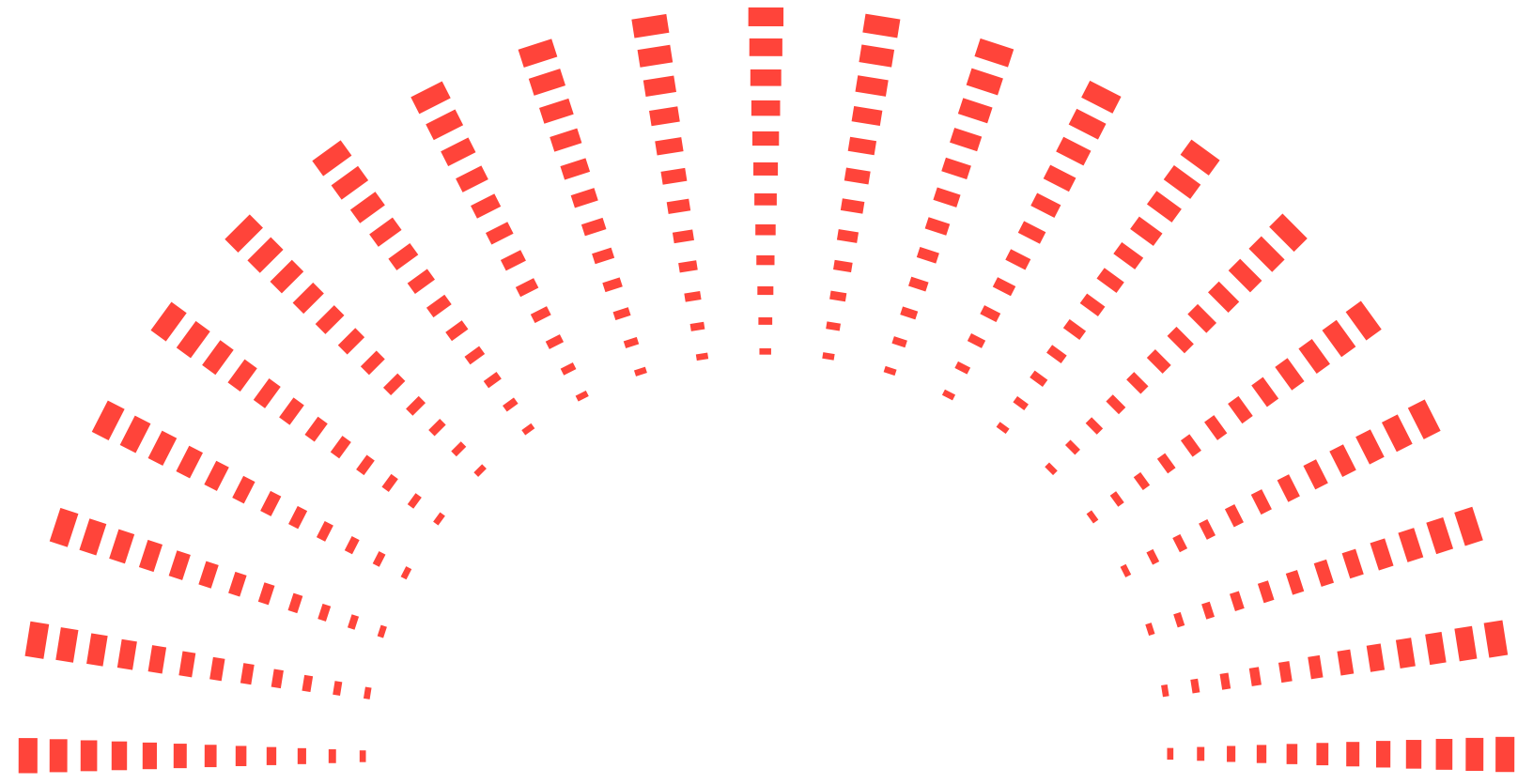
QNX

Solution Guide

Commercial Vehicles

Foundational Software Solutions
for Trucks, Buses and Delivery Vans



How QNX is Transforming the Vehicle 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

Commercial vehicles—trucks, buses and delivery vans—must be cost-efficient to build and maintain, and they must run reliably for decades. At the same time, software-defined designs and the drive toward autonomous vehicles lead to more complex and connected vehicle systems that make development, safety certification and cybersecurity more difficult and costly to achieve. To meet the challenge, next-generation commercial vehicles must be built on a software foundation designed for safety, cybersecurity and secure connectivity.

Software-defined systems enable both innovation and simplification in a rapidly changing commercial vehicle market. A common software foundation based on a microkernel operating system (OS) or hypervisor simplifies and accelerates development when used on ECUs throughout the vehicle—in systems as diverse as the digital cockpit, secure gateway, driver assistance, telematics, battery management, and emerging high-performance compute platforms. Safety certification and support are also paramount. OEMs need a software supplier with a proven record of helping customers to meet start of production (SOP) deadlines, streamline safety certification and strengthen security. Decades-long vehicle lifespans demand the selection of a software vendor that provides support at every stage of the software development life cycle (SDLC).

QNX helps commercial vehicle manufacturers to embrace the opportunities and minimize the risks presented by ever-changing technology. Our safe and secure embedded software solutions are trusted by top vehicle manufacturers, and we work closely with Tier 1 suppliers such as Aptiv, Bosch, Denso, Panasonic and Visteon as well as with silicon partners Intel, Qualcomm, Nvidia, NXP, Renesas, and Texas Instruments to deliver leading vehicle solutions globally.

Addressing Continually Evolving Commercial Vehicle Business Challenges

- Accelerate Safety Certification
- Strengthen Cybersecurity
- Port Software Easily
- Safeguard Long Lifecycles
- Leverage Silicon and Board Support
- Establish Reliability and Performance

Why Leading Commercial Vehicle Manufacturers Choose QNX

QNX helps commercial vehicle manufacturers and suppliers to overcome many challenges at once. The same QNX software foundation that enables companies to build in safety and cybersecurity also helps them to simplify safety certification, adapt legacy software, improve reliability, safeguard long product life cycles and enable innovation.

QNX solutions are standards based and offer proven development tools for building safety-critical and other vehicle systems. We pre-certify variants of our operating system and hypervisor to ISO 26262 ASIL D and provide certified solutions for safe communications and safe graphics, along with safe system libraries and middleware. Our software is backed by decades of trusted professional services.

> **Using a single OS and hypervisor for high-performance systems in the truck delivers huge economical and technical benefits to our operations and enables us to bring customer value to market faster and more efficiently.**
>
> Mikael Adelsberg, SVP of Connected, Autonomous and Embedded Systems at Scania.

Accelerate Safety Certification

When you use a pre-certified foundation, you need to certify only what you build, not the operating system you build it on. Certified to ISO 26262 ASIL D by TÜV Rheinland, the QNX® OS for Safety, QNX® Hypervisor for Safety and QNX® Black Channel Communications Technology enable your company to focus time and talent on its own value-added components and applications. Even the C and C++ toolchains are qualified to IEC 61508 and ISO 26262, and pre-certified C and C++ libraries are also available.

Port Software Easily

QNX products are POSIX compliant, so they make it easy to port from Linux or another OS without a lot of recoding, and QNX supports the AUTOSAR Adaptive standard, too. Developers ramp up quickly on the QNX® Software Development Platform (SDP), as it looks and feels like Linux and uses the industry-standard Eclipse development environment, GNU compiler collection (gcc) and APIs (e.g., PSE54, OpenGL® ES). Plus, QNX offers engineering services and board support packages (BSPs) for the most current automotive and industrial-qualified system-on-a-chips (SoCs) to streamline your development.

The use of trusted software that seamlessly scales from single core to multicore to high-performance compute platforms ensures portability and design flexibility. In addition, the QNX Hypervisor and the QNX Hypervisor for Safety isolate entire systems as guests in virtual machines, so you can port legacy code and implement new features with confidence that the new code won't affect other systems.

Safeguard Long Lifecycles

Commercial vehicle owners need customer support and service for many years after the start of production. QNX supports customers throughout the production life cycle and provides ongoing support for as long as needed. QNX experts can help with any version of QNX OS and provide unmatched support for all our products over the lifetime of your products.

Establish Reliability and Performance

Highly available, robust software systems for vehicles require a fail-proof foundation. The QNX® OS 8.0 and the QNX Hypervisor help commercial vehicle OEMs develop robust, reliable systems. The QNX microkernel architecture provides the real-time behavior and comprehensive separation and isolation needed for critical systems. All QNX OS services run outside of kernel space, facilitating high-availability, fault-tolerant designs. The QNX Hypervisor uses a priority-based virtual CPU (vCPU) sharing model with adaptive partitioning to control the allocation of processing power among competing virtual machines, ensuring that compute time is always available for the needs of complex, high-performance vehicle systems.

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, a secure supply chain and managed public key infrastructure (PKI) authentication. QNX solutions provide a layered approach to security that won't hamper functionality or performance. The QNX OS 8.0 reduces the attack surface by running services outside of the kernel space and provides granular control of system privilege levels, an AES-256 encrypted and self-verifying file system and secure boot. QNX Black Channel Communications Technology helps ensure safe data communication over unsafe links (e.g., UDP, TCP, CAN). Jarvis™, our software composition analysis solution, can help you uncover and remediate software vulnerabilities in components from across your complex supply chain. QNX also provides a managed PKI authentication and FIPS (Federal Information Processing Standards) so that developers have the essential building blocks to create secure embedded systems.

Silicon and Board Support

QNX also helps customers streamline development timelines through its deep, optimized integration for SoCs and reference hardware platforms, delivered as board support packages (BSPs), as well as through its professional services, including safety and security services. QNX BSPs provide an abstraction layer of hardware-specific software that facilitates the implementation of the QNX OS 8.0 on a given board. The extensive QNX BSP library includes BSPs for SoCs and reference hardware platforms manufactured by leading hardware manufacturers. In addition, the QNX OS 8.0 supports a wide selection of ARM® and x86 GPUs.

Software Solutions For Commercial Vehicles

QNX solutions are designed with a focus on the safety, security and real-time determinism needed for the next generation of trucks, buses and delivery vans. For more than 45 years, the QNX microkernel-based operating system has provided the foundation for hundreds of millions of critical systems deployed in more than 275 million passenger vehicles and a growing number of commercial vehicles. Commercial vehicle OEMs and suppliers globally choose QNX software, support and services to reduce time to market and development costs. We have the expertise to provide the software, support and professional services you need to deliver safe, secure and reliable systems faster for the whole vehicle.

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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. QNX is well aligned with the automotive challenges within electrification, automation and connectivity and the technical solutions needed in these domains.

Mikael Adelsberg, SVP of Connected, Autonomous and Embedded Systems at Scania.

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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. 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. QNX leads the way in ADAS and other advanced automotive technologies with initiatives like the 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® Platform for ADAS.

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. QNX enables digital cockpits that integrate multiple in-car systems while separating safety-critical systems from non-safety critical systems. QNX has been selected to deliver some of the most innovative experiences for trucks and buses by industry-leading manufacturers including Scania and Volvo Trucks.

Related Products: QNX Hypervisor, QNX Hypervisor for Safety, QNX® Advanced Virtualization Frameworks, QNX® Sound, QNX Cabin, QNX Platform for ADAS, QNX® Multimedia Suite, QNX® Speech Framework, QNX® SDK for Smartphone Connectivity.

Telematics

QNX 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 OS 8.0.

In-Cab Acoustics

Vehicle acoustics encompass a range of in-cabin sound features that need to be managed. QNX Sound was developed to enable automakers to design and manage the total sonic experience in their vehicles. 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 cancellation, in-car communication, hands-free communication, tuning tools, engine sound enhancement and external pedestrian alert solutions.

Related Products: QNX Sound.

Secure Gateway

Secure gateways are critical for functions that require access to an outside network, for example, telematics functions that need to connect with infrastructure. 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 OS 8.0, BlackBerry® Certicom Managed Public Key Infrastructure (PKI) Service.

Note: Ask us about firewall integration.

Digital Smart Mirrors

Smart mirrors enhance visibility around the vehicle to help drivers maneuver through tight spots and can minimize rear-view blind spots. Commercial vehicle drivers need to trust their mirrors, so safety and reliability are paramount. QNX provides a foundation for safe, reliable camera monitoring systems with the ASIL certification using the QNX OS for Safety, safe communications and other certified software components. The QNX Platform for ADAS provides low-latency camera and sensor input, enhancing the foundation for smart mirrors.

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

Trailer Telematics

The transportation and logistics industries are constantly faced with solving issues associated with increasing vehicle utilization, saving driver time, identifying theft or unauthorized use, and improving maintenance scheduling. Radar® is a data-driven asset monitoring device that helps automate operations and improve utilization of trailers, containers, chassis and other remote assets, while ensuring assets are safe and secure. The solution provides near real-time information such as vehicle location, route and mileage, temperature, humidity, door status and cargo load state—all presented in an intuitive online dashboard to make logistics operations more efficient.

Related Products: BlackBerry® Radar R2.

V2X

Vehicle-to-everything (V2X) is technology that enables vehicles to communicate with surrounding vehicles and external infrastructure. Certicom® Security Credential Management System (SCMS) services for securing vehicle-to vehicle and vehicle-to-everything (V2X) communication are based on industry technology standards. 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 OS 8.0, BlackBerry® Certicom Security Credential Management System (SCMS).

High-Performance Controllers

In response to the massive amount of compute power demanded by today's critical systems, 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 OS 8.0, QNX Hypervisor, QNX Hypervisor for Safety, QNX OS for Safety.

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 OS 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 45 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

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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 →