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Software and systems engineering — Reference model for product line engineering and management

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Software and systems engineering — Reference model for product line engineering and management

*Ingénierie du logiciel et des systèmes — Modèle de référence pour
l'ingénierie et la gestion de lignes de produits*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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.

ISO/IEC 26550 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

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Introduction

Software and Systems Product Line (SSPL) engineering and management creates, exploits, and manages a common platform to develop a family of products (e.g., software products, systems architectures) at lower cost, reduced time to market, and with better quality. As a result, it has gained increasing global attention since 1990s.

This standard provides a reference model consisting of an abstract representation of the key processes of software and systems product line engineering and management and the relationships between the processes. The key characteristics of product line engineering are that there are domain and application engineering lifecycle processes and the explicit definition of product line variability. The goal of domain engineering is to define and implement domain assets commonly used by member products within a product line, while the goal of application engineering is to develop applications by exploiting the domain assets including common and variable assets. Domain engineering explicitly defines product line variability which reflects the specific needs of different markets and market segments. Variability may be embedded in domain assets and during application engineering they are exploited in accordance with the defined variability models.

The reference model for SSPL engineering and management can be used in subsequent standardization efforts to create high-level of abstraction standards (e.g. product management, scoping, requirements engineering, design, realization, verification and validation, organizational and technical management), medium-level of abstraction standards (e.g. configuration management, variability modeling, risk management, quality assurance, measurement, evaluation, asset repository), and detailed-level of abstraction standards (e.g. texture, configuration mechanism, asset mining) of software and systems product line engineering.

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Software and systems engineering — Reference model for product line engineering and management

1 Scope

This International Standard is the entry point of the whole suite of international standards for software and systems product line engineering and management.

The scope of this International Standard is to:

- provide the terms and definitions specific to software and systems product line engineering and management;
- define a reference model for the overall structure and processes of software and systems product line engineering and management, and describe how the components of the reference model fit together;
- define interrelationships between the components of the reference model.

This International Standard does not describe any methods and tools associated with software and systems product line engineering and management. Descriptions of such methods and tools will appear in the consecutive standards (ISO/IEC 26551 through 26556). This International Standard does not deal with terms and definitions addressed by ISO/IEC/IEEE 24765:2010 that provides a common vocabulary applicable to all systems and software engineering work.

Whenever this International Standard refers to “products”, it means “system-level products” consisting of software systems or both hardware and software systems. It may be useful for the engineering and management of product lines that consist of only hardware systems but it has not been explicitly created to support such hardware product lines. This International Standard is not intended to help the engineering, production, warehousing, logistics, and management of physical items that, possibly combined with software, comprise the products. These processes belong to other disciplines (e.g., mechanics, electronics).

NOTE Annex A provides further information on products.

This International Standard, including the reference model and the terms and definitions, has been produced starting from References [6], [7] and [8], which finally resulted in a broad consensus from National Member Bodies at the time of publication. In addition to this background process, structure from ISO/IEC 12207:2008, ISO/IEC 15288:2008, ISO/IEC 15940:2006 and ISO/IEC 14102:2008 has been used as a baseline.

2 Normative references

The following referenced documents are indispensable for the application 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 12207:2008, *Systems and software engineering — Software life cycle processes*

ISO/IEC 15288:2008, *Systems and software engineering — Systems life cycle processes*