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Software and systems engineering — Methods and tools for product line configuration management

Ingénierie du logiciel et des systèmes — Méthodes et outils pour la gestion des configurations de gammes de produits

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Foreword

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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 a lower cost, with reduced time to market and better quality. As a result, it has gained increasing global attention since the 1990s.

SSPL engineering and management maintain changes of commonality and variability of a product line as well as multiple different products derived from the product line. The impacts of the changes in commonality and variability are on each product of a product line, and they are different for each product. Thus, the complexity of configuration management in SSPL is high, and configuration management for a single system that is not aware of these aspects cannot manage configurations of a product line. This document deals with configuration management methods and tools that are aware of these aspects.

This document can be used in the following modes:

— to provide guidance on how to identify, control, report, and evaluate configurations of a product line by organizations that want to adopt SSPL for producing their products;

— to provide guidance on the evaluation and selection for methods and tools for product line configuration management by a product line organization;

— to provide guidance on implementing or developing methods and/or tools by specifying a comprehensive set of methods and tools capabilities for supporting product line configuration management by either providers of methods or tools, or both.

The ISO/IEC 26550 family of standards addresses both engineering and management processes and capabilities of methods and tools in terms of the critical characteristics of product line development. This document provides processes and capabilities of methods and tools for configuration management in product lines.

Other standards in the ISO/IEC 26550 family are as follows: ISO/IEC 26550, ISO/IEC 26551, ISO/IEC 26552, ISO/IEC 26553, ISO/IEC 26554, ISO/IEC 26555, ISO/IEC 26556, ISO/IEC 26557, ISO/IEC 26558, ISO/IEC 26559, ISO/IEC 26560, ISO/IEC 26561, ISO/IEC 26562 and ISO/IEC 26564.

— Processes and capabilities of methods and tools for domain requirements engineering and application requirements engineering are provided in ISO/IEC 26551.

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

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

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

— Processes and capabilities of methods and tools for technical management are provided in ISO/IEC 26555.

— Processes and capabilities of methods and tools for organizational management are provided in ISO/IEC 26556.

— Processes and capabilities of methods and tools for variability mechanisms are provided in ISO/IEC 26557.

— Processes and capabilities of methods and tools for variability modelling are provided in ISO/IEC 26558.

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— Processes and capabilities of methods and tools for variability traceability are provided in ISO/IEC 26559.

— Processes and capabilities of methods and tools for product management are provided in ISO/IEC 26560.

— Processes and capabilities of methods and tools for product line transition management are provided in ISO/IEC 26562.

— Processes and capabilities of methods and tools for product line measurement are provided in ISO/IEC 26564.

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Software and systems engineering — Methods and tools for product line configuration management

1 Scope

This document, within the context of methods and tools that support the configuration management (CM) capability of software and systems product line engineering**:**

— specifies processes for product line CM (the processes are described in terms of purpose, inputs, tasks, and outcomes);

— specifies method capabilities to support the defined tasks of each process;

— specifies tool capabilities that automate or semi-automate tasks and methods.

This document does not concern the processes and capabilities of tools and methods for a single system but rather deals with those for a family of products.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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/

3.1
application asset
output of a specific application engineering process (e.g. application realization) that may be exploited in other lifecycle processes of application engineering and may be adapted as a *domain asset* (3.3) based on a product management decision

[SOURCE: ISO/IEC 26550:2015, 3.2, modified — Notes to entry have been removed.]

3.2
common configuration item
entity within a configuration that is common to all products

3.3
domain asset
output of domain engineering life cycle processes and can be reused in producing products during application engineering

[SOURCE: ISO/IEC 26550:2015, 3.11, modified — The alternative preferred term "core asset" and notes to entry have been removed.]

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3.4
product line configuration
snapshot of the product line that contains a collection of revisions of every *domain asset* (3.3) and member product in the product line

3.5
product line configuration delta
difference between the two versions of *product line configuration* (3.4)

3.6
product line configuration item
resulting artefacts that make up a product line

Note 1 to entry: Product line configuration item is a generic term for configuration items of domain engineering, application engineering, and managerial support.

3.7
product line configuration management
coordinated activities to direct and control *product line configuration* (3.4)

Note 1 to entry: Product line configuration management includes configuration management activities for domain engineering, application engineering, and organization and technical management.

[SOURCE: ISO/IEC TR 18018:2010, 3.7, modified — "product line" has been added in the term and in the definition; the abbreviated term has been removed; note 1 to entry has been added.]

3.8
variation in time
existence of different versions of a common or variable artefact at different times

Note 1 to entry: The variation in time dimension is synchronous with software evolution[24].

3.9
variable configuration item
entity within a configuration that is variable among products

3.10
variation in space
existence of different versions of a variable artefact in different shapes and used by different products

3.11
variability model
explicit definition for product line variability

[SOURCE: ISO/IEC 26550:2015, 3.27, modified — Note 1 to entry has been removed.]

4 Abbreviated terms

CM	configuration management
ConOps	concept of operations
PL	product line
SSPL	software and systems product line

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