Third ICSE Workshop on

Software Product Lines: Economics, Architectures, and Implications

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1 SCOPE OF THE WORKSHOP

Following the remarkable successes of the "First International Workshop on Software product lines: economics, architectures, and implications" held at ICSE 2000 in Limerick, and of the "Second International Workshop on Software product lines: economics, architectures, and implications" held at ICSE 2001 in Toronto, this workshop aims at sharing conceptual and practical experience by establishing contacts and starting the discussion between experts and practitioners from academia and industry.

2 RECENT ADVANCES IN THE RESEARCH

The discussion held in Toronto evidenced a good news and a bad news.

The **good news** is that now software is viewed more as a product, and not any longer as just code. Companies are now realizing this, without really providing the essential support from the product, the product is not going to be of an adequate quality.

The **bad news** is that still among researchers there is no consensus whether product lines in software require more investment than in other disciplines, such as hardware or manufacturing.

A possibility to avoid stalling could be to start introducing systematically product lines in domains prone to product line approaches, such as those of component based or parameterisable.

More business case analyses are required, insulating the different costs occurring in product lines, outlining all the different benefits, including quality, time to market, lower know-how turnover, … Altogether, .the need for more accurate process models is the need for more costing and business advantage models.

The 2001 workshop set some goals for the research in the area. The 2002 workshop will review the progress made in achieving such objectives.

- The use of domain isomorphism from requirement engineering and domain engineering to predict the likely variability in specifications
- The management of changes in time (evolvability), in requirements (variability), and in interactions with other products (compatibility)
- The relevance of frameworks for product line architectures

It would be of uttermost importance the **ability to track the links** between variation points in the domain requirements to variation points in design and code. This would be a remarkable progress in managing different and volatile requirements.

Product lines are intended to **capture the evolution of software products** and to last for a fairly long amount of time. Therefore, one of the hardest and most important aspects to consider is the ability of product lines themselves to evolve and change. Still, the only variability that they should have is that really needed to capture the required evolution, as a too general product line would end up being not manageable.

Moreover, it is important to **perceive and appreciate the difference between evolution and variation**. Variation does not require a change of architecture. Evolution does.

Compatibility and incompatibility should also be exploited as means to develop open product lines. They can be profitably used both as means of developing open/close architectures, and as a tool to develop suitable economic models.

The **use of frameworks** as the reference implementation strategy for product lines has been longly advocated. It is now time to verify if frameworks keep their promises, and, in particular, the support they can provide to management of variability, evolvability, and compatibility.

3 OBJECTIVES OF THE WORKSHOP

The objective of the workshop is to bring together people from industry and academia to investigate the proposals and the practices that pertain to the following conceptual and technical questions:

- Product lines introduce extra complexity in software development but offer high returns: What are the tradeoffs and when should software firms decide to go for a product line approach?
- What are success and failure factors for introducing software product lines in organizations?
- Is it possible to predict when product line investment pays in a specific domain and environment?
- How can the success of a product line be quantified, taking into account non-financial factors?
- What are successful product line solutions in the context of embedded systems? How can software product lines be designed together with the corresponding hardware?
- What are good strategies for adapting existing product line items to changes due to the evolution of the product line infrastructure?
- Which organizational forms are best suited for supporting product lines?
- Is product line development manageable by small and medium-sized companies?
- Which existing tools support the product line engineering best?

4 PUBLICATION OF THE RESULTS OF THE WORKSHOP

The organizers intend to publish the best papers of the workshop in a book they would edit and are in contact with a publisher for that purpose. In case that book is accepted, authors of accepted papers will be required to adhere to the respective camera-ready copy guidelines and to sign the suitable copyright transfer forms. Otherwise, the papers presented will be published as referable Fraunhofer IESE Technical Report, as happened for the ICSE 2000 workshop.

5 PROGRAM OF THE WORKSHOP

The workshop will be organized in three major discussion tracks, two invited talks, and one final panel.

The presenters for the three discussion sections are clustered according to their main topic addressed:

- *Economic and organizational aspects of product line development.*
  The issues addressed in this session include the planning of product lines (i.e., which products should be developed as part of the product line) with respect to the expected (economic) benefits and organizational issues that have to be addressed when introducing product line development into an organization.
- *Product line development for embedded systems.*
  In this session, successful approaches for software design according to product line concepts in the context of embedded and realtime systems are discussed. These approaches take care of the difficulties to together design hard- and software.
- *Case studies, experiments, and reports from industrial projects.*
  Experience presentation and exchange is the main purpose of this third session. Presented are industrial projects, experiments, and case studies together with the respective approaches used, their results, as well as lessons learned. This experience helps other organizations that intend to invest in product line development to get a feeling for the main risk factors and the critical issues to consider.

The invited speakers will focus on the following aspects of product line strategies:

- The goals and objectives of a large project aiming at the establishment of product line approaches
- Practical experience in software product lines development

Particular emphasis is on the final panel discussion. Here, communities with different backgrounds (theoretical, practical, academic, industrial, etc.) will be in touch with each other. During the final discussion the lines of the research for the years to come will be organized.

6 WORKSHOP ORGANIZERS

- Peter Knauber, University of Applied Science – Mannheim, Germany
- Giancarlo Succi, Free University of Bolzano – Bozen, Italy

INFORMATION AND QUESTIONS

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