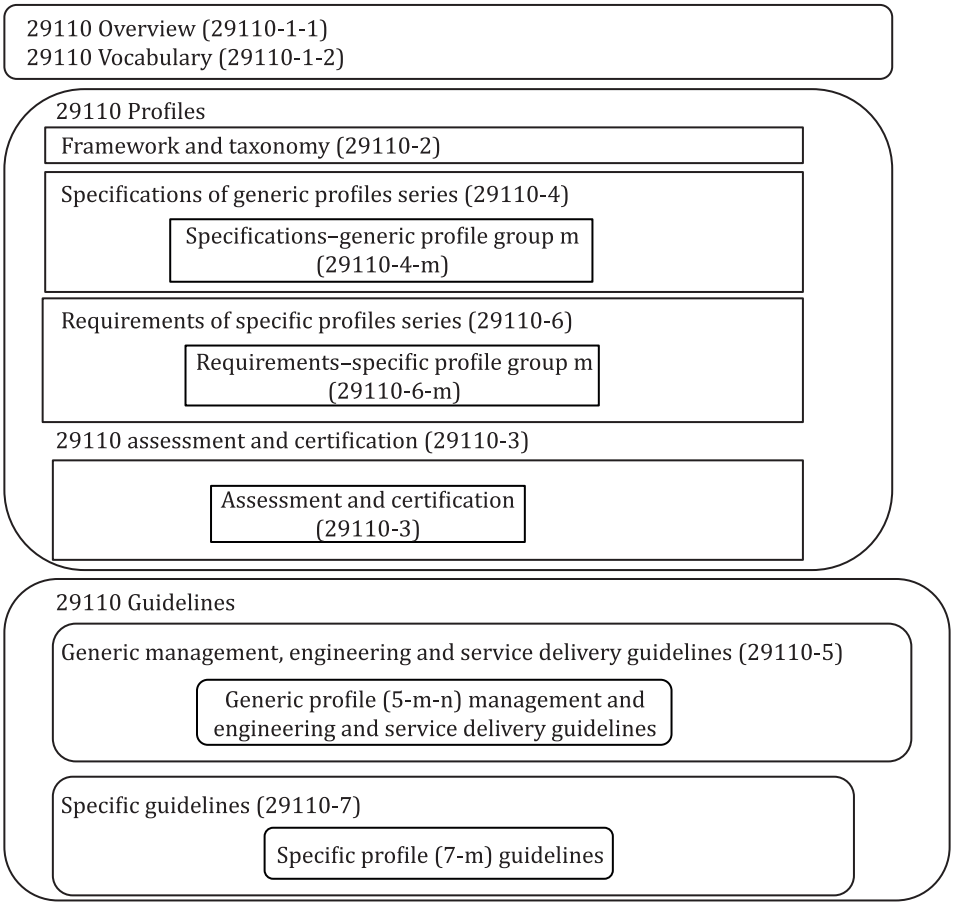

Figure 1 — The ISO/IEC 29110 series

ISO/IEC 29110-1-1 introduces processes, life cycle and standardization concepts, the taxonomy (catalogue) of ISO/IEC 29110 profiles and the ISO/IEC 29110 series. ISO/IEC 29110-1-1 also introduces the characteristics and needs of a VSE, and clarifies the rationale for specific profiles, documents, standards and guidelines. ISO/IEC 29110-1-2 defines the terms common to the ISO/IEC 29110 series. ISO/IEC 29110-1-1 and ISO/IEC 29110-1-2 are targeted at VSEs and their customers, assessors, standards producers, tool vendors and methodology vendors.

ISO/IEC 29110-2 introduces the concepts for systems and software engineering profiles for VSEs. It establishes the logic behind the definition and application of profiles. For standardized profiles, it specifies the elements common to all profiles (structure, requirements, conformity, and assessment). For domain-specific profiles (profiles that are not standardized and developed outside of the ISO process), it provides general guidance adapted from the definition of standardized profiles. ISO/IEC 29110-2 is targeted at profile producers, tool vendors and methodology vendors.

ISO/IEC 29110-3 defines certification schemes, assessment guidelines and compliance requirements for process capability assessment, conformity assessments, and self-assessments for process improvements. ISO/IEC 29110-3 also contains information that can be useful to developers of certification and assessment methods and developers of certification and assessment tools. ISO/IEC 29110-3 is addressed to people who have direct involvement with the assessment process, for example, the auditor, certification and accreditation bodies and the sponsor of the audit, who need guidance on ensuring that the requirements for performing an audit have been met. ISO/IEC 29110-3 is targeted at VSEs and their customers, assessors, accreditation bodies.

ISO/IEC 29110-4 provides the specifications for all generic profiles of the Generic profile group that are based on subsets of appropriate standards elements. ISO/IEC 29110-4 is targeted at VSEs, customers, standards producers, tool vendors and methodology vendors.

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ISO/IEC TR 29110-5 provides a management, engineering and service delivery guidelines for profiles of the Generic profile group. ISO/IEC 29110-5 is targeted at VSEs and their customers.

ISO/IEC 29110-6 provides the specifications for Specific profiles that are based on subsets of appropriate standards elements. ISO/IEC 29110-6 is targeted at VSEs, customers, standards producers, tool vendors and methodology vendors.

ISO/IEC 29110-7 provides a guideline for each profile of the specific profile group. ISO/IEC 29110-7 is targeted at VSEs and their customers.

If a new profile is needed, ISO/IEC 29110-4, ISO/IEC 29110-6, ISO/IEC 29110-7 or ISO/IEC 29110-5, or all, can be developed with minimal impact to existing documents.

Since a VSE may be an enterprise, a project or a department of an organization, a customer of a VSE can be internal or external to the organization.

0.2 Introduction to this document

This document is the second software profile of a four-profile software engineering roadmap (i.e. Entry, Basic, Intermediate and Advanced).

This document is intended to be used by VSEs to support the software product which they developed.

This document is intended to be used by VSEs to add accessibility tasks to the software implementation process.

This document is intended to be used with any processes, techniques and methods that enhance the VSE's customer satisfaction and productivity.

The life cycle processes described in the ISO/IEC 29110 series are not intended to preclude or discourage their use by organizations larger than VSEs.

Using this document, a VSE can obtain the following benefits:

— an agreed set of project requirements and expected work products is delivered to the customer;

— a disciplined management process that provides project visibility and corrective actions of project problems and deviations is performed;

— a systematic software implementation process that satisfies customer needs and ensures quality work products is followed.

VSEs that develop systems that have software components are invited to use the systems engineering Basic profile guideline of the ISO/IEC 29110 series (i.e. ISO/IEC 29110-5-6-2).

In this document, Annex A describes a process, which can be added to the Basic profile, to enable a VSE to support the software product which they developed. Annex B adds a set of tasks, one role and several work products to the software Basic profile for a VSE with the aim to better support software testing. Annex C describes a set of additional tasks for a VSE that should add accessibility to a software product. Annex D integrates security-related tasks and work products in the Basic profile for software engineering. Annex E describes the deployment packages for the software Basic profile.

Conformity requirements for implementations of this document can be found in ISO/IEC 29110-4-1.

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Systems and software engineering — Life cycle profiles for very small entities (VSEs) —

Part 5-1-2:
Software engineering guidelines for the generic Basic profile

1 Scope

This document provides management and engineering guidelines to the software Basic profile specified in ISO/IEC 29110-4-1 through project management and software implementation processes.

This document applies to VSEs that do not develop safety-critical software.

This document applies for software development projects, which can fulfil an external or internal agreement.

This document is applicable to VSEs developing a single product by a single work team.

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 and IEC maintain terminology databases for use in standardization at the following addresses:

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

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

3.1
acceptance testing
testing (3.47) conducted to determine whether a system satisfies its acceptance criteria and to enable the *customer* (3.10) to determine whether to accept the system

[SOURCE: ISO/IEC/IEEE 24765:2017, 3.34]

3.2
accessibility
extent to which products, systems, services, environments and facilities can be used by people from a population with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use

3.3
activity
set of cohesive *tasks* (3.41) of a *process* (3.18)

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

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3.4
adaptive strategies
techniques that people with disabilities use to improve interaction with the web

EXAMPLE Increasing the font size in a common browser.

[SOURCE: W3C Web Accessibility Initiative – Planning and Policies – Involving Users]

3.5
agreement
mutual acknowledgement of terms and conditions under which a working relationship is conducted

EXAMPLE Contract, memorandum of agreement.

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.5]

3.6
assistive technology
equipment, product system, hardware, software or service that is used to increase, maintain or improve capabilities of individuals

Note 1 to entry: Assistive technology is an umbrella term that is broader than assistive products.

Note 2 to entry: Assistive technology can include assistive services, and professional services needed for assessment, recommendation and provision.

[SOURCE: ISO/IEC GUIDE 71:2014, 2.16]

3.7
baseline
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

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.11]

3.8
Basic profile
profile (3.21) targeted at *VSEs* (3.52) developing a single product by a single work team

[SOURCE: ISO/IEC 29110-1-2:2024, 4.14]

3.9
conditional task
task (3.37) that can be mandatory under some specified condition(s), can be optional under other specified conditions, and can be out of scope or not applicable under other specified conditions

Note 1 to entry: These are to be observed if the specified condition(s) apply.

3.10
customer
person or organization that could or does receive a product or a service that is intended for or required by this person or organization

EXAMPLE Consumer, client, end-user, retailer, receiver of product or service from an internal *process* (3.18), beneficiary and purchaser.

Note 1 to entry: A customer can be internal or external to the organization.

[SOURCE: ISO 9000:2015, 3.2.4]

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3.11
defect
imperfection or deficiency in a *work product* (3.53) where that work product does not meet its *requirements* (3.26) or specifications and needs to be either repaired or replaced

[SOURCE: IEEE 1044:2009]

3.12
deployment package
DP
set of artefacts developed to facilitate the implementation of a set of practices, of the selected framework, in a *very small entity* (3.52)

[SOURCE: ISO/IEC 29110-1-2:2024, 3.35]

3.13
expected result
observable predicted behaviour of the *test item* (3.43) under specified conditions based on its specification or another source

[SOURCE: ISO/IEC/IEEE 29119-1:2022, 3.35]

3.14
generic profile group
profile (3.21) group applicable to *VSEs (very small entities)* (3.52) that do not develop safety-critical systems or *software products* (3.32) and have typical situational factors

[SOURCE: ISO/IEC 29110-1-2:2024, 4.28]

3.15
incident
unplanned interruption to a service, a reduction in the quality of a service or an event that has not yet impacted the service to the *customer* (3.10) or user

[SOURCE: ISO/IEC 20000-10:2018, 3.2.5]

3.16
integration testing
testing (3.47) in which software components, hardware components, or both are combined and tested to evaluate the interaction among them

[SOURCE: ISO/IEC/IEEE 24765:2017, 3.2034, modified — Note 1 to entry has been removed.]

3.17
persona
representation of a type of user that includes a concise summary of the characteristics and the behaviour of the user that is most informative to the design or illustrative of specific user *requirements* (3.26)

[SOURCE: ISO/IEC 25063:2014, modified — Note 1 to entry has been removed.]

3.18
process
set of interrelated or interacting *activities* (3.3) that transforms inputs into outputs

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

3.19
process purpose
high-level objective of performing the *process* (3.18) and the likely outcomes of effective implementation of the process

[SOURCE: ISO/IEC/IEEE 24774:2021, 3.12]

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3.20
process outcome
observable result of the successful achievement of the *process* (3.18)

[SOURCE: ISO/IEC/IEEE 24774:2021, 3.11]

3.21
profile
subset of appropriate standards' *processes* (3.18) and their outcomes, *activities* (3.3) and *tasks* (3.37) combined to accomplish a particular function

Note 1 to entry: The base standards used to develop profiles for *VSEs* (3.52) are the ISO/IEC/IEEE 12207, the ISO/IEC/IEEE 15288 and the ISO/IEC/IEEE 15289

[SOURCE: ISO/IEC 29110-1-2:2024, 3.70]

3.22
project
endeavour with defined start and finish dates undertaken to create a product or service in accordance with specified resources and *requirements* (3.26)

Note 1 to entry: A project is sometimes viewed as a unique *process* (3.18) comprising coordinated and controlled *activities* (3.3) and composed of activities from the technical management processes and technical processes defined in this document.

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.37]

3.23
report
information item that describes the results of *activities* (3.3) such as investigations, observations, assessments, or tests

[SOURCE: ISO/IEC/IEEE 15289:2019, 3.1.22]

3.24
review
process (3.18) or meeting during which a *work product* (3.53), or set of work products, is presented to *project* (3.22) personnel, managers, users, *customers* (3.10), or other interested parties for comment or approval

[SOURCE: ISO/IEC 29110-1-2:2024, 4.51]

3.25
risk
effect of uncertainty on objectives

Note 1 to entry: An effect is a deviation from the expected — positive and/or negative.

Note 2 to entry: Objectives can have different aspects (such as financial, health and safety, and environmental goals) and can apply at different levels (such as strategic, organization-wide, *project* (3.22), product and *process* (3.18)).

Note 3 to entry: Risk is often characterized by reference to potential events and consequences, or a combination of these.

Note 4 to entry: Risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood of occurrence.

Note 5 to entry: Uncertainty is the state, even partial, of deficiency of information related to, understanding or knowledge of, an event, its consequence, or likelihood.

[SOURCE: ISO 31073:2022, 3.1.1]

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3.26
requirement
statement that translates or expresses a need and its associated constraints and conditions

Note 1 to entry: A constraint is externally imposed limitation on the software, its design, or implementation or on the *process* (3.18) used to develop or modify a software.

Note 2 to entry: A condition is a measurable qualitative or quantitative attribute that is stipulated for a requirement and that indicates a circumstance or event under which a requirement applies.

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.44, modified — Notes to entry have been added.]

3.27
safety-critical software
software whose failure or malfunction can result in death or serious injury to people, loss of or severe damage to equipment or property, or damage to the natural environment

3.28
security
protection against intentional subversion or forced failure, containing a composite of four attributes: confidentiality, integrity, availability, and accountability, plus aspects of a fifth, usability, all of which have the related issue of their assurance

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.49]

3.29
security control
safeguard or countermeasure prescribed for an information system or an organization, designed to protect the confidentiality, integrity, and availability of its information and to meet a set of defined *security* (3.28) *requirements* (3.26)

[SOURCE: IEEE 7002:2022, 3, IEEE dictionary]

3.30
service level agreement
SLA
documented *agreement* (3.5) between the organization and the *customer* (3.10) that identifies services and their agreed performance

Note 1 to entry: A service level agreement can also be established between the organization and an external supplier, an internal supplier or a customer acting as supplier.

Note 2 to entry: A service level agreement can be included in a contract or another type of documented agreement.

[SOURCE: ISO/IEC 20000-10:2018, 3.2.20]

3.31
small and medium enterprise
SME
enterprise with less than 250 persons employed

[SOURCE: ISO/IEC 29110-1-2:2024, 3.92]

3.32
software product
set of computer programs, procedures, and possibly associated documentation and data

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.54, modified — Note 1 to entry has been removed.]

3.33
software support
continued provision of services and material necessary for the use and improvement of an implemented system

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3.34
stakeholder
individual or organization having a right, share, claim, or interest in a system or in its possession of characteristics that meet their needs and expectations

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.59, modified — EXAMPLE and note 1 to entry have been removed.]

3.35
system testing
testing (3.47) conducted on a complete, integrated system to evaluate the system's compliance with its specified *requirements* (3.26)

[SOURCE: ISO/IEC/IEEE 24765:2017, 3.4122]

3.36
support manager
role responsible for production support in the *VSE* (3.52) who oversees *customer* (3.10) relationships and change management within production environments

3.37
task
required, recommended, or permissible action, intended to contribute to the achievement of one or more outcomes of a *process* (3.18)

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

3.38
test condition
testable aspect of a component or system, such as a function, transaction, feature, quality attribute, or structural element identified as a basis for *testing* (3.47)

[SOURCE: ISO/IEC/IEEE 29119-1:2022, 3.88, modified — Note 1 to entry has been removed.]

3.39
test data
data created or selected to satisfy the input *requirements* (3.26) for executing one or more test cases

Note 1 to entry: Test data can be stored within the *test item* (3.43) (e.g. in arrays or flat files), or can come from external sources, such as other systems, hardware devices, or human operators.

[SOURCE: ISO/IEC/IEEE 29119-1:2022, 3.91]

3.40
test design technique
test technique
procedure used to create or select a test model, identify test coverage items, and derive corresponding test cases

EXAMPLE Equivalence partitioning, boundary value analysis, decision table *testing* (3.47), branch testing.

Note 1 to entry: The test design technique is typically used to achieve a required level of test coverage.

Note 2 to entry: Some test practices, such as exploratory testing or model-based testing are sometimes referred to as “test techniques”. Following the definition in the ISO/IEC/IEEE 29119 series, they are not test design techniques as they are not themselves providing a way to create test cases, but instead use test design techniques to achieve that.

[SOURCE: ISO/IEC/IEEE 29119-1:2022, 3.94]

3.41
test environment
environment containing facilities, hardware, software, firmware, procedures, needed to conduct a test

Note 1 to entry: A test environment can contain multiple environments to accommodate specific test level or test types (e.g. a unit test environment, a performance test environment).

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Note 2 to entry: A test environment can comprise several interconnected systems or virtual environments.

[SOURCE: ISO/IEC/IEEE 29119-1:2022, 3.95]

3.42
test execution
process (3.18) of running a test on the *test item* (3.43), producing actual result(s)

[SOURCE: ISO/IEC/IEEE 29119-1:2022, 3.99]

3.43
test item
test object
work product (3.53) to be tested

EXAMPLE Software component, system, requirements document, design specification, user guide.

[SOURCE: ISO/IEC/IEEE 29119-1:2022, 3.107]

3.44
test plan
detailed description of test objectives to be achieved and the means and schedule for achieving them, organized to coordinate *testing* (3.47) *activities* (3.3) for some *test item* (3.43) or set of test items

[SOURCE: ISO/IEC/IEEE 29119-1:2022, 3.117, modified — Notes to entry have been removed.]

3.45
test sub-process
test management and dynamic (and static) test *process* (3.18) used to perform a specific test level [e.g. *system testing* (3.35), *acceptance testing* (3.1)] or test type (e.g. usability testing, performance testing) normally within the context of an overall test process for a test *project* (3.22)

3.46
test result
indication of whether or not a specific test case has passed or failed, i.e. if the actual result corresponds to the *expected result* (3.13) or if deviations were observed

[SOURCE: ISO/IEC/IEEE 29119-1:2022, 3.122]

3.47
testing
set of *activities* (3.3) conducted to facilitate discovery and evaluation of properties of one or more *test items* (3.43)

[SOURCE: ISO/IEC/IEEE 29119-1:2022, 3.131, modified — "one or more" has been added; note 1 to entry has been removed.]

3.48
traceability
degree to which a relationship can be established among two or more logical entities, especially entities having a predecessor-successor or master-subordinate relationship to one another, such as *requirements* (3.26), system elements, *verifications* (3.50), or *tasks* (3.37)

EXAMPLE Software features and test cases are typically traced to software requirements.

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.69]

3.49
validation
confirmation, through the provision of objective evidence, that the *requirements* (3.26) for a specific intended use or application have been fulfilled

Note 1 to entry: A system is able to accomplish its intended use, goals and objectives (i.e. meet *stakeholder* (3.34) requirements) in the intended operational environment. The right system was built.

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Note 2 to entry: In a life cycle context, validation involves the set of *activities* (3.3) for gaining confidence that a system is able to accomplish its intended use, goals and objectives in an environment like the operational environment.

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.71]

3.50
verification
confirmation, through the provision of objective evidence, that specified *requirements* (3.26) have been fulfilled

Note 1 to entry: Verification is a set of *activities* (3.3) that compares a system or system element against the required characteristics. This includes, but is not limited to specified requirements, design, descriptions, and the system itself. The system was built right.

[SOURCE: ISO 9000:2015, 3.8.12, modified — Notes 1 to 3 to entry have been replaced by a new note 1 to entry.]

3.51
version control
establishment and maintenance of *baselines* (3.7) and the identification and control of changes to baselines that make it possible to return to the previous baseline

[SOURCE: ISO/IEC/IEEE 26511:2018, 3.1.40]

3.52
very small entity
VSE
enterprise, organization (e.g. government agency, non-profit organization), department or *project* (3.22) having up to 25 people

[SOURCE: ISO/IEC 29110-1-2:2024, 4.71, modified — "(e.g. government agency, non-profit organization)" has been added.]

3.53
work product
WP
artefact produced by a *process* (3.18)

EXAMPLE *Project* (3.22) plan, *requirements* (3.26) specification, design documentation, source code, *test plan* (3.44), test meeting minutes, schedules, budgets, and *incident* (3.15) *reports* (3.23).

Note 1 to entry: A subset of the work products can be baselined to be used as the basis of further work and some form the set of project deliverables.

[SOURCE: ISO/IEC 20246:2017, 3.20]

4 Naming, diagramming and definitions conventions

4.1 General

Conventions for naming, diagramming, describing and defining profiles are defined in ISO/IEC 29110-2-1:2015.

4.2 Naming, diagramming and definition conventions

The following process structure description and notation are used to describe the processes.

Process name – process identifier, followed by its abbreviation in parenthesis “( )”.

Process purpose – high level objective of performing the process and the likely outcomes of effective implementation of the process.

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Process outcomes – observable result of the successful achievement of the process purpose. Outcomes are identified by the abbreviation of the process name, followed by the letter "O" and a consecutive number, for example PM.O1, SI.O2.

Input work products – Work products (WP) which can be used to perform the process and its corresponding source, which can be another process or an external entity to the project, such as the customer. They are identified by the abbreviation of the process name.

Output work products – Work products generated by the process and its corresponding destination, which can be another process or an external entity to the project, such as customer. They are identified by the abbreviation of the process name.

Internal work products – Work products generated (i.e. output work product) and consumed (i.e. input work product) by the process. An internal work product is not reviewed or approved by the customer.

All work products' names initiate with capital letters. Some work products should have one or more statuses attached to the work product name surrounded by square brackets "[ ]" and separated by ",". The work product state may change during the process execution. See Clause 9 for the alphabetical list of the work products, its descriptions, possible states and the source of the work product. The source can be another process or an external entity to the project, such as the customer.

Roles involved – Names and abbreviation of the functions to be performed by project team members. Several roles may be played by a single person and one role may be assumed by several persons. Roles are assigned to project participants based on the characteristics of the project. The role list is identified by the abbreviation of the process name and showed as two column table. See Clause 8 for the alphabetical list of the roles and recommended competencies description.

Diagram – Graphical representation of the processes. The large round-edged rectangles indicate process or activities, and the smaller square-edged rectangles indicate the work products. The directional or bidirectional thick arrows indicate the major flow of information between processes or activities. The thin directional or bidirectional arrows indicate the input or output work products. The notation used in the diagrams does not imply the use of any specific process life cycle.

Activity – A set of cohesive tasks of a process. The task statements in this document are not imperative. A process activity is the first level of process workflow decomposition, and the second one is a task. Activities are identified by process name abbreviation followed by consecutive number and the activity name.

Activity description – Each activity description is identified by the activity name and the list of related process outcomes surrounded by parenthesis "( )". For example, PM.01 project planning (PM.O1, PM.O5, PM.O6, PM.O7) means that the activity PM.01 project planning contributes to the achievement of the listed objectives: PM.O1, PM.O5, PM.O6 and PM.O7.

Task description – Each task description begins with an active verb (e.g. assign, test) and is followed by an object (e.g. review the project plan). To facilitate their implementation, a few tasks are broken down in elementary tasks. The task description doesn't impose any technique or method to perform it. The selection of the techniques or methods is left to the VSE or project team.

Task description tables contain four columns corresponding to:

— Role - the abbreviation of role(s) involved in the task execution.

— Task - description of the task to be performed. Each task is identified by activity ID and consecutive number, for example PM.01.01, PM.01.02. A few numbered items are added to provide additional information intended to assist the understanding or use of tasks.

— Input work products – work products needed to execute a task.

— Output work products – work products created or modified by the execution of a task.

NOTE 1 A conditional task is executed if its associated work product (e.g. software user documentation) is required by the customer and listed in the delivery instructions. The conditional task statement is preceded with this text: " x) Conditional task:".

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Incorporation to project repository – list of work products to be saved in project repository; the version control strategy should be applied to some of them. A few work products (e.g. requirements) are baselined, a change to a baselined work product can be done through an approved change request.

NOTE 2 Tables used in process description are for presentation purposes only.

NOTE 3 The term 'Basic' is using a capital 'B' to indicate an ISO/IEC 29110 profile (e.g. the Basic profile) while the term 'basic' is used when referring to the most important part of something (e.g. basic principles).

NOTE 4 A work product is baselined when it has been approved and uploaded in the repository.

4.3 Abbreviated terms

AN	analyst
ARIA	accessible rich Internet applications
CMMI	Capability Maturity Model Integration
CSS	cascading style sheets
CUS	customer
DES	designer
DP	deployment package
HTML	hypertext mark-up language
IM	incident management
PCM	production change management
PM	project management
PJM	project manager
PR	programmer
SI	software implementation
SLM	service level management
SM	support manager
SMIL	synchronized multimedia integration language
SS	software support
ST	support team
TL	technical leader
W3C	World Wide Web Consortium
WCAG	Web Content Accessibility Guidelines
WT	work team

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5 Overview

5.1 General

This document provides project management (PM) and software implementation (SI) processes which integrate tasks based on the selection of elements from ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15289.

This document is intended to be used by the VSE to establish processes to implement any development approach or methodology including, for example, agile, evolutionary, incremental, test-driven development, based on the VSE or project needs.

5.2 Entry conditions to use the software Basic profile

To use this document, a VSE should fulfil the following conditions:

— project agreement was documented, approved by the management of the VSE and baselined before the start of the project;

— a project feasibility study was performed before the project start;

— the project team, including project manager, is assigned and trained;

— development cycle(s) should be documented (e.g. waterfall, iterative, incremental, evolutionary, agile);

— goods, services and infrastructure to start the project are available.

5.3 Processes and activities of the software Basic profile

This document provides two processes: a project management (PM) process and a software implementation (SI) process.

Both processes of the software Basic profile are interrelated (see Figure 2).

The processes illustrated in Figure 2 are intended to be used with any life cycle such as: waterfall, iterative, incremental, evolutionary or agile.

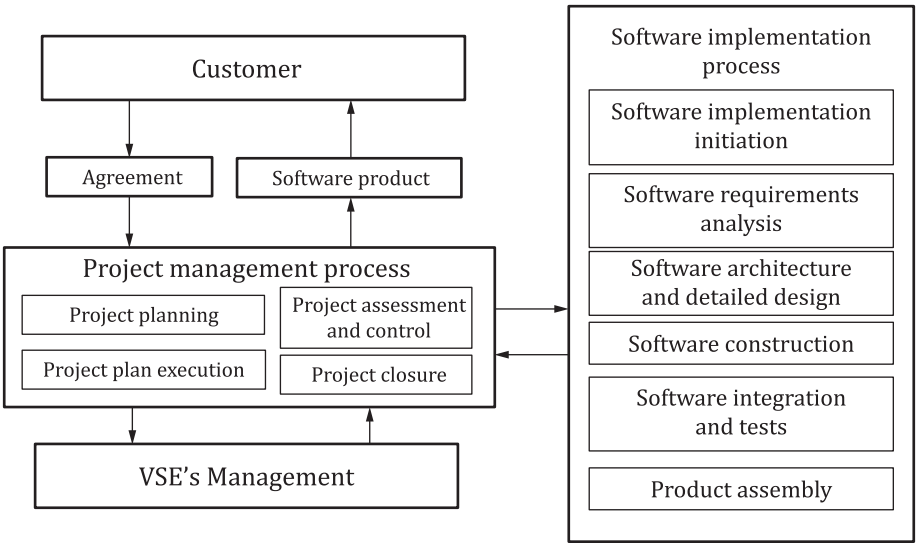

Figure 2 — Processes and activities of the software Basic profile

A customer can be external or internal to an organization (e.g. a client, a project or department of an organization that develops products composed of hardware and software components), therefore the agreement may come from an external or internal customer.

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The PM process uses the customer's agreement to plan the project. As the project progresses, the PM project assessment and control tasks compare the project progress against the project plan and actions are taken to eliminate deviations or incorporate changes to the project plan. The customer approves changes to the project plan, agreement and change requests that impact the project plan. The PM project closure activity delivers the software product, produced by the SI process, and gets the customer's acceptance to formalise the end of the project. A project repository is established to save the work products and to control its versions during the project.

The execution of the SI process is driven by the project plan. The SI process starts with an initiation activity of the project plan revision. The project plan guides the execution of the software requirements analysis, software architectural and detailed design, software construction, software integration and test, and software product assembly activities.

To remove work product's defects verification, validation and test tasks are included in the activity's workflow.

The customer provides an agreement as an input to project management process and receives a software product as a result of software implementation process execution (see Figure 2).

The Basic profile uses baselines and traceability for the control of work products:

— the requirements baseline is traceable to the agreement approved by the management of the VSE;

— the specification baseline is traceable to the requirements specification work product;

— the design is traceable to the software architecture and detailed design work products;

— the product baseline is traceable to all the work products listed in the delivery instructions signed by the customer and the project manager.

6 Project management (PM) process

6.1 PM process purpose

The purpose of the project management process is to achieve the project's time, quality and cost objectives by establishing and executing the tasks of the software implementation project systematically. It also carries out administrative tasks relating to the storage, handling, protection and delivery of work products and configuration items.

This document is intended to be used by the VSE to establish processes to implement any development approach or methodology including, for example, agile, evolutionary, incremental, test-driven development, based on the VSE or project needs.

6.2 PM process outcomes

PM.O1. The project plan for the execution of the project is developed according to the agreement and reviewed and accepted by the customer. The tasks and resources necessary to complete the work are sized and estimated.

PM.O2. Progress of the project is monitored against the project plan and recorded in the progress status record. Changes to the project plan are approved by the customer. Corrections to remediate problems and deviations from the plan are taken when project targets are not achieved. Closure of the project is performed to get the customer acceptance documented in the acceptance record.

PM.O3. The change requests are addressed through their reception and analysis. Changes to software requirements are evaluated for cost, schedule, and technical impact. Change requests that impact the project plan, the requirements or the agreement are approved by the customer.

PM.O4. Review meetings with the work team and the customer are held. Agreements are registered and tracked.

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PM.O5. Risks are identified as they develop and during the conduct of the project.

PM.O6. A software version control strategy is developed. Items of software product are identified, defined, and baselined. Modifications and releases of the items are controlled and made available to the customer and work team. The storage, handling and delivery of the items are controlled.

PM.O7. Software quality assurance is performed to provide assurance that work products and processes comply with the project plan and requirements specification.

NOTE Software quality assurance is implemented through the performance of the verification, validation and review tasks performed in project management and software implementation processes.

6.3 PM roles involved

The roles involved in the PM process are:

— customer;

— project manager;

— technical leader;

— work team.

6.4 PM activities and tasks

6.4.1 Overview of the PM process

Figure 3 shows the flow of information between the project management process activities including the most relevant work products and their relationship.

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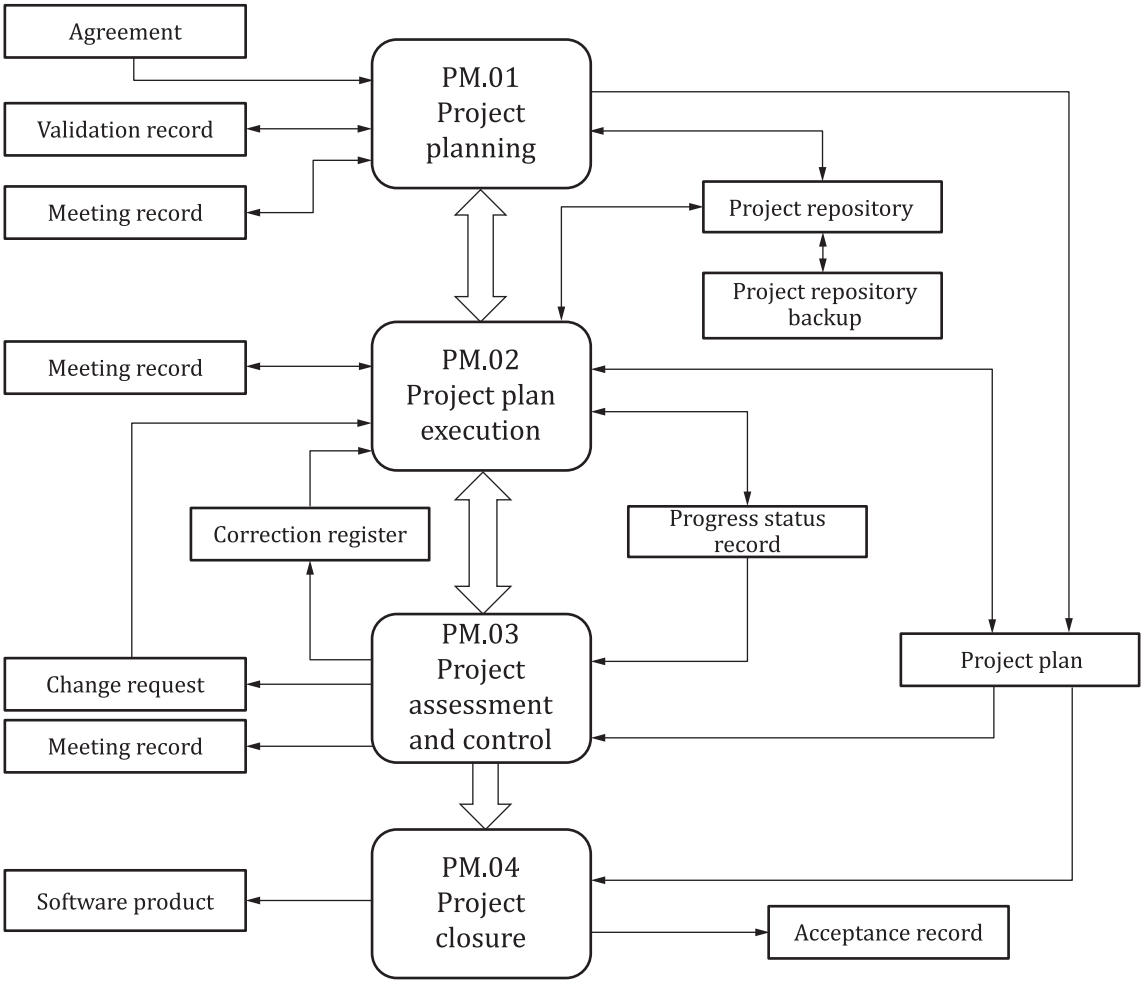

Figure 3 — Project management process

NOTE 1 The process illustrated in Figure 3 is intended to be used with any life cycle such as waterfall, iterative, incremental, evolutionary or agile.

NOTE 2 The agreement is provided by an internal or external customer.

6.4.2 PM activities

6.4.2.1 Overview

The project management process should have the following activities:

— PM.01 Project planning

— PM.02 Project plan execution

— PM.03 Project assessment and control

— PM.04 Project closure

6.4.2.2 PM.01 Project planning (contributes to PM.O1, PM.O5, PM.O6, PM.O7)

This activity documents the planning details needed to manage the project. The activity provides:

— reviewed agreement and the tasks needed to provide the work products of the agreement and to satisfy other customer requirements;

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— project life cycle, including task dependencies and duration;

— project quality assurance strategy through verification and validation of work products/deliverables, customer and work team reviews;

— work team and customer roles and responsibilities;

— project resources and training needs;

— estimates of effort, cost and schedule;

— identified project risks;

— project version control strategy;

— project repository to store, handle and deliver controlled work product and work product versions and baselined work products.

The task list for PM.01 project planning is given in Table 1.

Table 1 — PM.01 task list

Roles	Task list	Input work products	Output work products
PJM TL	PM.01.01 Review the agreement for the development cycle of the project (e.g. waterfall, iterative, incremental, evolutionary, agile). 1) The agreement is an entry condition to the use of this guideline as listed in Clause 6. 2) The agreement had been approved and baselined by the management of the VSE before the start of the project. 3) ISO/IEC 20246 defines different types of work product reviews.	Agreement [approved]	Project plan [initiated] — Development cycle
PJM CUS	PM.01.02 Define with the customer the delivery instructions. 1) The delivery instructions list all the work products (e.g. code, documentation) to be delivered to the customer as specified in the agreement.	Agreement [approved] Project plan [initiated]	Project plan [initiated] — Delivery instructions
PJM TL	PM.01.03 Identify the tasks to produce the work products to be delivered to the customer. 1) Tasks of the PM and SI processes, with verification, validation and reviews with customer and work team, are added to assure the quality of work products. 2) Tasks are identified according to the development cycle selected.	Agreement [approved] Project plan [initiated] — Delivery instructions	Project plan [initiated] — Tasks
PJM TL	PM.01.04 Establish the estimated duration to perform each task.	Project plan [initiated] — Tasks	Project plan [initiated] — Estimated duration

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Table 1 *(continued)*

Roles	Task list	Input work products	Output work products
PJM TL	PM.01.05 Identify and document the resources to perform the project in the project plan. 1) Resources include human, material, equipment and tools, standards. 2) Schedule and dates when resources will be needed are added to the project plan. 3) A work product is baselined when it should be approved and uploaded in the project repository.	Agreement [approved] Project plan [initiated]	Project plan [initiated] — Resources
PJM TL	PM.01.06 Establish the composition of work team. 1) Roles and responsibilities are assigned according to the resources available.	Project plan [initiated] — Resources	Project plan [initiated] — Composition of work team
PJM TL	PM.01.07 Create the schedule of the project tasks. 1) Estimated start and completion dates to each task are assigned. 2) The assigned resources, sequence and dependency of the tasks are considered.	Project plan [initiated] — Tasks — Estimated duration — Composition of work team	Project plan [initiated] — Schedule of the project tasks
PJM	PM.01.08 Calculate and document the project estimated effort and cost.	Project plan [initiated] — Schedule of the project tasks — Resources	Project plan [initiated] — Estimated effort and cost
PJM TL	PM.01.09 Identify and document the risks which can affect the project. 1) Risk is a combination of the effect, or impact, of uncertainty on project objectives. 2) An effect is a positive and/or negative deviation from the expected. 3) The management of deviations from the expected is performed to achieve the project and/or product objectives (e.g. financial, security).	Project plan [initiated]	Project plan [initiated] — Identification of project risks
PJM TL	PM.01.10 Document the version control strategy in the project plan. 1) Baselines selected for the project are described in the version control strategy.	Project plan [initiated]	Project plan [initiated] — Version control strategy

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Table 1 *(continued)*

Roles	Task list	Input work products	Output work products
PJM	PM.01.11 Generate the project plan. 1) All the elements previously documented are integrated to the project plan.	Project plan [initiated]	Project plan [initiated] — Tasks — Estimated duration — Resources — Composition of work team — Schedule of the project task — Estimated effort and cost — Identification of project risks — Version control strategy — Delivery instructions
PJM TL	PM.01.12 Add product description, scope, objectives and deliverables listed in the agreement to the project plan.	Agreement [approved] — Product description — Scope — Objectives — Deliverables Project plan [initiated]	Project plan [initiated] — Product description — Scope — Objectives — Deliverables
PJM TL	PM.01.13 Validate the project plan: — Make corrections until the document is approved by PJM. 1) All elements of the project plan are feasible and consistent. 2) The results of the validation are documented in a verification record.	Project plan [initiated]	Project plan [validated] Validation record [approved]
PJM CUS	PM.01.14 Obtain approval of the customer of the project plan. 1) The customer reviews and signs the project plan, making sure that the elements of the project plan match with the agreement.	Project plan [validated]	Project plan [approved] Meeting record [published]
PJM TL	PM.01.15 Establish the project repository using the version control strategy.	Project plan [approved] — Version control strategy	Project repository [established]

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Table 1 *(continued)*

Roles	Task list	Input work products	Output work products
PJM	PM.01.16 Add the agreement and the project plan to the project repository. 1) The approved agreement and the project plan are stored in the project repository as the baselined agreement and project plan. 2) Changes to the baselined agreement and to the project plan are done by approving change requests.	Project plan [approved] Agreement [approved]	Project repository [updated]

6.4.2.3 PM.02 Project plan execution (contributes to PM.O2, PM.O3, PM.O4, PM.O5, PM.O7)

This activity implements the documented plan on the project.

The activity provides:

— progress status record of the project updated;

— analysed and evaluated change requests to the plan impacting cost, schedule and technical requirements;

— approved changes to the plan;

— reviews and agreements with the work team (WT) and customer (CUS);

— back up of the project repository, and its recovery if necessary.

The task list for PM.02 project plan execution is given in Table 2.

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Table 2 — PM.02 task list

Roles	Task list	Input work products	Output work products
PJM TL WT	PM.02.01 Monitor the project plan execution. 1) Actual data are recorded in the progress status record. 2) Actual project record data to monitor includes: — Tasks — Results — Resources and effort — Cost — Elapsed time — Defects	Project plan [approved]	Progress status record [published]
PJM TL	PM.02.02 Analyse and evaluate change request for cost, schedule and technical impact. 1) Conditional task: Analyse and evaluate change request for cost, schedule and technical impact. 2) A change request may be initiated by the customer or internally by the PJM, TL or the WT. 3) A change request, which affects the agreement, should be negotiated by customer and PJM (see task PM.02.04).	Change request [initiated] Project plan [approved] Traceability record [initiated]	Change request [evaluated]
PJM CUS	PM.02.03 Obtain approval of change request: — If a change request is approved by customer or PJM, update the project plan if necessary. 1) Conditional task: Obtain approval of change request	Change request [evaluated]	Change request [approved or rejected]
PJM TL WT	PM.02.04 Conduct review meetings with the work team: — Track problems to closure. 1) Conditional task: Track problems to closure. 2) Meetings are conducted to identify problems, review risk status, record agreements. 3) If a problem should be detected, a correction register is initiated.	Project plan [approved] Progress status record [published]	Meeting record [published] Correction register [initiated]

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Table 2 *(continued)*

Roles	Task list	Input work products	Output work products
PJM CUS TL WT	PM.02.05 Conduct review meetings with the customer: — Initiate a change request if needed. — Record agreements between customer and PJM and tracked them to closure. — If a change request is initiated, update if necessary, the project plan according to new agreement between customer and PJM. 1) A change request which affects the customer, should be negotiated to reach acceptance of customer and PJM.	Project plan [approved] Progress status record [published] Meeting record [published]	Meeting record [published] Change request [approved] Project plan [updated]
TL	PM.02.06 Add project management artefacts to the project repository.	Project plan [approved] — Version control strategy	Project repository backup [established]
PJM TL	PM.02.07 Verify the project repository recovery using the project repository backup. 1) The verification is performed to check that the work products that should be backed up can be recovered.	Project repository backup [established]	Project repository [recovered]

6.4.2.4 PM.03 Project assessment and control (contributes to PM.02)

This activity evaluates the performance of the plan against documented commitments.

The activity provides:

— evaluation of actual plan performance and progress against targets;

— approval of customer of changes to the requirements or to the project plan;

— identified and evaluated significant cost, schedule and technical performance deviations and problems;

— review of project risks and identification of new risks;

— documented change requests, appropriate corrective action defined, and changes tracked to closure.

The task list for PM.03 Project assessment and control is given in Table 3.

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Table 3 — PM.03 task list

Roles	Task list	Input work products	Output work products
PJM TL WT	PM.03.01 Evaluate project progress with respect to the project plan, comparing: — Actual tasks against planned tasks — Actual results against established project objectives — Actual resource allocation against planned resources — Actual cost against budget estimates — Actual time against planned schedule — Actual risk against previously identified	Project plan [approved] Progress status record [published]	Progress status record [evaluated]
PJM TL WT	PM.03.02 Establish actions to correct deviations or problems and identified risks concerning the accomplishment of the project plan, as needed: — Document actions in the correction register. — Track actions to closure. 1) Conditional task: Track actions to closure.	Progress status record [evaluated]	Correction register [initiated]
PJM TL WT	PM.03.03 Identify changes to requirements or project plan: — Document actions in change request. — Track actions to closure. 1) Conditional task: Document actions in change request and track actions to closure. 2) To address major deviations, potential risks or problems concerning the accomplishment of the plan.	Progress status record [evaluated]	Change request [initiated]
CUS PJM	PM.03.04 Obtain approval from the customer about the changes to the requirements or to the project plan. 1) Conditional task: This task is not executed if there is no change to the requirements or to the project plan.	Progress status record [evaluated] Change request [initiated] Correction register [initiated] Agreement [approved]	Change request [approved] Meeting record [approved]

6.4.2.5 PM.04 Project closure (contributes to PM.02)

This activity provides the project's work products in accordance with the requirements of the agreement.

The activity provides:

— delivery of the work product as specified in the delivery instructions;

— support of customer work products acceptance in accordance with the delivery instructions;

— completion of the project and signature of the acceptance record;

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— updated project repository.

The task list for PM.04 Project closure is given in Table 4.

Table 4 — PM.04 task list

Roles	Task list	Input work products	Output work products
PJM CUS	PM.04.01. Obtain signature of customer of the acceptance record. 1) The work products, listed in the delivery instructions, should be assembled as the software product in activity SI.06. 2) The delivery instructions, signed by the customer and PJM, is used to conduct the acceptance of the work products by the customer. 3) The completion of the project that requires "signature of the acceptance record" cannot be applicable to mass-market customers. 4) The customer may be internal or external to the organization.	Project plan [approved] — Delivery instructions Software product [baselined]	Acceptance record [approved] Software product [delivered]
PJM	PM.04.02 Store the acceptance record in the project repository.	Acceptance record [approved]	Project repository [updated]

6.4.3 Incorporation to project repository

After the incorporation of the work products to project repository, a version control strategy should be applied to the project plan. The list of work products to be saved in the project repository are:

— project plan;

— change request;

— acceptance record;

— meeting record;

— correction register;

— progress status record;

— validation record.

7 Software implementation (SI) process

7.1 SI process purpose

The purpose of the software implementation process is the systematic performance of the analysis, design, construction, integration, testing activities and assembly of work products for a new or modified software product according to the specified requirements.

This document is intended to be used by the VSE to establish processes to implement any development approach or methodology including, for example, agile, evolutionary, incremental, test-driven development, based on the VSE or project needs.

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