



PROJECT RESULTS

System-family engineering

Achieving maturity and defining state of practice

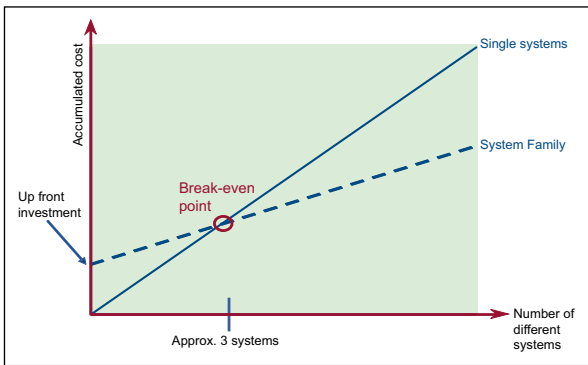
The FAMILIES project led to a large amount of models, methods, prototype tools and documented case studies emphasising the benefits of the system family approach to embedded software development. The resulting Family Evaluation Framework (FEF) can be used to assess the performance of a department in software product family engineering; and three books were published after project end addressing relevant education, best practices and research.

opportunities in rapidly changing markets. It is the only way out of the productivity gap originating from an increased demand for embedded software.

The family approach reduces development duplication at the expense of management of variability, which takes less effort. It leads to a reduction in development costs, product lead times and maintenance. In addition, reusing a lot of software improves products in several ways. Alignment and compatibility of products are improved through the simplicity of feature propagation and achievement of a common look and feel. And, since the software is used in many applications, it is tested in more situations, enhancing resulting product quality.

Applying the FAMILIES approach to all aspects of software development ensures improvement in overall software production. Consideration is given to the concerns of the business, the architecture, the process and the organisation. All led to methodology, models or documented case studies. The resulting improvements enable fast generation of software through managed reuse and mass software customisation by means of managed variability.

Methodology and support tools
The project resulted in a defined methodology, supported by models and prototype tools. This is all aimed at improving software architecture based on platform and variability management. In addition, it led to an improved insight into the separated processes and inter-process collaboration within software family engineering.



Economics

Software product family engineering has proven to be the ideal methodology for developing a diversity of software products and software-intensive systems at low cost, quickly and, at the same time, with high quality. FAMILIES was the final action in a series that includes two earlier ITEA projects: ESAPS and CAFÉ. Its aim was to consolidate the knowledge obtained in all three projects to the benefit of the whole software-intensive systems industry.

Reducing the productivity gap
European industry has identified the system family approach as one of the best ways to exploit business

FAMILIES (ITEA 02009)

Partners

- CEA
- European Software Institute
- Fraunhofer IESE
- ICT-Norway
- INRIA
- Ivorium
- Market Maker
- Nokia
- Philips
- Robert Bosch
- Siemens
- SOFTEAM
- Telvent
- Thales
- TU Wien
- Universidad Politécnica de Madrid
- University of Duisburg-Essen
- University of Helsinki
- VTT

Countries involved

- Austria
- Finland
- France
- Germany
- The Netherlands
- Norway
- Spain

Start of the project

July 2003

End of the project

June 2005



PROJECT RESULTS

Project partners reported the following improvements to support the productivity and quality improvements:

- Product cost reductions of 60 to 70%;
- Improved productivity by a factor of two to six times higher output;
- Investment reduction by an average 50%, and up to 90%;
- Product lead-time reductions by an average 50%, and up to 95%;
- Maintenance cost reduction;
- Portfolio complexity reduction;
- Training time reduction;
- Better product planning and use of roadmaps;
- Product defect density 50% or less; and
- Reuse of test cases from 40 to 60%.

The FAMILIES approach meant improvements also for development personnel. Product family engineering leads to a greater differentiation of software engineering jobs: domain engineering, dealing with the development of high quality components; applications engineering, dealing with the fast production of applications; and collaboration specialists. This diversity makes it easier to find the right place for the diversity of people in the organisation.

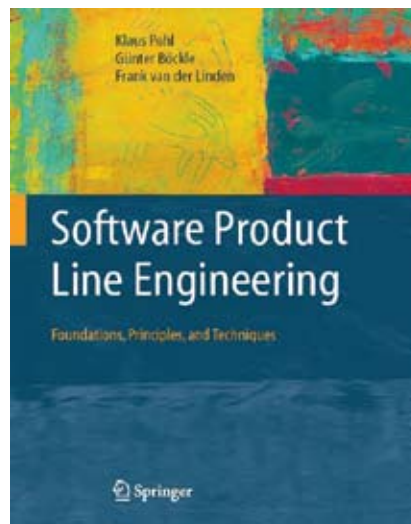
Consolidating state of practice

The project led to several European standards. The Family Evaluation Framework consolidates the state of practice in organisations in a

measurement tool. The Method catalogue provides an entry point to many methods usable in different parts of software product family engineering.

FAMILIES published four books addressing different audiences:

- German-language book – published in mid 2004;
- Education – in August 2005;
- Best practices – end 2006; and
- Research topics – mid 2006.



The project was involved in the steering committee and organisation of the yearly Software Product Line Conference (SPLC). In these events, Europe dominates attendance and papers, mainly originating from people that were active in the FAMILIES project.

Major project outcomes

Dissemination

- 18 papers in journal
- Four books
- 38 papers and presentations in conferences and workshops
- 18 additional presentations

Exploitation

- Improved software production in the companies: Increase productivity, quality & adaptability by all industrial partners
- Methods and improved consultation with clients for the consultancy companies
- Prototype tools at many partners. One marketable tool by a tool company, several open-source tools
- Courses and theses at universities

Standardisation

- 15 contributions to standardisation bodies: IEEE, OMG and CMMI

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