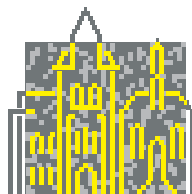


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(Editors)

Product Family Development

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Das Internationale Begegnungs- und Forschungszentrum für Informatik (IBFI) Schloss Dagstuhl ist eine gemeinnützige GmbH. Sie veranstaltet regelmäßig wissenschaftliche Seminare, welche nach Antrag der Tagungsleiter und Begutachtung durch das wissenschaftliche Direktorium mit persönlich eingeladenen Gästen durchgeführt werden.

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Summary

Product family engineering is a new paradigm in software engineering research, which promises high quality software products at lowered cost and shorter time schedules. The key idea is to emphasize proactive reuse, interchangeable components, and multi-project planning cycles, similar to practices applied for a long time for example in car manufacturing. Product family engineering has recently gained much interest in various application domains including electronic commerce, information systems, medical systems, and telecommunication systems. Product family engineering focuses on the creation and maintenance of a whole set, i.e., a family, of software products and software-intensive systems. A distinction is made between development *for* reuse (called *domain engineering*) dealing with planning, creation, and maintenance of system assets (development artifacts) common to the various application systems and development *with* reuse (called *application engineering*) where the parts that are specific to particular applications are handled.

The seminar built on the results of the very successful Dagstuhl Seminar on Product Family Development held in April 2001 (Seminar No. 01161). The focus of the first seminar was on the technical aspects of product family engineering, while the focus of this seminar was on management and organizational aspects. The objective of the seminar was to cross-fertilize and synthesize the work done by the different universities, research institutes, and industrial research groups working on product family engineering. The topics of the seminar were strategies for product family adoption, organizational forms that support product family development, testing of product family assets and application specific extensions, production of customer-specific applications, product family maturity, and lessons learnt from industrial product family development.

This Dagstuhl Seminar brought together twenty-five leading practitioners and researchers from various disciplines to cross-examine the effectiveness and the efficiency of product family based software system development. The seminar was organised by Günter Böckle (Siemens AG, München), Peter Knauber (University of Applied Sciences, Mannheim), Frank van der Linden (Philips, The Netherlands), Linda Northrop (Software Engineering Institute (SEI), USA), and Klaus Pohl (University of Duisburg-Essen).

The seminar was structured into two parts: an overview talk part over half a day and a working group part that took 2-and-a-half days.

Overview Talks

At the beginning of the seminar, a set of **plenary talks** provided overviews on various aspects of software product family engineering:

- Frank van der Linden (Philips, The Netherlands) explained the view and the latest results of the European major software product family initiative, the ITEA project CAF and FAMILIES.

Abstract (<http://www.dagstuhl.de/files/Proceedings/03/03151/OverviewTalks/03151.0T.vanderLindenFrank.Abstract.txt>),

Slides (<http://www.dagstuhl.de/files/Proceedings/03/03151/OverviewTalks/03151.0T.vanderLindenFrank.Slides.ppt>)

- Linda Northrop (SEI, USA) complemented this overview talk by providing an overview on the results and actual research plans of the software product line initiative by the Software Engineering Institute (SEI).
Slides (<http://www.dagstuhl.de/files/Proceedings/03/03151/OverviewTalks/03151.0T.NorthropLinda.Slides.pdf>)
- Jan Bosch (University of Groningen, The Netherlands) gave a talk on software variability management. In his talk he discussed the problems and issues of variability management and distinguished different levels of maturity in variability management.
Slides (<http://www.dagstuhl.de/files/Proceedings/03/03151/OverviewTalks/03151.0T.BoschJan.Slides.ppt>)
- Kari Känsälä (Nokia, Finland) held a talk on maturity assessment and the specific practices at Nokia. An extension of the CMMI called CMMI-SFE (System Family Engineering) was suggested, which specifically aims at V&V activities.
Abstract (<http://www.dagstuhl.de/files/Proceedings/03/03151/OverviewTalks/03151.0T.KaensaelaeKari.Abstract.doc>),
Slides (<http://www.dagstuhl.de/files/Proceedings/03/03151/OverviewTalks/03151.0T.KaensaelaeKari.Slides.ppt>)
- John McGregor (Clemson University, USA) provided in his talk an overview on product family testing. The specific problems of testing product families were discussed and practices were presented for system, integration, and component testing.
Abstract (<http://www.dagstuhl.de/files/Proceedings/03/03151/OverviewTalks/03151.0T.McGregorJohn.Abstract.htm>),
Slides (<http://www.dagstuhl.de/files/Proceedings/03/03151/OverviewTalks/03151.0T.McGregorJohn.Slides.ppt>)
- Gary Chastek (SEI, USA) dealt in his talk with production plans, which are descriptions of how core assets are to be used to develop a product in a product line. A product plan ensures that product developers can make effective use of the core assets.
Abstract (<http://www.dagstuhl.de/files/Proceedings/03/03151/OverviewTalks/03151.0T.ChastekGary.Abstract.doc>),
Slides (<http://www.dagstuhl.de/files/Proceedings/03/03151/OverviewTalks/03151.0T.ChastekGary.Slides.ppt>)

Working Groups

After a brainstorming session and further discussions, the participants identified four main topics for parallel working groups, namely:

- Economic Models for Software Product Lines
(http://www.dagstuhl.de/files/Proceedings/03/03151/WorkingGroups/03151.WG.ecmodel_workinggroup.html)
- Software Product Family Variability
(http://www.dagstuhl.de/files/Proceedings/03/03151/WorkingGroups/03151.WG.variability_workinggroup.html)
- Product Line Adoption
(http://www.dagstuhl.de/files/Proceedings/03/03151/WorkingGroups/03151.WG.adoption_workinggroup.html)
- Software Product Family Maturity
(http://www.dagstuhl.de/files/Proceedings/03/03151/WorkingGroups/03151.WG.maturity_workinggroup.html)

Within the parallel working groups these topics were discussed. The groups identified common grounds and synthesized their views on these topics.

Each working group gave an intermediate and a final presentation of their results in a plenary session. Moreover, a 1-page summary was written by each group, and outlines for conference and journal papers have been sketched. After the seminar, four papers have already been finalised and submitted for publication.

Thanks are due to the Dagstuhl Directorate for accepting this international event, and to the ITEA and local funding organisations for supporting the travel of the CAFE project participants. Without the enthusiastic cooperation of all participants this workshop would not have been the success as we feel it has been. Last, but definitely not least, our final thanks go to the Dagstuhl office in Saarbrücken and the local staff at Schloss Dagstuhl without whose support this event would have been much more work.

Essen, München, Mannheim, Eindhoven, and Pittsburgh, July 2003

Klaus Pohl, Günter Böckle, Peter Knauber, Frank van der Linden, Linda Northrop

Participants

- Bachmann, Felix (CMU – Pittsburgh)
- Böckle, Günter (Siemens AG – München)
- Bosch, Jan (University of Groningen)
- Bühne, Stan (Universität Duisburg – Essen)
- Chastek, Gary J. (CMU – Pittsburgh)
- Clements, Paul C. (CMU – Pittsburgh)
- Goedicke, Michael (Universität Duisburg-Essen)
- Käkölä, Timo (University of Jyväskylä)
- Käsälä, Kari (NOKIA Research Center – Helsinki)
- Kamsties, Erik (Universität Duisburg-Essen)
- Knauber, Peter (Fachhochschule Mannheim)
- Krzanik, Lech (University of Oulu)
- Leite, Julio Cesar (PUC-Rio de Janeiro)
- McGregor, John D. (Clemson University)
- Muthig, Dirk (FhG IESE – Kaiserslautern)
- Nord, Robert (CMU – Pittsburgh)
- Northrop, Linda (CMU – Pittsburgh)
- Obbink, Henk (Philips Research – Eindhoven)
- Pohl, Klaus (Universität Duisburg – Essen)
- Ramesh, Balasubramaniam (Georgia State University)
- Rombach, H. Dieter (Fraunhofer ITWM – Kaiserslautern)
- Schmid, Klaus (FhG IESE – Kaiserslautern)
- Thiel, Steffen (Robert Bosch GmbH – Frankfurt)
- van der Linden, Frank (Philips Medical Systems – Best)
- Vilbig, Alexander (TU München)