BlackBerry | QNX

AUTOMOTIVE

FOUNDATIONAL SOFTWARE SOLUTIONS FOR THE MODERN VEHICLE

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The automotive industry is undergoing a tremendous transformation. A confluence of consumer demands, regulatory requirements and technological innovations, including the advent of viable electric and connected vehicles, has brought about a complete reimagining of the vehicle. The race to develop truly autonomous vehicles is pushing the industry to fully embrace technologies like cloud, AI and high-performance computing (HPC) that will enable the driving features of tomorrow.

Software will continue to be the industry's biggest game-changer, as it will define both the vehicle and the brand behind the vehicle. New technologies will drive both innovation and complexity as consumers continue to expect driver and passenger experiences that align with the convenience and continuous improvement they find with their smart phones. And innovations like powerful domain controllers open opportunities to consolidate functions on a single system on a chip, while also introducing new safety and security challenges. Vehicles will also become increasingly connected to the Internet, which can make them more vulnerable to cyberattacks.

BlackBerry® QNX® helps automotive industry leaders take advantage of the opportunities and minimize the risks presented by today's technology. Our safe and secure embedded software solutions are trusted by 45 automakers, including BMW, Daimler, Fiat Chrysler, Ford, GM, Honda, Hyundai, Jaguar Land Rover, Toyota and Volkswagen. We work with automotive Tier 1 suppliers, like Aptiv, Bosch, Denso, Panasonic and Visteon, as well as silicon partners like Intel, Qualcomm, Nvidia, Renesas, Texas Instruments and NXP to deliver leading automotive solutions worldwide.


BlackBerry | QNX
290+
Automotive programs
Design wins in
24 OUT OF THE TOP 25
electric vehicle OEMs
9 OUT OF THE TOP 10
OEMs use BlackBerry QNX technology
215+
million vehicles on the road today
#1
Automotive Embedded OS
7 OUT OF THE TOP 7
Tier 1 suppliers use BlackBerry QNX

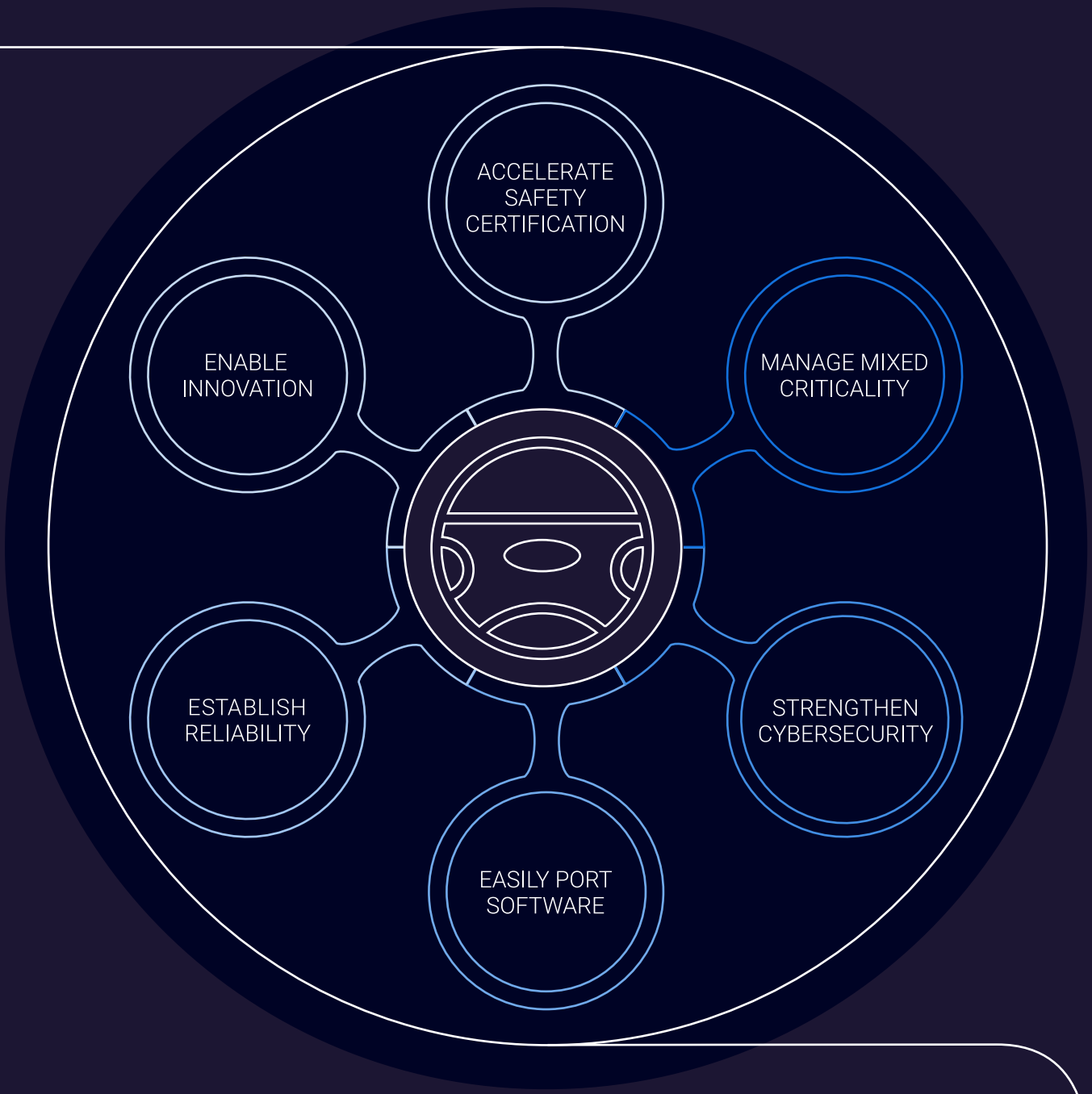

AIRBAG

WHY LEADING AUTOMAKERS AND SUPPLIERS CHOOSE BLACKBERRY QNX

BlackBerry QNX's broad solutions portfolio helps OEMs and Tier 1 suppliers design and develop high-performance, safe, secure and reliable software for vehicle systems, including traditional electronic control units (ECUs) and next-generation high-performance controllers.

BlackBerry QNX software is standards-based and offers proven, established development tools to address the needs of both safety-critical and non-safety systems in the vehicle. We have safety certified variants of our operating system and hypervisor to ISO 26262 ASIL D and provide solutions for safe communications and safe graphics, along with safe system libraries and middleware. Our software is backed by decades of trusted professional services—and in that time we have never missed a start of production (SOP) date.

We help automakers streamline certification, strengthen cybersecurity, manage mixed criticality, establish reliability, enable future innovation and easily port their software from Linux® environments.



"Powered by BlackBerry QNX technology, together we will deliver ADAS and autonomous driving software platforms that will set a new standard for the automotive industry."

—Dae-Heung Moon, CEO at Hyundai Autron

ACCELERATE SAFETY CERTIFICATION

Certifying a system to standards such as ISO 26262 can be challenging, time-consuming and costly. Certified to ISO 26262 ASIL D by TÜV Rheinland, the QNX® OS for Safety, QNX® Hypervisor for Safety and QNX® Black Channel Communications Technology can significantly reduce the scope, risk, length and cost of your certification processes. See our complete list of product certifications.

STRENGTHEN CYBERSECURITY

A cybersecurity breach can put drivers, passengers and the public at risk. Building and maintaining a secure system requires a reliable and secure OS, secure over-the-air (OTA) software updates, a secure supply chain and managed public key infrastructure (PKI) authentication. The QNX® Neutrino® RTOS reduces the attack surface by running all services outside of the kernel space and provides multi-layered protection with system-wide security policies, path trust, fortified functions, access controls, security tooling, and separation and isolation mechanisms. BlackBerry® Jarvis®, our software composition analysis solution, can help you uncover and remediate software vulnerabilities in components from across your complex supply chain.

ESTABLISH RELIABILITY

The **QNX Neutrino RTOS** and the **QNX® Hypervisor** help automotive OEMs and suppliers develop highly robust systems that are both secure and reliable. The QNX microkernel architecture separates critical OS components into their own protected memory partitions. All OS services run outside of kernel space in a high-availability, fault-tolerant design. In complex systems, the QNX Hypervisor provides the supervision and management capabilities to safely and reliably allow separate functional software areas to share common hardware and resources across multiple guest OSs. Our software is built to last the lifetime of your vehicle. In fact, we've had software running continuously in some embedded systems for decades.

MANAGE MIXED CRITICALITY

Automakers use embedded virtualization to consolidate multiple ECUs into a single SoC and reduce the cost and weight of vehicle electronics. However, when subsystems on the same SoC have differing reliability or safety requirements (e.g., infotainment versus instrument cluster in a digital cockpit), system design and safety certification can be a significant challenge. The QNX Hypervisor leverages the latest ARMv8 and x86-64 hardware virtualization extensions to enable developers to integrate diverse operating systems (e.g., QNX, Linux, Android™) and mixed criticality functions onto a single SoC, while maintaining performance, separation and isolation.

ENABLE INNOVATION

BlackBerry QNX helps automakers deliver connected driver and passenger experiences and enable future vehicle capabilities. BlackBerry IVY™ is a scalable, cloud-connected software platform that enables automakers to provide a consistent and secure way to read vehicle sensor data, normalize it and create actionable insights from that data—both locally in the vehicle and in the cloud.

EASILY PORT SOFTWARE

Standardized software can help scale your technology and leverage valuable talent across systems and programs. Designing and building your safety-critical systems using standardized tools (e.g., GCC toolchain, Eclipse IDE and plugins) and APIs (e.g., PSE54 and OpenGL® ES) is essential. In addition, the use of trusted software that seamlessly scales from single core to multicore to high-performance compute platforms helps you ensure maximum portability and design flexibility. Developers ramp up quickly because the QNX OS is POSIX-based, looks and feels like Linux, and uses the same Eclipse development environment, including the GNU compiler collection.

BLACKBERRY IVY

BlackBerry IVY was introduced by BlackBerry and Amazon Web Services (AWS) to accelerate innovation with an intelligent vehicle data platform.

BlackBerry IVY is a scalable, cloud-connected software platform that helps automakers provide a consistent and secure way to read vehicle sensor data, normalize it and create actionable insights from that data—both locally in the vehicle and in the cloud. The solution makes use of automotive software expertise from BlackBerry QNX and the broad portfolio of services from AWS, including IoT and machine learning. BlackBerry IVY is designed to run on the edge, inside a vehicle's embedded systems, and can be managed and configured from the cloud. With support for multiple operating systems and multi-cloud deployments, BlackBerry IVY gives automakers the ability to deliver new features, functionality, and experiences to customers over the lifetime of their vehicles.

BlackBerry IVY addresses a critical data access, collection and management problem in the automotive industry. In the past, the wide variety of vehicle sensors and data formats meant highly specialized skills were required to develop software for vehicles and to access and interact with vehicle data, especially data contained in the vehicle's safety-critical subsystems. A data abstraction layer in BlackBerry IVY protects vehicle data and driver.

BlackBerry IVY is designed to help OEMs and Tier 1 suppliers:

- **Fuel innovation** by supporting rapid development of new customer experiences
- **Drive revenue** by unlocking new revenue streams and business models
- **Reduce costs** by moving processing to the edge and reducing raw data transmission
- **Improve operations** with enhanced data visibility and access
- **Expand ecosystems** by unlocking access to the broader app developer community

Learn about how BlackBerry IVY can enable the future of automotive innovations at https://blackberry.qnx.com/en/aws.

SOFTWARE SOLUTIONS FOR THE MODERN VEHICLE

BlackBerry QNX is trusted in more than 215 million vehicles on the road today. Tier 1 automakers and OEMs choose the embedded software foundation and vast automotive software portfolio from BlackBerry QNX to design and integrate robust vehicle systems.

Automakers globally choose BlackBerry QNX software, support and services to accelerate time-to-market and reduce development costs. With BlackBerry QNX solutions, automakers can deliver innovative features while ensuring they meet critical start of production dates.

BlackBerry QNX provides solutions to support modern, connected vehicle features and subsystems like automatic driving, digital cockpits, instrument clusters, infotainment, digital instrument clusters, acoustics, telematics, secure gateways and more.

ADAS AND AUTOMATED DRIVE

When it comes to the driving functions of the vehicle, safety is the top priority. Vehicle software must process data from sensors such as cameras, LiDAR and radar in real time to make safe decisions on the control of the vehicle. BlackBerry QNX powers advanced driver assistance systems (ADAS) with an OS certified to ISO 26262 ASIL D, as well as frameworks and middleware to enable automated drive features. BlackBerry QNX leads the way in ADAS and other advanced automotive technologies with initiatives like the BlackBerry QNX Autonomous Vehicle Innovation Centre (AVIC), a catalyst for the private, public and academic sectors to collaborate on innovations in connected, automated and autonomous vehicles.

Related Products: *QNX OS for Safety, QNX Hypervisor for Safety, QNX® Sensor Framework*

DIGITAL COCKPIT

Today's digital cockpits seamlessly integrate instrument clusters, infotainment and telematics features, putting all of the vehicle's critical information in front of the driver in a well-orchestrated interface. BlackBerry QNX enables digital cockpits that integrate multiple in-car systems while separating safety-critical systems from non-safety critical systems. BlackBerry QNX is helping to deliver some of the most innovative driver and passenger experiences, including providing a foundation for Epic Games Unreal Engine to create an unparalleled digital cockpit experience in the GMC Hummer EV.

Related Products: *QNX Hypervisor, QNX Hypervisor for Safety, QNX® Advanced Virtualization Frameworks, QNX® Acoustics Management Platform, QNX® Sensor Framework, QNX® Multimedia Suite, QNX® Speech Framework, QNX® SDK for Smartphone Connectivity*

INSTRUMENT CLUSTERS

Instrument clusters have come a long way from analog meters and gauges. BlackBerry QNX offers a reliable, functionally safe solution for digital instrument clusters. Its one-of-a-kind ISO 26262 ASIL B pre-certified graphics solution and ISO 26262 ASIL D pre-certified RTOS and toolchain offer a level of pre-certification that enables faster development. This reduces the cost and risk of qualifying digital clusters to safety standards.

Related Products: *QNX® Graphics for Safety, QNX OS for Safety*

INFOTAINMENT

Infotainment systems deliver both information and entertainment to drivers and passengers. Modern infotainment systems are integrated more than ever with electronics throughout the vehicle. BlackBerry QNX offers market-leading technologies for the development of connected, safe and secure infotainment systems. This is why LG is now using BlackBerry QNX solutions in its next-generation in-vehicle infotainment systems.

Related Products: QNX Acoustics Management Platform, QNX Sensor Framework, QNX Multimedia Suite, QNX Speech Framework, QNX SDK for Smartphone Connectivity

TELEMATICS

BlackBerry provides the foundation for reliable and secure communication for applications like fleet and asset management. We provide the foundation for platforms that enable telematics capabilities today and into the future.

Related Products *QNX Neutrino RTOS*

HIGH-PERFORMANCE CONTROLLERS

In response to the massive amount of compute power demanded by today's critical systems, BlackBerry QNX provides the foundational software that enables the consolidation of several discrete ECUs into a centralized high-performance domain controller. This allows for virtualization of automotive operating systems and the safe consolidation of functions in domains such as powertrain systems and body controllers.

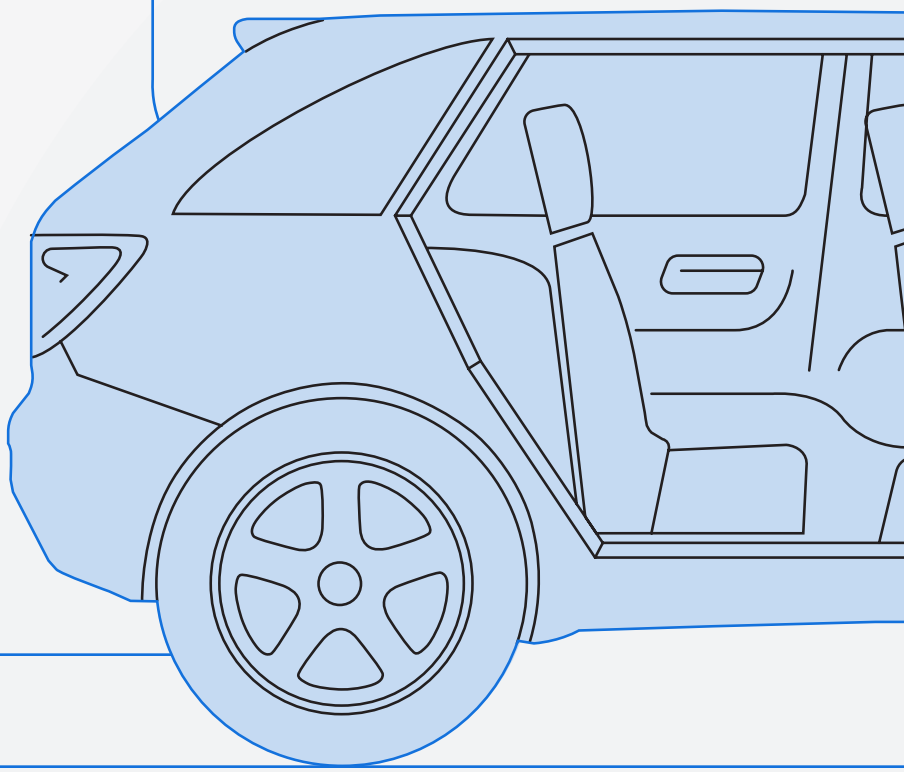
Related Products: *QNX Neutrino RTOS, QNX Hypervisor, QNX Hypervisor for Safety, QNX OS for Safety*

SECURE GATEWAYS

Secure gateways are critical for functions that require access to an outside network, for example, telematics functions that need to connect with infrastructure or software updates via OTA. BlackBerry QNX provides a foundational real-time operating system and secure solutions that enable you to build secure automotive gateways to protect vehicles from outside cyberattacks.

Related Products: *QNX Neutrino RTOS, Certicom® Managed Public Key Infrastructure (PKI) Service, BlackBerry QNX OTA*

*Note: Ask us about firewall integrations



OVER-THE-AIR (OTA) SOFTWARE UPDATES

BlackBerry provides a proven, reliable and secure OTA software update solution to allow preventive software maintenance over the lifetime of a vehicle.

Related Products: *BlackBerry QNX OTA*

ACOUSTICS

Vehicle acoustics encompass a range of vehicle sound features that need to be managed. The QNX Acoustics Management Platform (AMP) was developed to enable automakers to design and manage the total sonic experience in their cars. It offers a pure software solution designed to run on general-purpose application processor cores–saving bill-of-material costs and shortening time to production. The solution delivers uncompromising sound quality, noise and echo cancelation, in-car communication, handsfree communication, tuning tools, engine sound enhancement and external pedestrian alert solutions for cars.

Related Products: QNX Acoustics Management Platform

V2X

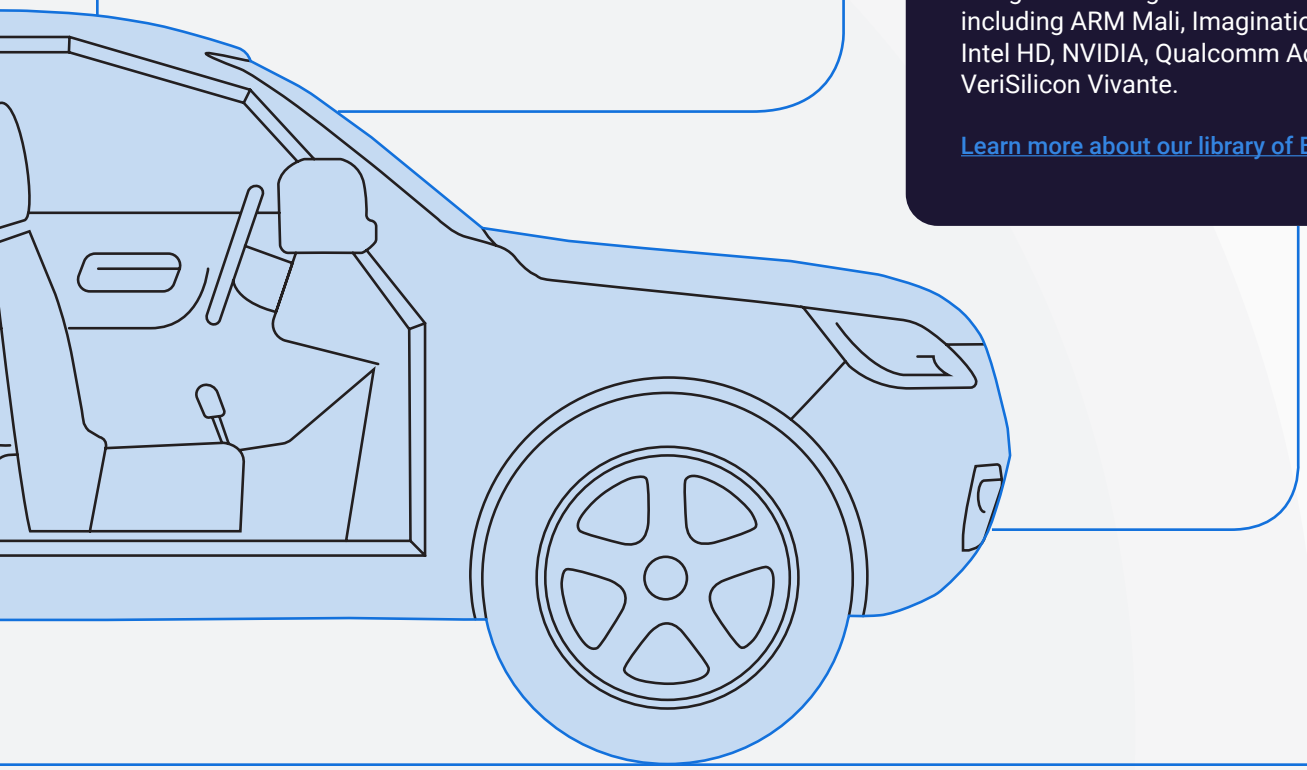
Vehicle-to-everything (V2X) is a technology that allows vehicles to communicate with the traffic aroundthem, or with external infrastructure. BlackBerry® Certicom® Security Credential Management System (SCMS) services for securing vehicle-to-vehicle and vehicle-to-everything (V2X) communication are based on industry technology standards and trust service principles. The SCMS platform is built to IEEE 1609.2 and CAMP specifications, and offers trusted security credentials to vehicle OEMs, Tier 1s, road operators and specialty service vehicles.

Related Products: QNX Neutrino RTOS, BlackBerry Certicom Security Credential Management System (SCMS)

BOARD SUPPORT

QNX Board Support Packages (BSPs) provide an abstraction layer of hardware-specific software that facilitates implementing the QNX Neutrino RTOS on your board. Our extensive BSP library includes BSPs for SoCs manufactured by all leading hardware manufacturers, including AMD, Intel, iWave, NVIDIA, NXP, Qualcomm, Renesas, Samsung, Texas Instruments and Xilinx. In addition, the QNX Neutrino RTOS supports applications using a wide range of ARM and x86 GPUs, including ARM Mali, Imagination PowerVR, Intel HD, NVIDIA, Qualcomm Adreno and VeriSilicon Vivante.

Learn more about our library of BSPs.



"Our automotive customers are developing exciting new products. We are thrilled to be working with BlackBerry QNX to provide secure connectivity and advanced edge computing capabilities for the next generation of electric and autonomous vehicles."

—Bill Vass, Vice President, Technology, Amazon Web Services, Inc.

FUNCTIONAL SAFETY

ISO 26262 safety certification is a major challenge, particularly when you use software of unknown provenance (SOUP). Using a pre-certified OS or embedded hypervisor for safety-critical systems can significantly reduce the complexity, cost, risk and length of your vehicle certification processes —and help ensure you meet your production date.

HOW WE HELP

BlackBerry QNX solutions deliver the safety, security and real-time determinism needed for connected and autonomous vehicles. The QNX OS for Safety, the QNX Hypervisor for Safety and QNX Black Channel Communications Technology are pre-certified with TÜV Rheinland® for use in applications requiring compliance up to ISO 26262 ASIL D. This pre-certification helps reduce your development and certification costs and timelines. BlackBerry® QNX® Safety Services, including functional safety training and professional services, are delivered by embedded system safety experts to help you reduce development risk and streamline your safety certification process.

OPERATING SYSTEM

Provides a reliable RTOS foundation that is pre-certified to the highest level of ISO26262 ASIL D

HYPERVISOR

Isolates safety-critical systems from non-safety critical systems

VEHICLE INSTRUMENT CLUSTERS

Delivers an ISO26262 ASIL B pre-certified graphics solution

SAFE DATA COMMUNICATION

Provides an ISO 26262 ASIL D-certified mechanism for data communication over an unsafe network

ADVANCED DRIVER ASSISTANCE

Provides a foundation on which to build safe and reliable autonomous driving software

> "BlackBerry QNX is the obvious choice for its safety-certified, extremely reliable and highly secure automotive software."
>
> **—Jarvis Yan, Partner and CTO of WM Motor**

SECURITY

There can be no safety without security. A modern vehicle has more than 100 million lines of code, and autonomous vehicles will contain the most complex software ever deployed by automakers.

Automotive software development needs to adhere to three tenets: safety, security and reliability. But with the volume of software and multiple tiers of software vendors in the supply chain, it is unlikely the industry can successfully establish common coding and security standards. This adds a layer of uncertainty in the development of a vehicle, particularly with the increased reliance on software to control critical driving functions.

HOW WE HELP

For more than 35 years, BlackBerry has been synonymous with security. BlackBerry QNX products and services are developed with the security of your end products in mind.

The QNX Neutrino RTOS has a microkernel architecture that reduces the attack surface by running all services outside of kernel space. The RTOS also provides multi-layered protection with system-wide security policies, path trust, fortified functions, access controls, security tooling, and separation and isolation mechanisms. We also provide Security Services to help at each phase in the software development lifecycle (SDLC) and binary scanning and analysis with BlackBerry Jarvis to identify vulnerabilities in open source software.

Our security solutions were designed with complex automotive software environments in mind. To facilitate the security of software originating from multiple suppliers across your supply chain, to security software updates and to enable secure vehicle-to-everything (V2X) communications we offer these solutions:

- BlackBerry Jarvis
- BlackBerry QNX OTA
- BlackBerry Certicom solutions

WP.29 COMPLIANCE

The Article 29 Working Party (WP.29) adopted in 2020 a new international automotive cybersecurity regulation establishing performance and audit requirements for cybersecurity and software update management for new passenger vehicles sold in the European Union and beyond.

BlackBerry® QNX® Professional Services team can help navigate the regulations and prepare development teams for these new requirements with a WP.29 readiness assessment to understand the overall cybersecurity posture, identify specific cybersecurity risks and create a roadmap to WP.29 compliance. Visit our WP.29 page.

SUPPORT & SERVICES

BlackBerry QNX offers a range of services to help automakers reach their goals faster. The BlackBerry QNX services teams have deep knowledge of functional safety and security, and a 100 percent success rate in achieving safety certifications with our customers.

Whether you want help with staff augmentation, kickstarting a project or certifying products, our embedded automotive development and OS experts can provide the right knowledge and experience at the right time.

PROVEN EXPERIENCE

Thousands of person-years in development, support, integration

SERVICE EXCELLENCE

100% success at meeting OEM start of production (SOP) deadlines

INTEGRATION & OPTIMIZATION EXPERTS

Higher performance on custom hardware and faster time to market

DEEP EXPERTISE

Experts in all areas of in-car embedded device software

GLOBAL FOOTPRINT

Regional experienced teams in US, EMEA and APAC

COMMITMENT

Dedicated, dependable, trusted staff

WE OFFER:

- Security services and binary analysis solutions
- Safety services to help you achieve ISO 26262 certifications to the ASIL your project requires
- Custom development
- Training courses developed and led by experts in functional safety and embedded software development
- A variety of support packages and technical advice from developers, engineers and architects
- A managed product lifecycle with regular updates and fixes

Learn more about our professional services and service packages.

SOFTWARE AT-A-GLANCE

FOUNDATION PRODUCTS	
QNX Neutrino RTOS	A deterministic, flexible foundation for your next-generation products with a unique microkernel architecture that provides scalability and dependability and layered security features
QNX Hypervisor	An embedded virtualization solution with a microkernel architecture so multiple OSs (Android, Linux, QNX) can safely operate on the same system-on-a-chip (SoC)
QNX Software Development Platform	The power of QNX Neutrino RTOS plus the QNX® Momentics® Tool Suite to provide you with a POSIX-compliant, Linux-like development platform
SAFETY-CERTIFIED PRODUCTS	
QNX OS for Safety	Built on the same microkernel architecture as the QNX Neutrino RTOS, the QNX OS for Safety is pre-certified to ISO 26262 ASIL D and to IEC 61508 SIL 3. Easily port Linux-based prototypes to the QNX real-time OS (RTOS) and get all the documentation and support you need for certification.
QNX Hypervisor for Safety	This real-time microkernel hypervisor provides the reliability and performance of the QNX OS and allows multiple OSs to safely operate in isolation and in parallel on the same system-on-a-chip (SoC). It is the first embedded hypervisor pre-certified to ISO 26262 ASIL D and to IEC 61508 SIL 3.
QNX Black Channel Communications Technology	Designed to the highest functional safety standards and certified to ISO 26262 ASIL D, this solution follows the Black Channel approach to ensure that communication exchanges are safe and that data is not altered or impacted during its transmission.
SECURITY SOLUTIONS	
BlackBerry Jarvis	A cloud-based, software composition analysis solution that blends system exploration technology and expert services to provide powerful capabilities to examine a complete software product for security vulnerabilities and software craftsmanship.
BlackBerry QNX OTA	BlackBerry QNX Over the Air (OTA) is a customized remote software update solution addressing the increasingly complex requirements of embedded system manufacturers. It can be tailored to seamlessly and securely update and manage endpoints on a variety of embedded systems.

BlackBerry Certicom Solutions	BlackBerry Certicom provides device security, anti-counterfeiting and product authentication to deliver end-to-end security with managed public key infrastructure, code signing and other applied cryptography and key management solutions.

AUTOMOTIVE SOFTWARE

BlackBerry IVY	BlackBerry IVY brings together BlackBerry QNX and AWS technologies to deliver a scalable, cloud-connected software platform. It enables automakers to create personalized driver and passenger experiences and improve operations of connected vehicles.
QNX Acoustics Management Platform (AMP)	Design and manage the total vehicle sonic experience with a pure software solution designed to run on general-purpose application processor cores for cost-effective high-fidelity sound.
QNX Advanced Virtualization Frameworks	Make use of our diverse set of industry-standard, hardware-independent frameworks to enable guest operating systems to share hardware and software services such as graphic displays, acoustic environments, touchscreens, media storage devices, video streams and cameras. The QNX Advanced Virtualization Frameworks provide extended capabilities to the QNX Hypervisor.
QNX Sensor Framework	Integrate sensor feeds from diverse sources (e.g., camera, radar, LiDAR, IMU, GPS sensors) into your critical embedded systems, including autonomous driving applications. Learn more.
QNX Multimedia Suite	Easily implement media capabilities including playback and recording of rich audio and video content in your embedded systems.
QNX Graphics	Enable developers to create interactive user experiences with a mature and advanced graphics framework that provides all the functionality required to work with industry-standards for UI development.
QNX Speech Framework	Designed to ease and accelerate the development of voice-controlled embedded systems, this framework abstracts the complexities of speech recognizers and natural language processing engines from the operating system platform and applications.
QNX SDK for Smartphone Connectivity	Enables developers to integrate industry-standard mobile phone protocols for mirroring mobile content to the vehicle's dashboard display. This offering includes solutions for Apple CarPlay® and Android Auto™.

ABOUT BLACKBERRY QNX

BlackBerry QNX is a trusted supplier of safe and secure operating systems, hypervisors, frameworks and development tools, and provides expert support and services for building the world's most critical embedded systems. The company's technology is trusted in more than 215 million vehicles and is deployed in embedded systems around the world, across a range of industries including automotive, medical devices, industrial controls, transportation, heavy machinery and robotics. Founded in 1980, BlackBerry QNX is headquartered in Ottawa, Canada, and was acquired by BlackBerry in 2010.

BlackBerry QNX software and development tools are standards-based and enable companies to adopt a scalable software platform strategy across product lines and business units. The BlackBerry QNX software portfolio, including our safety pre-certified product versions, is purpose built for embedded systems and scales to support everything from single-purpose devices to highly complex, mixed-criticality platforms. Because we believe we are not successful until you are, you can rely on our support and professional services teams to provide the expertise you need, when you need it –throughout the entire product development lifecycle.

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