
**Systems and software engineering —
Lifecycle profiles for Very Small
Entities (VSEs) —**

**Part 5-1-3:
Software engineering — Management
and engineering guide: Generic profile
group — Intermediate profile**

*Ingénierie des systèmes et du logiciel — Profils de cycle de vie pour
très petits organismes (TPO) —*

*Partie 5-1-3: Ingénierie du logiciel — Guide d'ingénierie et de gestion:
Groupe de profils génériques — Profil intermédiaire*





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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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

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

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

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

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

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

Introduction

Very Small Entities (VSEs) around the world are creating valuable products and services. For the purpose of the ISO/IEC 29110 series, a Very Small Entity (VSE) is an enterprise, an organization, a department or a project having up to 25 people. Since many VSEs develop and/or maintain system and software components used in systems, either as independent products or incorporated in larger systems, recognition of VSEs as suppliers of high quality products is required.

According to the Organization for Economic Co-operation and Development (OECD) SME and Entrepreneurship Outlook report (2005), Small and Medium Enterprises (SMEs) constitute the dominant form of business organization in all countries world-wide, accounting for over 95 % and up to 99 % of the business population depending on country. The challenge facing governments and economies 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 conformance 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 guides has been developed based on a set of VSE characteristics. The guides 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; processes, activities, tasks, and outcomes of ISO/IEC/IEEE 15288 for systems; 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 of standards and technical reports can be applied at any phase of system or software development within a life cycle. This series of standards and technical reports 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 ISO/IEC 29110.

The ISO/IEC 29110 series is intended to be used with any lifecycle 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. See [Table 1](#).

Table 1 — ISO/IEC 29110 target audience

ISO/IEC 29110	Title	Target audience
ISO/IEC 29110-1	Overview	VSEs and their customers, assessors, standards producers, tool vendors and methodology vendors.
ISO/IEC 29110-2	Framework for profile preparation	Profile producers, tool vendors and methodology vendors. Not intended for VSEs.
ISO/IEC 29110-3	Certification and assessment guidance	VSEs and their customers, assessors, accreditation bodies.
ISO/IEC 29110-4	Profile specifications	VSEs, customers, standards producers, tool vendors and methodology vendors.
ISO/IEC TR 29110-5	Management, engineering and service delivery guides	VSEs and their customers.
ISO/IEC 29110-6	Management and engineering guides not tied to a specific profile	VSEs and their customers.

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

ISO/IEC 29110-1 defines the terms common to the ISO/IEC 29110 series. It introduces processes, lifecycle and standardization concepts, the taxonomy (catalogue) of ISO/IEC 29110 profiles and the ISO/IEC 29110 series. It also introduces the characteristics and needs of a VSE, and clarifies the rationale for specific profiles, documents, standards and guides.

ISO/IEC 29110-2-1 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, conformance, 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 29110-3 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, e.g. 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 29110-4-m provides the specification for all profiles in one profile group that are based on subsets of appropriate standards elements.

ISO/IEC TR 29110-5-m provides management, engineering and service delivery guides for the profiles in a profile group.

The future ISO/IEC TR 29110-6-x provides management and engineering guides not tied to a specific profile.

This document provides a management and engineering guide for the software intermediate profile of the generic profile group. This guide describes the management of more than one project in parallel with more than one work team.

[Figure 1](#) describes the ISO/IEC 29110 International Standards (IS) and Technical Reports (TR) and positions the parts within the framework of reference. Overview, assessment guide, management and engineering guide are available from ISO as freely available. Technical Reports (TR). The Framework document, profile specifications and certification schemes are published as International Standards (IS).

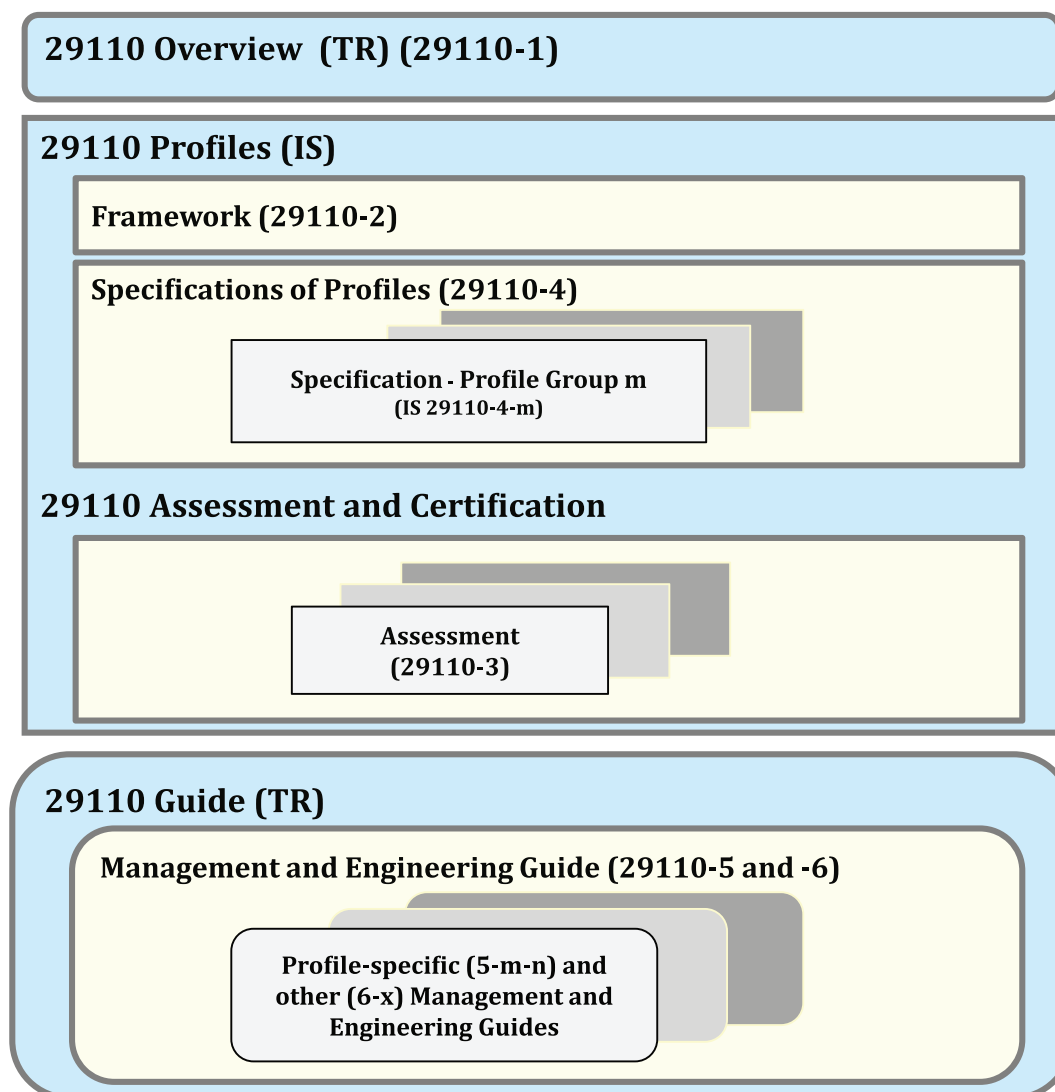


Figure 1 — ISO/IEC 29110 series

Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) —

Part 5-1-3:

Software engineering — Management and engineering guide: Generic profile group — Intermediate profile

1 Scope

This document provides management and engineering guide to the intermediate profile described in terms of business management, project management, software implementation and acquisition processes.

This document is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects having up to 25 people. The life cycle processes described in the ISO/IEC 29110 series are not intended to preclude or discourage their use by organizations bigger than VSEs.

ISO/IEC 29110-4-1 identifies the requirements applicable to the tasks and work products described in this document.

This document has been developed using the management and engineering guide of the Basic profile and by modifying and adding elements (e.g. process, task, work product, role) for VSEs involved in the development of more than one project in parallel with more than one work team.

This document applies for VSEs developing non-critical software.

Using this document, VSEs can obtain the following benefits:

- the management and monitoring of more than one project in parallel with more than one work team;
- reuse existing software components (e.g. code and document) in new projects;
- continuously measure projects and improve processes.

Once the software, developed by a VSE, has been accepted by their customers, the VSE that wants to provide after delivery services can refer to ISO/IEC TR 29110-5-3.¹⁾

This document is targeted to VSEs which are familiar with ISO/IEC TR 29110-5-1-2 for their software development projects and are involved in the development of more than one project in parallel with more than one work team.

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

2 Normative references

There are no normative references in this document.

1) To be published.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 29110-2-1 and the following apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 agreement

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

EXAMPLE Contract, memorandum of agreement.

[SOURCE: ISO/IEC/IEEE 15288:2015, 4.1.4]

3.2 acquirer

stakeholder that acquires or procures a product or service from a supplier

Note 1 to entry: Other terms commonly used for an acquirer are buyer, customer, owner, purchaser or internal/organizational sponsor.

[SOURCE: ISO/IEC/IEEE 15288:2015, 4.1.1]

3.3 conditional process

process that may be mandatory under some specified conditions, may be optional under other specified conditions, and may be out of scope or not applicable under other specified conditions

Note 1 to entry: These are to be observed if the specified conditions apply.

3.4 enabling system

system that supports a system-of-interest during its life cycle stages but does not necessarily contribute directly to its function during operation

EXAMPLE A configuration management system used to control software elements during software development.

Note 1 to entry: Each enabling system has a life cycle of its own. This document is applicable to each enabling system when, in its own right, it is treated as a system-of-interest.

[SOURCE: ISO/IEC/IEEE 15288:2015, 4.1.18]

3.5 security and intellectual property scheme

established and operated management system in the entity to ensure the security and intellectual property of its information items

3.6 system-of-interest

system whose life cycle is under consideration in the context of this document

[SOURCE: ISO/IEC/IEEE 15288:2015, 4.1.48]

4 Conventions and abbreviated terms

4.1 Naming, diagramming and definition conventions

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

- **Name:** process identifier, followed by its abbreviation in parentheses “()”.
- **Purpose:** general goals and results expected of the effective implementation of the process. The implementation of the process should provide tangible benefits to the stakeholders. The purpose is identified by the abbreviation of the process name.
- **Objectives:** specific goals to ensure the accomplishment of the process purpose. The objectives are identified by the abbreviation of the process name, followed by the letter “O” and a consecutive number; for example, RM.O1, PM.O2, etc. Each objective is followed by the square box which includes a list of the chosen processes for the Intermediate profile mainly from ISO/IEC/IEEE 12207 and its outcomes related to the objective. References to standards listed in Annex B such as ISO/IEC/IEEE 15288, ISO/IEC/IEEE 12207 and ISO 9001 are informative and do not imply partial conformance to the standards.
- **Input Work products:** work products required to perform the process and its corresponding source, which can be another process or an external entity to the project, such as the Customer. Identified by the abbreviation of the process name and showed as two column table of work product names and sources.
- **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 or Organizational Management. Identified by the abbreviation of the process name and showed as two column table of work product names and destinations.
- **Internal Work products:** work products generated and consumed by the process itself. An internal Work product is not reviewed or approved by the Customer. Identified by the abbreviation of the process name and showed as one column table of the work product names.

All work products’ names are printed in italics and initiate with capital letters. Some work products have one or more statuses attached to the work product name surrounded by square brackets “[]” and separated by “,”. The work product status may change during the process execution. See [Clause 11](#) for the alphabetical list of the work products, its descriptions, possible statuses 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 10](#) for the alphabetical list of the roles, its abbreviations and required 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 lifecycle.
- **Activity:** a set of cohesive tasks. Task is a requirement, recommendation, or permissible action, intended to contribute to the achievement of one or more objectives of a process. 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 objectives surrounded by parentheses “()”. For example, PM.1 Project Planning (PM.O1,

PM.05, PM.06, PM.07) means that the activity PM.1 Project Planning contributes to the achievement of the listed objectives: PM.01, PM.05, PM.06 and PM.07. The activity description begins with the task summary and is followed by the task descriptions table. The task description does not impose any technique or method to perform it. The selection of the techniques or methods is left to the VSE or project team.

Tasks description table contain four columns corresponding to:

- Role: the abbreviation of roles 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, and so on.
- Input Work products: work products needed to execute the task.
- Output Work products: work products created or modified by the execution of the task.
- **Incorporation to *Organizational Repository***: list of work products to be saved in *Organizational Repository*.

NOTE Tables used in process description are for presentation purpose only.

4.2 Notation used to document new processes, additions and modifications to the Basic profile processes

The Intermediate profile is the third profile of a four-profile roadmap (i.e. Entry, Basic, Intermediate and Advanced). The Intermediate profile has been designed to build upon the processes of the Basic profiles such that, when moving from the Basic profile to the Intermediate profile, a VSE has to add to its existing Basic profile processes the new processes (e.g. objectives, activities, tasks, roles and work products) described in this document.

Since, in the Intermediate profile, there are additions and modifications to the Basic profile processes, this document has been written such that it will be easy for a VSE to identify these additions and modifications. The Project Management (PM) and Software Implementation (SI) processes, of the Basic profile, have been complemented with additional objectives, tasks and work products in a context where a VSE is conducting more than one project in parallel with more than one work team. The following notation is used to highlight the addition/deletion/modification to the Basic profile:

- added text:
 - is underlined;
 - except for the processes of the Intermediate profile;
- deleted/modified text is strike out as follow: the text is stroked out;
- since, in the Basic profile, the abbreviation for the Project Management (PM) process was the same for Project Manager, in the Intermediate profile, the abbreviation for Project Manager has been changed from PM to PJM.

The Intermediate profile has two new processes that are not in the Basic profile: the Business Management (BM) process and a conditional process, the Acquisition Management (AM) process. The execution of the AM process is required only if a product/service needs to be obtained from an external Supplier by a VSE. To facilitate the identification of additional abbreviations, roles and work products of the BM and AM processes of the Intermediate profile, these items are underlined. To facilitate reading, the BM and AM processes have not been underlined.

The Intermediate profile terminology has been aligned with ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15289. The following terms of old standards have been replaced with the new terms:

- “Agreement” and “Contract” have been replaced with “Agreement”;

- work products are identified with a unique code WP.XX where XX is a sequential number in [Clause 11](#). These codes have not been used in the descriptions of activities and tasks in order to facilitate readability.

4.3 Abbreviated terms

AM	Acquisition Management
BM	Business Management
OLR	Organizational Lessons Learned Record
OR	Organizational Repository
PJM	Project Manager
PLR	Project Lessons Learned Record
PO	Purchase Order
RFP	Request for Proposal
RR	Resource Request
SUP	Supplier
VSE	Very Small Entity

5 Overview

The Intermediate Profile Management and Engineering Guide applies to a Very Small Entity (VSE) (enterprise, organization, department or project having up to 25 people) which are familiar with or have implemented ISO/IEC TR 29110-5-1-2 for their software development projects.

This document provides Organizational Management, Project Management, Software Implementation and Acquisition processes which integrate practices mainly based on the selection of ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15289 standards elements. [Annex A](#) provides information about Deployment Packages that facilitate the implementation of these processes.

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

Using this document, VSEs can obtain the following benefits:

- the management and monitoring of more than one project in parallel with more than one work team;
- reuse existing software components (e.g. code and document) in new projects;
- continuously measure projects and improve processes.

To use this document, a VSE needs to be familiar with or have implemented ISO/IEC TR 29110-5-1-2 for their software development projects.

The purpose of the Business Management (BM) process is to identify opportunities, evaluate all in-place *Agreements* or requests from customers for fit with organizational goals and resources, obtain and provide the VSE with the necessary resources to perform all projects, monitor and evaluate all projects, conduct lessons learned to improve the VSE and protect its intellectual property and the security of its assets and information items. The purpose of the Project Management (PM) process is to establish and carry out in a systematic way the *Tasks* of the software implementation process, which

allows complying with the project's *Objectives* in the expected quality, time and costs. The purpose of the Software Implementation (SI) process is the systematic performance of the analysis, design, construction, integration and test activities for new or modified software work products according to the specified requirements. The purpose of the Acquisition Management (AM) process is to obtain products and/or services required by the VSE. The execution of the AM process is only required if a product/service needs to be obtained from a supplier by the VSE, i.e. a conditional process.

The processes are interrelated (see [Figure 2](#)). The arrow connecting the AM process to the other processes is dashed to indicate that this process is conditional.

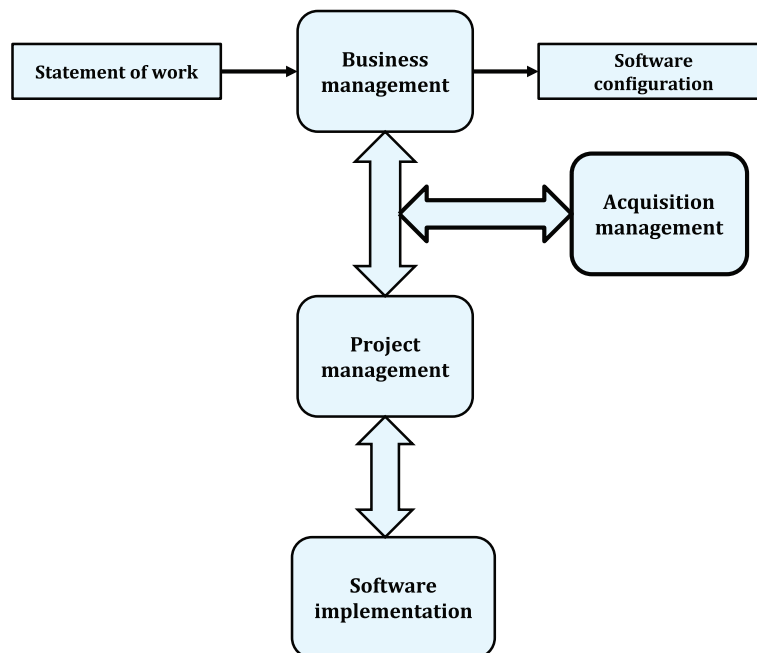


Figure 2 — Intermediate profile processes

6 Business Management (BM) process

6.1 BM purpose

The purpose of the Business Management process is to identify opportunities, evaluate all in-place *Agreements* or requests from customers for fit with organizational objectives and resources, obtain and provide the VSE with the necessary resources to perform all projects, monitor and evaluate all projects, conduct lessons learned to improve the VSE and protect its intellectual property and the security of its assets and information items.

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

6.2 BM objectives

- BM.O1. Initiate and sustain necessary, sufficient and suitable projects in order to meet the objectives of the VSE.
- BM.O2. Provide to the customer the work product that meets the agreed requirements.
- BM.O3. Provide the VSE with necessary human resources and to maintain their competencies, consistent with business needs.

- BM.04. Provide an enabling infrastructure and services to all projects to support the VSE and the project objectives throughout the life cycle.
- BM.05. Collect and analyse measures of all projects and to improve or maintain the management and engineering processes of the VSE.
- BM.06. Protect the intellectual property and the security of the assets and information items of the VSE.
- BM.07. Establish an Organizational Repository, integrate and store the projects' relevant documentation. The Organizational Repository has to protect the security of its assets and information items. BM input work products.

6.3 BM input work products

[Table 2](#) provides a list of input work products.

Table 2 — BM input work products

Name	Source
<i>Agreement</i>	Customer
<i>Request for Proposal</i>	Customer
<i>Change Request</i>	Customer Project Manager
<i>Resource Request</i>	Project Manager
<i>Purchase Order</i>	Project Manager
<i>Human Resource Record</i>	Project Manager

6.4 BM output work products

[Table 3](#) provides a list of output work products.

Table 3 — BM output work products

Name	Destination
<i>Contract</i>	Business Management
<i>Project Plan</i>	Business Management
<i>Proposal</i>	Customer
<i>Software Configuration</i>	Customer

6.5 BM internal work products

[Table 4](#) provides a list of internal work products.

Table 4 — BM internal work products

Name
<i>Business Objectives</i>
<i>Project Opportunities</i>
<i>Security and Intellectual Property Protection Plan</i>
<i>Resource Request</i>
<i>Organizational Lessons Learned Record</i>
<i>Process Improvement Record</i>

6.6 BM roles involved

[Table 5](#) provides a list of roles involved in the BM process.

Table 5 — BM roles involved

Role	Abbreviation
Business Management	BM
Project Manager	PJM
Customer	CUS

6.7 BM process description

6.7.1 BM diagram

[Figure 3](#) shows the flow of information between the Business Management Process activities including the most relevant work products and their relationships.

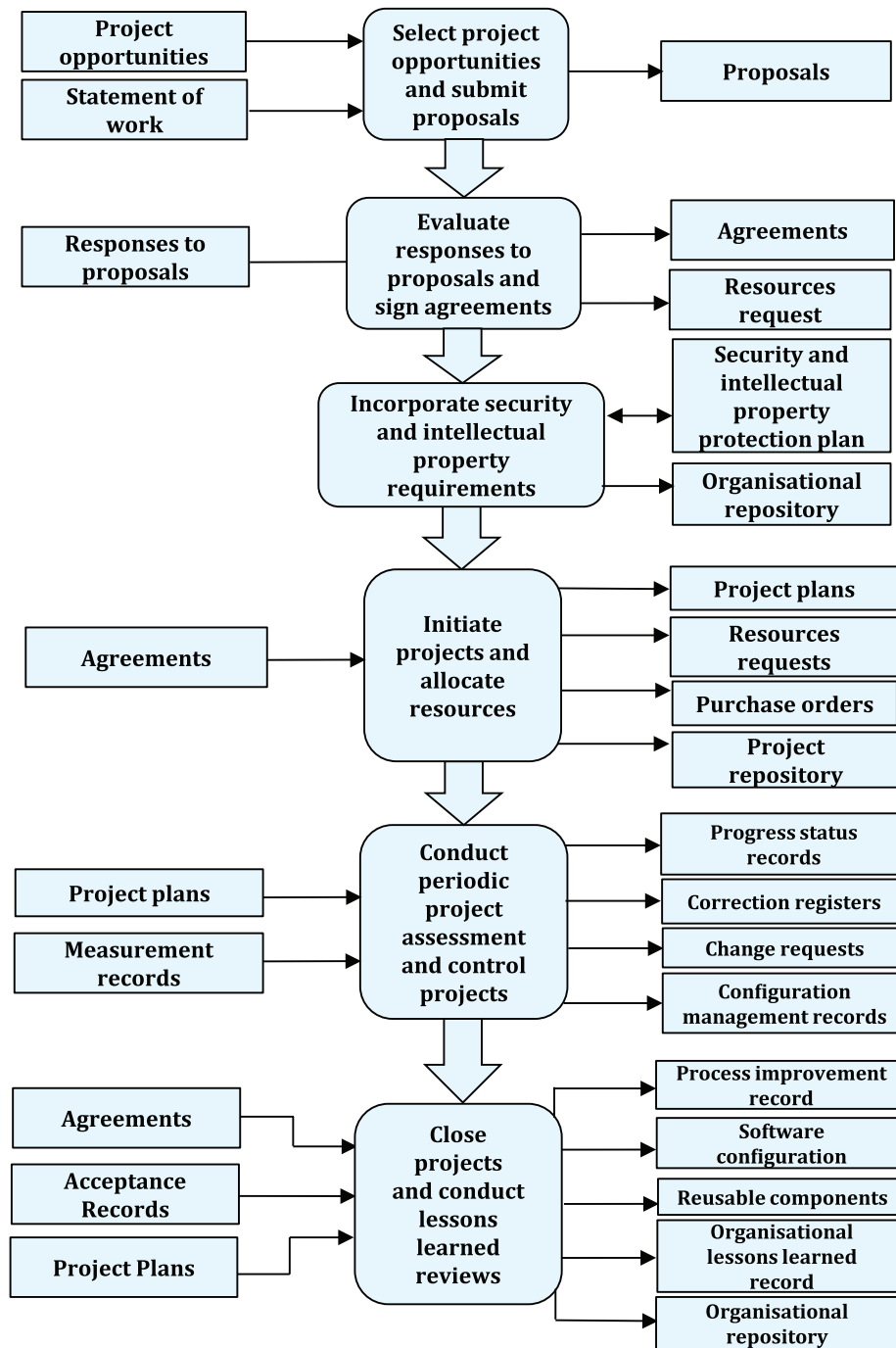


Figure 3 — Business Management Process diagram

6.7.2 BM activities

The Business Management Process has the following activities:

- BM.01. Select Project Opportunities and Submit Proposals;
- BM.02. Evaluate Responses to Proposals and Sign Agreements;
- BM.03. Incorporate Security and Intellectual Property Requirements;
- BM.04. Initiate Projects and Allocate Resources;

- BM.05. Conduct Periodic Project Assessment and Control Projects;
- BM.06. Close Projects and Conduct Lessons Learned Reviews.

6.7.2.1 BM.01 Select Project Opportunities and Submit Proposals (BM.01)

The Select Project Opportunities and Submit Proposals activity describes the tasks and information items needed to document project opportunities and proposals sent to potential customers. BM.01 task list is given in [Table 6](#).

The activity provides

- project opportunities, and
- proposals submitted to potential customers.

Table 6 — BM.01 task list

Role	Task list	Input Work products	Output Work products
BM PJMs	BM.01.01 Document <i>Project Opportunities</i> . Agreements (e.g. contracts) and Statement of Work from past projects could be used to document the <i>Project Opportunities</i> .	<i>Statements of Work (from past projects)</i> <i>Agreements (from past projects)</i>	<i>Project Opportunities [initiated]</i>
BM PJMs	BM.01.02 Select Project Opportunities	<i>Project Opportunities [updated]</i>	<i>Project Opportunities [approved]</i>
BM PJMs	BM.01.03 Prepare and approve <i>Proposals</i> <i>Proposals could be developed using the Proposal template in the Work product description section of this document.</i>	<i>Project Opportunities [approved]</i> <i>Proposal template</i>	<i>Proposal [approved]</i>
BM PJMs	BM.01.04 Submit <i>Proposals</i> to potential Customers	<i>Proposal [approved]</i>	<i>Proposal [submitted]</i>

6.7.2.2 BM.02. Evaluate Responses to Proposals and Sign Agreements (BM.01)

The Evaluate Responses to Proposals and Sign Agreements activity involves the evaluation of the responses to proposals received from customers, the negotiation and signature of agreements with customers. Once an agreement is signed, a project manager is assigned to the project and the project manager documents its project plan. BM.02 task list is given in [Table 7](#).

The activity provides

- request for proposal(s), and
- agreements.

Table 7 — BM.02 task list

Role	Task list	Input Work products	Output Work products
BM	BM.02.01 Evaluate all responses to Proposals from potential Customers and Prepare <i>Agreements</i> for the accepted <i>Proposals</i> .	<i>Proposals [submitted]</i>	<i>Agreement [initiated]</i>
BM CUS	BM.02.02 Negotiate, finalize and sign all <i>Agreements</i> with Customers	<i>Agreement [initiated]</i>	<i>Agreement [signed]</i>
BM PJMs	BM.02.03 Approve Projects and assign Project Managers to develop <i>Project Plans and Resources Requests</i> . Update <i>Project Opportunities</i> (if applicable). Project Plans are developed according to the Planning activity of the PM Process.	<i>Agreement [approved]</i>	<i>Projects Managers assigned</i> <i>Project Opportunities [updated]</i>

6.7.2.3 BM.03 Incorporate Security and Intellectual Property Requirements (BMS.06)

The Incorporate Security and Intellectual Property Requirements activity documents the tasks and information items needed to develop and implement security of its assets and information items and the protection of the intellectual property of the VSE. BM.03 task list is given in [Table 8](#).

The activity provides

- Security and Intellectual Property Protection Plan, and
- organizational repository to store assets and information items securely.

Table 8 — BM.03 task list

Role	Task list	Input Work products	Output Work products
BM	BM.03.01 Develop a Security and Intellectual Property Protection Plan using the template provided in the work product description table	<i>Security and Intellectual Property Protection Plan Template</i>	<i>Security and Intellectual Property Protection Plan [initiated]</i>
BM PJMs	BM.03.02 Review and approve the Security and Intellectual Property Protection Plan	<i>Security and Intellectual Property Protection Plan [initiated]</i>	<i>Security and Intellectual Property Protection Plan [approved]</i>
BM PJMs	BM.03.03 Implement the Security and Intellectual Property Protection Plan	<i>Security and Intellectual Property Protection Plan [approved]</i>	<i>Security and Intellectual Property Protection Plan [implemented]</i>
BM	BM.03.04 Establish and maintain an <i>Organizational Repository</i> . The repository has to protect the security and intellectual property of the VSE and its customers	<i>Security and Intellectual Property Protection Plan [approved]</i>	<i>Organizational Repository [established]</i>

6.7.2.4 BM.04. Initiate Projects and Allocate Resources (BM.03, BM.03, BM.07)

The Initiate Projects and Allocate Resources activity is initiated with the approval of Project Plans and the Resources Requests. Human resources are allocated to Projects. If products or services have to be acquired, Purchase Orders are approved. A project repository is established. BM.04 task list is given in [Table 9](#).

The activity provides

- Approved Project Plans,

- Approved Resources Requests,
- Approved Purchased Orders, and
- Human Resource Record.

Table 9 — BM.04 task list

Role	Task List	Input Work products	Output Work products
BM PJMs	BM.04.01 Review and Approve all <i>Project Plans</i> and <i>Resource Requests</i> . Assign required Human resources and other resources to Project (e.g. work team, computer facilities).	<i>Agreements [approved]</i> <i>Project Plans [initiated]</i> <i>Resources Requests [initiated]</i> <i>Human Resource Record</i>	<i>Project Plans [approved]</i> <i>Resources Requests [approved]</i>
BM PJMs	BM.04.02 Obtain resources and train Project team members if needed.	<i>Resource Requests [approved]</i> <i>Human Resource Record</i>	<i>Resources obtained and trained</i> <i>Human Resource Record</i>
BM PJMs	BM.04.03 Decide if products or services have to be acquired from <i>Suppliers</i> and list the <i>products</i> or <i>services</i> to be acquired. NOTE If a product (e.g. software component) or a service has to be acquired from supplier(s), use the Acquisition Management Process of this document.	<i>Project Plans [approved]</i>	<i>List of Products or Services to be acquired</i>
BM PJMs	BM.04.04 Approve all <i>Purchase Orders</i> to obtain products or services from <i>Suppliers</i> . Purchase Orders are approved by the Project Plan Execution activity of the PM process.	<i>List of Products or Services to be acquired</i> <i>Purchase Orders [initiated]</i>	<i>Purchase Orders [approved]</i>
PJMs	BM.04.05 Establish and maintain a Project <i>Repository</i> .	<i>Security and Intellectual Property Protection Plan [approved]</i>	<i>Project Repository [established]</i>

6.7.2.5 BM.05. Conduct periodic Project Assessment and Control Projects (BM.02, BM.06)

The Conduct periodic Project Assessment and Control Projects activity evaluates the performance of all the plans against documented commitments. The information items needed to perform this activity are the outputs of the Project Assessment and Control activity of the PM process. BM.05 task list is given in [Table 10](#).

The activity provides

- Progress Status Record,
- Correction Register, and
- Change Request.

Table 10 — BM.05 task list

Role	Task list	Input Work products	Output Work products
BM PJMs	BM.05.01 Evaluate all projects progress with respect to the <i>Project Plans</i> , comparing: <ul style="list-style-type: none"> — actual <i>Tasks</i> against planned <i>Tasks</i>; — actual results against established project <i>Objectives</i>; — actual resource allocation against planned <i>Resources</i>; — actual cost against budget estimates; — actual time against planned schedule; — actual risk against previously identified. 	<i>Project Plans [approved]</i> <i>Progress Status Records</i> <i>Measurement Records</i>	<i>Progress Status Records [evaluated]</i>
BM PJMs	BM.05.02 Establish actions to correct deviations or problems and identified risks. Concerning the accomplishment of the plan, as needed, document them in <i>Correction Register</i> and track them to closure.	<i>Progress Status Records [evaluated]</i>	<i>Correction Registers</i>
BM PJMs	BM.05.03 Identify changes to requirements and/or <i>Project Plans</i> . To address major deviations, potential risks or problems concerning the accomplishment of the plan, document them in <i>Change Requests</i> and track them to closure.	<i>Progress Status Records [evaluated]</i>	<i>Change Requests [initiated]</i>
BM	BM.05.04 Record and report the status of the items and modifications.	<i>Configuration Management strategy</i> <i>Configuration Management Records</i>	<i>Configuration Management Records [updated]</i>

6.7.2.6 BM.06. Close Projects and Conduct Lessons Learned Reviews (BM.01, BM.05)

The Close Project and Conduct Lessons Learned Reviews activity formalizes, at the organizational level, the project closure activity of the PM process, by delivering the products to Customers. Organizational Lessons Learned reviews are performed using the output of the Project Closure activity of the PM process. Process Improvement opportunities are document and implemented and reusable components are identified and stored in the Organizational Repository. BM.06 task list is given in [Table 11](#).

The activity provides:

- Acceptance Record;
- Delivery Instructions signed by Customer;
- Software Configuration;
- Organizational Lessons learned;
- Process Improvement Record;
- Reusable Components;
- Updated Organizational Repository.

Table 11 — BM.06 task list

Role	Task list	Input Work products	Output Work products
BM PJMs CUS	BM.06.01 Formalize the completion of the projects according to the <i>Delivery Instructions</i> . As established in the <i>Project Plans</i> , providing acceptance support and getting the <i>Acceptance Record</i> signed from the Customers.	<i>Agreements [approved]</i> <i>Acceptance Records [initiated]</i> <i>Delivery Instructions [signed by Customer]</i> <i>Software Configuration [delivered internally]</i>	<i>Acceptance Records [signed]</i> <i>Delivery Instructions [signed by Customer]</i> <i>Software Configuration [accepted]</i>
BM PJMs	BM.06.02 Conduct a lessons learned review of all projects. Analyse lessons learned to identify improvements to processes, document and prioritise them in the <i>Improvement Record</i> . Implement selected improvements.	<i>Agreements [approved]</i> <i>Project Plans</i> <i>Meeting Records</i> <i>Project Lessons Learned Record</i> <i>Measurement Records</i>	<i>Organizational Lessons Learned Record</i> <i>Process Improvement Record</i>
BM PJM	BM.06.03 Identify Reusable Components from Project Repositories and store them in Organizational Repository.	<i>Software Configuration</i> <i>Project Repositories</i>	<i>Organizational Repository [updated]</i> — <i>Reusable Components</i>
BM PJM	BM.06.04 Update <i>Organizational Repository</i> .	<i>Software Configuration [accepted]</i> <i>Project Repositories</i>	<i>Organizational Repository [updated]</i>

6.7.3 BM incorporation to the Organizational Repository

The list of work products to be saved in *Organizational Repository* is given in [Table 12](#).

Table 12 — BM repository work products

Work product
<i>Organizational Objectives</i>
<i>Project Opportunities</i>
<i>Proposal</i>
<i>Project Plan</i>
<i>Agreement</i>
<i>Acceptance Record</i>
<i>Security and Intellectual Property Protection Plan</i>
<i>Organizational Lessons Learned Record</i>
<i>Process Improvement Record</i>
<i>Meeting Record</i>
<i>Purchase Order</i>
<i>Reusable Components</i>
<i>Resource Request</i>
<i>Human Resource record</i>

7 Project Management (PM) process

7.1 PM purpose

The purpose of the Project Management process is to establish and carry out in a systematic way the *Tasks* of the software implementation project, which allows complying with the project's *Objectives* in the expected quality, time and costs.

The PM process of the Basic profile has been complemented with additional objectives, tasks and work products in a context where a VSE is conducting more than one project with more than one work team. In addition, new tasks have been added to the PM process of the Basic profile to improve the management of projects.

The following notation is used to highlight the addition/deletion/modification to the Basic profile:

- added text is underlined;
- deleted/modified text is strike out as follow: ~~the text is stroked out~~;
- the abbreviation for Project Manager has been changed from PM to PJM.

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, etc. based on the VSE organization or project needs.

7.2 PM objectives

- PM.01. 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.02. Progress of the project is monitored against the *Project Plan* and recorded in the *Progress Status Record*. 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*. The Software is disposed according to the Agreement.
- PM.03. The *Change Requests* are addressed through their reception and analysis. Changes to software requirements are evaluated for cost, schedule and technical impact.
- PM.04. Review meetings with the Work Team and the Customer are held. Reviews of work products of activities are conducted. Agreements are registered and tracked.
- PM.05. *Risks* are identified as they develop and during the progress of the project.
- PM.06. A software ~~Version-Control~~ *Configuration Management Strategy* is developed. Items of *Software Configuration* are identified, defined and baselined. Modifications and releases of the items are controlled and made available to the Customer and Work Team. The status of the items and modifications are recorded and reported; the completeness and consistency of the items is ensured; the storage, handling and delivery of the items are controlled.

7.3 PM input work products

[Table 13](#) provides a list of input work products.

Table 13 — PM input work products

Name	Source
<i>Agreement</i>	Customer
<i>Software Configuration</i>	Software Implementation
<i>Change Request</i>	Customer
	Software Implementation

7.4 PM output work products

[Table 14](#) provides a list of output work products.

Table 14 — PM output work products

Name	Destination
<i>Project Plan</i>	Software Implementation
<i>Acceptance Record</i>	Organizational Management
<i>Measurement Record</i>	Organizational Management
<i>Project Repository</i>	Software Implementation
<i>Meeting Record</i>	Customer
<i>Software Configuration</i>	Customer

7.5 PM internal work products

[Table 15](#) provides a list of internal work products.

Table 15 — PM internal work products

Name
<i>Change Request</i>
<i>Correction Register</i>
<i>Meeting Record</i>
<i>Project Lessons Learned Record</i>
<i>Measurement Record</i>
<i>Verification Results</i>
<i>Progress Status Record</i>
<i>Project Repository Backup</i>

7.6 PM roles involved

[Table 16](#) provides a list of roles involved in the PM process.

Table 16 — PM roles involved

Role	Abbreviation
Customer	CUS
Project Manager	<u>PM P/M</u>
Technical Leader	TL
Work Team	WT

7.7 PM process description

7.7.1 PM diagram

Figure 4 shows the flow of information between the Project Management Process activities including the most relevant work products and their relationship.

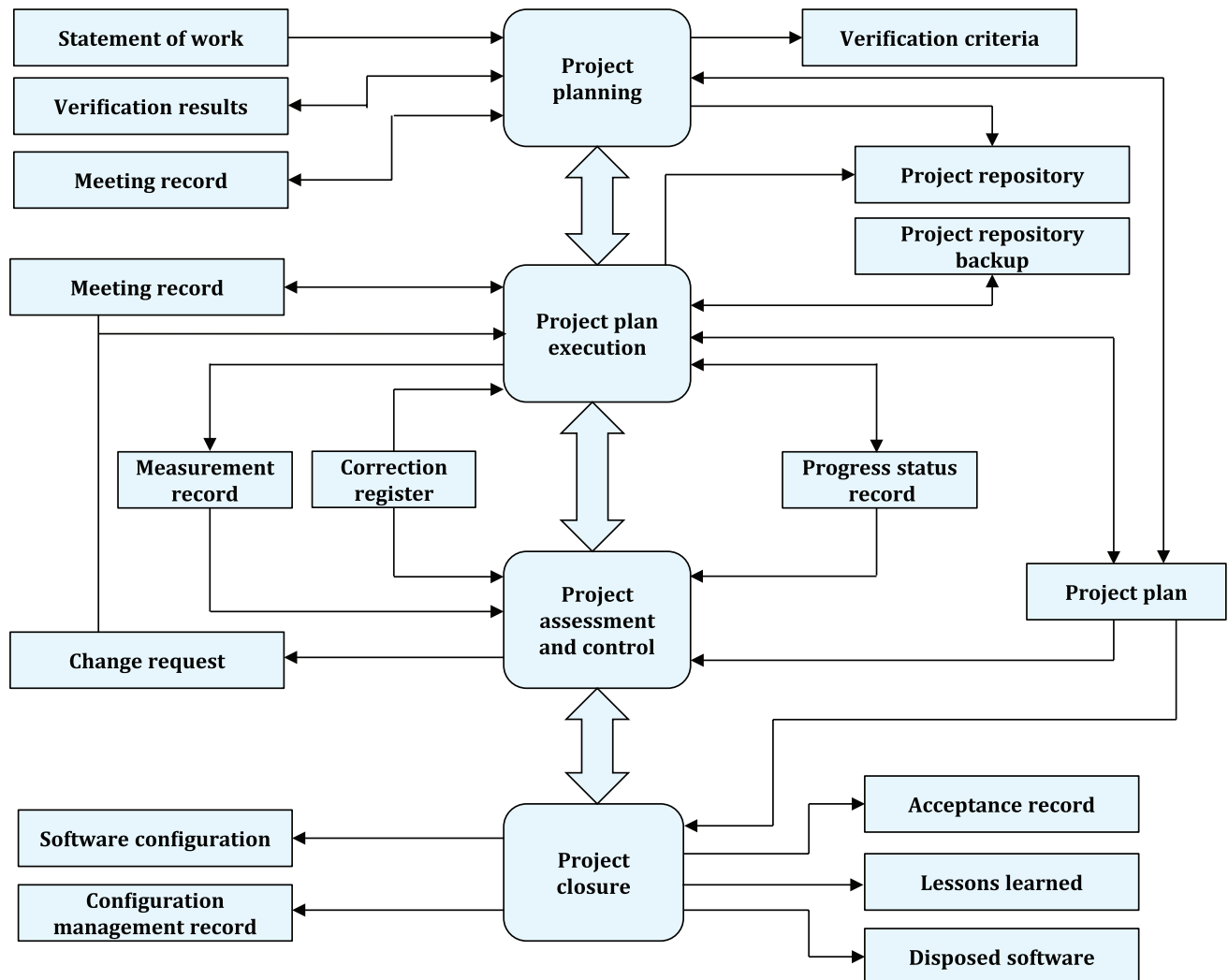


Figure 4 — Project Management Process diagram

7.7.2 PM activities

7.7.2.1 General

The Project Management Process has the following activities:

- PM.01 Project Planning;
- PM.02 Project Plan Execution;
- PM.03 Project Assessment and Control;
- PM.04 Project Closure.

7.7.2.2 PM.1 Project Planning (PM.01, PM.05, PM.06, PM.07)

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

- Reviewed *Agreement* and the *Tasks* needed to provide the ~~contract~~ *Agreement Deliverables* and to satisfy Customer requirements.
- Project lifecycle, 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 and baseline strategy.
- *Project Repository* to store, handle and deliver controlled work product and document versions and baselines.

The task list for PM.01 project planning is given in [Table 17](#).

Table 17 — PM.01 task list

Role	Task list	Input Work products	Output Work products
PJM TL	PM.01.01 Review the <i>Agreement</i>	<i>Agreement</i>	<i>Agreement [reviewed]</i>
PJM CUS	PM.01.02 Define with the Customer the <i>Delivery Instructions</i> of each one of the <i>Deliverables</i> , <u>the standards and format</u> specified in the <i>Agreement</i> .	<i>Agreement [reviewed]</i>	<i>Project Plan</i> — <i>Delivery Instructions</i>
PJM CUS	PM.01.03 Define a <i>Software Disposal Approach</i> * (Optional)	<i>Agreement [reviewed]</i>	<i>Project Plan</i> — <i>Software Disposal Approach</i>
PJM TL	PM.01.03 Identify the specific <i>Tasks</i> to be performed in order to produce the <i>Deliverables</i> and their <i>Software Components</i> identified in the <i>Agreement</i> . Include <i>Tasks</i> in the SI process along with verification, validation and reviews with Customer and Work Team <i>Tasks</i> to assure the quality of work products. <u>Determine the type of review and the effort required which will be conducted for each type of work products developed (e.g. desk-check, walk-through, inspection).</u> <u>Criteria for verification of all required software work products is identified.</u> Identify the <i>Tasks</i> to perform the <i>Delivery Instructions</i> . Document the <i>Tasks</i> . <u>Include task to perform a lessons learned review (i.e. post-mortem) at the end of the project.</u>	<i>Agreement [reviewed]</i>	<i>Project Plan</i> — <i>Tasks</i> — <i>Verification criteria</i>
PJM TL	PM.01.04 Establish the <i>Estimated Duration</i> to perform each task.	<i>Project Plan</i> — <i>Tasks</i>	<i>Project Plan</i> — <i>Estimated Duration</i>

Table 17 (continued)

Role	Task list	Input Work products	Output Work products
PJM TL	PM.01.05 Identify and document the <i>Resources</i> : human, material, equipment and tools, standards. Including the required training of the Work Team to perform the project. Include in the schedule the dates when <i>Resources</i> and training will be needed.	<i>Agreement</i>	<i>Project Plan</i> — <i>Resources</i>
PJM TL	PM.01.06 Establish the <i>Composition of Work Team</i> assigning roles and responsibilities according to the <i>Resources</i> .	<i>Project Plan</i> — <i>Resources</i>	<i>Project Plan</i> — <i>Composition of Work Team</i>
PJM TL	PM.01.07 Assign estimated start and completion dates to each one of the <i>Tasks</i> . In order to create the <i>Schedule of the Project Tasks</i> taking into account the assigned <i>Resources</i> , sequence and dependency of the <i>Tasks</i> .	<i>Project Plan</i> — <i>Tasks</i> — <i>Estimated Duration</i> — <i>Composition of Work Team</i>	<i>Project Plan</i> — <i>Schedule of the Project Tasks</i>
PJM	PM.01.08 Calculate and document the project <i>Estimated Effort and Cost</i> .	<i>Project Plan</i> — <i>Schedule of the Project Tasks</i> — <i>Resources</i>	<i>Project Plan</i> — <i>Estimated Effort and Cost</i>
PJM TL	PM.01.09 Identify, <u>analyse, prioritize, mitigate</u> and document the risks which may affect the project.	<i>All elements previously defined</i>	<i>Project Plan</i> — <i>Identification of Project Risks</i>
PJM TL	<u>PM.01.10 Define and plan the collection and analysis of an appropriate set of project's measures</u>	<u><i>All elements previously defined</i></u>	<u><i>Project Plan</i></u> — <u><i>Identification of Project measures and the documentation of the collection and analysis procedure</i></u>
PJM TL	PM.01.11 Document the <u><i>Version Control Configuration management Strategy</i></u> in the <i>Project Plan</i> .		<i>Project Plan</i> — <u><i>Version Control Configuration management Strategy</i></u>
PJM	PM.01.12 Generate the <i>Project Plan</i> integrating the elements previously identified and documented.	<i>All elements previously defined</i>	<i>Project Plan</i> — <i>Tasks</i> — <i>Estimated Duration</i> — <i>Resources</i> — <i>Composition of Work Team</i> — <i>Schedule of the Project Task</i> — <i>Estimated Effort and Cost</i> — <i>Identification of Project Risks</i> — <i>Version Control Strategy</i> — <i>Delivery Instructions</i>