

# PREFACE

The importance of software quality and by extension software tests is continuously growing. Our clients across the world work on so-called “sensitive” or safety-critical projects which require high software quality, even in the smallest embedded targets. Software testing is well-integrated in their development process. They need long-established and proven testing tools qualified or certified for the development of safety critical software.

Later, other sectors started to adopt standards and followed guidelines for software testing. For the automotive industry – the most important industry for embedded testing in Europe – the norm ISO 26262 "Road vehicles – Functional safety" regulates how the software is developed and tested to guarantee high safety in safety critical software. The first version of this standard which was published end of 2011 is an adaptation of the standard IEC 61508, and takes into account the particularities of the automotive industry.

Not too long-ago, software tests were considered useless by certain developers – one often encountered the phrase “It’s our client who tells us if something does not function properly.” However, ever since, standards have changed this attitude. Not unlike the norm DO-178 for the aerospace industry, ISO 26262 is very strict concerning procedures to be followed and quality measures to be completed. If an accident occurs, proof of safety measures can be demanded years after the original software was delivered. Therefore, some of our clients store their test coverage reports for more than 30 years.

The railway, (EN 50128 “Railway applications – Communication, signalling and processing systems”) nuclear (CEI 60880), and medical (CEI/EN 62304 Medical device software - Software life-cycle processes) industry have similar, field-dependent, quality norms. The common factor of all these norms is: the higher the risk, the higher the test requirements.

All these norms require - among other measures to improve quality - both static analysis and proof of test coverage.

Companies that develop "critical" software therefore no longer have a choice today: testing is a mandatory and integral part of the software development process.

Software testing is also important for other industries. Of course, most of our clients work in the "critical sector", but in recent years we have an increasing number of users of our test tools in sectors that are not subject to standards. E.g., the agriculture sector is undergoing rapid changes with its technological innovations. More and more harvesting solutions, barn cleaners, automated feeding systems and milking robots are used.

One of our customers, a specialist in these technological innovations told me: “The error-free operation of software in machines feeding or milking cows is essential. Animals that receive too much or too little food can get sick - a farmer who would have to milk a thousand cows in the middle of the night "manually" certainly has to deal with serious consequences on his farm.”

Our experience clearly lies in the testing of embedded systems, and therefore of “technical” software. Thanks to the feedback from our more than 600 customers in 40 countries around the world, we believe we have a clear picture of the steps to follow to produce “good software”. Since 2003 we have also seen a lot of avoidable mistakes - some funny, some catastrophic, but all costly. It would be interesting and fun for the reader to write about these stories, but it would obviously not be in the best interest of the companies involved. A positive point: after these setbacks, in recent years we have observed a surge in effort from our customers to move towards exemplary testing procedures. We are pleased to see that there are more and more 'good students' in the industry - also outside of 'critical' sectors such as aerospace and defense, automotive and transportation.

Good software quality is essential. Testing is not a source of cost or a necessary evil, but - when done properly - a lever to reduce risk, increase quality and above all save expenses due to software malfunctions. This 4th edition of “Pratique des Tests Logiciels” provides the foundation for strategizing and testing effectively. I recommend all current and future participants in software projects to read and study this book.

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