




# **Software Product-Line Engineering**

**A Family-Based Software  
Development Process**



**David M. Weiss**  
**Chi Tau Robert Lai**

Foreword by David Lorge Parnas

# Software Product Line Engineering A Family Based Software Development Process

**Awais Rashid, Jean-Claude  
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## **Software Product Line Engineering A Family Based Software Development Process:**

Software Product Lines Patrick Donohoe, 2012-12-06 Software product lines are emerging as a critical new paradigm for software development. Product lines are enabling organizations to achieve impressive time to market gains and cost reductions. With the increasing number of product lines and product line researchers and practitioners, the time is right for a comprehensive examination of the issues surrounding the software product line approach. The Software Engineering Institute at Carnegie Mellon University is proud to sponsor the first conference on this important subject. This book comprises the proceedings of the First Software Product Line Conference SPLC1 held August 28-31, 2000 in Denver, Colorado, USA. The twenty-seven papers of the conference technical program present research results and experience reports that cover all aspects of software product lines. Topics include business issues, enabling technologies, organizational issues, and life cycle issues. Emphasis is placed on experiences in the development and fielding of product lines of complex systems, especially those that expose problems in the design, development, or evolution of software product lines. The book will be essential reading for researchers and practitioners alike. *Software Product-line Engineering* David M. Weiss, Chi-Tau Robert Lai, 1999 illustrates a process that has been successfully applied to reduce costs for organizations that develop large programming systems. With the help of this book, many more can learn how to exploit the idea of program families and bring about a substantial improvement in the state of practice in the software industry. David Lorge Parnas. Many organizations have mastered the practice of software development, yet few have become truly efficient at software production. With the adoption of an efficient, systematic software production method, organizations can gain significant competitive advantages, including reduced time to market, better schedule predictability, more reliable code, and decreased costs. *Software Product Line Engineering* provides the actionable information and proven tactics necessary to effect organizational change and make your future software projects more successful. The authors outline a systematic method for rapid software production through the FAST (Family Oriented Abstraction Specification and Translation) process, a revolutionary commercial product developed at AT&T that continues to evolve at Lucent Technologies. FAST uses practical domain engineering to decouple *Proceedings of the Estonian Academy of Sciences, Engineering*, 2005-12. **UML-Based Software Product Line Engineering with SMarty** Edson Oliveira Jr., 2023-02-06 This book is about software product lines (SPLs) designed and developed taking UML diagrams as the primary basis, modeled according to a rigorous approach composed of an UML profile and a systematic process for variability management activities forming the Stereotype-based Management of Variability (SMarty) approach. The book consists of five parts. Part I provides essential concepts on SPL in terms of the first development methodologies. It also introduces variability concepts and discusses SPL architectures, finishing with the SMarty approach. Part II is focused on the design verification and validation of SMarty SPLs, and Part III concentrates on the SPL architecture evolution based on ISO/IEC metrics, the SysTEM/PLA method, optimization with the MOA4PLA method, and feature interaction prevention. Next, Part IV

presents SMarty as a basis for SPL development such as the M SPLearning SPL for mobile learning applications the PLeTs SPL for testing tools the PlugSPL plugin environment for supporting the SPL life cycle the SyMPLES approach for designing embedded systems with SysML the SMartySPeM approach for software process lines SPeL and re engineering of class diagrams into an SPL Eventually Part V promotes controlled experimentation in UML based SPLs presenting essential concepts on how to plan conduct and document experiments as well as showing several experiments carried out with SMarty This book aims at lecturers graduate students and experienced practitioners Lecturers might use the book for graduate level courses about SPL fundamentals and tools students will learn about the SPL engineering process variability management and mass customization and practitioners will see how to plan the transition from single product development to an SPL based process how to document inherent variability in a given domain or how to apply controlled experiments to SPLs *Software Product Lines* Robert L. Nord, 2004-07-30 This book constitutes the refereed proceedings of the Third International Software Product Line Conference SPLC 2004 held in Boston MA USA in August September 2004 The 18 revised full technical papers presented together with a keynote abstract and summaries of panels tutorials and workshops were carefully reviewed and selected for inclusion in the book Organized in sections on business architecture and quality assurance the papers address topics ranging from how to start a software product line in a company to case studies of mature product lines and the technology used to test strategies of product lines to strategies and notations for creating product line architectures and to the importance of binding times in creating product lines *Software Product Lines* Robert Nord, 2004-08-18 This book constitutes the refereed proceedings of the Third International Software Product Line Conference SPLC 2004 held in Boston MA USA in August September 2004 The 18 revised full technical papers presented together with a keynote abstract and summaries of panels tutorials and workshops were carefully reviewed and selected for inclusion in the book Organized in sections on business architecture and quality assurance the papers address topics ranging from how to start a software product line in a company to case studies of mature product lines and the technology used to test strategies of product lines to strategies and notations for creating product line architectures and to the importance of binding times in creating product lines Applied Software Product Line Engineering Kyo C. Kang, Vijayan Sugumaran, Sooyong Park, 2009-12-22 Over the last decade software product line engineering SPLe has emerged as one of the most promising software development paradigms for increasing productivity in IT related industries Detailing the various aspects of SPLe implementation in different domains Applied Software Product Line Engineering documents best practices with regard to syst *Software Product Lines* Gary J. Chastek, 2003-08-02 Software product lines are emerging as an important new paradigm for software development Product lines are enabling organizations to achieve impressive time to market gains and cost reductions In 1997 we at the Software Engineering Institute SEI launched a Product Line Practice Initiative Our vision was that product line development would be a low risk high return proposition for the entire software engineering community It was our hope from the beginning that there

would eventually be sufficient interest to hold a conference The First Software Product Line Conference SPLC1 was the realization of that hope Since SPLC1 we have seen a growing interest in software product lines Companies are launching their own software product line initiatives product line technical and business practices are maturing product line tool vendors are emerging and books on product lines are being published Motivated by the enthusiastic response to SPLC1 and the increasing number of software product lines and product line researchers and practitioners the SEI is proud to sponsor this second conference dedicated to software product lines We were gratified by the submissions to SPLC2 from all parts of the globe from government and commercial organizations From these submissions we were able to assemble a rich and varied conference program with unique opportunities for software product line novices experts and those in between This collection represents the papers selected from that response and includes research and experience reports Software Product Line Abdelrahman Elfaki, 2012-04-04 The Software Product Line SPL is an emerging methodology for developing software products Currently there are two hot issues in the SPL modelling and the analysis of the SPL Variability modelling techniques have been developed to assist engineers in dealing with the complications of variability management The principal goal of modelling variability techniques is to configure a successful software product by managing variability in domain engineering In other words a good method for modelling variability is a prerequisite for a successful SPL On the other hand analysis of the SPL aids the extraction of useful information from the SPL and provides a control and planning strategy mechanism for engineers or experts In addition the analysis of the SPL provides a clear view for users Moreover it ensures the accuracy of the SPL This book presents new techniques for modelling and new methods for SPL analysis

**Model-Driven Software Development** Markus Völter, Thomas Stahl, Jorn Bettin, Arno Haase, Simon Helsen, 2013-06-26 Model Driven Software Development MDSD is currently a highly regarded development paradigm among developers and researchers With the advent of OMG's MDA and Microsoft's Software Factories the MDSD approach has moved to the centre of the programmer's attention becoming the focus of conferences such as OOPSLA JAOO and OOP MDSD is about using domain specific languages to create models that express application structure or behaviour in an efficient and domain specific way These models are subsequently transformed into executable code by a sequence of model transformations This practical guide for software architects and developers is peppered with practical examples and extensive case studies International experts deliver A comprehensive overview of MDSD and how it relates to industry standards such as MDA and Software Factories Technical details on meta modeling DSL construction model to model and model to code transformations and software architecture Invaluable insight into the software development process plus engineering issues such as versioning testing and product line engineering Essential management knowledge covering economic and organizational topics from a global perspective Get started and benefit from some practical support along the way Generative and Component-Based Software Engineering Greg Butler, Stan Jarzabek, 2003-06-30 This book constitutes the thoroughly refereed

post proceedings of the Second International Symposium on Generative and Component Based Software Engineering GCSE 2000 held in Erfurt Germany in October 2000 The twelve revised full papers presented with two invited keynote papers were carefully reviewed and selected from 29 submissions The book offers topical sections on aspects and patterns models and paradigms components and architectures and Mixin based composition and metaprogramming Aspect-Oriented, Model-Driven Software Product Lines Awais Rashid, Jean-Claude Royer, Andreas Rummler, 2011-09-08 Software product lines provide a systematic means of managing variability in a suite of products They have many benefits but there are three major barriers that can prevent them from reaching their full potential First there is the challenge of scale a large number of variants may exist in a product line context and the number of interrelationships and dependencies can rise exponentially Second variations tend to be systemic by nature in that they affect the whole architecture of the software product line Third software product lines often serve different business contexts each with its own intricacies and complexities The AMPLE <http://www.ample-project.net> approach tackles these three challenges by combining advances in aspect oriented software development and model driven engineering The full suite of methods and tools that constitute this approach are discussed in detail in this edited volume and illustrated using three real world industrial case studies **Model Driven Engineering Languages and Systems** Gregor Engels, 2007-09-13 This book constitutes the refereed proceedings of the 10th International Conference on Model Driven Engineering Languages and Systems formerly the UML series of conferences MODELS 2007 held in Nashville USA September 30 October 5 2007 The 45 revised full papers were carefully reviewed and selected from 158 initial submissions The papers are organized in topical sections Engineering Modeling Languages Benoit Combemale, Robert France, Jean-Marc Jézéquel, Bernhard Rumpe, James Steel, Didier Vojtisek, 2016-11-17 Written by foremost experts in the field Engineering Modeling Languages provides end to end coverage of the engineering of modeling languages to turn domain knowledge into tools The book provides a definition of different kinds of modeling languages their instrumentation with tools such as editors interpreters and generators the integration of multiple modeling languages to achieve a system view and the validation of both models and tools Industrial case studies across a range of application domains are included to attest to the benefits offered by the different techniques The book also includes a variety of simple worked examples that introduce the techniques to the novice user The book is structured in two main parts The first part is organized around a flow that introduces readers to Model Driven Engineering MDE concepts and technologies in a pragmatic manner It starts with definitions of modeling and MDE and then moves into a deeper discussion of how to express the knowledge of particular domains using modeling languages to ease the development of systems in the domains The second part of the book presents examples of applications of the model driven approach to different types of software systems In addition to illustrating the unification power of models in different software domains this part demonstrates applicability from different starting points language business knowledge standard etc and focuses on different software engineering

activities such as Requirement Engineering Analysis Design Implementation and V V Each chapter concludes with a small set of exercises to help the reader reflect on what was learned or to dig further into the examples Many examples of models and code snippets are presented throughout the book and a supplemental website features all of the models and programs and their associated tooling discussed in the book

**Managing Corporate Information Systems Evolution and Maintenance** Khaled M. Khan,Yan Zhang,2005-01-01 This book addresses the recent developments in systems maintenance research and practices ranging from technicality of systems evolution to managerial aspects of the topic including issues such as evolving legacy systems to e business applying patterns for reengineering legacy systems to web architectural recovery of legacy systems evolving legacy systems into software components

**Software Technologies** Pascal Lorenz,Jorge Cardoso,Leszek A. Maciaszek,Marten van Sinderen,2016-02-24 This book constitutes the thoroughly refereed proceedings of the 10th International Joint Conference on Software Technologies ICSOFT 2015 held in Colmar France in July 2015 The 23 revised full papers presented were carefully reviewed and selected from 117 submissions The papers are organized around the following conference tracks enterprise software technologies software project management software engineering methods and techniques distributed and mobile software systems

**Computational Science and Its Applications -- ICCSA 2015** Osvaldo Gervasi,Beniamino Murgante,Sanjay Misra,Marina L. Gavrilova,Ana Maria Alves Coutinho Rocha,Carmelo Torre,David Taniar,Bernady O. Aduhan,2015-06-18 The five volume set LNCS 9155 9159 constitutes the refereed proceedings of the 15th International Conference on Computational Science and Its Applications ICCSA 2015 held in Banff AB Canada in June 2015 The 232 revised full papers presented in 22 workshops and a general track were carefully reviewed and selected from 780 initial submissions for inclusion in this volume They cover various areas in computational science ranging from computational science technologies to specific areas of computational science such as computational geometry and security

**Unconventional Programming Paradigms** Jean-Pierre Banâtre,Pascal Fradet,Jean-Louis Giavitto,Olivier Michel,2005-08-25 Nowadays developers have to face the proliferation of hardware and software environments the increasing demands of the users the growing number of p grams and the sharing of information competences and services thanks to the generalization of databases and communication networks A program is no more a monolithic entity conceived produced and nalized before being used A p gram is now seen as an open and adaptive frame which for example can namically incorporate services not foreseen by the initial designer These new needs call for new control structures and program interactions Unconventional approaches to programming have long been developed in various niches and constitute a reservoir of alternative ways to face the programming languages crisis New models of programming e g bio inspired computing ti cial chemistry amorphous computing are also currently experiencing a renewed period of growth as they face speci c needs and new application mains These approaches provide new abstractions and notations or develop new ways of interacting with programs They are implemented by embedding new sophisticated data structures in a classical

programming model API by extending an existing language with new constructs to handle concurrency ceptions open environments by conceiving new software life cycles and program executions aspect weaving run time compilation or by relying on an entire new paradigm to specify a computation They are inspired by theoretical considerations e g topological algebraic or logical foundations driven by the domain at hand domain speci c languages like PostScript musical notation animation signal processing etc or by metaphors taken from various areas quantum computing computing with molecules information processing in ological tissues problem solving from nature ethological and social modeling

*Evolving Software Systems* Tom Mens,Alexander Serebrenik,Anthony Cleve,2014-01-08 During the last few years software evolution research has explored new domains such as the study of socio technical aspects and collaboration between different individuals contributing to a software system the use of search based techniques and meta heuristics the mining of unstructured software repositories the evolution of software requirements and the dynamic adaptation of software systems at runtime Also more and more attention is being paid to the evolution of collections of inter related and inter dependent software projects be it in the form of web systems software product families software ecosystems or systems of systems With this book the editors present insightful contributions on these and other domains currently being intensively explored written by renowned researchers in the respective fields of software evolution Each chapter presents the state of the art in a particular topic as well as the current research available tool support and remaining challenges The book is complemented by a glossary of important terms used in the community a reference list of nearly 1 000 papers and books and tips on additional resources that may be useful to the reader reference books journals standards and major scientific events in the domain of software evolution and datasets This book is intended for all those interested in software engineering and more particularly software maintenance and evolution Researchers and software practitioners alike will find in the contributed chapters an overview of the most recent findings covering a broad spectrum of software evolution topics In addition it can also serve as the basis of graduate or postgraduate courses on e g software evolution requirements engineering model driven software development or social informatics

*Reuse of Off-the-Shelf Components* Maurizio Morisio,2006-07-25 This book constitutes the refereed proceedings of the 9th International Conference on Software Reuse ICSR 2006 held in Torino Italy in June 2006 The book presents 27 revised full papers and 13 revised short papers carefully reviewed and selected from numerous submissions The Coverage includes COTS selection and integration product lines domain analysis and variability reengineering maintenance programming languages and retrieval aspect oriented software development approaches and models and components



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web represent two unsigned 2 bit numbers the outputs are the four bits of the product of the input numbers express the logic functions for each term in the product on a karnaugh map of the four input variables hence design a multiplier circuit using 4 input nand and inverter gates only a 3 a 2 a1 a0 0001 1100

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web nov 15 2021 logic gates logic gates are used in a computer to transform the 1s and 0s from input wires it accepts inputs and then outputs are results based on their state the logic gate is a small transistor circuit that is part of different forms in an integrated circuit each type of gate has one or usually two inputs and one output

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