ax**i**vion
stopping software erosion

Erosion protection for navigation software in the fast-moving automotive industry

The software solution EB street director by Elektrobit (EB) is used for multifunctional navigation applications in the innovation-hungry automotive sector. For the developers at EB, this means having to implement new software features in ever shorter cycles, while simultaneously satisfying the automobile industry's exacting performance and quality requirements. Axivion Suite has made a vital contribution to their successful development.

THE CHALLENGE ++ EB street director by Elektrobit is used in the automobile sector and in consumer electronics for both mobile navigation devices and permanently installed systems. Regardless of the field of application or end device, modern navigation systems are becoming ever more complex and multifunctional. EB street director is therefore modular in design, with a navigation core that can be used for a variety of different end applications. This modularity allows the software to be integrated into new development projects in the automotive sector and makes it possible to build more convenient functionalities into the solution for the driver. Especially in the premium segment, with automobile manufacturers such as Audi, Porsche and Mercedes Benz, as well as Volkswagen, this places extremely high demands on the performance of the overall solution.

For developers in the highly dynamic automotive industry this means having to integrate many new features and often within a very short time frame. This is in addition to fundamental technical innovations, which must be integrated, such as connectivity for on-board systems with external devices and cloud-based services for the common use of data. At the same time, care has to be taken throughout all development phases to ensure that the system architecture remains sustainable, consistent and easy to maintain. This is the only way to implement new requirements rapidly and cost-effectively in the long-term – and meet the high quality requirements of the automotive sector. Additional challenges are presented by EB itself as designing these complex software solutions calls for more than just a handful of developers working at a single location. The trend is towards

larger development teams, with projects often being executed by over 100 personnel at various locations around the world. The challenge is to ensure that all those involved in the project are kept informed and remain at the same level of technical knowledge. When new personnel join the development teams, they must be brought up to speed as quickly as possible and involved in the productive process.

"The Axivion Suite provides us with crucial support when implementing new features in EB street director and guaranteeing the quality of our software solutions in the long term."

Jakob Schmidt, Software Architect at Elektrobit

THE SOLUTION ++ When it comes to day-to-day development work at EB, the Axivion Suite meets two central requirements right from the start: At regular intervals, the software tool automatically checks the conformity of the high-level architecture, which is modelled on UML-based tools, and the detailed design, with the code. At the same time, the Axivion Suite continuously checks that the detailed design meets the high-level architecture requirements.

Information on architecture violations flows into regular reporting which will be made available either to individual team managers or the entire development team by email, depending on the deployment scenario, as a dashboard message or within the normal integrated development environment. Decisions concerning counter-measures, such as code corrections or architecture tracking, can then be made on a case-by-case basis. In this context, it is vital that the information is transparent and available, at all times, to everyone involved in the project. This enables the team to make informed decisions about whether rapid and successful development should be given higher priority in some situations and routine system maintenance should be considered less important. In this case, they may decide not to make an adjustment immediately. However, it is essential that information concerning the violation is retained and can be reprioritised at a later date.

In order to ensure that Axivion Suite rapidly becomes part of EB's everyday development work, Axivion has accompanied every stage of the new tool's introduction as the solution provider. From the technical integration of the Axivion Suite into the development environment and setting up the required analyses and reports to training developers and architects – Axivion offers every service from a single source.

THE SUCCESS ++ After introducing the Axivion Suite, EB soon achieved its first successes at developer level: Transparent reporting provides programmers with an overview of their code. As they learn something every day, they can improve their development work and gain a better understanding of the architecture of their software. At the same time, integrating new personnel at the various locations has become considerably easier and faster.

The continuous improvement of its development work has now enabled EB to implement new features into the modules of EB street director faster than ever before. When the architects modify their models in line with the requirements of the new feature, these architecture modifications are now visible and transparent for all those involved in the project, which facilitates consistent further development – a key requirement for agile software development.

Moreover, new experience gained from the development, testing and debugging processes enables project managers to prepare cost estimates for new projects more easily and rapidly, while impact analyses can also be conducted significantly more efficiently.

All in all, the continuous architecture optimisation process, with clear interfaces and modules, ensures better testability. In this way, EB can ensure that the overall system is easy to maintain in the long term, as well as the quality of the navigation software solution, which is subject to particularly stringent requirements and standards in the automotive sector.

ABOUT ELEKTROBIT ++ Elektrobit (EB) is a multiple award-winning and visionary global supplier of embedded software solutions, cloud computing and services for the automotive industry. As a leading automotive software company, with over 25 years of industry experience, EB offers flexible, innovative software solutions for connected car infrastructures, human machine interface (HMI) technologies, navigation & driver assistance systems, electronic control units (ECUs), and software engineering services. EB's products power over 70 million vehicles worldwide. EB is a wholly-owned subsidiary of Continental AG.

For further information, please visit: www.elektrobit.com

ABOUT AXIVION ++ Axivion, based in Stuttgart, Germany, is a provider for innovative software solutions for static code analysis and for protection from software erosion. The core product of Axivion is the Axivion Suite, a tool suite for the improvement of software quality and maintainability of software systems implemented in the programming languages C, C++ and C#. In addition to static code analysis, the tool suite includes innovative software tools for architecture verification and clone management. Moreover, the tool suite detects software erosion factors such as cycles, dead code and violations of programming rules.

Axivion's MISRA checker covers 100 % of all automatically testable MISRA rules for the standards MISRA C:2004, MISRA C:2012, and MISRA C++:2008. Furthermore, the AUTOSAR C++14 styleguide as well as the CERT® programming rules for secure software development are supported.

The Professional Services Team of Axivion offers methods and training concepts as well as service and consulting to support customers to assure an effective and efficient rollout of the tools.

Axivion's customers are companies that develop innovative technical software across different industries, e. g. industrial automation, automotive, railway, electronics, information and telecommunication, avionics, medical, mechanical engineering, as well as measurement, control and regulation technology.

axivion
stopping software erosion