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## Introduction

Model-based product line engineering (MBPLE) is a broad topic involving many stakeholders. For most companies, MBPLE's transformational nature concerns almost all engineering activities and operations. Leaders need to understand MBPLE to plan and implement it strategically, as well as to understand and frame its application. But MBPLE principles, concepts, and methods must also be understood by a wider population, including the following:

Process owners who create and adapt MBPLE methods and tools to meet organization-specific requirements.

Engineers who use MBPLE methods directly to create feature models and shared assets supersets.

Engineers and product owners who develop parts of the product line.

Students who learn systems engineering, product line engineering (PLE), and model-based approaches.

This book discusses MBPLE as a central topic, covering all its facets, including the enabling factors for a successful implementation of MBPLE in an organization. For readers who are new to the topic or who would like to acquire a broad understanding of MBPLE, reading the book following the order of the sections might be the best approach. However, readers who are interested in a particular topic or who have previous knowledge of PLE can browse freely through the different sections of the book.

Part I discusses the motivation of MBPLE, which is important for all MBPLE stakeholders. Like all engineering approaches, MBPLE is only a means to an end. Therefore, it is important and helpful to have a good understanding of the purpose of MBPLE.

Part II describes the fundamental concepts of MBPLE, independently of concrete implementations of modeling languages and tools. Like Part I, Part II is also an important reading for all MBPLE stakeholders. The chapters in Part II look at the historical development of model-based approaches and PLE, as well as relevant standards such as ISO/IEC 26550 (ISO/IEC 2015) and ISO/IEC 26580 (ISO/IEC 2021), which provide the framework wherein the MBPLE concepts are presented.

Part III explains the technical implementation of MBPLE and is of particular interest to those who use MBPLE directly. One focus is on the models with SysML, whereby both the widely used SysML v1 and the new SysML v2 are used.

Part IV explains the adoption of MBPLE in organizations, a significant topic for leadership roles. The chapters consider both the investment and return on investment of introducing MBPLE, the processes, the methods, the organization, the information model, and the tool chains. This part is

rounded off by a chapter with an interview of two PLE pioneers, Dr. Danilo Beuche from PTC and Dr. Charles Krueger from Big Lever Software.

Part V intends to show that the book presents MBPLE not only in theory but also in real-life practice. Five chapters focus on industrial cases about adopting MBPLE from five different organizations.

In the appendix, a glossary lists the most important MBPLE terms for reference.

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## References

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