

FRAUNHOFER INSTITUTE FOR EXPERIMENTAL SOFTWARE ENGINEERING

**360°  
DIAGNOSTICS  
CENTER**



## 360° Diagnostics Center

### Our service package for independent quality diagnoses

Software quality is the basis of your success: The safety and reliability of your software are of crucial importance for you. By providing high levels of flexibility, maintainability, and extensibility, you ensure that you will be able to live up to the needs of your customers even when the innovation speed of the market increases continually because, if important features cannot be realized on time, or if the certification of your product is denied, your customers will not be happy. With our 360° Diagnostics Center we support you in assuring that you can always provide the necessary level of software quality!



## Software quality made in Germany

Regardless of whether your organization invests in the new development or adaptation of a system, whether you are testing a supplier's software or your own solution – a lack of software quality constitutes a major business risk. Therefore it is important to get an objective opinion. For more than 20 years, Fraunhofer IESE has been a trusted partner for companies from a wide variety of domains when it comes to performing **independent, high-quality quality diagnoses** according to the state of the art and the state of the practice. In our German software testing center, we analyze our customers' products and processes on the one hand, and, as an independent third party, assess the quality of supplier products and processes on the other hand.

However, the independence of the experts of our 360° Diagnostics Center is not the only reason why they are the ideal partners for your success. Based on **state-of-the-art analysis tools** and the **experience gained in hundreds of analyses**, we deliver highly professional and reliable results within a short time.

This results in important savings for you with regard to:

- High purchase costs
- Time required for training
- Mistakes in the planning, execution, and evaluation of the analyses

With our specially developed analysis tools, we are also able to perform tests that go far beyond state-of-the-practice possibilities. And, if necessary, we will adapt our testing tools in order to provide robust analysis results for your individual issues regarding your product.

This is what we are offering in our German software testing center:

- Experience from hundreds of analyses
- State-of-the-art tools
- Portfolio of unique, self-developed analysis tools

## 360° – Everything in view

Our 360° Diagnostics Center is much more than a test center, as we use it to examine **software quality from all relevant perspectives**. Flexible test components give you an efficient 360° view on quality that is adapted individually to your needs and to your product.

In our 360° Diagnostics Center, we check all of these:

- Systems
- Processes
- Organizations

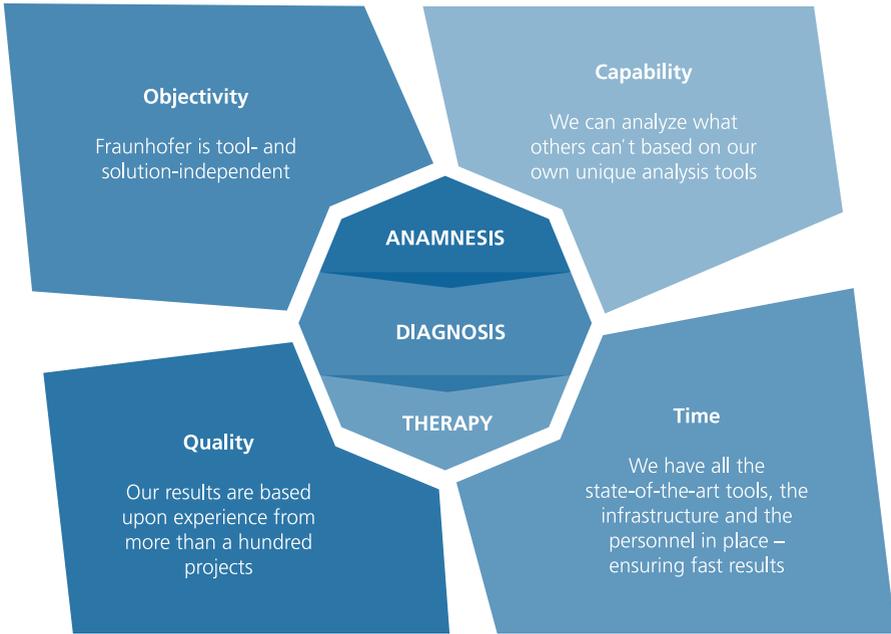
And we do so for embedded systems, for information systems, and for their seamless interaction in Smart Ecosystems.

We analyze a product thoroughly – from the actual function itself to non-functional system properties such as:

- Safety
- Security
- Reliability
- Performance
- User Experience
- Internal software qualities such as maintainability or extensibility

If necessary, our experts will check all development artifacts, from the requirements via the architecture to the implemented code. And we do so not only after the product is finished: We can already **predict the quality of your system** in early phases of the development, which helps you avoid making expensive wrong decisions right from the start.





## Innovative testing procedures for innovative products

In addition to the comprehensive analysis of a system, it is also important to be able to test individual aspects of the system in detail. Due to the great innovative power of our customers, **every test is as individual as the products** to be analyzed. Depending on the system and the issue, we elaborate a precisely matching test plan. Many years of experience in testing methodologies enable us to efficiently implement individual testing concepts for your requirements. Our specially developed tools for variant analysis or – in early development phases already – for the

analysis and simulation of E/E/SW architectures are just some examples of the unique opportunities offered by our 360° Diagnostics Center. In addition to manual evaluation procedures, our tool FERAL makes it possible to test initial system concepts using co-simulation of function, software, hardware, communication systems, and user behavior. This allows us to offer you decision support already in early phases that is based on facts rather on developers' "gut feeling", as in the past. In addition to the systematic selection of technologies and the structuring of the architecture such that the desired business goals can be achieved, we can also subject the necessary safety concepts to a

simulation-based validation process. This allows you to **avoid expensive wrong decisions right from the start.**

### Many years of experience as a reliable partner of leading companies

**Expertise, individuality, and diversity** form the basis of our successful, trusting cooperation with our customers. For many years we have provided support to companies of many different sizes and from many different domains. These include the automotive industry, the avionics industry, mechanical engineering companies, as well as financial service providers, insurance companies, or the IT industry.

We do, for example, support organizations in the **independent evaluation of their system and software architecture.** Usually, the architecture of a system degenerates unnoticed for a long time. But at some point in time, when it is almost too late, the first symptoms appear: insufficient performance, exponentially rising costs for extensions and adaptations, or malfunctions. In the context of our ACES Methodology for pragmatic architecture evaluation, which has matured over the course of many years, our architects detect problems in the architecture already very early. A central element in this regard are the business goals and the derived architecture goals that the software must fulfill in order to enable the success of the

product. In scenario-based analyses, we use these as a basis for checking not only the structure of the system, but also the platforms and development technologies used in terms of their suitability. In addition, we use special tools to analyze and evaluate the current architecture on the basis of the existing source code. As an architecture generally does not only serve a single system, but rather an entire product family, commercial tools can also be complemented with special tools developed at Fraunhofer IESE. One example of such tools is the PuLSE™ framework, which serves to evaluate the suitability of the architecture and the variation management from the perspective of the current and future product family.

Many customers also rely on our **support before problems arise.** If you want to have a clear competitive edge as a result of speed, software quality, and lower costs, we help you keep an eye on your system right from the start with the help of continuous evaluations. In cases such as the introduction of multi-core processors or new communication technologies such as TTEthernet in the area of embedded systems, it is important to ensure portability and select a suitable technology early on. And particularly in the case of new issues such as over-the-air updates or downloadable apps for safety-critical automotive functions, it is important for our customers to safeguard their invest-

ments in future products with the help of solid design space exploration or early validation of safety concepts.

## Your partner for your success

Never before has software changed the value chains so radically and created completely new business models. The landscape of opportunities is changing at breakneck speed. This development offers many chances and risks at the same time. If you want to handle problems quickly in this fast-paced competition, or if you do not even want to let such problems emerge at all by making the right decisions from the start, you can count on our 360° Diagnostics Center and many other testing procedures available to our customers.

We are aware that your success is based on the quality of your decisions, your processes, and your products!





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## Fraunhofer IESE

The Fraunhofer Institute for Experimental Software Engineering IESE in Kaiserslautern has been one of the world's leading research institutes in the area of software and systems engineering for more than 20 years. Its researchers have contributed their expertise in the areas of Processes, Architecture, Security, Safety, Requirements Engineering, and User Experience in more than 1,200 projects. The institute is working on innovative topics related to digital ecosystems, such as Industrie 4.0, Big Data, and Cyber-Security. It is a technology and innovation partner for the digital transformation in the areas of Autonomous & Cyber-Physical Systems and Digital Services, and its research focuses on the interaction between embedded systems and information systems in digital ecosystems.

Fraunhofer IESE is one of 72 institutes and research units of the Fraunhofer-Gesellschaft. Together they have a major impact on shaping applied research in Europe and contribute to Germany's competitiveness in international markets.