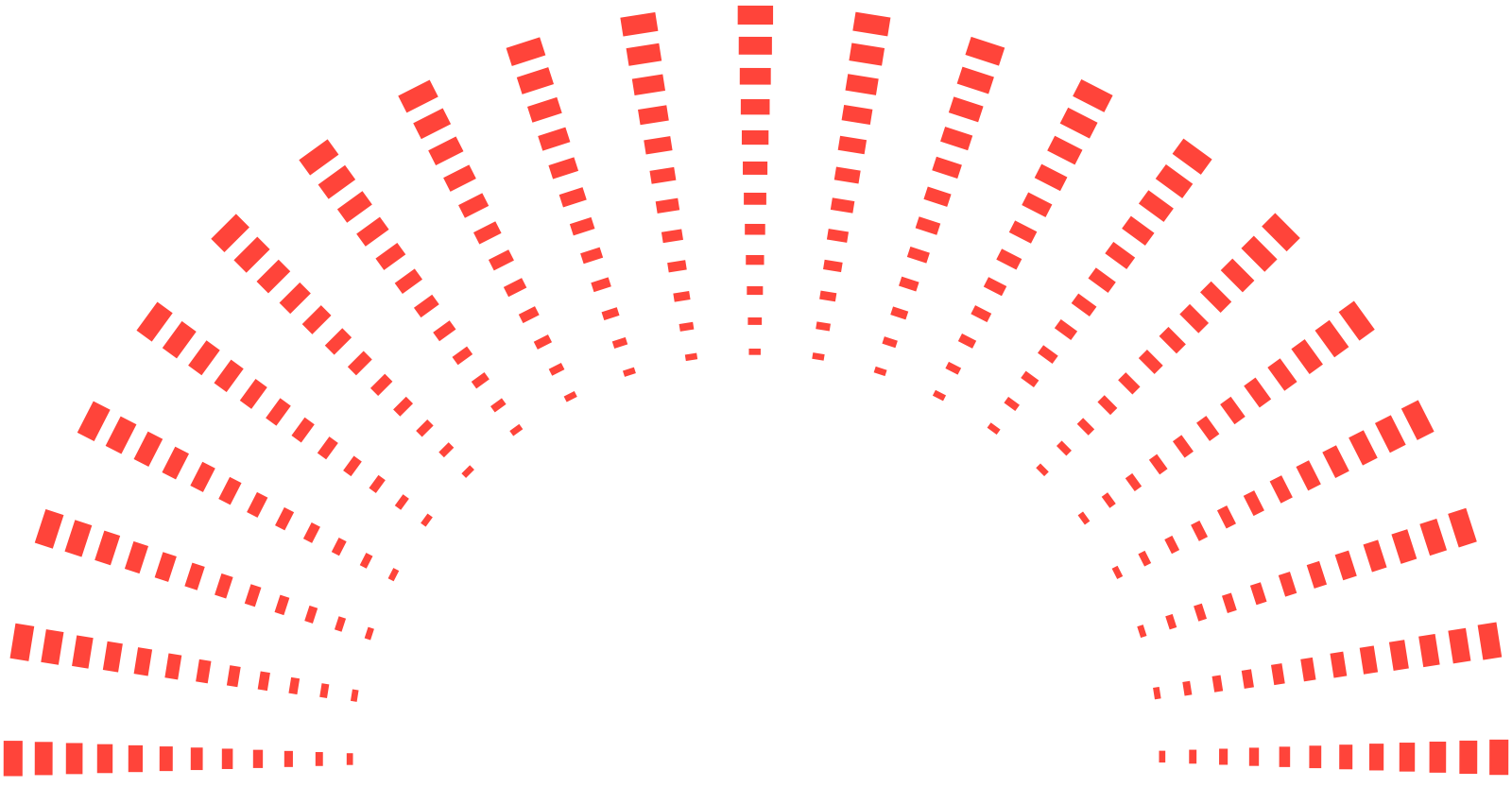
QNX

Solution Guide

Automotive

The Foundation for the
Software-Defined Vehicle



How QNX is Transforming the Automotive Industry

5/5
Top Tier 1s

270+
Vehicles Makes & Models

275M+
Vehicles

24/25
Top EV Automakers

10/10
Top Automakers

45+
Automakers

100%
SOP Deadlines

The automotive industry is undergoing the most rapid transformation in its history. A confluence of consumer demands, regulatory requirements, and technological advances, along with the prevalence of electric and connected vehicles, has brought about a complete reimagining of the space. The race to develop truly autonomous vehicles is pushing the industry to adopt technologies in areas like cloud, AI and high-performance computing (HPC) that will enable innovative driving features both in the short term and well into the future. Software will continue to be the industry's biggest game-changer, as it defines both the vehicle and the brand behind it. However, the movement toward the software-defined vehicle across all automotive segments brings both challenges and opportunities.

QNX helps automakers take advantage of the opportunities and minimize the risks presented by today's technology. Our safe and secure embedded software solutions are trusted by more than 45 automakers, including BMW, Daimler, Dongfeng Motor, Fiat Chrysler, Ford, GM, Honda, Hyundai, Jaguar Land Rover, Mercedes-Benz, Toyota and Volkswagen. We work with automotive Tier 1 suppliers, like BICV, Bosch, Chongqing Yazaki Meter, Continental, DENSO, Garmin, Magna, Marelli, Panasonic, PATEO, Valeo, and Visteon. And we have strong partnerships with leading automotive silicon partners like NVIDIA, NXP, Qualcomm, Renesas, Texas Instruments and Intel to ensure we can bring fully featured automotive software solutions to the market.

Software-Defined Vehicle Challenges and Opportunities

QNX has a depth and breadth of solutions to enable automakers to reduce hardware and embrace technologies like high-performance compute, data enablement, and cloud computing to reduce both cost and complexity. The adoption of these technologies will also bring about opportunities in areas like new feature-based revenue streams, data monetization, and accelerated development.

Addressing Continually Evolving Automotive Business Challenges

- **Reduce Complexity and Cost**
- **Enhance the User Experience**
- **Facilitate New Revenue Models**
- **Harness the Power of the Cloud**
- **Implement With Velocity**
- **Increase Emphasis on Functional Safety & Security**

Why Leading Automakers and Suppliers Choose QNX

Successfully capitalizing on opportunities for efficiencies and new business models poses challenges to the automotive industry. Addressing these challenges is the key to driving the software-defined vehicle. Our customers look to us to help them move forward on this journey.

Reducing the number of discrete electronic control units (ECUs), as a means of reducing costs, results in significant technical challenges. Exceptional driver and passenger experiences are essential to selling today's vehicles, and the systems that deliver those experiences range from connectivity to acoustics to digital cockpits. Monetizing the vehicle by providing actionable data for third-party consumption sets the scene for new revenue opportunities not only for automakers, but also for the wider ecosystem. New cloud technologies pave the way for faster time-to-market. And as vehicle safety and security are of the utmost importance, automakers continue to build this in from the beginning of their product development, not as an afterthought.

Our track record, spanning more than 25 years in automotive software, along with our 100 percent start of production (SOP) success rate, are just some of the reasons new and long-standing customers trust QNX to help them address these challenges and prepare for future innovations.

What Our Customers Are Saying

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QNX is a true partner and has provided us with the foundation we need to produce the safe and secure vehicles of tomorrow.

Mark Mohr, Senior VP Vehicle Technology, Volvo Group.

The fact that QNX® OS 8.0 is POSIX-based and looks and feels like Linux, our team felt at home working with the platform from the first minutes, the safe and secure vehicles of tomorrow.

Krisztián Holman, Senior Software Engineer, Aimotive.

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Reducing the Cost of Building a Modern Vehicle

Vehicle electronic systems architectures are evolving rapidly. Firstly, there is the consolidation of multiple ECUs onto a single domain controller SoC. Secondly, is the move towards zonal architectures and controllers. These advances represent steps on the journey towards a high-performance computing platform in the vehicle. This evolution, driven by cost reduction and the increasing need for complex data processing in the vehicle, brings inherent technical challenges. Addressing these leads to increased software complexity.

QNX enables automakers to address the challenges and complexities associated with new vehicle architectures. Mixed-criticality (safety and non-safety) systems, such as those found in integrated cockpits, can be managed safely. Multiple Operating Systems (OSs) including Linux®, Android™ and others can be securely isolated from each other. And scaling software across vehicle platforms, brands and models can be achieved efficiently, whilst ensuring the utmost safety and reliability.

How We Help

QNX OS 8.0 | QNX Hypervisor

The QNX® OS 8.0 is our industry leading RTOS for embedded systems. With its comprehensive tool suite, developers can rapidly create, debug, optimize and deploy embedded software. Using the QNX® Hypervisor, they can also consolidate multiple, diverse OSs on a single SoC using industry standards, including VirtIO. Safety pre-certified versions of both products mean developers need to certify only the safety-critical components they build, enabling savings on development cost and time-to-market.

> **Our continued relationship is testimony to not only the commercial value of our combined vision, but also our shared commitment to empower the future of connected cars with secure, safe, and innovative technologies.**
>
> Yannick Hoyau, VP Of Engineering & Innovation, Marelli.

Enhancing the Driver and Passenger Experience

Vehicle buyers view the driver and passenger experience as a key factor in their purchase. Audio is helping to define this experience—from entertainment to propulsion sounds to ambient noise control—and plays a growing role in defining the automaker's brand. The role of vehicle data is also increasingly important, particularly when it comes to market-differentiating applications.

QNX equips automakers to innovate and win the battle for the superior in-cabin experience—from an innovative software-defined audio solution, to enabling data-driven application development.

How We Help

Software-Defined Audio

QNX® Sound is a holistic, cloud-enabled software environment that manages the entire vehicle soundscape—including hundreds of interactions between hands-free calling, multi-zone wake-up word and command, in-car communications, safety alerts, noise reduction, sound generation, and media playback—accessible from a cloud-enabled tool suite with a graphical programming interface for endless signal processing creativity.

QNX Sound includes an extension mechanism for audio software developers and signal processing suppliers to seamlessly integrate their solutions into vehicles, allowing them to consolidate and manage the next generation of audio experiences.

A Strong Foundation with QNX OS 8.0 and QNX Hypervisor

QNX Sound can run on our foundational software—QNX OS 8.0 and QNX Hypervisor, offering seamless, safe and reliable integration. They are also designed to be OS agnostic.

Enabling Innovation and Streamlining Development

Cloud technology has well and truly arrived in the automotive industry. Monetization of vehicle data, using high-performance on-board processing allied to cloud-based systems is enabling new business models. And as automakers grow their engineering teams, the need for cloud-enabled development tools and processes has become paramount to streamline development and reduce time-to-market.

QNX has combined its extensive automotive experience, cloud technology expertise, and ecosystem presence to offer an in-vehicle software platform that enables automakers and their partners to monetize vehicle data and innovate more effectively. Also, cloud-enabled versions of QNX technology significantly improve engineering efficiency by helping to eliminate bottlenecks associated with embedded systems software development.

What Our Customers Are Saying

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With QNX technology underpinning our next generation digital cockpit platform, together we are helping to deliver a smarter and more technologically sophisticated future for drivers and passengers alike, without sacrificing safety, security or reliability.

Sung-Hoon Lee, SVP of Sales Division, Hyundai Mobis.

Migrating our core software stack to the QNX cloud has been a game-changer for our virtual software development and validation efforts, significantly boosting the efficiency of our developers and improving overall time-to-market for new features in the vehicle.

Martin Stamm, Technical Lead, Continental.

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How We Help

Jumpstart Development In the Cloud

QNX® Accelerate is an initiative that enables embedded systems software development using cloud-enabled versions of QNX technology. By harnessing the agility, speed and scale of the cloud, it empowers developers in new ways—enabling better collaboration, enhancing the developer experience, increasing development efficiencies and reducing time-to-market.

Functional Safety & Security

If there is one single aspect that underpins all automotive engineering, it is the uncompromising requirement for safety and security. And the more sophisticated vehicles become, the more sophisticated of an approach is needed. Safety and security are in our DNA. We're backed by BlackBerry's more than 35 years of excellence in cybersecurity. And we've been providing software for the world's most critical systems, including 25 years delivering functionally safe automotive systems.

How We Help

Accelerate Safety Certification

Having pre-certified software and tooling is essential to cost-effective safety-certified design and testing. With QNX® OS for Safety and QNX® Hypervisor for Safety, developers need only certify the safety-critical components they build - reducing effort, cost, and time to-market. Both products are certified by TÜV Rheinland to ISO 26262 ASIL D, and QNX Hypervisor for Safety uses safety-certified VirtIO drivers. Ongoing review and portfolio expansion ensures the latest standards versions are supported.

Manage Mixed-Criticality

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 AArch64 (which includes ARMv8 and ARMv9) and x86-64 hardware virtualization extensions to enable developers to integrate diverse operating systems (e.g., QNX, Linux and Android) and mixed-criticality functions onto a single SoC, while maintaining performance, separation and isolation.

> **QNX is the obvious choice for its safety-certified, extremely reliable and highly secure automotive software.**
>
> Royce Stubbs, Senior Software Engineer, MedAcuity.

Strengthen Cybersecurity

Compared to monolithic kernels, the QNX OS 8.0 microkernel architecture has a much smaller attack surface, making it inherently more secure. It also offers a comprehensive suite of security features such as access control mechanisms, security policies, permission controls, encryption support, self-verifying filesystems and more. QNX has earned several key industry certifications, showcasing its commitment to cybersecurity, including the certification to the ISO/SAE 21434 automotive cybersecurity standard, TISAX, and the ISO/IEC 27001 standard. These successes showcase a solid infrastructure and foundation for delivering secure solutions.

Safe and Secure Communication

QNX OS for Safety offers add-on products to help you increase the reliability and safety of communications and files within critical automotive systems. QNX® Filesystem for Safety (QFS) is a POSIX-compliant read-only filesystem certified to ISO 26262 ASIL B. And QNX® Black Channel Communications Technology meets or exceeds the highest functional safety standards and is certified to ISO 26262 ASIL D.

Software Solutions for the Vehicle of Today and Tomorrow

QNX is trusted in more than 275 million vehicles on the road today. OEMs and Tier 1s depend on the embedded software foundation and the vast software portfolio from QNX to design and integrate robust vehicle systems.

QNX provides solutions to support connected vehicle features, as well as the latest vehicle domain subsystems.

ADAS

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. QNX offers a foundation for building ADAS and automated driving applications, from multi-camera surround view to active safety systems such as emergency braking all the way to autonomous driving systems. Built upon the QNX OS for Safety and certified to ISO 26262 ASIL D, our modular sensor/processor-agnostic software framework allows developers to write applications once and reuse them on a wide range of hardware systems.

Related Products: QNX OS for Safety, QNX Hypervisor for Safety, QNX® Platform for ADAS.

Cockpit Domain Controller (CDC)

Today's digital cockpits seamlessly integrate instrument clusters, infotainment, and telematics features, putting all the vehicle's critical information in front of the driver in a well-orchestrated interface. QNX offers a reference implementation that provides automakers with a fast path to building safe and secure next-generation cockpits on leading SoCs. Built on our industry leading QNX Hypervisor, and optionally QNX® Advanced Virtualization Frameworks, our digital cockpit reference implementation uses a set of shared device frameworks based on the industry standard VirtIO. Our VirtIO technology provides a straightforward, efficient and extensible mechanism for ensuring graphics, video, audio, input/touch and other modules can readily be shared between QNX and Android operating systems on the platform.

Related Products: QNX Hypervisor, QNX Hypervisor for Safety, QNX OS for Safety, QNX Advanced Virtualization Frameworks, QNX Sound, QNX Platform for ADAS.

Instrument Clusters

Instrument clusters have come a long way from analog meters and gauges. 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 OS for Safety.

Telematics & Secure Gateways

Secure gateways are critical for functions that require access to an outside network – telematics functions that need to connect with infrastructure. QNX foundational software and secure solutions enable the building of secure automotive gateways that protect vehicles from cyberattacks.

Related Products: QNX OS 8.0, Certicom Managed Public Key Infrastructure (PKI) Service.

V2X

Vehicle-to-everything (V2X) technology allows vehicles to communicate with the traffic around them or with external infrastructure. BlackBerry® Certicom® Security Credential Management System (SCMS) services for securing 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 automakers, Tier 1s, road operators and specialty vehicles.

Related Products: QNX OS 8.0, BlackBerry Certicom SCMS.

Surround View

Surround view systems offer a 360-degree view around the vehicle, as well as a bird's eye view using four or more on-board cameras. They serve as a driver's aid for parking and reversing the vehicle. QNX foundational software enables the rapid development and integration of surround view systems.

Related Products: QNX OS 8.0, QNX Hypervisor, QNX Platform for ADAS, Ethernet Audio Video Bridging (AVB).

Driver Monitoring

Distracted or tired drivers pose a major safety risk; hence automakers are increasingly incorporating driver monitoring technology into the cabin, using cameras that monitor eye movement. Rapid development and integration of this technology can be achieved with QNX foundational software.

Related Products: QNX OS for Safety, QNX Hypervisor, QNX Platform for ADAS.

Body Control

This single centralized module controls multiple lighting, convenience, and access systems within the vehicle. The number and complexity of body control functions varies by vehicle model and trim level, as well as over time. QNX foundational software enables rapid development and updating, and reliable running of this software.

Related Products: QNX OS 8.0, QNX Hypervisor.

Battery Management

Electric vehicle battery charging and discharging must be carefully managed to prevent the voltage, current and temperature of any battery cell or module from exceeding defined limits. The vehicle battery management system (BMS) is a critical area where the reliability of QNX foundational software is key to ensuring battery safety and efficiency.

Related Products: QNX OS 8.0, QNX Hypervisor.

Chassis

Chassis functions include one or more of: braking control, steering control and suspension control. This spans both safety critical functions, such as antilock braking, as well as functions where settings can be selected by the driver, such as traction control, suspension stiffness and steering feedback. Underpinning the software for these functions with QNX foundational software enables rapid development and upgrade, with pre-safety certifications where applicable.

Related Products: QNX OS 8.0, QNX OS for Safety, QNX Hypervisor, QNX Hypervisor for Safety.

Powertrain

The powertrain system involves actuators for transmission, engine control, throttle control and cruise control. Safe, reliable and accurate operation of actuators, as well as monitoring of their states is critical to safe operation of a vehicle. QNX foundational software is proven in mission-critical systems where safety and reliability must be built-in from the start of development.

Related Products: QNX OS 8.0, QNX OS for Safety, QNX Hypervisor, QNX Hypervisor for Safety.

Smart Sensors, Zonal, and Central Compute Controllers

Smart Sensors perform pre-processing of vehicle sensor data prior to forwarding for further computation. Examples include smart camera, radar and lidar sensors for the pre-processing of data, prior to passing it on to zonal and central compute controllers for use in highly automated and autonomous drive applications. QNX foundational software running in the sensor module enables reliable, high-performance pre-processing.

In zonal architectures, the vehicle is divided into zones, such as ‘front right’ or ‘rear left’. The zonal controller acts as a hub interfacing multiple sensors and actuators in the zone, with the vehicle’s central compute controller. Reliability and performance underpinned by QNX foundational software are key. Central compute controllers also referred to as high-performance compute (HPC) nodes, centralize the processing of functions across all vehicle zones. This level of computing demands the ultra-high performance, reliability, safety, and security of which QNX foundational software is capable.

Related Products: QNX OS 8.0, QNX OS for Safety, QNX Hypervisor, QNX Hypervisor for Safety, QNX Platform for ADAS.

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Powered by 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, Hyundai Autron.

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QNX Support & Services

Proven Experience

Thousands of person-years in development, support and integration.

Service Excellence

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

Global Footprint

Regional experienced teams in US, EMEA and APAC.

Commitment

Dedicated, dependable and trusted staff.

Professional Services Expertise

Hardware

Prototyping, board support packages, driver development/customization, system optimization, fast boot, hypervisor support.

Porting & Integration

Linux/Android hypervisor guests, middleware integration, open-source porting/integration, legacy OS migration.

Safety & Security

Functional safety services, safety cases, hazard and risk analysis, penetration testing, security best practices, safety and security training.

Application

UI/UX design/development, application development, protocol development, middleware design and development, application stack design, application profiling and optimization.

Vehicle Architectures

Domain-based, zonal, and High Performance Computing architectural design, software development and integration.

Consulting

Architectural reviews, on-site consulting (long/short term), cloud architecture integration, expert consultation, service retainers.

Learn more about our professional services and service packages →

Foundation Products/Initiatives

QNX Software Development Platform 8.0

QNX Software Development Platform (SDP) 8.0 is the foundational development platform for the next generation of mission and safety-critical systems merging unprecedented performance with unparalleled security and reliability—without compromise. It features our next-generation QNX Operating System built on a future-ready architecture designed to maximize silicon advancements thanks to our advanced microkernel design.

Learn more →

https://blackberry.qnx.com/en/products/foundation-software/qnx-software-development-platform

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.

Learn more →

https://blackberry.qnx.com/en/products/foundation-software/qnx-hypervisor/advanced-virtualization-frameworks

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).

Learn more →

https://blackberry.qnx.com/en/products/foundation-software/qnx-hypervisor

QNX Accelerate

QNX Accelerate is an initiative that makes cloud-enabled versions of our foundational products available. This reduces embedded software development cycles and improves time-to-market.

Learn more →

https://blackberry.qnx.com/en/products/accelerate

Safety-Certified Products

QNX OS for Safety

Built on the same microkernel architecture as the QNX® OS 8.0, 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.

Learn more →

https://blackberry.qnx.com/en/products/safety-certified/qnx-os-for-safety

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.

Learn more →

https://blackberry.qnx.com/en/products/safety-certified/qnx-hypervisor-for-safety

Security Solutions

QNX Cybersecurity

For more than 40 years, QNX has provided safe and secure embedded software solutions for automotive, industrial controls, robotics, medical devices, and other mission-critical applications. QNX cybersecurity is built on a strong culture, product excellence, and an ecosystem that enhances the company's security capabilities.

Learn more →

https://blackberry.qnx.com/en/products/security/qnx-security

Automotive Functions

QNX Cabin

QNX® Cabin is a hardware-portable, pre-integrated digital cockpit software reference implementation that provides a development framework for designing digital cockpit systems. By increasing software portability and supporting cloud-first development, QNX Cabin helps reduce development costs and accelerates time-to-market.

Learn more →

https://blackberry.qnx.com/en/products/automotive/qnx-cabin

QNX Multimedia Suite

The QNX Multimedia Suite is middleware delivered with the QNX Software Development Platform. It can be implemented as an independent standalone system or fully integrated with other QNX products, including the QNX Platform for ADAS.

Learn more →

https://blackberry.qnx.com/en/products/automotive/multimedia

QNX Platform for ADAS

QNX Platform for ADAS is a foundation for building ADAS and automated driving applications. The modular, sensor/processor-agnostic framework allows for code to be written once and re-used. Optimized for automotive silicon and compatible with a variety of processing cores.

Learn more →

https://blackberry.qnx.com/en/products/automotive/qnx-adas

QNX Sound

QNX Sound is a holistic software environment that lets you design the next generation of vehicle audio with a holistic software environment that manages the entire vehicle soundscape.

Learn more →

https://blackberry.qnx.com/en/products/automotive/qnx-sound

May 2025

QNX

About QNX

QNX, a division of BlackBerry Limited, enhances the human experience and amplifies technology-driven industries, providing a trusted foundation for software-defined businesses to thrive. The business leads the way in delivering safe and secure operating systems, hypervisors, middleware, solutions, and development tools, along with support and services delivered by trusted embedded software experts. QNX® technology has been deployed in the world's most critical embedded systems, including more than 275 million vehicles on the road today. QNX® software is trusted across industries including automotive, medical devices, industrial controls, robotics, commercial vehicles, rail, and aerospace and defense. Founded in 1980, QNX is headquartered in Ottawa, Canada.

Learn more at qnx.com →