TECHNICAL REPORT

ISO/IEC TR 29110-5-1-3

First edition
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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).

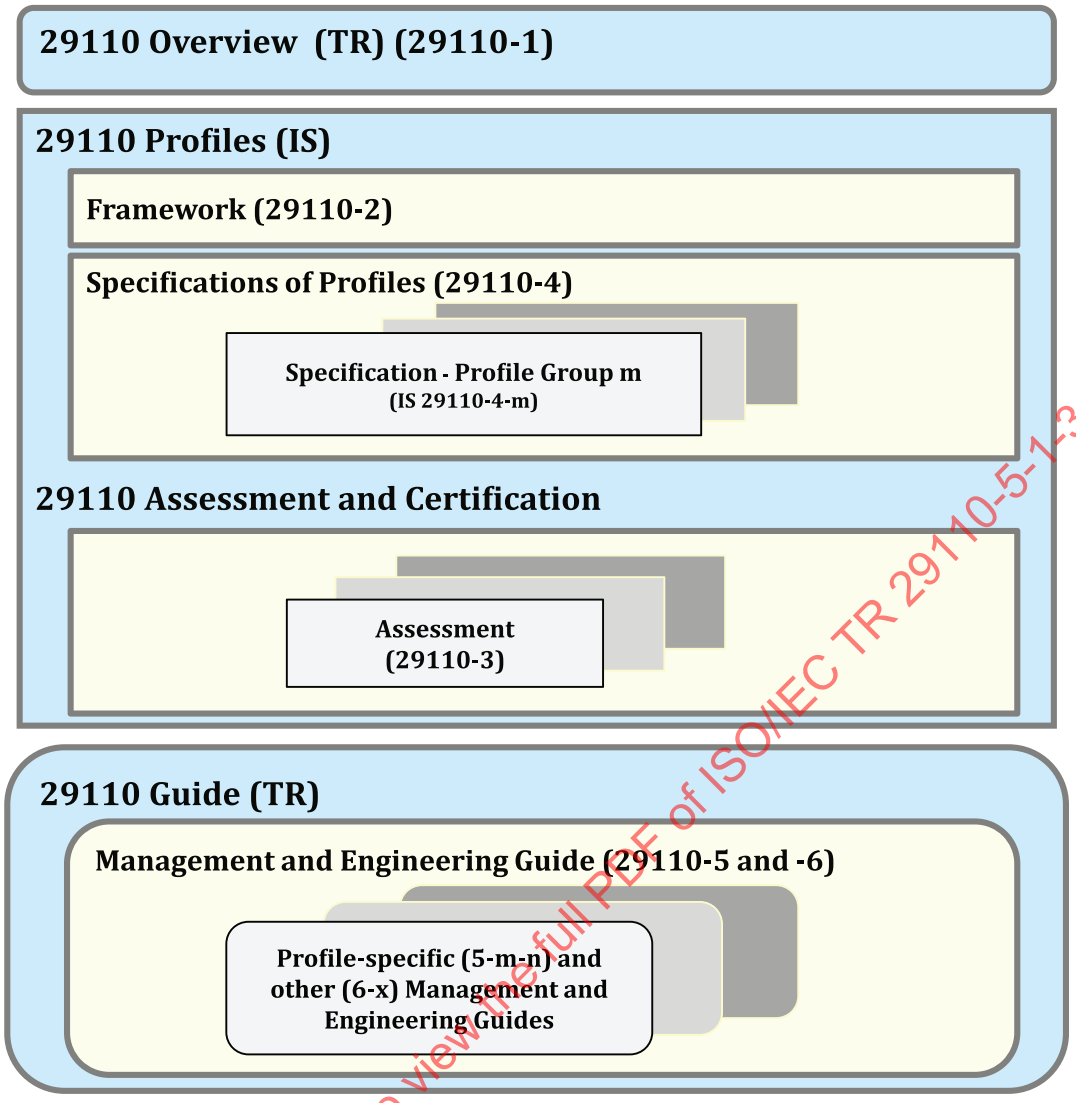

Figure 1 — ISO/IEC 29110 series

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.01,

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 (eg. 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.

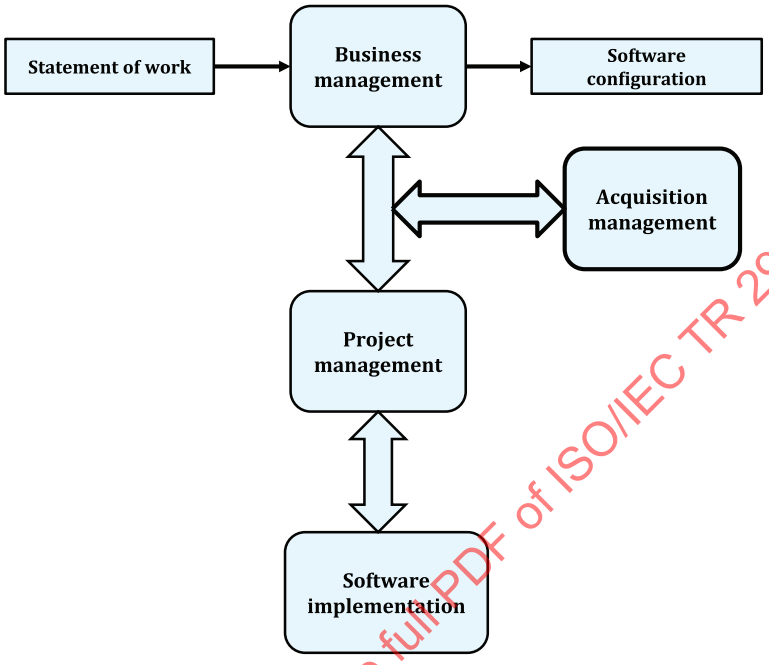

Figure 2 — Intermediate profile processes

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.O4. Provide an enabling infrastructure and services to all projects to support the VSE and the project objectives throughout the life cycle.

— BM.O5. Collect and analyse measures of all projects and to improve or maintain the management and engineering processes of the VSE.

— BM.O6. Protect the intellectual property and the security of the assets and information items of the VSE.

— BM.O7. 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
Agreement	Customer
Request for Proposal	Customer
Change Request	Customer Project Manager
Resource Request	Project Manager
Purchase Order	Project Manager
Human Resource Record	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
Contract	Business Management
Project Plan	Business Management
Proposal	Customer
Software Configuration	Customer

6.5 BM internal work products

Table 4 provides a list of internal work products.

Table 4 — BM internal work products

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

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.

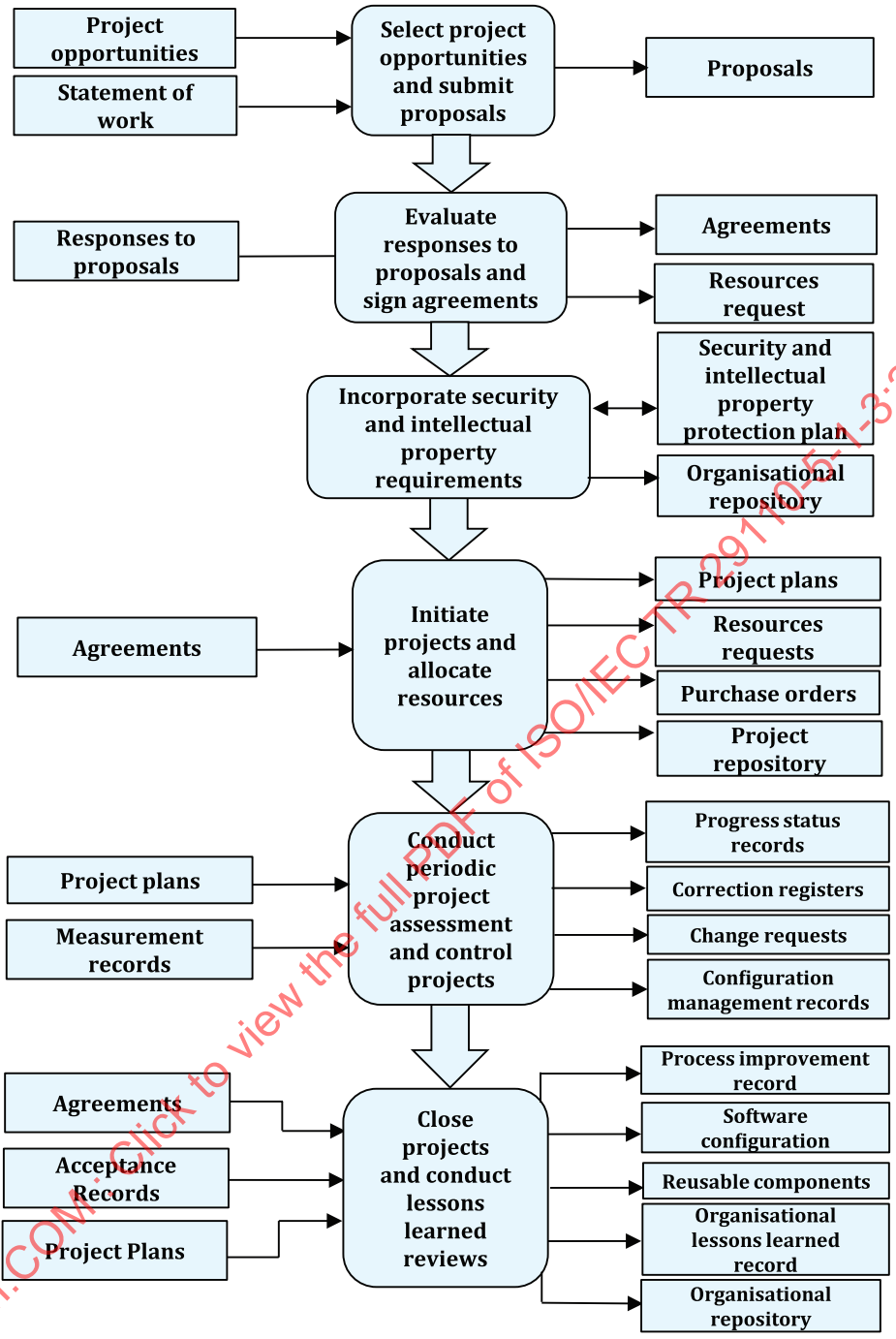

Figure 3 — Business Management Process diagram

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.O1)

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 *Project Opportunities*. Agreements (e.g. contracts) and Statement of Work from past projects could be used to document the *Project Opportunities*.	*Statements of Work (from past projects)* *Agreements (from past projects)*	*Project Opportunities [initiated]*
BM PJMs	BM.01.02 Select Project Opportunities	*Project Opportunities [updated]*	*Project Opportunities [approved]*
BM PJMs	BM.01.03 Prepare and approve *Proposals* *Proposals could be developed using the Proposal template in the Work product description section of this document.*	*Project Opportunities [approved]* *Proposal template*	*Proposal [approved]*
BM PJMs	BM.01.04 Submit *Proposals* to potential customers	*Proposal [approved]*	*Proposal [submitted]*

6.7.2.2 BM.02. Evaluate Responses to Proposals and Sign Agreements (BM.O1)

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 *Agreements* for the accepted *Proposals.*	*Proposals [submitted]*	*Agreement [initiated]*
BM CUS	BM.02.02 Negotiate, finalize and sign all *Agreements* with Customers	*Agreement [initiated]*	*Agreement [signed]*
BM PJMs	BM.02.03 Approve Projects and assign Project Managers to develop *Project Plans and Resources Requests.* Update *Project Opportunities* (if applicable). Project Plans are developed according to the Planning activity of the PM Process.	*Agreement [approved]*	*Projects Managers assigned* *Project Opportunities [updated]*

6.7.2.3 BM.03 Incorporate Security and Intellectual Property Requirements (BMS.O6)

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	*Security and Intellectual Property Protection Plan Template*	*Security and Intellectual Property Protection Plan [initiated]*
BM PJMs	BM.03.02 Review and approve the Security and Intellectual Property Protection Plan	*Security and Intellectual Property Protection Plan [initiated]*	*Security and Intellectual Property Protection Plan [approved]*
BM PJMs	BM.03.03 Implement the Security and Intellectual Property Protection Plan	*Security and Intellectual Property Protection Plan [approved]*	*Security and Intellectual Property Protection Plan [implemented]*
BM	BM.03.04 Establish and maintain an *Organizational Repository.* The repository has to protect the security and intellectual property of the VSE and its customers	*Security and Intellectual Property Protection Plan [approved]*	*Organizational Repository [established]*

6.7.2.4 BM.04. Initiate Projects and Allocate Resources (BM.O3, BM.O3, BM.O7)

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 *Project Plans* and *Resource Requests.* Assign required Human resources and other resources to Project (e.g. work team, computer facilities).	*Agreements [approved]* *Project Plans [initiated]* *Resources Requests [initiated]* *Human Resource Record*	*Project Plans [approved]* *Resources Requests [approved]*
BM PJMs	BM.04.02 Obtain resources and train Project team members if needed.	*Resource Requests [approved]* *Human Resource Record*	*Resources obtained and trained* *Human Resource Record*
BM PJMs	BM.04.03 Decide if products or services have to be acquired from *Suppliers* and list the *products* or services 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.	*Project Plans [approved]*	*List of Products or Services to be acquired*
BM PJMs	BM.04.04 Approve all *Purchase Orders* to obtain products or services from *Suppliers*. Purchase Orders are approved by the Project Plan Execution activity of the PM process.	*List of Products or Services to be acquired* *Purchase Orders [initiated]*	*Purchase Orders [approved]*
PJMs	BM.04.05 Establish and maintain a Project *Repository.*	*Security and Intellectual Property Protection Plan [approved]*	*Project Repository [established]*

6.7.2.5 BM.05. Conduct periodic Project Assessment and Control Projects (BM.O2, BM.O6)

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 *Project Plans*, 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 Plans [approved]* *Progress Status Records* *Measurement Records*	*Progress Status Records [evaluated]*
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 *Correction Register* and track them to closure.	*Progress Status Records [evaluated]*	*Correction Registers*
BM PJMs	BM.05.03 Identify changes to requirements and/or *Project Plans.* To address major deviations, potential risks or problems concerning the accomplishment of the plan, document them in *Change Requests* and track them to closure.	*Progress Status Records [evaluated]*	*Change Requests [initiated]*
BM	BM.05.04 Record and report the status of the items and modifications.	*Configuration Management strategy* *Configuration Management Records*	*Configuration Management Records [updated]*

6.7.2.6 BM.06. Close Projects and Conduct Lessons Learned Reviews (BM.O1, BM.O5)

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 *Delivery Instructions.* As established in the *Project Plans,* providing acceptance support and getting the *Acceptance Record* signed from the Customers.	*Agreements [approved]* *Acceptance Records [initiated]* *Delivery Instructions [signed by Customer]* *Software Configuration [delivered internally]*	*Acceptance Records [signed]* *Delivery Instructions [signed by Customer]* *Software Configuration [accepted]*
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 *Improvement Record*. Implement selected improvements.	*Agreements [approved]* *Project Plans* *Meeting Records* *Project Lessons Learned Record* *Measurement Records*	*Organizational Lessons Learned Record* *Process Improvement Record*
BM PJM	BM.06.03 Identify Reusable Components from Project Repositories and store them in Organizational Repository.	*Software Configuration* *Project Repositories*	*Organizational Repository [updated]* — *Reusable Components*
BM PJM	BM.06.04 Update *Organizational Repository.*	*Software Configuration [accepted]* *Project Repositories*	*Organizational Repository [updated]*

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

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.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.* 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.O3. The *Change Requests* are addressed through their reception and analysis. Changes to software requirements are evaluated for cost, schedule and technical impact.

— PM.O4. 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.O5. *Risks* are identified as they develop and during the progress of the project.

— PM.O6. 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
Agreement	Customer
Software Configuration	Software Implementation
Change Request	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
Project Plan	Software Implementation
Acceptance Record	Organizational Management
Measurement Record	Organizational Management
Project Repository	Software Implementation
Meeting Record	Customer
Software Configuration	Customer

7.5 PM internal work products

Table 15 provides a list of internal work products.

Table 15 — PM internal work products

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

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	~~PM~~ PJM
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.

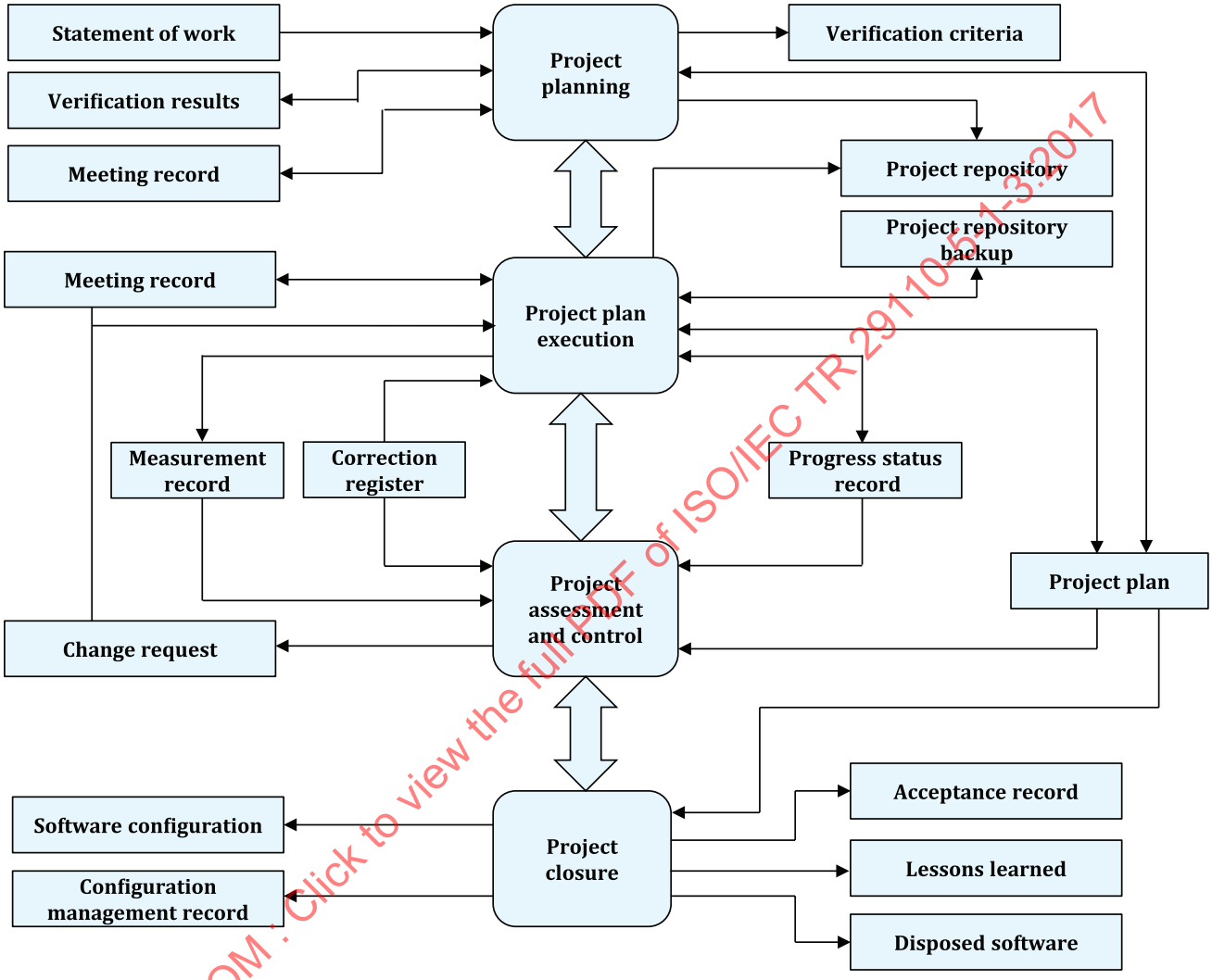

Figure 4 — Project Management Process diagram

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 *Agreement*	*Agreement*	*Agreement [reviewed]*
PJM CUS	PM.01.02 Define with the Customer the *Delivery Instructions* of each one of the *Deliverables, the standards and format* specified in the *Agreement.*	*Agreement [reviewed]*	*Project Plan* — *Delivery Instructions*
PJM CUS	PM.01.03 Define a *Software Disposal Approach* * (Optional)	*Agreement [reviewed]*	*Project Plan* — *Software Disposal Approach*
PJM TL	PM.01.03 Identify the specific *Tasks* to be performed in order to produce the *Deliverables* and their *Software Components* identified in the *Agreement.* Include *Tasks* in the SI process along with verification, validation and reviews with Customer and Work Team *Tasks* to assure the quality of work products. *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).* *Criteria for verification of all required software work products is identified.* Identify the *Tasks* to perform the *Delivery Instructions.* Document the *Tasks.* *Include task to perform a lessons learned review (i.e. post-mortem) at the end of the project.*	*Agreement [reviewed]*	*Project Plan* — *Tasks* — *Verification criteria*
PJM TL	PM.01.04 Establish the *Estimated Duration* to perform each task.	*Project Plan* — *Tasks*	*Project Plan* — *Estimated Duration*

Table 17 *(continued)*

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

Table 17 *(continued)*

Role	Task list	Input Work products	Output Work products
PM TL	PM.01.13 Include Work product Description, Scope, Objectives and Deliverables in the Project Plan.	*Agreement* — *Work product Description* — *Scope* — *Objectives* — *Deliverables*	*Project Plan* — *Work product Description* — *Scope* — *Objectives* — *Deliverables*
PM TL	PM.01.14 Verify and obtain approval of the *Project Plan.* Verify that all *Project Plan* elements are viable and consistent. The results found are documented in a *Verification Results* and corrections are made until the document is approved by PM.	*Project Plan*	*Verification Results* *Project Plan [verified]*
PM	PM01.15 Develop the *Resource Request* and obtain approval of *Project Plan* from BM.	*Project Plan [verified]* *Resource Request Template*	*Project Plan [approved]* *Resource Request [approved]*
PM CUS	PM.01.16 Review and accept the *Project Plan.* Customer reviews and accepts the *Project Plan*, making sure that the *Project Plan* elements match with the *Agreement.*	*Project Plan [verified]*	*Meeting Record* *Project Plan [accepted]*
PM TL	PM.01.17 Establish the Project Repository using the ~~Version Control~~ Configuration management Strategy.	~~*Version Control*~~ *Configuration management Strategy*	*Project Repository*

7.7.2.3 PM.02 Project Plan Execution (PM.02, PM.03, PM.04, PM.05, PM.07)

The Project Plan Execution 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 18.

Table 18 — PM.02 task list

Role	Task list	Input Work products	Output Work products
PJM TL WT	PM.02.01 Monitor the *Project Plan* execution and record actual data in *Progress Status Record.*	*Project Plan*	*Progress Status Record*
PJM TL WT	PM.02.02 Collect and analyse project's measures Project's measures to be collected are as follows: — resources; — cost; — effort; — time (of the schedule); — risk; — defect.	*Project Plan* *Measurement collection and analysis procedure*	*Measurement Record*
PJM TL	PM.02.03 Analyse and evaluate the *Change Request* for cost, schedule and technical impact. The *Change Request* can be initiated externally by the Customer or internally by the Work Team. Update the *Project Plan*, if the accepted change does not affect agreements with Customer. *Change Request*, which affects those agreements, needs to be negotiated by both parties (see PM.2.4).	*Change Request [initiated]* *Project Plan*	*Change Request [evaluated]* *Project Plan [updated]*
PJM TL WT	PM.02.04 Conduct revision meetings with the Work Team, identify problems, review risk status, record agreements and track them to closure.	*Project Plan* *Progress Status Record* *Correction Register* *Meeting Record*	*Meeting Record [updated]*
PJM CUS TL WT	PM.02.05 Conduct revision meetings with the Customer, record agreements and track them to closure. *Change Request* initiated by Customer or initiated by Work Team, which affects the Customer, needs to be negotiated to reach acceptance of both parties. If necessary, update the *Project Plan* according to new agreement with Customer.	*Project Plan* *Progress Status Record* *Change Request [evaluated]* *Meeting Record*	*Meeting Record [updated]* *Change Request [accepted]* *Project Plan [updated]*
PJM	PM.02.06 Approve, if applicable, Purchase Order(s).	*Purchase Order(s) [initiated]*	*Purchase Order(s) [approved]*
PJM	PM.02.07 Perform backup according to the *Version Control Strategy.*	*Version Control Strategy*	*Project Repository Backup*
PJM	PM.02.08 Perform *Project Repository* recovery using the *Project Repository Backup*, if necessary.	*Project Repository Backup*	*Project Repository [recovered]*

7.7.2.4 PM.03 Project Assessment and Control (PM.02)

The Project Assessment and Control activity evaluates the performance of the plan against documented commitments. The activity provides:

— evaluation of actual plan performance and progress against targets;

— 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 19.

Table 19 — PM.03 task list

Role	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* *Progress Status Record* — *Project Measures*	*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 plan. As needed, document them in *Correction Register* and track them to closure.	*Progress Status Record [evaluated]*	*Correction Register*
PJM TL WT	PM.03.03 Identify changes to requirements and/or *Project Plan* to address major deviations, potential risks or problems concerning the accomplishment of the plan. Document them in *Change Request* and track them to closure.	*Progress Status Record [evaluated]*	*Change Request [initiated]*
TL WT	PM.03.04 Record and report the status of the items and modifications.	*Configuration management strategy*	*Configuration Management Record*

7.7.2.5 PM.04 Project Closure (PM.02)

The Project Closure activity provides the project's documentation and work products in accordance with ~~contract~~ Agreement requirements. The activity provides:

— delivery of the work product as specified in the *Delivery Instructions*;

— support of Customer work product acceptance in accordance to *Delivery Instructions*;

— completion of the project and sign of the *Acceptance Record.*

The task list for PM.04 Project Control is given in Table 20.

Table 20 — PM.04 task list

Role	Task list	Input Work products	Output Work products
PJM TL WT CUS	PM.04.01 Execute the *Software Disposal Approach (Optional)*	*Project Plan* *Software Disposal Approach*	*Disposed Software*
PJM CUS	PM.04.02 Formalise the completion of the project according to the *Delivery Instructions* established in the *Project Plan.* Providing acceptance support and getting the *Acceptance Record* signed by the Customer.	*Project Plan* — *Delivery Instructions* *Acceptance Record [initiated]* *Software Configuration [delivered internally]*	*Acceptance Record [signed]* *Software Configuration [accepted]*
PJM TL WT	PM.04.03. Conduct a lessons learned review. Evaluate project accomplishments (e.g. estimates, resources, schedule, quality) with respect to the Project Plan.	*Project Plan* *Meeting Records* *Changes Requests*	*Project Lessons learned Record*
PJM	PM.04. Update *Project Repository*.	*Software Configuration [accepted]* *Project Repository*	*Project Repository [updated]*

7.7.3 PM incorporation to *Project Repository*

The list of work products to be saved in *Project Repository* is given in Table 21. After the incorporation, ~~*Version Control*~~ *Configuration Management Strategy* has to be applied to *Project Plan.*

Table 21 — PM repository work products

Work product
Project Plan
Change Request
Acceptance Record
Meeting Record
Correction Register
Project Lessons Learned Record
Progress Status Record
Verification Results

8 Software Implementation (SI) process

8.1 SI purpose

The purpose of the Software Implementation 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 SI 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 SI process of the Basic profile to improve the software implementation process.

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.

8.2 SI objectives

— SI.01. *Tasks* of the activities are performed through the accomplishment of the current *Project Plan*.

— SI.02. Software requirements are defined, analysed for correctness and testability, approved by the Customer, baselined and communicated.

— SI.03. Software architectural and detailed design is developed and baselined. It describes the *Software Components* and internal and external interfaces of them. Consistency and traceability to software requirements are established.

— SI.04. *Software Components* defined by the design are produced. Unit test are defined and performed to verify the consistency with requirements and the design. Traceability to the requirements and design are established.

— SI.05. *Software* is produced performing integration of *Software Components* and verified using *Test Cases and Test Procedures*. Results are recorded at the *Test Report*. Defects are corrected and consistency and traceability to *Software Design* are established.

— SI.06. A *Software Configuration*, that meets the *Requirements Specification* as agreed to with the Customer, which includes user, operation and maintenance documentations is integrated, baselined and stored at the *Project Repository*. Needs for changes to the *Software Configuration* are detected and related change requests are initiated.

— SI.07. Verification and Validation *Tasks* of all required work products are performed using the defined criteria to achieve consistency among output and input work products in each activity. Defects are identified and corrected; records are stored in the *Verification/Validation Results*. SI input work products.

8.3 SI input work products

Table 22 provides a list of input work products.

Table 22 — SI input work products

Name	Source
Project Plan	Project Management
Project Repository	Project Management

8.4 SI output work products

Table 23 provides a list of output work products.

Table 23 — SI output work products

Name	Destination
Software Configuration — *Requirements Specification* — *Software Design* — *Traceability Record* — *Software Components* — *Software* — *Test Cases and Test Procedures* — *Test Report* — *Product Operation Guide* — *Software User Documentation* — *Maintenance Documentation*	Project Management
— *Change Request*	Project Management

8.5 SI internal work products

Table 24 provides a list of internal work products.

Table 24 — SI internal work products

Name
Validation Results
Verification Results

8.6 SI roles involved

Table 25 provides a list of roles involved in the SI process.

Table 25 — SI roles involved

Role	Abbreviation
Customer	CUS
Analyst	AN
Designer	DES
Programmer	PR
Project Manager	PJM
Technical Leader	TL
Work Team	WT

8.7 SI diagram

8.7.1 General

Figure 5 shows the flow of information between the Software Implementation Process activities including the most relevant work products and their relationship.

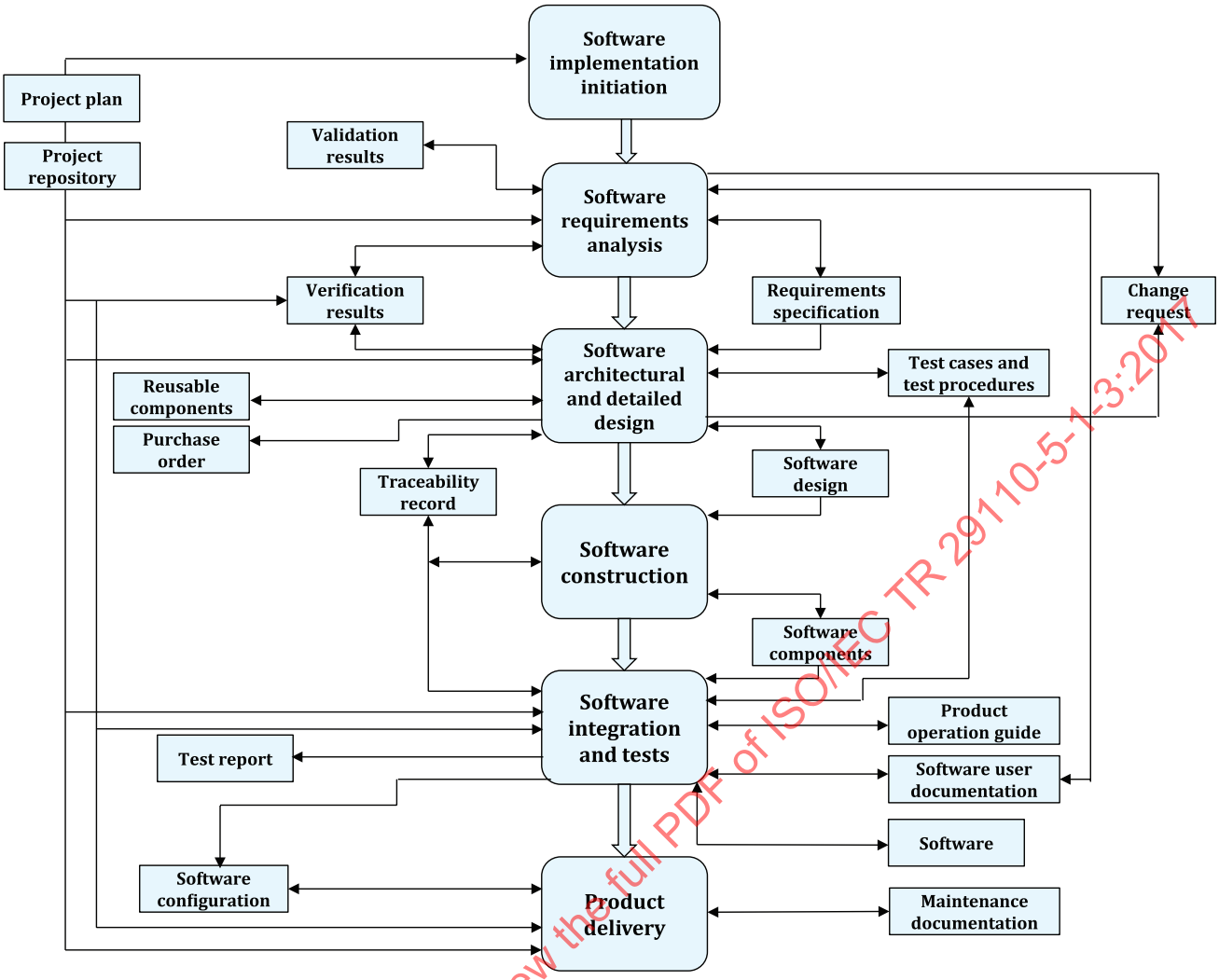

Figure 5 — Software Implementation Process diagram

8.7.2 SI activities

8.7.2.1 General

The Software Implementation Process has the following activities.

— SI.01 Software Implementation Initiation

— SI.02 Software Requirements Analysis

— SI.03 Software Architectural and Detailed Design

— SI.04 Software Construction

— SI.05 Software Integration and Test

— SI.06 Product Delivery

8.7.2.2 SI.01 Software Implementation Initiation (SI.O1)

The Software Implementation Initiation activity ensures that the *Project Plan* established in Project Planning activity is committed to by the Work Team. The activity provides:

— review of the *Project Plan* by the Work Team to determine task assignment;

— commitment to *Project Plan* by the Work Team and Project Manager;

— an implementation environment established.

The task list for SI.01 Software Implementation Initiation is given in Table 26.

Table 26 — SI.01 task list

Role	Task list	Input Work products	Output Work products
PJM TL WT	SI.01.01 Revision of the current *Project Plan* with the Work Team members. In order to achieve a common understanding and get their engagement with the project.	*Project Plan*	*Project Plan [reviewed]*
TL WT	SI.01.02 Set or update the implementation environment.	*Project Plan [reviewed]*	
TL WT	SI.01.03 Collect project's measures and store them in the Project Repository	*Project Plan*	*Measurement Record*

8.7.2.3 SI.02 Software Requirements Analysis (SI.O2, SI.O6, SI.O7)

The Software Requirements Analysis activity analyses the agreed Customer's requirements and establishes the validated project requirements. The activity provides:

— Work Team review of the *Project Plan* to determine task assignment;

— elicitation, analysis and specification of Customer's requirements;

— agreement on the Customer requirements;

— verification and validation of requirements;

— version control of the software requirements work products.

The task list for SI.02 Software Requirements Analysis is given in Table 27.

Table 27 — SI.02 task list

Role	Task list	Input Work products	Output Work products
TL WT	SI.02.01 Assign *Tasks* to the Work Team members in accordance with their role, based on the current *Project Plan.*	*Project Plan [reviewed]* — *Tasks*	
AN CUS	SI.02.02 Document or update the *Requirements Specification.* Identify and consult information sources (Customer, users, previous systems, documents, etc.) in order to get new requirements. Identify and quantify the required quality characteristics. Analyse the identified requirements to determinate the *Scope* and feasibility. Generate or update the *Requirements Specification.*	*Project Plan* — *Work product Description*	*Requirements Specification*
AN TL	SI.02.03 Verify against defined criteria and obtain approval of the *Requirements Specification.* Verify the correctness and testability of the *Requirements Specification* and its consistency with the *Product Description*. Additionally, review that requirements (e.g. walk-through, inspection) are complete, unambiguous and not contradictory. The results found are documented in a *Verification Results* and corrections are made until the document is approved by AN. If significant changes were needed, initiate a *Change Request.*	*Requirements Specification* *Project Plan* — *Product Description* — *Verification criteria*	*Verification Results* *Requirements Specification [verified]* *Change Request [initiated]*
CUS AN	SI.02.04 Validate and obtain approval of the *Requirements Specification* Validate that *Requirements Specification* satisfies needs and agreed upon expectations including the user interface usability. The results found are documented in a *Validation Results* and corrections are made until the document is approved by the CUS.	*Requirements Specification [verified]*	*Validation Results* *Requirements Specification [validated]*
AN	SI.02.05 Document the preliminary version of the **Software User Documentation* or update the present manual, if appropriate.	*Requirements Specification [validated]*	**Software User Documentation [preliminary]*
* Optional.			

Table 27 *(continued)*

Role	Task list	Input Work products	Output Work products
AN TL	SI.02.06 Verify and obtain approval of the **Software User Documentation*, if appropriate. Verify consistency of the **Software User Documentation* with the *Requirements Specification*. The results found are documented in a *Verification Results* and corrections are made until the document is approved by AN. If significant changes were needed, initiate a *Change Request.*	**Software User Documentation [preliminary]* *Requirements Specification*	*Verification Results* **Software User Documentation [preliminary, verified]* *Change Request [initiated]*
TL	SI.02.07 Incorporate the *Requirements Specification,* and **Software User Documentation* to the *Software Configuration* in the baseline.	*Requirements Specification [validated]* **Software User Documentation [preliminary, verified]*	*Software Configuration* — *Requirements Specification [validated, baselined]* — **Software User Documentation [preliminary, verified, baselined]*
TL WT	SI.02.08 Collect project's measures and store them in the Project Repository	*Project Plan*	*Measurement Record*
* Optional.			

8.7.2.4 SI.03 Software Architectural and Detailed Design (SI.03, SI.06, SI.07)

The Software Architectural and Detailed Design activity transforms the software requirements to the system software architecture and software detailed design. The activity provides:

— Work Team review of the *Project Plan* to determine task assignment;

— design software architecture, *Software Components* and associated interfaces;

— detailed design of the *Software Components* and interfaces;

— Work Team review of the *Requirements Specification*;

— *Software Design* verified and defects corrected;

— verified *Test Cases and Test Procedures* for integration testing;

— traceability of the software requirements to the *Software Design*, *Test Cases and Test Procedures*;

— design work products and documents under version control.

NOTE Software Architecture and Detailed Design can be performed separately according to the project schedule.

The task list for SI.03 Software Architectural and Detailed Design is given in Table 28.

Table 28 — SI.03 task list

Role	Task list	Input Work products	Output Work products
TL AN DES	SI.03.01 Assign *Tasks* to the Work Team members related to their role according to the current *Project Plan.*	*Project Plan* — *Tasks*	
AN DES	SI.03.02 ~~Understand~~ Review the *Requirements Specification* for understandability. Identify the artefacts to reuse. Decide whether to develop, buy or reuse. Elaborate the Purchase Order (PO) for the artefact to be purchased.	*Requirements Specification [validated, baselined]* *Organizational Repository* — *Reusable Components*	*Verification Results* ** Purchase order [initiated]*
AN DES	SI.03.03 Document or update the *Software Design.* Analyse the *Requirements Specification* to generate the architectural design, its arrangement in subsystems and *Software Components* defining the internal and external interfaces. Describe in detail, the appearance and the behaviour of the interface, based on the *Requirements Specification* in a way that *Resources* for its implementation can be foreseen. Provide the detail of *Software Components* and their interfaces to allow the construction in an evident way. Identify the artefacts to reuse. Decide whether to develop, buy or reuse. Document the details of the Purchase Order (PO) for the artefact to be purchased. Generate or update the *Traceability Record.*	*Requirements Specification [validated, baselined]* *Organizational Repository* — *Reusable Components*	*Software Design* *Traceability Record* **Purchase order [initiated]*
AN DES	SI.03.04 Verify against defined criteria and obtain approval of the *Software Design.* Verify correctness of *Software Design* documentation, its feasibility, reusability and consistency with their *Requirement Specification*. Verify that the *Traceability Record* contains the adequate relationships between requirements and the *Software Design* elements. The results found are documented in a *Verification Results* and corrections are made until DES approves the document. If significant changes were needed, initiate a *Change Request.*	*Software Design* *Project Plan* — *Verification criteria* *Traceability Record* *Requirements Specification [validated, baselined]*	*Verification Results* *Software Design [verified]* *Traceability Record [verified]* *Change Request [initiated].*
DES	SI.03.05 Establish or update Test Cases and Test Procedures for integration testing based on Requirements Specification and Software Design. Customer provides testing data, if needed.	*Requirements Specification [validated, baselined]* *Software Design [verified, baselined]*	*Test Cases and Test Procedures*
TL DES	SI.03.06 Define an integration approach	*Software Design*	*Integration Approach*

* Conditional.

Table 28 *(continued)*

Role	Task list	Input Work products	Output Work products
DES AN	SI.03.07 Verify and obtain approval of the *Test Cases and Test Procedures.* Verify consistency among *Requirements Specification*, *Software Design* and *Test Cases and Test Procedures*. The results found are documented in a *Verification Results* and corrections are made until the document is approved by AN.	*Test Cases and Test Procedures* *Requirements Specification [validated, baselined]* *Software Design [verified, baselined]*	*Verification Results* *Test Cases and Test Procedures [verified]*
DES	SI.03.08 Update the Traceability Record incorporating the Test Cases and Test Procedures.	*Test Cases and Test Procedures [verified]* *Traceability Record [updated]*	*Traceability Record [updated]*
TL	SI.03.09 Incorporate the Software Design, and Traceability Record to the Software Configuration as part of the baseline. Incorporate the Test Cases, and Test Procedures to the Project Repository.	*Software Design [verified]* *Test Cases and Test Procedures [verified]* *Traceability Record [verified]*	*Software Configuration* — *Software Design [verified, baselined]* — *Test Cases and Test Procedures [verified]* — *Traceability Record [verified, baselined]*
TL WT	SI.03.10 Collect Project's measures and store them in the Project Repository	*Project Plan*	*Measurement Record*
* Conditional.			

8.7.2.5 SI.04 Software Construction (SI.O4, SI.O6, SI.O7)

The Software Construction activity develops the software code and data from the *Software Design*. The activity provides:

— Work Team review of the *Project Plan* to determine task assignment;

— Work Team review of the *Software Design* to determine software construction sequence;

— coded *Software Components* and applied unit tests;

— traceability between *Software Components* and *Software Design*.

The task list for SI.04 Software Construction is given in Table 29.

Table 29 — SI.04 task list

Role	Task list	Input Work products	Output Work products
TL PR	SI.04.01 Assign *Tasks* to the Work Team members related to their role, according to the current *Project Plan.*	*Project Plan* — *Tasks*	
PR	SI.04.02 ~~Understand~~ Review the *Software Design* for better understandability.	*Software Design [verified, baselined]*	*Verification Results*
PR	SI.04.03 Construct or update *Software Components* based on the detailed part of the *Software Design*.	*Software Design [verified, baselined]* *Traceability Record [verified, baselined]*	*Software Components*

Table 29 *(continued)*

Role	Task list	Input Work products	Output Work products
PR	SI.04.04 Design or update unit test cases and apply them to verify that the *Software Components* implements the detailed part of the *Software Design*.	*Software Components*	*Software Components [unit tested]*
PR	SI.04.05 Correct the defects found, using the verification criteria, until successful unit test (reaching exit criteria) is achieved.	*Software Components [unit tested]* *Project Plan* — *Verification criteria*	*Software Components [corrected]*
PR	SI.04.06 Update the *Traceability Record* incorporating *Software Components* constructed or modified.	*Software Components [corrected]* *Traceability Record [verified, baselined].*	*Traceability Record [updated]*
TL	SI.04.07 Incorporate *Software Components* and *Traceability Record* to the *Software Configuration* as part of the baseline.	*Software Components [corrected]* *Traceability Record [updated]*	*Software Configuration* — *Software Components [corrected, baselined]* — *Traceability Record [updated baselined]*
TL WT	SI.04.08 Collect project's measures and store them in the Project Repository	*Project Plan*	*Measurement Record*

8.7.2.6 SI.05 Software Integration and Test (SI.05, SI.06, SI.07)

The Software Integration and Test activity ensures that the integrated *Software Components* satisfy the software requirements. The activity provides:

— Work Team review of the *Project Plan* to determine task assignment;

— understanding of *Test Cases and Procedures* and the integration environment;

— integrated *Software Components*, corrected defects and documented results;

— traceability of requirements and design to the integrated software product;

— documented and verified operational and software user documentations;

— verified *Software* baseline.

The task list for SI.05 Software Integration and Test is given in Table 30.

Table 30 — SI.05 task list

Role	Task list	Input Work products	Output Work products
TL PR	SI.05.01 Assign *Tasks* to the work team members related to their role, according to the current *Project Plan.*	*Project Plan* — *Tasks*	
TL	SI.05.02 Define acceptance criteria	*Project Plan*	*Acceptance criteria*
PR	SI.05.03 ~~Understand~~ Review the *Test Cases and Test Procedures* for understandability. Set or update the testing environment.	*Test Cases and Test Procedures [verified]*	*Verification Results*
* Optional.			

Table 30 *(continued)*

Role	Task list	Input Work products	Output Work products
PR	SI.05.04 Integrate, using the Integration Approach, the *Software* using *Software Components* and updates *Test Cases and Test Procedures* for integration testing, as needed.	*Integration Approach* *Software Components [corrected, baselined]* *Test Cases and Test Procedures [verified]* *Traceability Record [updated, baselined]*	*Software* *Test Cases and Test Procedures*
PR CUS	SI.05.05 Perform *Software* tests using *Test Cases and Test Procedures* for integration and document results in *Test Report*.	*Software* *Test Cases and Test Procedures*	*Software [tested]* *Test Report*
PR	SI.05.06 Correct the defects found, using the verification criteria, and perform regression test until exit criteria is achieved.	*Software [tested]* *Project Plan* — *Verification criteria* *Test Report* *Test Cases and Test Procedures* *Traceability Record [updated, baselined]*	*Software [corrected]* *Test Report [defects eliminated]*
PR	SI.05.07 Updates the *Traceability Record,* if appropriate.	*Software [corrected]* *Traceability Record [updated, baselined]*	*Traceability Record [updated]*
PR	SI.05.08 Document the **Product Operation Guide* or update the current guide, if appropriate.	*Software [tested]*	**Product Operation Guide*
PR DES	SI.05.09 Verify, using the verification criteria, and obtain approval of the **Product Operation Guide*, if appropriate (see SI.5.7) Verify consistency of the *Product Operation Guide* with the *Software*. The results found are documented in a *Verification Results* and corrections are made until the document is approved by DES.	**Product Operation Guide* *Software [tested]*	*Verification Results* **Product Operation Guide [verified]*
AN	SI.05.10 Document the **Software User Documentation* or update the current one, if appropriate.	*Software [tested]* **Software User Documentation [preliminary]*	**Software User Documentation*

* Optional.

Table 30 *(continued)*

Role	Task list	Input Work products	Output Work products
AN CUS	SI.05.11 Verify, using the verification criteria, and obtain approval of the **Software User Documentation*, if appropriate (see SI.5.9) Verify consistency of the *Software User Documentation* with the *Software*. The results found are documented in a *Verification Results* and corrections are made until the document is approved by CUS.	**Software User Documentation* *Software [tested]*	*Verification Results* **Software User Documentation [verified]*
TL	SI.05.12 Incorporate the *Test Cases and Test Procedures, Software, Traceability Record, Test Report, *Product Operation Guide and *Software User Documentation* to the *Software Configuration* as part of the baseline.	*Test Cases and Test Procedures* *Software [tested]* *Test Report* *Traceability Record [updated]* **Product Operation Guide [verified]* **Software User Documentation [verified]*	*Software Configuration* — *Test Cases and Test Procedures [baselined]* — *Software [tested, baselined]* — *Traceability Record [updated, baselined]* — *Test Report [baselined]* — **Product Operation Guide [verified, baselined]* — **Software User Documentation [verified, baselined]*
TL WT	SI.05.13 Collect project's measures and store them in the Project Repository	*Project Plan*	*Measurement Record*
* Optional.			

8.7.2.7 SI.06 Product Delivery (SI.06, SI.07)

The Product Delivery activity provides the integrated software Product to the Customer. The activity provides:

— Work Team review of the *Project Plan* to determine task assignment;

— verified *Maintenance Documentation*;

— delivery of the software Product and applicable documentation in accordance with the *Delivery Instructions*.

The task list for SI.06 Product Delivery is given in Table 31.

Table 31 — SI.06 task list

Role	Task list	Input Work products	Output Work products
TL WT	SI.06.01 Assign *Tasks* to the work team members related to their role, according to the current *Project Plan.*	*Project Plan* — *Tasks*	
DES	SI.06.02 ~~Understand~~ Review the *Software Configuration* for understandability.	*Software Configuration*	*Verification Results*
DES	SI.06.03 Document the *Maintenance Documentation* or update the current one.	*Software Configuration*	*Maintenance Documentation*

Table 31 *(continued)*

Role	Task list	Input Work products	Output Work products
DES TL	SI.06.04 Verify, using the verification criteria, and obtain approval of the *Maintenance Documentation.* Verify consistency of *Maintenance Documentation* with *Software Configuration*. The results found are documented in a *Verification Results* and corrections are made until the document is approved by TL.	*Maintenance Documentation* *Software Configuration*	*Verification Results* *Maintenance Documentation [verified]*
TL	SI.06.05 Incorporate the *Maintenance Documentation* as baseline for the *Software Configuration.*	*Software Configuration* *Maintenance Documentation [verified]*	*Software Configuration* — *Maintenance Documentation [verified, baselined]*
TL WT	SI.06.06 Verify the completeness and consistency of software configuration.	*Software Configuration* *Configuration Management Strategy [approved]*	*Software Configuration [Status]*
TL PJM	SI.06.07 Perform delivery to PJM according to *Delivery Instructions.*	*Project Plan* — *Delivery Instructions* *Software Configuration*	*Software Configuration [delivered internally]*
TL WT	SI.06.08 Collect project's measures and store them in the Project Repository	*Project Plan*	*Measurement Record*

8.7.3 SI incorporation to the *Project Repository*

The list of work products to be saved in *Project Repository* is given in Table 32. After the incorporation, *Version Control Strategy* has to be applied to *Requirements Specification, Software Design, Traceability Record, Test Cases and Test Procedures, Software Components, Software, Work product Operation Guide, Software User Documentation, Maintenance Documentation and Measurement Record*.

Table 32 — SI repository work products

Work product
Requirements Specification
Software User Documentation
Software Design
Traceability Record
Test Cases and Test Procedures
Software Components
Software
Product Operation Guide
Maintenance Documentation
Measurement Record
Test Report
Verification Results
Validation Results

9 Acquisition Management process (AM)

9.1 AM purpose

The purpose of Acquisition Management process is to obtain the work products and/or services that satisfy the need expressed by the VSE.

This process, a conditional process, has to be executed if a VSE requires work products or services from an external supplier. If this is the case, this process is included in the scope of an audit or an assessment.

9.2 AM objective

AM.O1. Obtain the work product and/or service that satisfies the needs expressed by the VSE.

9.3 AM input work products

Table 33 provides a list of input work products.

Table 33 — AM input work products

Name	Source
Purchase Order	Business Management
Statement of Work	Business Management or Project Management

9.4 AM output work products

Table 34 provides a list of output work products.

Table 34 — AM output work products

Name	Destination
Supplier Contract	Supplier Business Management
Delivery Instruction	Supplier Project Management
Acceptance Record	Project Management
Meeting Record (with supplier)	Project Management Business Management

9.5 AM internal work products

Table 35 provides a list of internal work products.

Table 35 — AM internal work products

Name
List of potential Suppliers
Meeting Record

9.6 AM roles involved

Table 36 provides a list of roles involved in the AM process.

Table 36 — AM roles involved

Role	Abbreviation
Business Management	BM
Project Manager	PJM
Supplier	SUP

9.7 AM diagrams

9.7.1 General

Figure 6 shows the flow of information between the Acquisition Management process activities including the most relevant work products and their relationship.

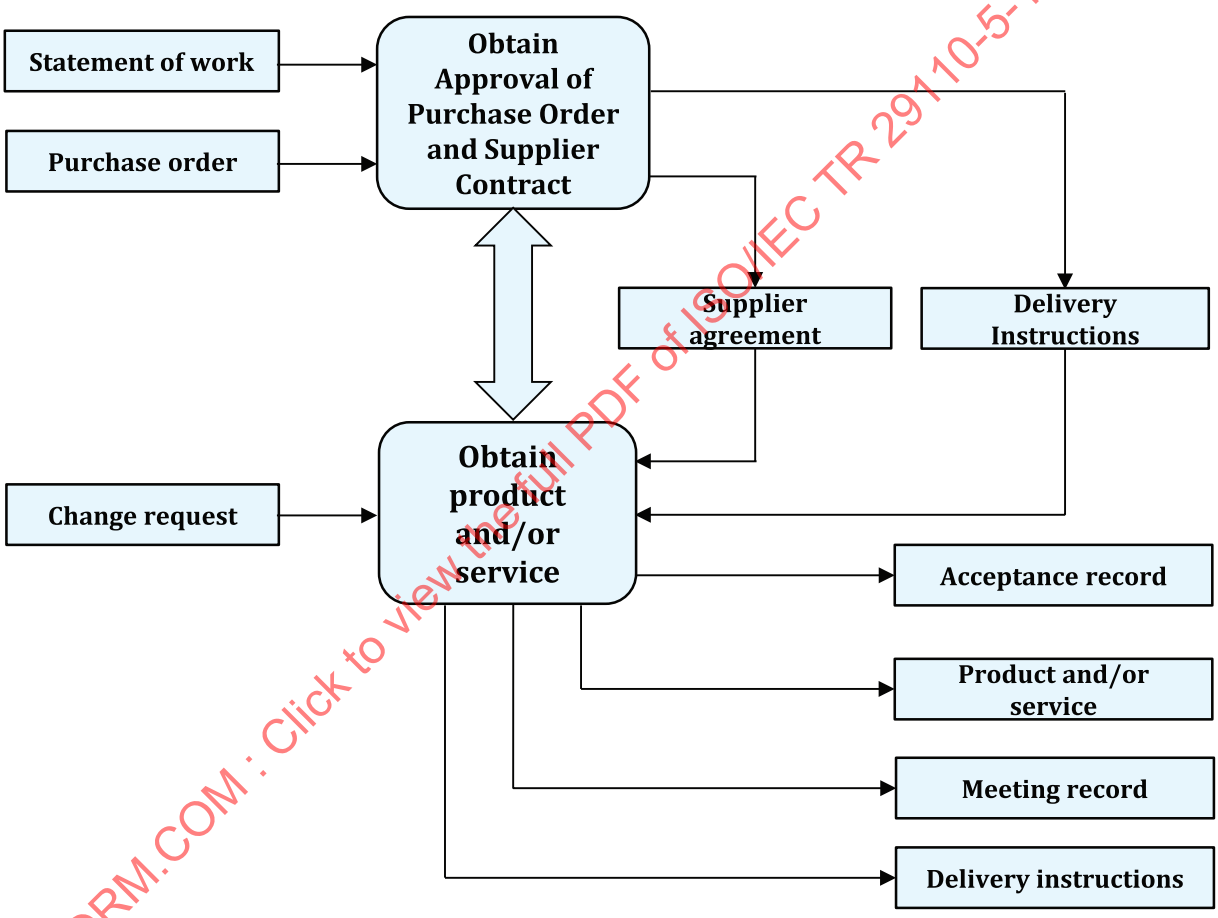

Figure 6 — Acquisition Management process

9.7.2 AM activities

9.7.2.1 General

The Acquisition Process has the following activities:

— AM.01 Obtain approval of *Purchase Orders* and *Supplier Agreements*;

— AM.02 Obtain Products and/or Services.

9.7.2.2 AM.01 Obtain approval of Purchase Orders and Supplier Agreements (AM.O1)

The Obtain approval of Purchase Orders and Supplier Agreements activity ensures that the products and/or services that satisfy the need expressed by the VSE are obtained. The task list for AM.01 is given in Table 37.

The activity provides

— approved *Purchase Order(s)*, and

— approved *Supplier Agreement(s)*.

Table 37 — AM.01 task list

Role	Task list	Input Work products	Output Work products
PJM BM	AM.01.01 Obtain approval of *Purchase Order(s)* from BM. NOTE A *Purchase Order* has been initiated in activity SI.03.	*Agreement* *Purchase Order(s) [initiated]*	*Purchase Order(s) [approved]*
	AM.01.02 Develop, using the approved *Purchase Order(s)*, the *Supplier Agreement* and the *Delivery Instructions.* NOTE A *Purchase Order* may describe a product or a service.	*Purchase Order(s) [approved]*	*Supplier Agreement [initiated]* *Delivery Instructions [initiated]*
PJM BM	AM.01.03 Obtain approval from BM of the *Supplier Agreement* and the *Delivery Instructions.*	*Supplier Contract [initiated]* *Delivery Instructions [initiated]*	*Supplier Agreement [approved]* *Delivery Instructions [approved]*
PJM BM	AM.01.04 Identify and select *Supplier(s)* and document/update potential suppliers on the *List of potential Suppliers*	*List of potential Suppliers*	*Selected Supplier(s)* *List of potential Suppliers [updated]*
PJM BM SUP	AM.01.05 Obtain signature of the *Supplier Agreement* and the *Delivery Instructions* by the Supplier.	*Supplier(s) Agreement [approved]* *Delivery Instructions [approved]*	*Supplier(s) Agreement [signed by BM and Supplier]* *Delivery Instructions [signed by BM and Supplier(s)]*

9.7.2.3 AM.02 Obtain Products and/or Services (AM.O1)

The Obtain Products and/or Services activity ensures that the products and/or services that satisfy the need expressed in the *Supplier(s) Agreement* is obtained. The task list for AM.02 is given in Table 38.

The activity provides:

— Products and/or Services required by the *Supplier Agreement*;

— *Acceptance Record*;

— *Delivery Instruction*.

Table 38 — AM.02 task list

Role	Task list	Input Work products	Output Work products
PJM SUP	AM.02.01 Monitor the *Supplier Agreement(s)* such that specified constraints such as cost, schedule and quality are met. If needed, document a change to the *Supplier Agreement(s)* in a *Change Request*. Document any issue in *Meeting Record* and obtain signature of *Supplier(s).*	*Supplier Agreement(s) [signed by VSE and Supplier]* *Delivery Instructions*	*Meeting Record [signed by PJM and supplier(s)]* *Change Request*
PJM BM SUP	AM.02.02 Accept Supplier deliverable(s) specified in the *Supplier Agreement(s)* and *Delivery Instructions*, describe open items in *Meeting Records* and obtain signature of supplier of the *Acceptance Record.* NOTE If the product/service does not meet the acceptance criteria, PJM produce *Meeting Record* to document the issue(s).	*Supplier Agreement(s) [signed by BM and Supplier]* *Delivery Instructions [approved]* *Meeting Record [signed by PJM and Supplier(s)]*	*Acceptance Record [signed by PJM and Supplier(s)]* *Meeting Record [signed by PJM and Supplier(s)]* *Product/Service [accepted] or [pending acceptance]*
PJM BM SUP	AM.02.03 Track open item(s) in a satisfactory conclusion to the VSE and to the Supplier(s) and obtain signature of Supplier(s) of the *Acceptance Record and update the List of potential Suppliers.*	*Supplier Agreement(s)* *Delivery Instructions [approved]* *Product/Service [pending acceptance]* *Meeting Record [signed by VSE and Supplier(s)]* *Acceptance Record [signed by PJM and Supplier(s)]* *List of potential Suppliers [initiated]*	*Product/Service [accepted]* *Acceptance Record [signed by PJM and Supplier(s)]* *List of potential Suppliers [updated]*

9.7.3 AM incorporation to the *Project Repository*

The list of work products to be saved in *Project Repository* is given in Table 39.

Table 39 — AM repository work products

Work product
Purchase Order
Supplier Agreement
Delivery Instructions
Acceptance Record
Meeting Record
Product/Service (from Supplier)

10 Roles

This is an alphabetical list of the roles, its abbreviations and suggested competencies description. This list is showed as a four-column table for presentation purpose only.

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.

Table 40 — Roles

	Role	Abbreviation	Knowledge and competency
1.	Analyst	AN	Knowledge and experience eliciting, specifying and analysing the requirements. Knowledge in designing user interfaces and ergonomic criteria. Knowledge of the revision techniques. Knowledge of the editing techniques. Experience on the software development and maintenance.
2.	Business Management	BM	Knowledge of technical domain of VSE. Knowledge of customers of the VSE. Knowledge of VSE's objectives. Knowledge of the management of more than one project in parallel with more than one work team. Knowledge of all processes of the VSE. Knowledge of capabilities and deficiencies of the VSE. Knowledge of marketing techniques.
3.	Customer	CUS	Knowledge of the Customer processes and ability to explain the Customer requirements. The Customer (representative) must have the authority to approve the requirements and their changes. The Customer includes user representatives in order to ensure that the operational environment is addressed. Knowledge and experience in the application domain.
4.	Designer	DES	Knowledge and experience in the Software Components and architecture design. Knowledge of the revision techniques. Knowledge and experience in the planning and performance of integration tests. Knowledge of the editing techniques. Experience on the software development and maintenance.
5.	Programmer	PR	Knowledge and/or experience in programming, integration and unit tests. Knowledge of the revision techniques. Knowledge of the editing techniques. Experience on the software development and maintenance.
6.	Project Manager	PJM	Leadership capability with experience making decisions, planning, personnel management, delegation and supervision, finances and software development.

Table 40 *(continued)*

	Role	Abbreviation	Knowledge and competency
7.	Supplier	SUP	Knowledge and experience in the software application domain. Knowledge of the Customer processes and ability to explain the Customer requirements.
8.	Technical Leader	TL	Knowledge and experience in the software process domain.
9.	Work Team	WT	Knowledge and experience according to their roles on the project: TL, AN, DES, and/or PR. Knowledge on the standards used by the Customer and/or by the VSE.

11 Work product description

Table 41 and Table 42 are alphabetical lists of the input, output and internal process work products, its descriptions, possible states and the source of the work products. The source can be another process or an external entity to the project, such as the Customer.

The lists are shown as a four-column table for presentation purpose only. Work product items in the following tables are based on ISO/IEC/IEEE 15289 information items with some exceptions. Information items may be combined or subdivided consistent with the project, service, or processes, phases, and stakeholder needs by a VSE.

The product status gives the information to the project team about the type of work (tasks) already done on the product (for example, evaluated, verified, tested, baselined). This information can be used to start next tasks that can use the product as an input. Some products have no status assigned because they are only informative and they do not change the content (for example, Acceptance Record, Correction Register, Project Repository Backup, Verification/Validation Results).

Table 41 lists the work products of the Basic profile. The following notation is used to highlight the addition/deletion/modification to the work products of the Basic profile:

— added text is underlined;

— deleted/modified text is strike out as follow: ~~the text is stroked out~~.

Table 40 lists the work products developed specifically for the Intermediate profile.

Work products are identified with a unique code WP.XX where XX is a sequential number. These codes have not been used in the descriptions of activities and tasks in order to facilitate readability.

Table 41 — Work product Descriptions — Basic Profile

Work product identification	Name	Description	Source
WP.01	*Acceptance Record*	Documents the Customer acceptance of the *Deliverables* of the project. It may have the following characteristics: — record of the receipt of the delivery; — identifies the date received; — identifies the delivered elements; — records the verification of any Customer acceptance criteria defined; — identifies any open issues (if applicable); — signed by receiving Customer and Supplier. The applicable statuses are: initiated and signed.	Project Management
WP.02	*Change Request*	Identifies a *Software*, or documentation problem or desired improvement, and requests modifications. It may have the following characteristics: — identifies purpose of change; — identifies request status; — identifies requester contact information; — impacted system(s); — impact to operations of existing system(s) defined; — impact to associated documentation defined; — criticality of the request, date needed. The applicable statuses are: initiated, evaluated, rejected and accepted.	Software Implementation Customer Project Management
WP.03	*Correction Register*	Identifies activities established to correct a deviation or problem concerning the accomplishment of a plan. It may have the following characteristics: — identifies the initial problem; — defines a solution; — identifies corrective actions taken; — identifies the ownership for completion of defined actions; — identifies the open date and target closure date; — contains a status indicator; — indicates follow up actions. The applicable status is: published	Project Management

Table 41 *(continued)*

Work product identification	Name	Description	Source
WP.04	*Maintenance Documentation*	Describes the *Software Configuration* and the environment used for development and testing (compilers, design tools, construction and tests). It may have the following characteristics: — includes or refers to all S*oftware Configuration* elements developed during implementation; — identifies environment used for development and testing (compilers, design tools, construction and tests tools). It is written in terms that maintenance personnel can understand. The applicable statuses are: verified and baselined.	Software Implementation
WP.05	*Meeting Record*	Records the agreements established with Customer and/or Work Team. It may have the following characteristics: — purpose of meeting; — attendees; — date, place held; — reference to previous minutes; — what was accomplished; — identifies issues raised; — any open issues; — agreements; — next meeting, if any. The applicable status is: updated.	Project Management
WP.06	*Product Operation Guide*	Contains the necessary information to install and manage the *Software*. It may have the following characteristics: — Criteria for operational use; — A description of how to operate the product including: — operational environment required — supporting tools and material (e.g. user manuals) required — possible safety warnings — start-up preparations and sequence — frequently asked questions (FAQ) — sources of further information and help to operate the product — Certification and safety approvals — Warranty and replacement instructions — It should be written in terms that the personnel responsible for the operation can understand. The applicable statuses are: verified and baselined.	Software Implementation

Table 41 *(continued)*

Work product identification	Name	Description	Source
WP.07	*Progress Status Record*	Records the status of the project against the *Project Plan*. It may have the following characteristics: — project measures; — status of actual *Tasks* against planned *Tasks*; — status of actual results against established *Objectives*/goals; — status of actual resource allocation against planned *Resources*; — status of actual cost against budget estimates; — status of actual time against planned schedule; — status of actual risk and mitigation against previously identified; — record of any deviations from planned *Tasks* and reason why. The applicable status is: evaluated.	Project Management
WP.08	*Project Plan*	Presents how the project processes and activities will be executed to assure the project's successful completion and the quality of the deliverable products. It includes the following elements which may have the characteristics as follows: — *Product Description*; — purpose; — general Customer requirements; — *Scope* description of what is included and what is not; — *Objectives* of the project; — *Deliverables* - list of work products to be delivered to Customer, standards and format required by the SOW; — *Software Disposal Approach*; — *Tasks*, including verification, validation and reviews with Customer and Work Team, to assure the quality of work products. *Tasks* may be represented as a Work Breakdown Structure (WBS); — *Estimated Duration* of tasks; — *Resources* (humans, materials, standards, equipment and tools) including the required training, and the schedule when the *Resources* are needed; — *Composition of Work Team*; — *Schedule of the Project Tasks,* the expected start and completion date for each task, and the relationship and dependencies of the *Tasks*; — *Estimated Effort and Cost*; — *Identification, priorisation and mitigation of Project Risks*; — *Verification criteria (e.g. maximum estimated number of defects left in a software unit) for each software unit (e.g. specifications, architecture)*;	Project Management

Table 41 *(continued)*

Work product identification	Name	Description	Source
		— *Measures, a set of measures is listed including the unit of measurement, measures are stored in the project repository*; — ~~*Version Control*~~ *Configuration management Strategy;* — work product repository tools or mechanism identified; — location and access mechanisms for the repository specified; — version identification and control defined; — backup and recovery mechanisms defined; — status of items and their modifications recorded and reported; — completeness and consistency of items ensured; — storage, handling and delivery (including archival and retrieval) mechanisms specified; — *Delivery Instructions*; — elements required for product release identified (i.e. hardware, software, documentation etc.); — delivery requirements; — sequential ordering of *Tasks* to be performed; — applicable releases identified; — identifies all delivered *Software Components* with version information; — identifies any necessary backup and recovery procedures. The applicable statuses are: initiated, verified, accepted, updated and reviewed.	
WP.09	*Project Repository*	Electronic container to store project work products and deliverables. It may have the following characteristics: — stores project work products; — stores released *Deliverables* work products; — storage and retrieval capabilities; — ability to browse content; — listing of contents with description of attributes; — sharing and transfer of work products between affected groups; — effective controls over access; — maintain work products descriptions; — recovery of archive versions of work products; — ability to report work products status; — changes to work products are tracked to *Change Requests*. The applicable statuses are: recovered and updated.	Project Management

Table 41 *(continued)*

Work product identification	Name	Description	Source
WP.10	*Project Repository Backup*	Repository used to back-up the *Project Repository* and, if necessary, to recover the information.	Project Management
WP.11	*Requirements Specification*	Identifies the software requirements. It may have the following characteristics: — Introduction –general description of Software and its use within the Scope of the Customer business; — Requirements description: — Functionality – established needs to be satisfied by the Software when it is used in specific conditions. Functionality must be adequate, accurate and safe; — User interface – definition of those user interface characteristics that allow to understand and learn the Software easily so the user be able to perform his/her Tasks efficiently including the interface exemplar description; — External interfaces – definition of interfaces with other software or hardware; — Reliability – specification of the software execution level concerning the maturity, fault tolerance and recovery; — Efficiency – specification of the software execution level concerning the time and use of the Resources; — Maintenance – description of the elements facilitating the understanding and execution of the future Software modifications; — Portability – description of the Software characteristics that allow its transfer from one place to other; — Design and construction limitations/constraints – needs imposed by the Customer; — Interoperability – capability for two or more systems or Software Components be able to change information each other and use it; — Reusability – feature of any product/sub-product, or a part of it, so that it can be used by several users as an end product, in the own software development, or in the execution of other software products; — Legal and regulative – needs imposed by laws, regulations, etc. Each requirement is identified, unique and it is verifiable or can be assessed. The applicable statuses are: verified, validated and baselined.	Software Implementation
WP.12	*Software*	Software item (*Software* source and executable code) for a Customer, constituted by a collection of integrated *Software Components*. The applicable statuses are: tested and baselined.	Software Implementation

Table 41 *(continued)*

Work product identification	Name	Description	Source
WP.13	*Software Components*	A set of related code units. The applicable statuses are: unit tested, corrected and baselined.	Software Implementation
WP.14	*Software Configuration*	A uniquely identified and consistent set of software products including: — *Requirements Specification*; — *Software Design*; — *Traceability Record*; — *Software Components*; — *Software*; — *Test Cases and Test Procedures*; — *Test Report*; — *Product Operation Guide*; — *Software User Documentation*; — *Maintenance Documentation*. The applicable statuses are: delivered and accepted.	Software Implementation
WP.15	*Software Design*	Textual and graphical information on the *Software* structure. This structure may include the following parts: Architectural high level software design – Describes the overall *Software* structure: — Identifies the required *Software Components*; — Identifies the relationship between *Software Components*; — Consideration is given to any required: — *Software* performance characteristics; — hardware, software and human interfaces; — security characteristics; — database design requirements; — error handling and recovery attributes.	Software Implementation

Table 41 *(continued)*

Work product identification	Name	Description	Source
		Detailed low level software design – includes details of the *Software Components* to facilitate its construction and test within the programming environment: — provides detailed design (could be represented as a prototype, flow chart, entity relationship diagram, pseudo code, etc.); — provides format of input/output data; — provides specification of data storage needs; — establishes required data naming conventions; — defines the format of required data structures; — defines the data fields and purpose of each required data element; — provides the specifications of the program structure. The applicable statuses are: verified and baselined.	
WP.16	*Software User Documentation*	Describes the way of using the *Software* based on the user interface. It may have the following characteristics: — user procedures for performing specified *Tasks* using the *Software*; — installation and de-installation procedures; — brief description of the intended use of the *Software* (the concept of operations); — the supplied and required *Resources*; — needed operational environment; — availability of problem reporting and assistance; — procedures to access and exit the *Software*; — lists and explains *Software* commands and system-provided messages to the user; — as appropriate for the identified risk, it includes warnings, cautions, and notes, with corrections; — it includes troubleshooting and error correction procedures. It is written in terms understandable by users. The applicable statuses are: preliminary, verified and baselined.	Software Implementation
WP.17	*Statement of Work or Agreement*	Description of work to be done related to *Software* development. It may include: — *Product Description*; — purpose; — general Customer requirements; — *Scope* description of what is included and what is not; — *Objectives* of the project; — *Deliverables* list of work products to be delivered to Customer. The applicable status is: reviewed.	Customer

Table 41 *(continued)*

Work product identification	Name	Description	Source
WP.18	*Test Cases and Test Procedures*	Elements needed to test code. Test Case may include: — identifies the test case; — test items; — input specifications; — output specifications; — environmental needs; — special procedural requirements; — interface dependencies; Test Procedures may include: — integration approach; — integration tests; — regression tests; — identifies: test name, test description and test completion date; — identifies potential implementation issues; — identifies the person who completed the test procedure; — identifies prerequisites; — identifies procedure steps including the step number, the required action by the tester and the expected results. The applicable statuses are: verified and baselined.	Software Implementation
WP.19	*Test Report*	Documents the tests execution. It may include: — a summary of each defect; — identifies the related test case; — identifies the tester who found each defect; — identifies the severity for each defect; — identifies the affected function(s) for each defect; — identifies the date when each defect originated; — identifies the date when each defect was resolved; — identifies the person who resolved each defect. The applicable status is: baselined.	Software Implementation

Table 41 *(continued)*

Work product identification	Name	Description	Source
WP.20	*Traceability Record*	Documents the relationship among the requirements included in the *Requirements Specification, Software Design* elements, *Software Components, Test Cases and Test Procedures.* It may include: — identifies requirements of *Requirements Specification* to be traced; — provides forward and backward mapping of requirements to *Software Design* elements, *Software Components*, *Test Cases and Test Procedures*. The applicable statuses are: verified, baselined and updated.	Software Implementation
WP.21	*Verification Results*	Documents the verification execution. It may include the record of: — participants; — date; — place; — duration; — verification check-list; — passed items of verification; — failed items of verification; — pending items of verification; — defects identified during verification.	Project Management Software Implementation
WP.22	*Validation Results*	Documents the validation execution, It may include the record of: — participants; — date; — place; — duration; — validation check-list; — passed items of validation; — failed items of validation; — pending items of validation; — defects identified during validation;	Software Implementation

Table 42 is an alphabetical list of the work products developed specifically for the Intermediate profile.

Table 42 — Work product descriptions — Intermediate profile

Work product identification	Name	Description	Source
WP.23	*Agreement*	Describes the mutual acknowledgement of terms and conditions under which a working relationship is conducted. EXAMPLE Contract, memorandum of agreement. It may have the following characteristics: — identifies customer requirements (functional and non-functional); — identifies time frame for delivery; — identifies budget and resources provided by both parts; — identifies what is to be purchased; — identifies any warranty information; — identifies any copyright and licensing information; — identifies acceptance criteria (e.g. delivery instructions); — identifies change management and problem resolution procedures; — identifies the role of the customer; — evidence of review and approval by authorised signatories. The applicable statuses are initiated, approved, and updated.	Business Management
WP.24	*Configuration Management Record*	Documents the configuration and status of software and associated documentation. It may have the following characteristics: — list of the approved configuration; — status of proposed changes to the configuration; — implementation status of approved changes; — "as delivered" *Software Configuration*. The applicable statuses are: initiated, approved and published.	Software Implementation
WP.25	*Human Resource Record*	Personnel and training information of human resources. It may have the following characteristics: — *Human Resource Register*: — personal data; — education; — experience; — roles assigned; — training.	Business Management

Table 42 *(continued)*

Work product identification	Name	Description	Source
		— *Training Plan/Record* description of the training activities. It may have the following characteristics: — courses, workshops, mentoring, on the job training, etc.; — calendar (planned and actual information); — trainers; — logistics. The applicable status are initial, approved, published	
WP.26	*Integration Approach*	Describes the approach used to integrate the software components in order to obtain the software. One approach is a *global integration (*big-bang integration) where all the software elements are assembled in only one step. Another approach is to integrate software components as they become available. Other known approaches are top-down integration, risk driven integration (i.e. most critical components are integrated first) and bottom-up integration. It may have the following characteristics: — the order for assembling the implemented software components based on the priorities of the software requirements and architecture definition focusing on the interfaces; — regression strategy; — minimization of integration time, cost, and risks. The applicable statuses are: verified and approved.	Software Implementation
WP.27	*List of Products or Services*	List the products or services to be acquired from Supplier(s). It may have the following characteristics: — software component(s); — service(s); — potential supplier(s); — delivery Instructions; The applicable status is initiated	Business Management
WP.28	*List of potential suppliers*	List potential Suppliers that could provide the product or service required. It may have the following characteristics: — product(s) required; — service(s) required; — potential supplier(s). The applicable status is initiated and updated	Acquisition Management

Table 42 *(continued)*

Work product identification	Name	Description	Source
WP.29	*Measurement collection and analysis procedure*	Describes a collection procedure to ensure that the right data is collected, is collected and stored properly and analysed. It may have the following characteristics: — specify the business/project goal of each measure; — specify the unit of each measure; — specify how to collect and store the data for each required measure; — specifies who is responsible for obtaining measurement data; — specifies how data are stored, retrieved; — specifies the appropriate data analysis methods and tools; — specifies the data storage format and location; — specifies the format of measurement reporting; — specifies who should receive the *Measurement Record*. The applicable statuses are verified and baselined.	Project Management
WP.30	*Measurement Record*	Records measurements collected during the execution of the tasks. It may have the following characteristics: — Process measures EXAMPLE Effort (person-hour), estimation accuracy (e.g. estimated/actual start and end dates), estimated cost, cost of rework, productivity. — Work product measures EXAMPLE Quality (number of defects), size (number of requirements, number of pages, number of lines of code, number of function points). The applicable status is updated, approved, published.	All processes
WP.31	*Organizational Lessons Learned Record*	A lessons learned meeting is conducted after a few projects have been completed. The objective is to capture and document the organizational knowledge gained after a few projects have been completed and closed to improve the performance of the VSE. The information from the following documents could be used when performing a lessons learned review:	Business Management

Table 42 *(continued)*

Work product identification	Name	Description	Source
		— Organizational Management Plan; — Business Objectives; — Project Plans; — Progress Status Records; — Correction Register; — Meeting Records. It may have the following characteristics: — potential causes of problems; — recommendations to improve the performance of VSE and projects such as quality, estimates, schedule. The applicable statuses are initiated, approved, published.	
WP.32	*Organizational Repository*	Electronic container to store organizational documents such as processes and work products. It may have the following characteristics: — agreement; — agreements with Customers; — agreements with Suppliers; — reusable components; — organizational lessons learned; — stores project work products; — stores released products; statuses are established, recovered and updated. — storage and retrieval capabilities; — ability to browse content; — listing of contents with description of attributes; — sharing and transfer of work products between affected groups; — effective controls over access; — maintain work products descriptions; — recovery of archive versions of work products; — ability to report work products status. The applicable	Business Management
WP.33	*Processes Improvements Record*	The repository of all improvement suggestions and for those selected the actions to be carried out to deploy the improvements suggestions. It may have the following characteristics: — Processes Improvement Suggestions; — Processes Improvement Actions. The applicable status is published.	Business Management

Table 42 *(continued)*

Work product identification	Name	Description	Source
WP.34	*Project lessons Learned Record*	A lessons learned meeting is conducted after a project has been completed. The objective is to capture and document the knowledge gained during a project to improve the performance of future projects. The information from the following documents is used when performing a lessons learned review: — Project Plan; — Progress Status Record; — Correction Register; — Meeting Record. It have the following characteristics: — potential causes of problems; — recommendations to improve the performance of projects such as quality, estimates, schedule. The applicable statuses are initiated, approved, published.	Project Management
WP.35	*Project Opportunities*	Lists the business opportunities of the VSE. It may have the following characteristics: — new functionalities for actual product; — potential customers (e.g. name of organization, name of contact); — potential business partners. The applicable statuses are initiated, updated and approved.	Business Management
WP.36	*Proposal*	Describes what the VSE is proposing to a customer either after having evaluated an Agreement of a customer or as a result of an analysis of opportunities. It may have the following characteristics: — proposed solution; — proposed schedule; — scope of initial proposal: — requirements that would be satisfied; — requirements that could not be satisfied, and provides a justification of variants; — identifies conditions (e.g. time, location) that affect the validity of the proposal; — identifies obligations of the acquirer and the consequences of these not being met; — defines the estimated price of proposed development, product, or service. The applicable statuses are initiated, approved and submitted.	Business Management

Table 42 *(continued)*

Work product identification	Name	Description	Source
WP.37	*Purchase Order*	Defines a product or service to be acquired. It may have the following characteristics: — name and address of supplier; — description of the product or service to be acquired; — agreed price; — quantity; — delivery date. The applicable statuses are initiated, approved.	Software Implementation
WP.38	*Resource Request*	The Resource Request may have the following characteristics: — plan for the necessary resources, knowledge and skills needed to perform the process or project. the request may include — Human Resource requirements (knowledge and skills), and — infrastructure requirements (hardware, software, tools); — requests for resource acquisition of the elements or any training needed. the request may include — description, and — due date. The applicable statuses are initiated, approved.	All processes
WP.39	*Request For Proposal*	A document used to request proposals from sellers of products or services. It may have the following characteristics: — Reference to the requirements specifications; — Identifies desired characteristics, such as: — system architecture, configuration requirements; — quality criteria or requirements; — project schedule requirements; — expected delivery/service dates; — cost/price expectations; — regulatory standards/requirements; — Identifies submission date for resubmission of the response. The applicable statuses are received, approved, rejected.	Customer

Table 42 *(continued)*

Work product identification	Name	Description	Source
WP.40	*Security and Intellectual Property Protection Plan*	Documents how the VSE protects the security and intellectual property of its assets and information items. It may include: — objectives of the plan; — security requirements; — roles and responsibilities; — identification of intellectual Property items to protect; — Organizational Repository security procedure. The applicable statuses are initiated, approved, and implemented.	Business Management
WP.41	*Supplier Agreement*	Documented agreement (e.g. contract) between the acquirer, i.e. the VSE, and a supplier. It may include (adapted from the CMMI-DEV): — establishing the agreement, specification, terms and conditions, list of deliverables, schedule, budget, and acceptance process — identifying who from the project and supplier are responsible and authorized to make changes to the supplier agreement — identifying how requirements changes and changes to the supplier agreement are to be determined, communicated, and addressed — identifying standards and procedures that will be followed — identifying critical dependencies between the project and the supplier — identifying the types of reviews that will be conducted with the supplier — identifying the supplier's responsibilities for on-going maintenance and support of the acquired products	Acquisition Management

Table 42 *(continued)*

Work product identification	Name	Description	Source
		— identifying warranty, ownership, and rights of use for the acquired products — identifying acceptance criteria — identifying and signing the *Delivery Instructions* The applicable statuses are reviewed, approved, signed by supplier.	
WP.42	*Test Cases and Test Procedures*	Elements needed to test code. Test Case may include: — identifies the test case; — test items; — input specifications; — output specifications; — environmental needs; — special procedural requirements; — interface dependencies. Test Procedures may include: — Integration approach; — Integration tests; — Regression tests; — identifies: test name, test description and test completion date; — identifies potential implementation issues; — identifies the person who completed the test procedure; — identifies prerequisites; — identifies procedure steps including the step number, the required action by the tester and the expected results. The applicable statuses are verified and baselined.	Software Implementation

12 Software tools requirements

12.1 General

Software tools that could be used to perform process activities (see Table 43, Table 44, Table 45, and Table 46).

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~~.

12.2 Business Management process

Table 43 — Business Management tools

Activity	Resource list
Document and Select Project Opportunities Evaluation of Requests, Submission of Proposals and signature of Contract Periodic Project Assessment and Control Project Closure, *Organizational Lessons Learned* and *Process Improvement*	Tools allowing documentation, management and control and the use and management of the *Project Repository*.

12.3 Project Management process

Table 44 — Project Management tools

Activity	Resource list
Project Planning Project Plan Execution Project Assessment and Control Project Closure	Tools allowing documentation, management and control the *Project Plan* and the use and management of the *Project Repository*.

12.4 Software Implementation process

Table 45 — Software Implementation tools

Activity	Resource list
Software Implementation Initiation Software Requirements Analysis Software Architectural and Detailed Design Software Construction Software Integration and Tests Product Delivery	Documentation tools
Software Requirements Analysis	*Requirements Specification* tools
Software Architectural and Detailed Design	*Software Design* tools
Software Construction	*Construction* Tools
Software Integration and Tests	Tests tools, bug tracking tools

12.5 Acquisition Management process (conditional process)

Table 46 — Acquisition Management tools

Activity	Resource List
Obtain approval of *Purchase Order* and *Supplier Contract* Obtain Product and/or Service	Tools allowing documentation, management and control and the use and management of the *Project Repository*.

Annex A
(informative)

Software engineering deployment packages

In order to facilitate the implementation, by VSEs, of a Profile, a set of Deployment Packages are available. A deployment package is a set of artefacts developed to facilitate the implementation of a set of practices, of the selected framework, in a VSE. But, a deployment package is not a complete process reference model. Deployment packages are not intended to preclude or discourage the use of additional guidelines that VSEs find useful.

The elements of a typical deployment package are technical description, relationships with ISO/IEC 29110, key definitions, detailed description of processes, activities, tasks, steps, roles, products, template, checklist, example, references and mapping to standards and models, and a list of tools. The mapping is only given as information to show that a Deployment Package has explicit links to ISO/IEC 29110–5, such as ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15289, or models such as the CMMI-DEV®[2)] developed by the Software Engineering Institute. Hence, by deploying and implementing a package, a VSE can see its concrete step to achieve or demonstrate coverage to ISO/IEC 29110–5. Deployment Packages are designed such that a VSE can implement its content, without having to implement the complete framework at the same time. The table of content of a system engineering deployment package is illustrated in Table A.1.

Table A.1 — Table of Content of a Software Engineering Deployment Package

1. Technical Description
   - Purpose of this document
   - Why this Topic is important?
2. Definitions
3. Relationships with ISO/IEC 29110
4. Overview of Processes, Activities, Tasks, Roles and Products
5. Description of Processes, Activities, Tasks, Steps, Roles and Products
   - Role Description
   - System Description
   - Artefact Description
6. Template(s)
7. Example(s)
8. Checklist(s)
9. Tool(s)
10. References to other Standards and Models (e.g. ISO 9001, ISO/IEC/IEEE 12207, CMMI-DEV®)
11. References
12. Evaluation form

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

— added text is underlined;

— deleted/modified text is strike out as follow: ~~the text is strike out~~.

2) CMMI-DEV is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO.

Some Deployment Packages have been updated (e.g. Project Management) to include the modifications/additions to the Intermediate profile. These Deployment Packages are indicated by adding (Updated) in parentheses.

For the ~~Basic~~ Intermediate Profile, a set of Software Engineering Deployment Packages is available, at no cost, on the Internet:

a) Business Management;

b) Requirements Analysis;

c) Architecture and Detailed Design;

d) Construction and Unit Testing;

e) Integration and Test;

f) Verification and Validation;

g) ~~Version Control~~ Configuration Management;

h) Project Management;

i) Product Delivery;

j) Acquisition Management;

k) Self-Assessment.

Annex B
(informative)

Mapping between the objectives of ISO/IEC TR 29110-5-1-3 and ISO/IEC/IEEE 12207 and ISO 9001

B.1 General

This annex present the mapping between the objectives of ISO/IEC TR 29110-5-1-3 and the base standard used to develop this profile (e.g. ISO/IEC/IEEE 12207 and ISO 9001).

NOTE 1 The objectives of the Basic profile (first edition) were followed by a square box that includes a list of the chosen processes for the Basic profile from ISO/IEC/IEEE 12207 and its outcomes related to the objective.

NOTE 2 Alignment of this document with ISO/IEC 29110-4-1 will be verified once the Intermediate profile is specified in ISO/IEC 29110-4-1.

B.2 Business Management (BM) objectives

BM.O1. Initiate and sustain necessary, sufficient and suitable projects in order to meet the objectives of the VSE.

6.2.3 Project Portfolio Management Process

a) Business venture opportunities, investments or necessities are qualified and prioritized.

b) Projects are identified.

c) Resources and budgets for each project are allocated.

[ISO/IEC/IEEE 12207:2016, 6.2.3]

4.2 ***Understanding the needs and expectations of interested parties***

Due to their effect or potential effect on the organization's ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements, the organization shall determine:

a) the interested parties that are relevant to the quality management system;

b) the requirements of these interested parties that are relevant to the quality management system

4.4.1 *The organization shall establish, implement, maintain and continually improve a quality management system, including the processes needed and their interactions, in accordance with the requirements of this document.*

The organization shall determine the processes needed for the quality management system and their application throughout the organization, and shall:

d) determine the resources needed for these processes and ensure their availability;

f) address the risks and opportunities as determined in accordance with the requirements of 6.1;

[ISO 9001:2015, 4.2, 4.4.1]

NOTE The re-application of existing knowledge is known as knowledge reuse and includes the reuse of software elements (ISO/IEC/IEEE 12207).