

PRODUCT BRIEF

QNX OS for Safety 2.0

Automotive



Change is fast and competition is fierce in the automotive market. In order to create an edge, automotive manufacturers seek ways to build a competitive advantage, such as through improved vehicle performance, a better user experience and more attractive prices. The growing focus on autonomous cars gives manufacturers an additional arena in which to compete. Much of the evolution in automotive electronics is enabled by powerful hardware and sophisticated software. The QNX OS for Safety is a software solution that provides the reliable foundation necessary for building competitive automotive systems in a cost-effective and safe manner.

Benefits

- Pre-certified to the highest ISO 26262 ASIL level to reduce development, certification cost and risk
- Freedom from interference mechanisms to enable and simplify the design of systems with a mix of safety and non-safety critical functions
- Qualified C and C++ toolchain to ease the certification workload for customers
- Fully API-compatible with standard QNX Neutrino RTOS to minimize ramp up time and allow code re-usage

Safety Certified

The growing size and complexity of the autonomous vehicle system makes functional safety a topic of paramount importance. In-vehicle electronic components that manufacturers rely on to build a competitive advantage often require powerful hardware and sophisticated software, whether it is an instrument cluster with a compelling user interface or a complicated ADAS function such as pedestrian avoidance.

ISO 26262, an international standard for functional safety, is being adopted widely by the automotive industry as the state-of-the-art definition for vehicle functional safety at the system, hardware and software levels. Building an automotive system compliant with ISO 26262 is a significant task, especially for manufacturers who are not familiar with functional safety at all levels of the design. To help mitigate risk of non-compliance and reduce development and certification costs, BlackBerry QNX provides a reliable RTOS foundation that is pre-certified to the highest level of ISO 26262 – ASIL D. Using QNX OS for Safety as the building block can greatly relieve the certification burden for automotive manufacturers and give them the peace of mind they need when building systems with safety-critical requirements.

Freedom from Interference

While functional safety requirements place emphasis on the system being deterministic and reliable, other competitive features demand the system to be more dynamic, connected and versatile. On one hand, features such as pedestrian avoidance and warning symbols on instrument clusters must be developed with a certain level of safety guarantee. On the other hand, consumers are expecting a compelling and fascinating user experience from systems in the vehicle cockpit, like the infotainment system and driver information display. While these two design goals are very different, both must be satisfied. Therefore, the mechanism to support the design of systems with such mixed criticality becomes crucial. QNX OS for Safety is based on the QNX Neutrino RTOS, which has a microkernel architecture that comes with the inherent ability to separate multiple domains spatially and temporally at the application level. This significantly eases the task of ensuring freedom from interference in systems with mixed criticality. With sufficient separation between the safety-critical and non-safety-critical domains, the design can be greatly simplified. A simpler design also leads to a simpler safety case, which translates, overall, into a lower certification effort.

Qualified Toolchains

ISO 26262 not only places requirements on the hardware and software that make up the system, but also demands proper qualification of the tools that are used to create the system. Tools are classified into various categories depending on the impact they have on the safety of the work product, ranging from tool confidence level (TCL) 1 to TCL 3, with TCL 3 being the highest level. Understanding the importance of the toolchain correctness, the QNX OS for Safety includes the qualification of the C and C++ toolchain to TCL 3. The C and C++ compiler, linker and assembler for the ARM and x86 architecture are crucial to the correct generation of the software that will run on the microprocessors in the car. Taking on the qualification of these toolchains offloads certification tasks that could consume a great deal of time and effort from customers and paves a smoother road to project success.

API Compatibility

The QNX OS for Safety is fully API-compatible with BlackBerry QNX's standard RTOS release. Version 2.0 of the product is compatible with QNX Software Development Platform 7.0. Developers who are already familiar with the standard RTOS require no ramp-up time when working with the safety-certified product, and can use the same QNX Momentics tool suite development environment to develop safety-critical systems. The API compatibility not only eases the learning curve for the development team, but also makes it possible for customers to leverage one common platform for safety-critical and non-safety-critical applications, thus maximizing code re-usage.

Technology

Product Package

The QNX OS for Safety includes software and documentation, all pre-certified to ISO 26262 ASIL D

Software

- QNX Neutrino RTOS microkernel, process manager with multicore support and adaptive partitioning technology
- POSIX compliant libc

Documentation

- ISO 26262 ASIL D certificate, issued by TÜV Rheinland
- Safety Manual
- Installation and Usage Guide
- Hazard and Risk Analysis
- Safety Case
- Release Notes

Hardware Support

QNX OS for Safety is supported on the 32- and 64-bit ARM and x86 architecture. The product is enabled and tested on many popular automotive hardware including Intel Apollo Lake and NXP i.Mx 8. The product can be adapted to run on a customer's chosen hardware through BlackBerry QNX's experienced team of safety professionals and technical support experts.

About BlackBerry QNX

BlackBerry QNX, is a leading supplier of safe, secure, and trusted operating systems, development tools, and professional services for connected embedded systems. Global leaders such as Ford, Audi, Cisco, General Electric, Lockheed Martin, and Siemens depend on BlackBerry QNX technologies for their next generation of secure vehicle software platforms, network routers, medical devices, industrial automation systems, security and defense systems, and other mission and/or life-critical applications. This includes full software lifecycle management via secure over the air software updates. Founded in 1980, BlackBerry QNX is headquartered in Ottawa, Canada, with its products distributed in over 100 countries worldwide.

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