





FRAUNHOFER INSTITUTE FOR **OPEN COMMUNICATION SYSTEMS FOKUS**

YOUR BENEFITS

Researchers from SQC advise and support their customers in all aspects of system development and system guality. The intertwining of different skills and methods for quality assurance in this connection guarantee a look at 'the bigger picture', which includes business, as well as process- and certification-relevant aspects. In the field of test automation, SQC uses modelbased testing as the most flexible and easy-to-service form of guality assurance. In comparison with (semi-) manual solutions, modelbased testing offers significantly lower costs, along with better guality. The modelling languages required for modelbased testing can be simplified through the use of domain-specific modelling languages (DSLs). The experts at SQC are able to freely and flexibly customise these languages in order to suit the needs of the user.

CONTACT

Andreas Hoffmann Vice Director System Quality Center – SQC Phone +49 (0)30 3463-7392 andreas.hoffmann@fokus.fraunhofer.de

Fraunhofer FOKUS Kaiserin-Augusta-Allee 31 10589 Berlin Germany

www.fokus.fraunhofer.de/en/sqc



CHALLENGE

The quality of products is vital to their acceptance on the market. Quality assurance is therefore given a high priority, particularly in markets with safety-critical products, such as, for example, the medical, transport and automation sectors. In these sectors, quality is critical to product approval. A lack of guality can have serious consequences for both users and manufacturers. However, the budgets for guality assurance are limited. For managers and engineers, it is therefore important that available resources are used efficiently.

Manual test methods are often used for quality assurance purposes. However, due to the fact that this approach is only able to generate a relatively small number of test cases, the efficiency of this test method is limited and rising costs are often unavoidable. A valuable alternative is model-based test generation: The use of models from which test cases can be automatically derived has significant potential to increase test guality while lowering costs. Moreover, it has been shown in case studies and in practical applications that the investments in the technology and training that are necessary for the introduction of model-based testing methods pay off after a short time.



TEST AUTOMATION

One focus of current research is test automation – both in test execution and in test design. The experts from SQC collaborate with manufacturers of commercial test automation solutions, develop their own prototypes and successfully implement these in practice. As a result, they have gained extensive knowledge of everything from requirements analysis to implementation in test automation solutions. For these purposes, the researchers from SQC use, among other things, the tool chain shown in Figure 1. This tool chain allows models to be imported from different modelling tools (such as, for example, Enterprise Architect or Topcased) and to be exported for test generation using different test generators (for example Conformig Designer, MS SpecExplorer or ParTeG). The advantages of this approach are the direct reusability of existing artefacts and the interchangeability of the underlying test generators - also possible for multivariant products. This allows the costs of entry into model-based testing methods to be further reduced, while at the same time maintaining flexibility.



Figure 1: Tool chain for test automation

REQUIREMENTS MANAGEMENT

The quality of requirements and variant management is an essential prerequisite for the successful automation of test design. As the requirements often form the basis of testing, their quality is crucial to the quality of generated test cases. Moreover, the traceability of test cases to their requirements must be guaranteed, especially in safety-critical domains. The experts at SQC advise their customers in the analysis and improvement of requirements management – both in the creation of documents and in the underlying processes – and support their customers right up to product approval.

COMPETENCIES

The System Quality Center (SQC) of the Fraunhofer Institute FOKUS has many years of experience in quality assurance for various software and hardware systems. Scientists at SQC have gained extensive expertise in constructive and analytical quality assurance. In this work, they make use of various quality assurance methods, such as reviewing, testing and verification techniques.