

6th Collaborative Workshop on Evolution and Maintenance of Long-Living Systems

Robert Heinrich¹, Reiner Jung², Marco Konersmann³, Eric Schmieders⁴

¹Karlsruhe Institute of Technology, Karlsruhe, Germany, robert.heinrich@kit.edu

²Christian-Albrechts-Universität zu Kiel, Kiel, Germany, reiner.jung@email.uni-kiel.de

³University of Duisburg-Essen, Essen, Germany, marco.konersmann@uni-due.de

⁴Landesamt für Zentrale Polizeiliche Dienste NRW, Duisburg, Germany

Digitalization is a key development, socially and technologically. It not only transforms analog into digital processes, but also requires a different way of handling data and software. The use of both frequently changes. This leads to constant changes in the requirements and in the technological context. Problems, such as inconsistent requirement specifications, architecture erosion and SLA violations arise. These problems are particularly relevant in the industrial practice, in which such a system not only undergoes initial development, but must be further developed constantly.

In recent years, the EMLS workshop series has dealt with the challenges of the transition between the various software development phases. Experiences with specific technologies and solution strategies are just as much demanded for the workshop as problems and evaluation strategies. The EMLS workshops create a forum in which the participants work on common topics collaboratively. We strive for an exchange between research and industry.

The aim of the workshop is to promote the exchange on the above-mentioned topics. In the workshop we discuss challenges, solutions, and experiences. The focus of the workshop is on intensive discussions, which take much room in the programme. The accepted contributions and summaries of the discussions will be published.

The workshop uses, where possible, small groups to foster the exchange between the participants. At the beginning of each session, the authors present their topics in short presentations. Small groups will then be formed on these topics. For each group, the organisers provide a moderator to lead the discussion. The groups will be equipped with suitable discussion material, such as flip charts and discussion cards, which can be used to guide the discussion and to prepare the presentation of the results. At the end of the session, the discussion's results are collected within the groups and then

The workshop will be opened this year with a keynote by Prof. Dr. Lars Grunke of the Humboldt-Universität zu Berlin. The keynote with the title **Software engineering challenges**

presented to the broader audience.

The contributions and a summary of the results will be published in order to record the results, to make them visible to the outside world and to provide a summary of all discussed to the participants. In addition, the presentations will be made available on the website emls.paluno.uni-due.de.

for evolving data-intensive scientific software deals with the challenges of this special domain in the context of evolution.

The first contribution is **Clean Code: On the Use of Practices and Tools to Produce Maintainable Code for Long-Living Software** by Björn Latte, Sören Henning and Maik Wojcieszak. The authors present an experience report on the use of different, combined best practices in software engineering. Their experiences with clean code, code reviews, test-driven development, static code analysis, and continuous delivery help to manage evolution on the level of the program code.

Long-living systems are often affected by refactorings several times during their lifecycle. The contribution **A Reproduction Study of Refactoring Detection Tools** by Liang Tan and Christoph Bockisch describes and evaluates tools for the detection of refactorings. Afterwards the tool *Refactoring-Miner* is examined in detail, highlighting the advantages and disadvantages.

The contribution **Evolving a Use Case for Industry 4.0 Environments Towards Integration of Physical Access Control** by Stephan Seifermann and Maximilian Walter describes an evolution scenario in smart production environments, in which defective parts cause changes in access control for quality assurance personnel. The evolution scenario is discussed in detail in the workshop and could serve as a basis for benchmarks in the future. The workshop concludes with a summary of the contributions and discussions. As organisers, we thank all authors and participants of the EMLS'19, and the organisers of the SE'19.