

# Using Feature Models for Product Derivation

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## 1. Motivation

In general the implementation of a software product line leads to a high degree of variability within the software architecture. For an effective development and deployment it is necessary to resolve variation points within the architecture and source code automatically during product/variant derivation. Given the complexity of most software systems tool support is necessary for these tasks.

Feature models are one of the most used modelling concepts for description of commonality and variability in the context of software product lines. Using the ideas of model driven development, the feature models can be used not only in domain analysis but also to drive the complex process of asset selection and configuration. Knowledge about benefits as well as the limits of these feature model-based derivation techniques as made available in the proposed tutorial helps users to choose the right technique for assets in their specific SPLD.

## 2. Contents

This tutorial shows how feature models combined with appropriate tools can provide this support [1]. At first the importance of the separation of problem space modelling and solution space modelling is discussed. Concepts how to connect both spaces using constraints and/or generative approaches are shown.

Furthermore some typical patterns of variability in the solution space are shown and their automatic resolution in common languages like C/C++ and Java is demonstrated. Integration of code generators, aspect-oriented programming and software configuration management systems into the derivation process is also discussed.

The tutorial is accompanied by short demonstrations of the presented concepts with freely available tools (AspectC++, fmp, OAW, pure::variants, XVLC) and thereby gives attendees an idea where to look when concepts are put into practice.

The tutorial concludes with a summary and a discussion.

## 3. Intended Audience

The tutorial is intended for practitioners from industry (SPL Novice to Intermediate). Attendees should have a basic understanding of software design. Some knowledge about software product lines in general is helpful.

## 4. References

[1] D. Beuche, H. Papajewski, and W. Schröder-Preikschat, "Variability management with feature models", *Science of Computer Programming*, Volume 53, Issue 3, Elsevier, December 2004, pp. 333-352.