INTERNATIONAL STANDARD

ISO/IEC 26555

Second edition
2015-12-01

Software and systems engineering — Tools and methods for product line technical management

Ingénierie du logiciel et des systèmes — Outils et méthodes pour le management technique des gammes de produits

Reference number
ISO/IEC 26555:2015(E)

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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).

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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 WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

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

This second edition cancels and replaces the first edition (ISO/IEC 26555:2013), of which it constitutes a minor revision.

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Introduction

The major purpose of this International Standard is to deal with the capabilities of tools and methods of software and systems product line (SSPL) Technical Management. This International Standard defines how the tools and methods can support for the software and systems product line-specific technical management processes. Since product lines deal with multiple products that have similarities, product lines have an unprecedented level of technical management complexities. This arises from the following sources:

— There are inherent differences in technical considerations because there are parallel development processes, domain and application engineering, in a product line and the two processes are tightly related with each other around assets.

— The close relationships among domain engineering, application engineering, and assets require the highly matured managerial capabilities for addressing relationships among them.

— There are lack of tools and methods to support the product line-specific technical management.

Technical management provides management support for a timely and proper deployment of product line in balance with pre-defined product line objectives such as reusability, reducing cost, improving quality, etc., as well as its planned cost, schedule, and resources. Technical management addresses actual means used to support, monitor, and control the activities of both domain engineering and application engineering of a product line.

There are needs for defining product line-specific technical management processes that integrate the involved product line disciplines with those for a single product. Furthermore, support of tools and methods are required so that a product line organization can perform technical management under the systematic control of complexities. This International Standard addresses the product line-specific processes in technical management by dividing those into *process management, variability management, asset management, and support management* areas with the guidance of a set of tools and methods capabilities for supporting tasks for product line technical management.

This International Standard is intended to benefit people who acquire, supply, develop, operate, and maintain tools and methods for product line technical management. This International Standard can be used in one or more of the following modes:

— By an organization intended to implement product lines—to understand, adopt, and enact the processes, tools, and methods for product line technical management. This also helps the organization to evaluate and select relevant tools and methods based on business and user-related criteria.

— By a tool vendor who facilitates or leverages product line engineering practices—to provide a set of tool capabilities that should be embodied in a tool for supporting product line technical management.

ISO/IEC 26550 addresses both engineering and management processes and covers the key characteristics of product line development. ISO/IEC 26550 provides an overview of the consecutive international standards (i.e. ISO/IEC 26551 to ISO/IEC 26556), as well as the structure of the model:

— Processes and capabilities of methods and tools for product line scoping, domain requirements engineering, and application requirements engineering are provided as ISO/IEC 26551.

— Processes and capabilities of methods and tools for domain design and application design are provided as ISO/IEC 26552.

— Processes and capabilities of methods and tools for domain realization and application realization are provided as ISO/IEC 26553.

— Processes and capabilities of methods and tools for domain verification and validation and application verification and validation are provided in ISO/IEC 26554.

— Processes and capabilities of methods and tools for technical management are provided in this International Standard.

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— Processes and capabilities of methods and tools for organizational management are provided in this International Standard.

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Software and systems engineering — Tools and methods for product line technical management

1 Scope

This International Standard deals with the tools and methods of technical management for software products, software services, software-intensive systems (including System Architecture and excluding hardware) within a product line. The scope of this International Standard is as follows:

— Enable the users of this standard to holistically understand, adopt, and enact the processes, tools, and methods for product line technical management. In addition, this International Standard helps the users evaluate and select relevant tools and methods based on business and user-related criteria.

— Help product line engineers, developers, and tool vendors become informed about capabilities of tools and methods that are required for supporting product line implementation from technical aspects.

— Provide product line-specific processes and capabilities of tools and methods in technical management.

This International Standard does not concern processes and capabilities of tools and methods for technical management for a one-of-a-kind system but rather deals with those belonging to a family of systems.

NOTE System Architecture is a set of logical and physical principles used to achieve a mission within a given environment. From System Architecture are derived components that can be subsystems, software products, human-based products like crew or operators or hardware product like mechanical structures, electronic boards, chemicals, etc. The scope of the International Standard spans from the system, to sub-systems, and software products. Other types of components and especially those related to human beings and to hardware parts are not within the scope of this International Standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

There are no normative references cited in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
application engineering process
processes for developing a member product in a product line

3.2
attached process
process definitions how each asset will be used in application

Note 1 to entry: The set of attached processes are those for orchestrating the assets together into a coherent whole application.

3.3
binding time
moment of variability resolution

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