

# Report on the 2nd Workshop on Software Patterns and Quality (SPAQu'08)

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## ABSTRACT

We held the 2nd Workshop on Software Patterns and Quality (SPAQu'08) as a focus group of the 15th Conference on Pattern Languages of Programs (PLoP '08), to discuss the theoretical, social, technological and practical issues related to quality aspects of software patterns, including security aspects. In this report we summarize the objectives and results of the workshop.

## Categories and Subject Descriptors

D.2.11 [Software Engineering]: Software Architectures—*Patterns*

## General Terms

Design, Documentation, Experimentation, Security

## Keywords

Patterns, Quality, Verification and Validation, Measurement

## 1. SUMMARY OF THE WORKSHOP

Following the success of SPAQu'07[1], we held the 2nd Workshop on Software Patterns and Quality (SPAQu'08[2]) as a focus group of the 15th Conference on Pattern Languages of Programs (PLoP '08) on October 20, 2008, Nashville, Tennessee, USA.

According to the Call for Papers circulated during July-August 2008, we got four paper submissions. For each submission we assigned three members of the program committee to review them. Based on the review results, we decided to accept all of the four submissions for paper presentations because those had enough originality, usefulness, and technical quality.

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On the workshop date, about 10 people showed up. We discussed the theoretical, social, technological and practical issues related to quality aspects of software patterns, including security aspects. The workshop provided the opportunity for bringing together researchers and practitioners, and for discussing future prospects in this area. As part of the workshop format, we had three paper presentations followed by periods of questions and discussions. After the presentations we discussed several topics related to these presentations.

In the following, we summarize the objectives and results of the workshop.

## 2. OBJECTIVES AND MOTIVATION

A software pattern is an abstracted repeatable solution to a commonly occurring problem in a certain context, which can be used for improved software development. Patterns help people involved in software to share experience-based proven solutions and develop products, manage processes, projects and organizations, and communicate with each other more efficiently and effectively.

As requirements for software products and processes have become more complex, larger scale and have begun to require higher reliability and security, demand is increasing for a system of technologies to capture, share, enhance, apply and evaluate software patterns. Especially, although several pattern catalogs have been published, little is known about how to specify, measure and evaluate those patterns themselves and/or the results of their application from the viewpoint of quality. Such conditions make it difficult to understand the nature of software patterns and pattern-oriented development methods.

To overcome such conditions, a first workshop of this series was held on December 2007 collocated with APSEC. It attracted more than 30 people, and was successful to discuss the intended topics. However, we believe that there is still room to improve our understanding and we need further research on these topics, consequently more workshops are necessary.

## 3. PAPER PRESENTATIONS

We had the two full paper presentations and one position presentation. The final camera-ready versions of these

papers are included in the post-proceedings of PLoP '08, following this report.

- "DEQUALITE: Building Design-based Software Quality Models" (full paper) by Foutse Khomh and Yann-Gael Guéheneuc (University of Montreal)

The paper proposes a method to build quality models that allows the measurement of the quality of object-oriented systems by taking into account the internal attributes of the system and also its design. The proposed method uses a machine-learning approach and tries to evaluate the impact of design patterns on the quality of the system.

- "Quality of Test Specification by Application of Patterns" (full) by Justyna Zander-Nowicka (Fraunhofer FOKUS) and Pieter J. Mosterman (The MathWorks, Inc.)

The paper describes an approach for defining test models for embedded systems in a reusable and maintainable way by applying test patterns. Moreover, to investigate the quality of model-based testing, the paper proposes several quality metrics from the test coverage point of view.

- "Abstract security patterns" (position paper) by Eduardo B. Fernandez (Florida Atlantic University), Hironori Washizaki (Waseda University) and Nobukazu Yoshioka (National Institute of Informatics)

The paper proposes the concept of abstract security patterns that deal with abstract security mechanisms. Moreover, the paper discusses how to organize security patterns into a pattern hierarchy according to the degree of abstractness of each pattern.

## 4. DISCUSSION

After the above-mentioned presentations, we discussed the current status and future prospects of the area of software patterns and quality. The following topics were discussed.

- Industrial aspects: Two challenging aspects are how to extract/mine design patterns applicable for industry, and how to validate them. We confirmed that we have to keep continuing to collect real problems and case studies, based on industry-academia collaborations.
- Architecture evaluation: Most of conventional architecture evaluation techniques are qualitative and experience-based; it is sometimes hard to verify the validity of the evaluation results. Regarding security aspects, security patterns applied to architectures can be used to evaluate their security. We discussed the necessity of quality metrics, such as the number of possible threats and the coverage of mitigated threats, for measuring effect of security mechanisms provided by patterns.
- Pattern classification: We confirmed that one of the problems in the pattern classification is the diversity of pattern formats. To solve the problem, we think that we need a mapping among different formats and a taxonomy/ontology of patterns.

## 5. FUTURE PERSPECTIVE

By the above-mentioned discussion, we confirmed that there are still many aspects to be clarified in the area of software patterns and quality. Therefore, we will continue to hold more workshops.

## 6. REFERENCES

- [1] Hironori Washizaki, Nobukazu Yoshioka, "1st International Workshop on Software Patterns and Quality (SPAQu'07)," Proceedings of the 14th Asia-Pacific Software Engineering Conference (APSEC), pp.557–558, 2007.
- [2] 2nd Workshop on Software Patterns and Quality (SPAQu'08), 2008.  
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