Master's Thesis

## Integration of Feature Modeling and Static Code Analysis in the FORCE Tool Environment

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**Master-Thesis:**

FORCE (Feature-ORiented Component Engineering) is a development platform based on Eclipse intended to support software development and evolution in Industrial Software Ecosystems (ISECOs). It is currently under development in the CD Laboratory MEVSS in a cooperation with Keba AG. FORCE can be seen as a feature-based clone-and-own approach for managing multiple distributed product lines in SECOs.

FORCE is based on the following main elements:

1. *A feature-oriented modeling approach* which supports feature models, the hierarchical decomposition and modularization of features models, different kinds of relations and dependencies, as well as versioning of features and feature models.
2. *Configuration-aware static analysis* is based on code models that comprise an abstract syntax tree representation of the program code as well as a configuration-aware system dependency graph (CSDG) which represent all the control and data dependencies globally in a system.
3. *Feature-to-code mappings* connect feature model elements to source code elements and define how optional and alternative features are implemented.

The task of this master thesis now is to further refine the integration of feature models and configuration-aware static program analysis to further lift the full potentials of both approaches. Specifically, this will include

- model-to-code consistency checking to determine if feature models (including constraints) are still consistent with the actual code
- the identification of feature implementations in the code by analyzing variability information (e.g., preprocessor directives) to support feature elicitation
- and feature dependency analysis to discover feature dependencies at code level and shifting them to the model level.