Jürgen Münch
Matias Vierimaa (Eds.)

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Product-Focused Software Process Improvement

7th International Conference, PROFES 2006
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Preface

The 7th International Conference on Product Focused Software Process Improvement (PROFES 2006) brought together researchers and industrial practitioners for reporting new research results and exchanging experiences and findings in the area of process and product improvement. The focus of the conference was on understanding, evaluating, controlling, and improving the relationship between process improvement activities (such as the deployment of innovative defect detection processes) and their effects on products (such as improved product reliability and safety). Consequently, major topics of the conference included the evaluation of existing software process improvement (SPI) approaches in different contexts, the presentation of new or modified SPI approaches, and the relation between SPI and new development techniques or emerging application domains.

The need for SPI is being widely recognized. Current trends in software intensive systems such as increased distribution of software development and growing dependability on software-intensive systems in everyday life emphasize this need. This implies the establishment of advanced process improvement capabilities and an adequate understanding of the impact of the processes on the generated products, services, and business value in different situations. Recent trends enforce the establishment of such capabilities: more and more products are being developed in distributed, global environments with many customer-supplier relations in the development chain. Outsourcing, off-shoring, near-shoring, and in-sourcing aggravate this trend. In addition, systems are being built from multiple disciplines (such as electronics, mechanics, and software). Supporting such distributed and multi-disciplinary development requires well-understood and accurately implemented development process interfaces, process synchronization, and process evolution. In addition, more and more organizations are forced to adhere to regulatory constraints that require the existence of explicit processes and the demonstration of adherence to those processes. Examples are the IEC 61508 standard for safety-related systems, the tailoring of ECSS (European Cooperation for Space Standardization) software engineering standards for ground segments in ESA (European Space Agency), or the German national standard V-Model XT for systems used by public authorities. Adhering to those standards requires systematic evolution of the existing processes. Finally, market dynamics force organizations to adapt better and faster to changes in the development environment and to enforce innovations (e.g., increase of reliability levels). These process changes impose risk challenges for SPI approaches. Advanced SPI is required to support the assessment of the impact of process changes and the flexible adaptation of processes. Due to the fact that software development processes are human-based and depend on the development context (including domain characteristics, workforce capabilities, and organizational maturity), changes to these processes typically cause significant costs and should be considered carefully. Alternative improvement options need to be evaluated with respect to their implementation cost and their potential impact on business goals.

Currently, two types of SPI approaches are mainly used in practice: a) continuous SPI approaches (also referred to as problem-oriented approaches) and b) model-based SPI approaches (also referred to as solution-oriented approaches).

Continuous SPI approaches (such as the Quality Improvement Paradigm, PDCA, or Profes) focus on selected problems of a software development organization and usually involve improvement cycles based on an initial baseline. One important advantage of continuous approaches is that they focus on solving specific problems by analyzing the problem at hand, implementing and observing problem-focused improvement actions, and measuring the effects of the actions. The interpretation of the measurement data is used as input for further optimization of the solution. In addition, solving one problem typically reveals further improvement potential in related areas. Continuous approaches are focused and, therefore, it is difficult to create an overall awareness for quality issues in a very large software organization with thousands of employees.

Model-based SPI approaches (such as ISO/IEC 15504, CMMI, or BOOTSTRAP) compare the current processes and practices of a development organization against a reference model or a benchmark. They provide so-called capability maturity levels with different sets of processes and practices. These levels define an improvement roadmap. The advantage of such models is that they can be easily used to enforce an awareness for quality issues in large organizations because many developers are involved in the improvement of the maturity level. From the management point of view, reaching a specific capability level can be defined as a clear and assessable goal. One important disadvantage is that model-based SPI approaches typically do not assess the impact of processes on product characteristics and therefore cannot be used to analytically identify and tackle process problems that cause concrete product deficiencies. Typically, it is checked whether a process or practice is in place, but its impact on a business goal or its value for the organization is not evaluated. The practices of the reference models are usually of a generic type and based on hypothesis. Having a high maturity level does not mean that the organization is successful in fulfilling its business goals (such as an appropriate trade-off between time-to-market and product quality).

Continuous and model-based SPI approaches can be seen as being complementary: model-based approaches can be used to identify problem areas and potential improvement options, and continuous approaches can be used to implement and optimize solutions. Although continuous approaches can be successfully applied without having a high maturity level, model-based approaches usually require continuous improvement at a certain maturity level.

In practice, the typical question is no longer whether process improvement is necessary, but how to define and implement a strategy for introducing advanced process improvement step by step and how to evaluate its success. Along with this, many research questions need to be solved.

The technical program was selected by a committee of leading experts in software process modeling and software process improvement research. This year, 55 papers from 26 nations were submitted, with each paper receiving at least three reviews. The Program Committee met in Amsterdam for one full day in February 2006. The Program Committee finally selected 26 technical full papers. The topics indicate that software process improvement remains a vibrant research discipline of high interest for industry. Emerging technologies and application domains, a paradigm shift from software to system engineering in many domains (such as automotive or space), and the need for better decision support for software process improvement is reflected in these papers.

The technical program consisted of tracks-decision support, embedded software and system development, measurement, industrial experiences, process improvement, agile development practices, and product line engineering. In addition, a track with 12 selected short paper presentations was added in order to demonstrate the variety of approaches, to support the discussions, and to exchange experience. We were proud to have four keynote speakers, Jan Bosch, Jan Jaap Cannegieter, Michiel van Gnuchten, and Barbara Kitchenham, as well as interesting tutorials and co-located workshops.

We are thankful for the opportunity to serve as program co-chairs for this conference. The Program Committee members and reviewers provided excellent support in reviewing the papers. We are also grateful to the authors, presenters, and session chairs for their time and effort to make PROFES 2006 a success. The General Chair, Rini van Solingen, and the Steering Committee provided excellent guidance. We wish to thank the Fraunhofer Institute for Experimental Software Engineering (IESE), the Centrum for Wiskunde en Informatika (CWI), VTT, the University of Oulu, Drenthe University, and Eindhoven University of Technology for supporting the conference. We would like to thank the Organizing Committee and all the other supporters for making the event possible. Last but not least, many thanks to Timo Klein at IESE for copyediting this volume.

April 2006

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