

AgQua: Aggregation Procedures for Quality

Motivation

In the automotive sector, it is essential that the authorization and release of software is based on a sound assessment of its quality. Not only can low software quality lead to high costs and damage to a brand's image as a result of product recalls, faulty software can, in worst-case scenarios, cause life-threatening situations. Therefore, the safety standard ISO 26262 requires the systematic verification of quality for safety-relevant vehicle software as well as proof that all safety requirements have been implemented, in particular that functional safety requirements have been correctly and fully implemented. In order to demonstrate this, the quality of the resulting software must be continually evaluated during the software development process. To do this in practice, diverse quality assurance measures are carried out and applied to the various development artifacts throughout the entire software development cycle. If artifacts are developed iteratively as the range of functions increases, the quality assurance measures will follow and will be applied repeatedly. Many of these can be largely carried out via an automated process using established processes and tools. However, for the overall assessment of the quality of a software product, there is, in practice, no established procedure. Instead, this is left up to the user.

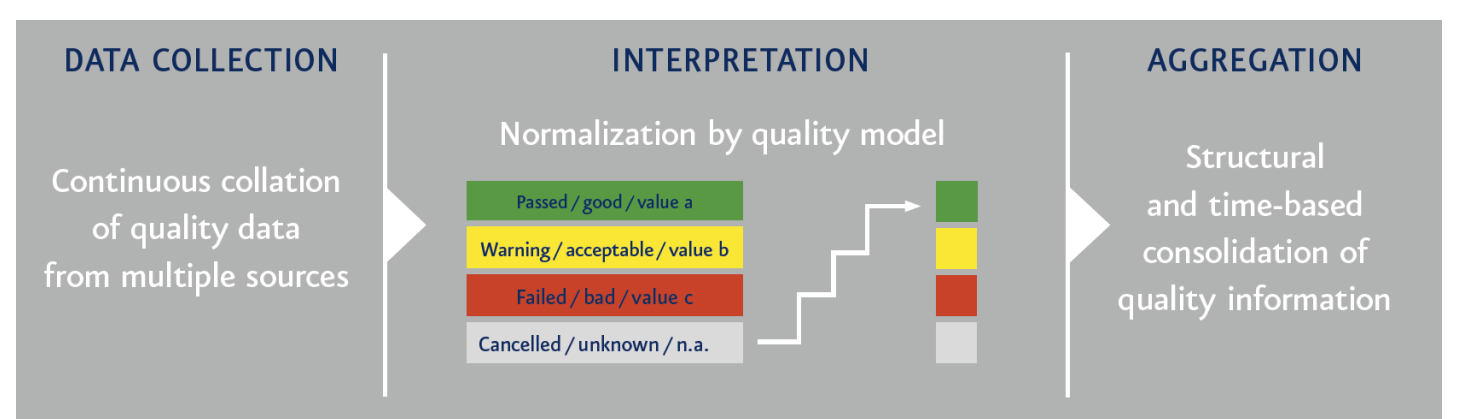
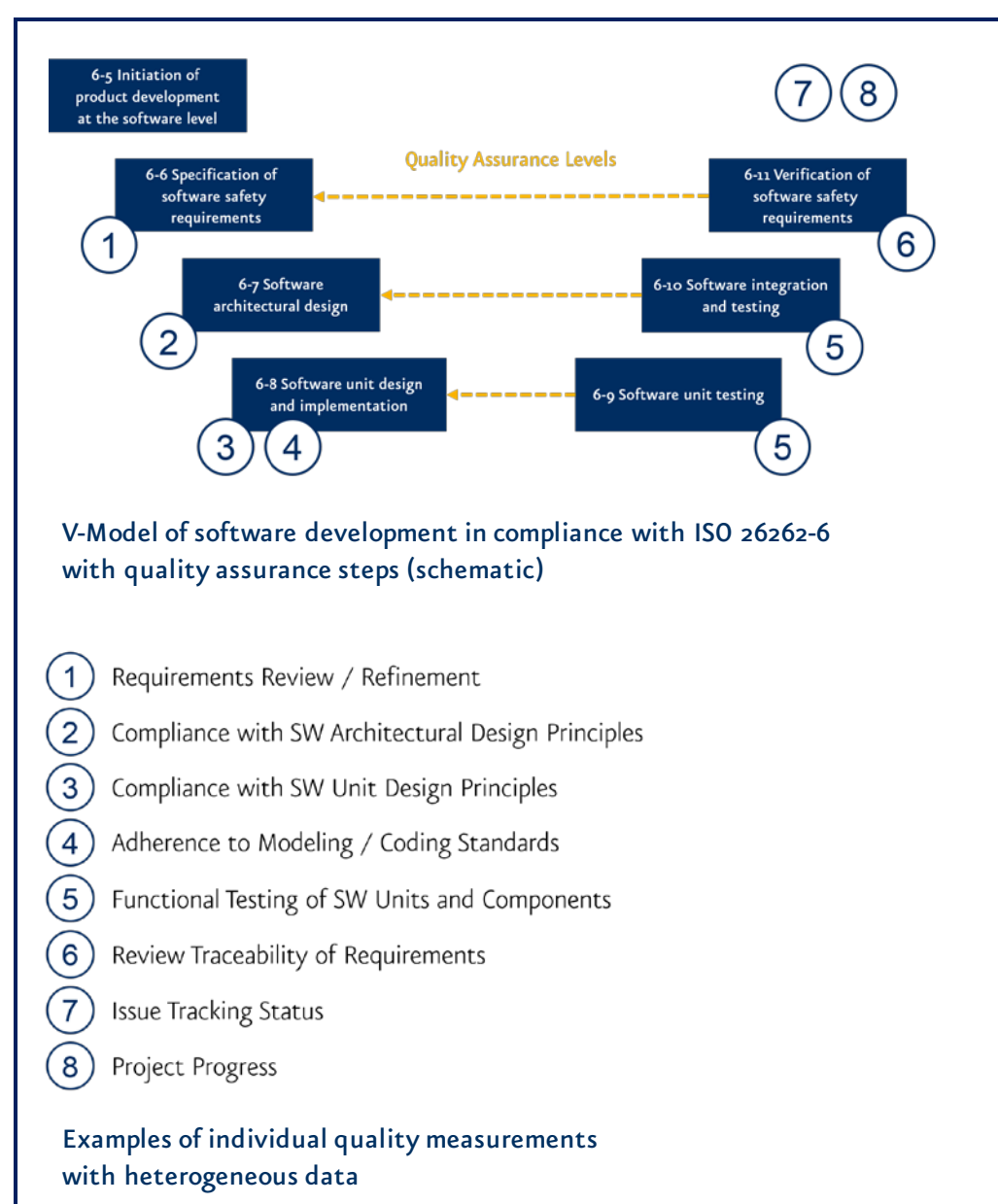
Project aim

In industry, there are often proprietary solutions, quality surveys, and quality monitoring to be carried out and realized over the course of time, with the aim of obtaining statements about the overall quality via a quantitative evaluation of the existing heterogeneous data. The overall assessment of the quality of a software product occurs via the aggregation of the individual quality measurements. MES has developed a generic concept to aggregate quality measurements and has implemented them in one tool: the MES Quality Commander.

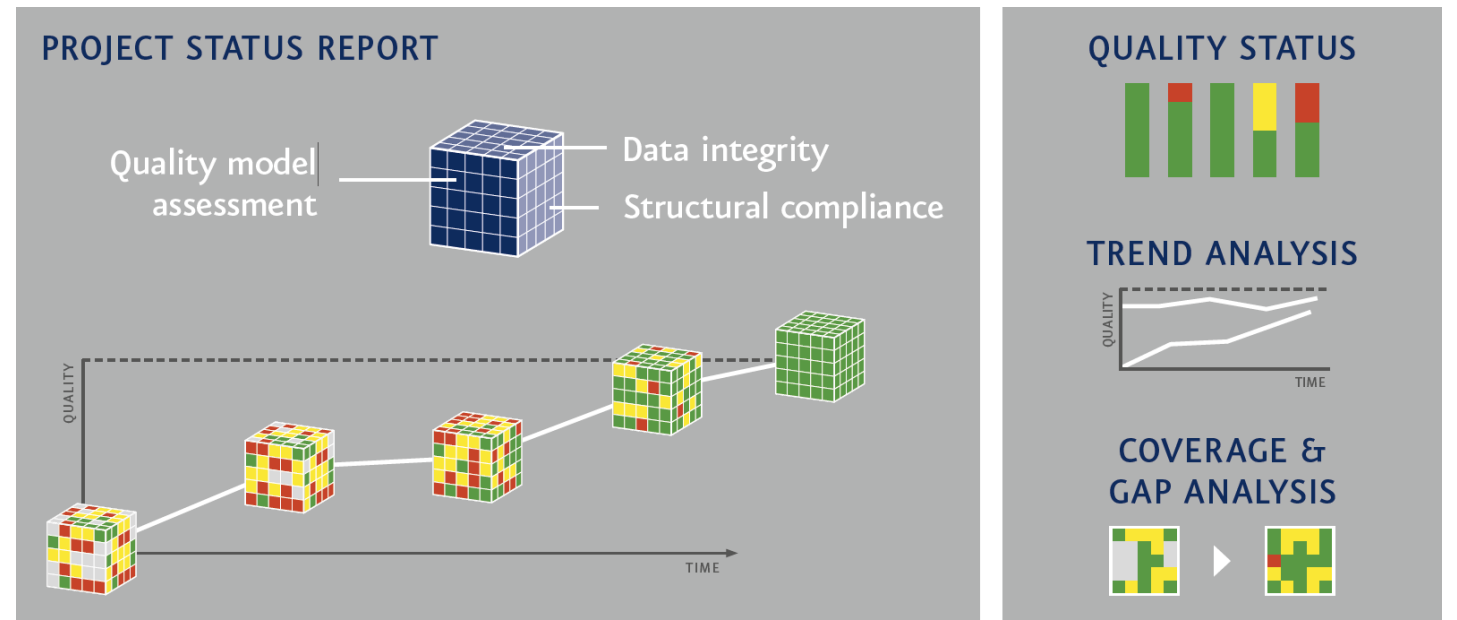
In the manufacturing sector, assessing the overall quality of a product is already well established. Likewise, the results of various measurement processes are summarized into an overall assessment of product quality. Regularly determining and documenting product quality during the production process is an important way to optimize and control the production processes in order to meet the specifications that relate to the quality to be achieved.

The aim of this project is to evaluate and systematically expand the procedure for the quantitative evaluation and aggregation of quality measurements developed in the MES Quality Commander, with regard to the procedure's significance. Additionally, this procedure will be compared to the established procedures used in the manufacturing sector, and possible potential for optimization will be identified. In order to transfer methods from the manufacturing sector to software development, the similarities and differences between the two domains will be worked out and the transfer possibilities will be evaluated. The procedures that are applicable to the transfer will be compared to the approach implemented in the MES Quality Commander and further development possibilities will be derived.

Methodology for quality control in software development

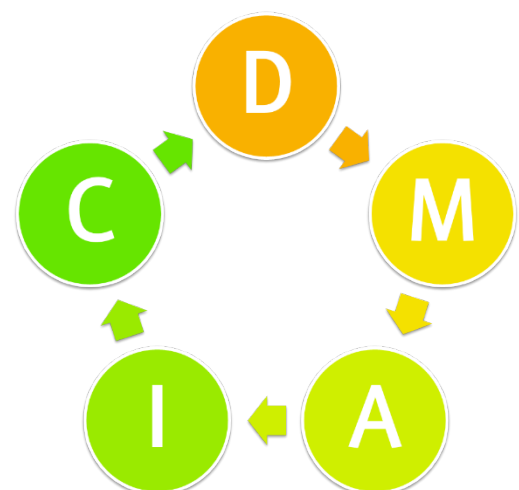


Data collection, evaluation and aggregation with the MES Quality Commander, the quality model forms the basis of the normalization of the heterogeneous data; this creates the basis for their comparability

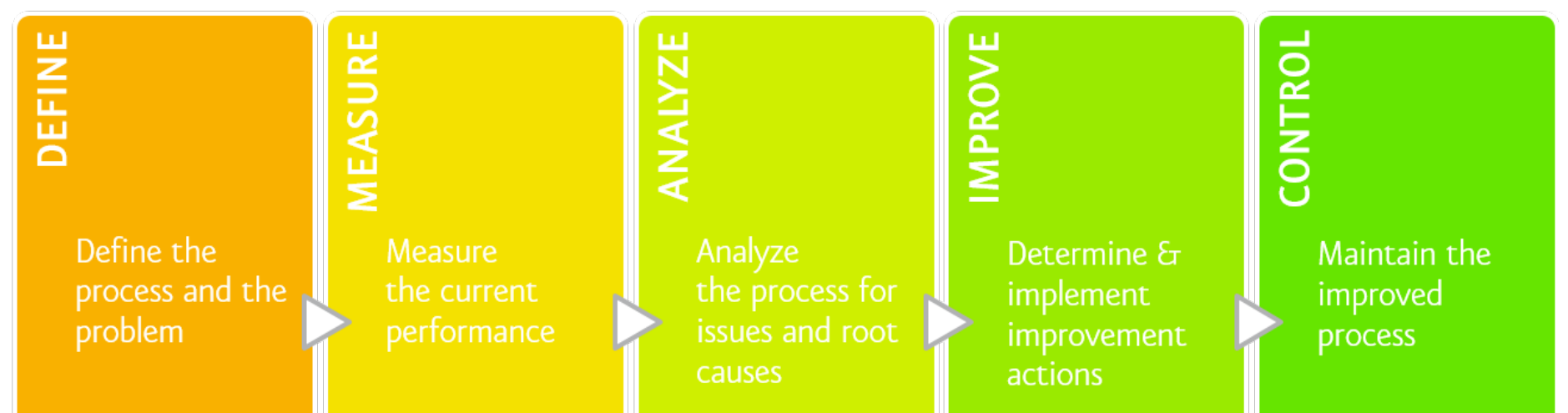


Visualizing aggregated quality data allows for quality gaps and required measures to be identified, the progress update supports prognoses for the project

Methodology for quality control in the production industry



Six Sigma Method for quality management in the production industry



Project partner: Model Engineering Solutions GmbH

Model Engineering Solutions GmbH (MES) is a high-tech software company specializing in integrated quality assurance of embedded automotive software. MES was founded in October 2006 as a company spin-off / individual enterprise within the scope of the IMMOs project funded by the German Federal Ministry of Education and Research, and became a limited company in 2008. Since its founding, MES has been developing and operating tools that support the development of embedded vehicle software via constructive and analytical quality assurance. Alongside tool development, MES also provides consulting services within the area of model-based development of embedded software, such as offering support in defining efficient development processes. MES customers include major German car manufacturers like Daimler AG, Volkswagen, and Audi as well as suppliers to the automotive industry like Continental, Bosch, and Siemens.

Project partner: Technische Universität Berlin

For 25 years, the Production Technology Center at the Technische Universität Berlin has stood for future-oriented research and teaching. 25 years of interdisciplinary collaboration have brought Berlin's quality science field into an outstanding position both in the scientific and industrial environment. The Quality Science Department at the Institute of Machine Tools and Factory Management at the TU Berlin is engaged in the research and development of approaches and methods for model-based, holistic quality description and evaluation as well as procedures for applying the developed methods in the product life cycle, both in production and service provider companies. Alongside increased product and process quality, the goal here is to improve efficiency in a company's organization.