When one of Germany’s leading car manufacturers made the decision to use a new embedded processor in future production cars, it was of paramount importance that the compiler was validated under as stringent conditions as possible.

Although the supplied compiler had already been validated by the compiler developer, additional testing was deemed necessary in order to guarantee that the target application code would compile without introducing execution errors. The safety-critical nature of automotive systems such as Electronic Stability Control (ESC) means that the embedded software needs to be 100% deterministic, not only in terms of its decision making but also in terms of its real-time performance. Eliminating errors introduced by the compilation process itself is a major factor in achieving these requirements.

To assist in compiler validation, Munich-based consulting company Validas AG (www.validas.de) was brought in. Validas is a world-leader in software tool validation for embedded systems, especially for safety-critical applications in the automotive, avionics and railway industries.

“There was a time critical element to adoption of the new silicon, so our task was to find a compiler validation suite that would comprehensively test the associated compiler and do it quickly,” says Validas CEO Dr. Oscar Slotosch. “After evaluating ACE’s SuperTest compiler test and validation suite, especially in relation to its test case coverage, we came to the conclusion that it would do exactly what our customer wanted. In terms of meeting the deadlines, one of the strengths of SuperTest was that it delivered on its promise of being an ‘out-of-the-box’ solution.”

“Configuring SuperTest to do what we wanted was extremely straightforward, which meant that we were up and running with compiler testing within a few days. In fact the documentation provided was so good that we didn’t need to draw on ACE for support,” says Slotosch.

“The other big advantage in terms of timing was SuperTest’s fast run-time, which allowed us to achieve over 99% test coverage within a few weeks. That meant it offered very good value for money.”

Dr. Oscar Slotosch, CEO at Validas
Under certain conditions it is not unusual for compilers to produce compilation errors, often as a result of gaps in the compiler developer’s testing. After extensive testing with SuperTest, this was found to be the case for the compiler in question. Using SuperTest’s small feature-oriented tests, the compiler provider was able to locate compilation errors and identify the precise conditions under which they would occur. It was also possible to verify that none of the proposed application codes would trigger these errors. Because some types of error can be stimulated by programming violations, rigorous testing with SuperTest also acted as an additional check on software quality.

About ACE....

ACE Associated Compiler Experts bv specializes in the development and commercialization of products and services for professional compiler development. Their leading products are the CoSy compiler development system and the SuperTest compiler test and validation suite. The company is a member of the ACE Group and is based in Amsterdam, The Netherlands.

About SuperTest...

SuperTest is the world’s most comprehensive compiler test and validation suite, coming from ACE in Amsterdam. With SuperTest, ACE makes its well over 30 years of experience and expertise in compiler construction and testing available to the compiler industry. Both professional compiler developers and software quality assurance engineers will appreciate more than 40,000 source files in SuperTest, providing over a million of conformance tests, as well as a host of quality and regression tests dealing with compiler internals such as analyses and optimization algorithms.

For companies with a very high reputation to maintain and stringent automotive safety standards to meet, compiler quality will always be an issue. SuperTest’s ability to achieve the confidence levels needed to introduce new silicon solutions into safety-critical automotive applications has now won it a permanent place in the arsenal of software development tools recommended by Validas to its customers.