

---

---

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

Part 5-6-3:  
**Systems engineering: Management  
and engineering guide: Generic profile  
group: Intermediate profile**





**COPYRIGHT PROTECTED DOCUMENT**

© ISO/IEC 2019

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

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vi</b>
<b>1 Scope</b> .....	<b>1</b>
1.1 Fields of application .....	1
1.2 Target audience .....	1
<b>2 Normative references</b> .....	<b>2</b>
<b>3 Terms and definitions</b> .....	<b>2</b>
<b>4 Conventions and abbreviated terms</b> .....	<b>4</b>
4.1 Naming, diagramming and definition conventions .....	4
4.2 Notation used to document new processes, additions and modifications to the Basic profile processes .....	6
4.3 Abbreviated terms .....	6
<b>5 Systems Thinking</b> .....	<b>7</b>
<b>6 Overview</b> .....	<b>8</b>
<b>7 Business Management (BM) process</b> .....	<b>10</b>
7.1 BM purpose.....	10
7.2 BM objectives .....	10
7.3 BM input work products.....	11
7.4 BM output work products .....	11
7.5 BM internal work products.....	11
7.6 BM roles involved .....	12
7.7 BM process description.....	12
7.7.1 BM diagram .....	12
7.7.2 BM activities .....	13
7.7.3 BM incorporation to the Organisational Repository.....	18
<b>8 Project Management (PM) process</b> .....	<b>19</b>
8.1 PM purpose.....	19
8.2 PM objectives.....	19
8.3 PM input work products.....	20
8.4 PM output work products .....	20
8.5 PM internal work products .....	20
8.6 PM roles involved.....	21
8.7 PM diagram.....	21
8.8 PM activities.....	22
8.8.1 General.....	22
8.8.2 PM incorporation to Project Repository.....	31
<b>9 System Definition and Realisation (SR) process</b> .....	<b>31</b>
9.1 SR purpose.....	31
9.2 SR objectives .....	31
9.3 SR input work products.....	32
9.4 SR output work products .....	32
9.5 SR internal work products .....	32
9.6 SR roles involved .....	33
9.7 SR diagram.....	33
9.7.1 General.....	33
9.7.2 SR activities .....	34
9.7.3 SR incorporation to the Project Repository.....	46
<b>10 Acquisition Management process (AM)</b> .....	<b>47</b>
10.1 AM purpose.....	47
10.2 AM objective.....	47

10.3	AM input work products.....	47
10.4	AM output work products.....	47
10.5	AM internal work products.....	48
10.6	AM roles involved.....	48
10.7	AM diagrams.....	48
	10.7.1 General.....	48
	10.7.2 AM incorporation to the <i>Project Repository</i> .....	51
<b>11</b>	<b>Roles.....</b>	<b>51</b>
<b>12</b>	<b>Work product description.....</b>	<b>53</b>
<b>13</b>	<b>System tools requirements.....</b>	<b>79</b>
	13.1 System tools requirements overview.....	79
	13.2 Project Management process.....	79
	13.3 System Definition and Realisation process.....	80
	<b>Annex A (informative) Systems engineering deployment packages.....</b>	<b>81</b>
	<b>Annex B (informative) Mapping between the objectives of this document and ISO/IEC/IEEE 15288 and ISO 9001.....</b>	<b>83</b>
	<b>Bibliography.....</b>	<b>92</b>

## Foreword

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

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://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](http://www.iso.org/patents)) or the IEC list of patent declarations received (see <http://patents.iec.ch>).

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

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

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

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

Very Small Entities (VSEs) around the world are contributing to valuable products and services. For the purpose of ISO/IEC 29110 (all parts), a Very Small Entity (VSE) is an enterprise, an organisation, a department or a project having up to 25 people. Since many VSEs develop and/or maintain system elements and software components used in systems, or sold to be used by others, a 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 organisation in all countries world-wide, accounting for over 95 % and up to 99 % of the business population depending on country’. The challenge facing OECD governments is to provide a business environment that supports the competitiveness of this large heterogeneous business population and that promotes a vibrant entrepreneurial culture.

From studies and surveys conducted, it is clear that the majority of International Standards do not address the needs of VSEs. Implementation of and conformance with these standards is difficult, if not impossible. Subsequently 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 often cut off 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 application of 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 systems or software lifecycle processes. To rectify some of these difficulties, a set of guides has been developed according to 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; and processes, activities, tasks, and outcomes of ISO/IEC/IEEE 15288 for systems; and information products (documentation) of ISO/IEC/IEEE 15289 for software and systems.

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

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

ISO/IEC 29110 (all parts) is intended to be used with any lifecycles 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 (all parts) target audience**

The ISO/IEC 29110 series	Title	Target audience
ISO/IEC 29110-1	Overview	VSEs and their customers, assessors, standards producers, tool vendors and methodology vendors.

Table 1 (continued)

The ISO/IEC 29110 series	Title	Target audience
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 29110-5	Management, engineering and service delivery guidelines	VSEs and their customers.
ISO/IEC 29110-6	Profile specifications	VSEs, customers, standards producers, tool vendors and methodology vendors.
ISO/IEC 29110-7	Specific profile guidelines	VSEs and their customers.

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

ISO/IEC TR 29110-1 defines the terms common to the Set of ISO/IEC 29110 Documents. 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-m 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-m defines certification schemes, assessment guidelines and compliance requirements for process capability assessment, conformity assessments, and self-assessments for process improvements. ISO/IEC 29110-3-m 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-m 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-n provides a management and engineering guide for each profile in one profile group.

ISO/IEC 29110-6-m provides the specification for specific profiles that are based on subsets of appropriate standards elements.

ISO/IEC TR 29110-7-m provides a guide for each profile in the specific profile group.

This document provides a management and engineering guide for the systems engineering Intermediate profile of the generic profile group. This guide is oriented towards 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 Technical Reports (TR). The Framework document, profile specifications and certification schemes are published as International Standards (IS).

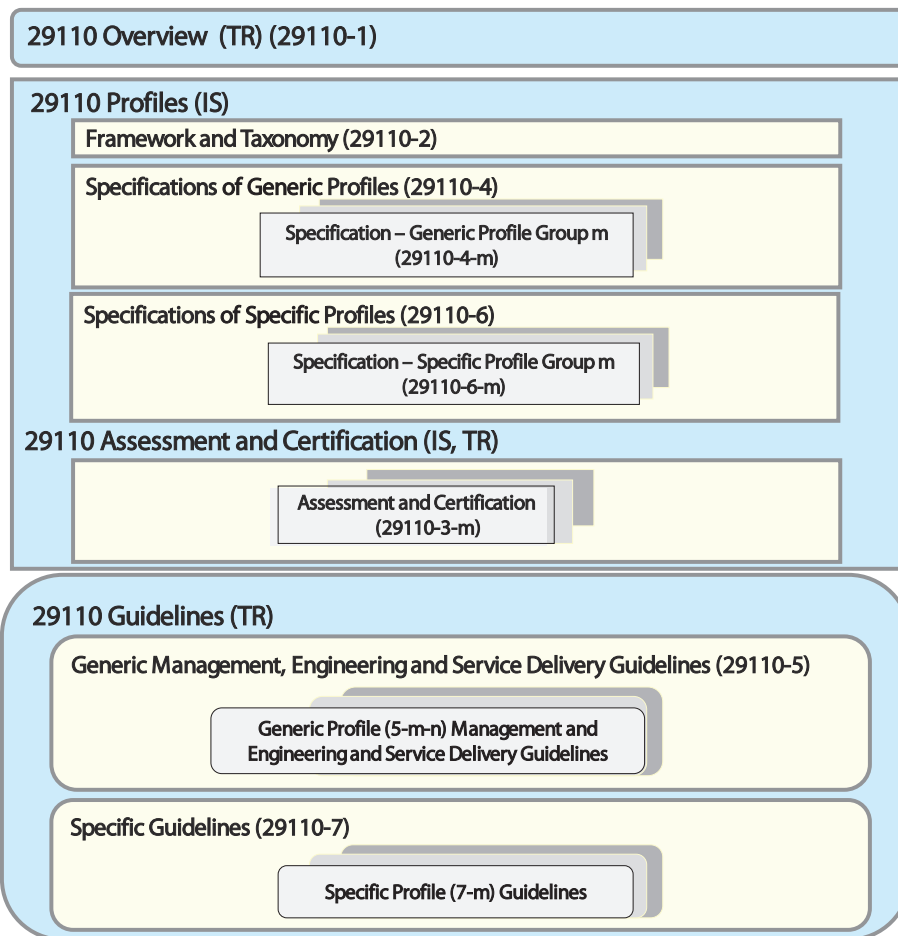


Figure 1 — The ISO/IEC 29110 Series



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

## Part 5-6-3:

### Systems engineering: Management and engineering guide: Generic profile group: Intermediate profile

## 1 Scope

### 1.1 Fields of application

This document provides management and engineering guidance within the Intermediate profile for the Business Management, Project Management, System Definition and Realisation and Acquisition Management processes.

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

This document has been developed using the management and engineering guide from the systems engineering Basic profile. Elements were added or modified (e.g. process, task, work product, role) to support VSEs involved in the development of more than one project in parallel with more than one work team.

This guide is oriented towards the management of more than one project in parallel with more than one work team.

This document applies for the development of non-critical systems.

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

- An agreed set of project requirements (technical part of contract) and expected work products are agreed by the Acquirer.
- A disciplined management process, that provides project visibility and corrective actions of project problems and deviations, is performed.
- A systematic System Definition and Realisation process, that satisfies Acquirer needs and helps ensure quality work products, is followed.

Once the system, 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.

In the context of systems engineering, that is the System Definition and Realisation (SR) process, the group that is part of the VSE responsible for developing software elements that are part of the system are encouraged to use the management and engineering guide of the software engineering Intermediate profile (ISO/IEC TR 29110-5-1-3).

### 1.2 Target audience

This document is targeted at VSEs that do not develop critical systems and have little or no experience with systems engineering (SE) process planning and implementation using ISO/IEC/IEEE 15288.

This document is also targeted to VSEs which are familiar with management and engineering guide of the systems engineering Basic profile (ISO/IEC TR 29110 5-6-2) for their system 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 processes, techniques and methods that enhance the VSE's Stakeholder satisfaction and productivity.

## **2 Normative references**

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

ISO/IEC 29110-2-1, *Software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 2-1: Framework and taxonomy*