International Standard

ISO/IEC 29110-1-1

First edition
2024-05

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

Part 1-1: Overview

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

Partie 1-1: Aperçu général

Reference number
ISO/IEC 29110-1-1:2024(en)

© ISO/IEC 2024



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2024

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
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Abbreviated terms **1**

5 VSE Characteristics and VSE potential benefits **1**
5.1 VSE characteristics 1
5.2 VSE potential benefits 2

6 Lifecycle process concepts **2**
6.1 General 2
6.2 Systems concepts 2
6.3 Life cycle models and stages 2
6.4 Life cycle product types 2

7 Process improvement and assessment concepts **3**
7.1 Process improvement concepts 3
7.2 Capability assessment concepts 3
7.3 Conformity assessment 3

8 Standardization concepts **4**
8.1 General 4
8.2 Standard 4
8.3 Guidelines 4
8.4 Profile 4
8.5 Profile group 4
8.6 Generic profile group 4
8.7 Use of profiles 5
8.8 Conformity to profiles 5

9 Catalogue of VSE profile-based documents **5**
9.1 General 5
9.2 Profile-based documents 5
9.3 The software engineering generic profile group 6
9.3.1 General 6
9.3.2 The Entry profile 6
9.3.3 The Basic profile 6
9.3.4 The Intermediate profile 7
9.3.5 The Advanced profile 7
9.3.6 The agile profile 7
9.4 The systems engineering generic profile group 7
9.4.1 General 7
9.4.2 The Entry profile 7
9.4.3 The Basic profile 7
9.4.4 The Intermediate profile 7
9.4.5 The Advanced profile 7
9.5 The organizational management profile group 7
9.6 The service delivery profile group 8
9.7 Specific profile group — The space profile 8

10 Overview of the ISO/IEC 29110 series **8**
10.1 General 8
10.2 Profile specific documents 8
10.2.1 VSE profiles 8
10.2.2 Generic profile group 8

© ISO/IEC 2024 – All rights reserved

10.2.3 Profile specifications 8
10.2.4 Management and engineering guidelines 8
10.2.5 Product line engineering 9
10.3 Introductory documents 9
10.3.1 Overview 9
10.3.2 Vocabulary 9
10.4 Framework 9
10.5 Domain specific profile 9
10.6 Certification and assessment guidelines 9
10.6.1 Guidelines 9
10.6.2 Certification guidelines 10
10.6.3 Assessment guidelines 10
10.6.4 Framework of autonomy-based improvement 10
10.7 Specific profile guidelines 10
Annex A (informative) **Reference works** **11**
Bibliography **13**

© ISO/IEC 2024 – All rights reserved

Foreword

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

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

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO and IEC had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents and https://patents.iec.ch. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

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

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 07, *Software and systems engineering*.

This edition of ISO/IEC 29110-1-1, together with ISO/IEC 29110-1-2, cancels and replaces ISO/IEC TR 29110-1:2016, which has been technically revised.

The main changes are as follows:

— addition of concepts from parts of the ISO/IEC 29110 series published since the publication of the ISO/IEC TR 29110-1:2016.

A list of all parts in the ISO/IEC 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.

© ISO/IEC 2024 – All rights reserved

Introduction

For the ISO/IEC 29110 series, a very small entity (VSE) is an enterprise, an organization (e.g. government agency, non-profit 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, a recognition of VSEs as suppliers of high-quality products is required.

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

From studies and surveys conducted, the majority of International Standards did not address the needs of VSEs. Implementation of and conformity with these standards was difficult, if not impossible. See Annex A for additional information.

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

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

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

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

The ISO/IEC 29110 series is intended to be used with any 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. Figure 1 describes the ISO/IEC 29110 series and positions the parts within the framework of reference.

© ISO/IEC 2024 – All rights reserved

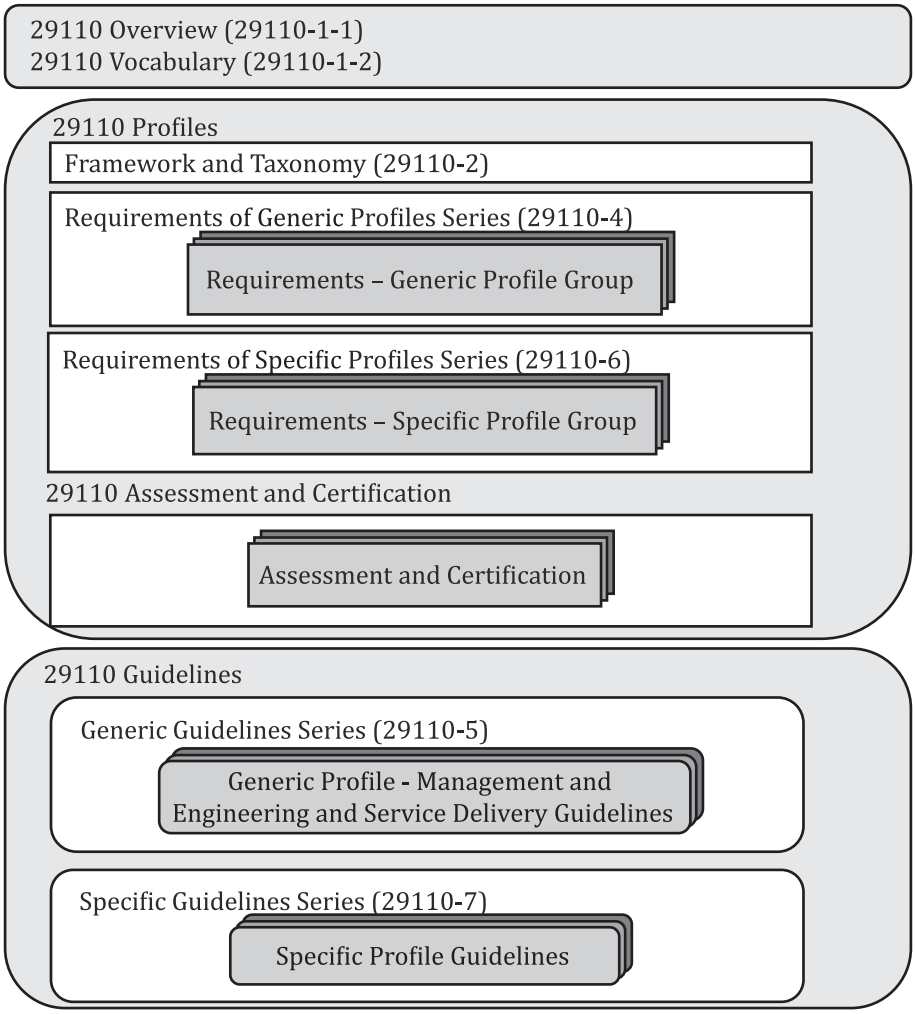


Figure 1 — ISO/IEC 29110 series

The life cycle processes defined in the ISO/IEC 29110 series can be used by a VSE when developing, acquiring and using, as well as when creating and supplying systems, having hardware and software elements. They can be applied at any level in a systems development, software's structure and at any stage in the life cycle. The life cycle processes defined in the ISO/IEC 29110 series are not intended to preclude or discourage the use of additional processes that a VSE finds useful.

This document is targeted both at the general audience wishing to understand the ISO/IEC 29110 series of documents, and more specifically, at users of the ISO/IEC 29110 series.

© ISO/IEC 2024 – All rights reserved

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

Part 1-1: Overview

1 Scope

This document establishes the major concepts required to understand and use the ISO/IEC 29110 series. It specifies the characteristics and requirements of a VSE, and clarifies the rationale for VSE-specific profiles, documents, profile specifications and guidelines.

This document introduces the taxonomy (catalogue) of ISO/IEC 29110 profiles and the ISO/IEC 29110 series.

This document is applicable to a VSE but can also be used by an entity that is larger than a VSE.

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 29110-1-2, *Standard atmospheres for conditioning and/or testing — Specifications*

3 Terms and definitions

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

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

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

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

4 Abbreviated terms

PLE	product line engineering
SSPL	software and systems product line
VSE	Very Small Entity

5 VSE Characteristics and VSE potential benefits

5.1 VSE characteristics

VSEs are subject to a number of characteristics, needs and desirable competencies that affect the contents, the nature and the extent of their activities. The profiles address a subset of VSEs which are described through the following characteristics, needs, and desirable competencies, classified in four categories: finance and resources, customer interface, internal business processes, and learning and growth. Amplification of these

© ISO/IEC 2024 – All rights reserved