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Software and systems engineering — Methods and tools for product line maturity framework

Ingénierie logiciel et système – Outils et méthodes pour un cadre de maturité d'une ligne 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.

To achieve the objectives of SSPL adoption, the performance of SSPL engineering and management should be evaluated and improved based on the results. The product line maturity framework guides to adopt and construct required constituents of product line process assessment and improvement, and it operates, appraises, and improves product line processes to align with the product line objectives. The product line maturity framework deals with a product family, so its focuses are on SSPL specific aspects such as domain and application engineering, variability management, business involvement, and collaboration among these aspects. Processes, activities, and tasks are necessary to utilize the product line maturity framework, and methods and tools to support them are required for enhancing the efficiency, collaboration, and application quality of the maturity framework.

This document can be used in the following modes:

— by organizations that want to adopt SSPL for producing their products – to provide guidance on how to adopt, construct, operate, appraise, and improve product line maturity framework;

— by a product line organization – to provide guidance on the evaluation and selection of methods and tools for adopting, constructing, operating, appraising, and improving product line maturity framework;

— by providers of either methods or tools, or both – to provide guidance on implementing or developing either methods or tools, or both, by specifying a comprehensive set of methods and tools capabilities for adopting, constructing, operating, appraising, and improving product line maturity framework.

Documents on product line engineering and management developed by ISO/IEC JTC 1 address 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 adopting, constructing, operating, appraising, and improving product line maturity framework. Standards in the ISO/IEC 26550 family include 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, ISO/IEC 26563, ISO/IEC 26564, and ISO/IEC 26566.

— 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;

— 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 line product management are provided in ISO/IEC 26560;

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— Processes and capabilities of methods and tools for product line technical probe are provided in ISO/IEC 26561;

— 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 configuration management are provided in ISO/IEC 26563;

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

— Processes and capabilities of methods and tools for product line texture are provided in ISO/IEC 26566 (International Standard under development);

— Others (ISO/IEC 26567 to ISO/IEC 26599): To be developed.

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Software and systems engineering — Methods and tools for product line maturity framework

1 Scope

This document, within the context of methods and tools that support adoption, construction, operation, and management of product line maturity framework, specifies:

— processes for managing, operationalizing, and supporting product line maturity framework adoption (those processes are described in terms of purpose, inputs, tasks, and outcomes);

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

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

This document does not concern the processes and capabilities of methods and tools 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 engineering
life cycle consisting of a set of processes in which the application assets and member products of the product line are implemented and managed by reusing domain assets in conformance to the domain architecture and by binding the *variability* (3.10) of the platform

[SOURCE: ISO/IEC 26550:2015, 3.4, modified — Note 1 to entry has been removed.]

3.2
binding
task to make a decision on relevant variants, which can be application assets, from domain assets using the domain *variability* (3.10) model and from application assets using the application variability model

[SOURCE: ISO/IEC 26550:2015, 3.8, modified — "will be" has been replaced by "can be"; note 1 to entry has been removed.]

3.3
commonality
set of functional and non-functional characteristics that is shared by all applications belonging to the product line

[SOURCE: ISO/IEC 26550:2015, 3.9]

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