

Title of Paper

Challenges Measuring Benefits of Quality Assurance

Presenter

Nicolas Porta, Thomas Beil, Heike Frank

Session Format

Workshop Tutorial Conference Presentation

Instructional Level

Introductory Intermediate Advanced

Target Group

Project Managers, QA Managers, Decision Makers

Keywords (please mention main topic here if not part of the title)

- Measurement
 - Quality Assurance
 - Quantitative Project Management
 - Automotive
-

Abstract

Scenario

The development of electric / electronics (E/E) for OEMs (Original Equipment Manufacturer) in the automotive domain is characterized by developing not only software but also hardware. Additionally the V-Model is usually not run entirely by the OEM: In most of the projects, component specifications are written on the OEM's side while the supplier develops the actual Electronic Control Unit (ECU) with the according hard- and software. The OEM himself performs the subsequent integration tests and monitors the development of the supplier

As stated by Barry Boehm, much of current software engineering still happens in a value neutral setting putting in danger the project outcomes.

Considering quality assurance (QA), relevant factors are taken into account but not always in a proper systematic way.

Goal

Facing the described scenario, value must be considered when deciding about which QA measure fits best to specific projects. To accomplish this goal, methods / models are needed which allow comparisons between costs and benefits of implemented QA measures.

Challenges & Concepts

Cost-benefit-models of QA in literature do not satisfactory regard the given boundary conditions in the automotive context, e.g. they don't consider:

- *OEM-supplier relation*
Models are usually based on organizations that perform the whole software development inhouse and control the whole development process, while in most automotive OEM projects the supplier is deeply involved.
-

-
- *Added complexity for measurement through implementation of QA measures in more than one tool*
Considering preventive QA measures like configuration management, a frequent assumption is that only one tool is used to perform this activity. In practice many tools take over the role of configuration management depending on the artefacts to control (requirements, documentation, code etc.).
 - *Iterative development with V-cycles*
One important effect of QA measures e.g. of reviews is that defects are found earlier in the development process. Therefore many models calculate the benefit of these measures evaluating how many defects can be found earlier and how much costs can be avoided this way. Regarding a development which follows more than one V-cycle it has to be checked how strong the benefits still are, when an earlier defect detection is only realized inside a V-cycle but not weightily in the development process as a whole.

Therefore concepts are needed, which allow an application of cost-benefit-models in automotive E/E development projects.

Based on expert opinions, models from literature are adapted to the described context, taking into account the specific boundary conditions of an automotive OEM. Examples of concepts for single QA measures (e.g. requirements engineering, reviews or configuration management) will be included and discussed in the presentation.

Biographies

Nicolas Porta is currently employed at Daimler Research & Development and works on cost-benefit analyses of quality assurance measures. During his studies of economics, computer science and philosophy at the Ulm University he made internships at DaimlerChrysler Research and wrote his master's thesis (Dipl.-WiWi) there in the field of Requirements Engineering & Management. After graduation he worked as process consultant in the automotive industry for the HOOD Group until starting his PhD thesis at Daimler in fall 2006.

Thomas Beil is currently employed at Daimler Research & Development and works on quality management and process improvement. He studied computer science at the Stuttgart University focused on programming languages and databases. At the time he is working in the field of quality and project metrics for electric / electronics development.

Heike Frank received a diploma in physics from the Ulm University. Since 1991 she is employed at the Daimler AG. Currently she is working as scientist in the team *Management of Process Maturity* at Daimler Research & Development in Ulm, Germany. Her work areas include evaluation and improvement of development processes with a focus on measurement and process improvement.

Contact information of Presenter

Nicolas Porta
Daimler AG
W 050 - HPC G 012 - GR/ESP
71059 Sindelfingen / Germany
Phone +49(0)7031 4389289
mailto: nicolas.porta@daimler.com

Thomas Beil
Daimler AG
W 050 - HPC G 012 - GR/ESP
71059 Sindelfingen / Germany
Phone +497031/4389-616
mailto: thomas.beil@daimler.com

Heike Frank
Daimler AG
W 096 - HPC U 800 - GR/ESP

89081 Ulm / Germany
Phone +49 731-5 05 2857
mailto: heike.frank@daimler.com
