



www.qnx.com

AUTOMOTIVE

FOUNDATIONAL SOFTWARE SOLUTIONS
FOR THE MODERN VEHICLE



OVERVIEW

Dear colleagues in the automotive industry,

We are in the midst of a pivotal moment in the evolution of the car. Connected and autonomous cars will have a place in history alongside the birth of industrialized production of automobiles, hybrid and electric vehicles, and the globalization of the market.

The industry has stretched the boundaries of technology to create ideas and innovations previously only imaginable in sci-fi movies. However, building such cars is not without its challenges.

AUTOMOTIVE SOFTWARE IS COMPLEX

A modern vehicle has over 100 million lines of code and autonomous vehicles will contain the most complex software ever deployed by automakers. In addition to the size of software, the software supply chain made up of multiple tiers of software suppliers is unlikely to have common established coding and security standards. This adds a layer of uncertainty in the development of a vehicle. With increased reliance on software to control critical driving functions, software needs to adhere to two primary tenets, Safety and Security.

SAFETY

Modern vehicles require safety certification to ISO 26262 for systems such as ADAS and digital instrument clusters. Some of these critical systems require software that is pre-certified up to ISO 26262 ASIL D, the highest safety integrity level.

SECURITY

BlackBerry believes that there can be no safety without security. Hackers accessing a car through a non-critical ECU system can tamper or take over a safety-critical system, such as the steering, brakes or engine systems. As the software in a car grows so does the attack surface, which makes it more vulnerable to cyberattacks. Each poorly constructed piece of software represents a potential vulnerability that can be exploited by attackers.

BlackBerry QNX is perfectly positioned to address these challenges as we have the solutions, the expertise and pedigree to be the safety certified and secure foundational software for autonomous and connected vehicles.

Read on further to understand how we can address your challenges.

Sincerely,



John Wall

Senior Vice President and Head of BlackBerry QNX

ABOUT BLACKBERRY QNX

Based in Ottawa, Ontario, Canada, BlackBerry QNX has delivered the foundational operating systems and middleware of many of the world's most mission-critical embedded systems for nearly four decades. From nuclear power plants, surgical robots and class III certified life-critical medical devices to autonomous and connected vehicles, BlackBerry QNX has delivered software solutions that consistently provide reliability, security and safety.

BlackBerry QNX has the broadest portfolio of software products and tools to protect vehicles against cybersecurity attacks. Security should not be a bolt-on afterthought. We believe security is inherent in every stage of design, development and testing. In addition to the best-in-class safety -certified operating system, BlackBerry provides a host of security products such as managed PKI, FIPS 140-2 certified toolkits, key inject tools, binary code static analysis tools, security credential management systems (SCMS), and Over The Air (OTA) Software Update for autonomous and connected vehicles.

BlackBerry QNX's embedded software solutions can be found in more than 40 different automakers, including Audi, BMW, Ford, GM, Honda, Hyundai, Jaguar Land Rover, KIA, Maserati, Mercedes-Benz, Porsche, Toyota, and Volkswagen. The company partners with automotive Tier 1s, like Aptiv, Bosch, Denso, Panasonic and Visteon, and silicon partners, like Intel, Qualcomm, Nvidia, Renesas and NXP to deliver electronic control units (ECUs) to the automakers.



QNX TECHNOLOGY IN
60 MILLION
CARS

#1

AUTOMOTIVE
SOFTWARE FOR
INFOTAINMENT



#1 OS IN TELEMATICS

67
MILLION

HANDSFREE
SOFTWARE
UNITS SHIPPED

TELEMATICS
UNITS SHIPPED
AND SECURED

42
MILLION



IN OVER **240**
MODELS

100% SUCCESS RATE
MEETING OEM START OF
PRODUCTION DEADLINES

SOFTWARE SOLUTIONS FOR THE MODERN VEHICLE

ADAS AND ACTIVE SAFETY

BlackBerry QNX offers ISO 26262 certified OS and frameworks that power advanced driver assistance systems (ADAS) modules and enable automated driving.

Products

- QNX Platform for ADAS
 - QNX OS for Safety
-

OVER-THE-AIR (OTA) SOFTWARE UPDATES

BlackBerry provides a proven, reliable and secure OTA software update service to allow preventative software maintenance over the lifetime of a car.

Products

- BlackBerry OTA Software Update Management Service
-

SECURE MANUFACTURING

Protection of an Engine Control Unit (ECU) begins when its silicon chips are being manufactured. Certicom allows silicon chips used in ECUs to be injected with private keys and certificates to create a root of trust.

Products

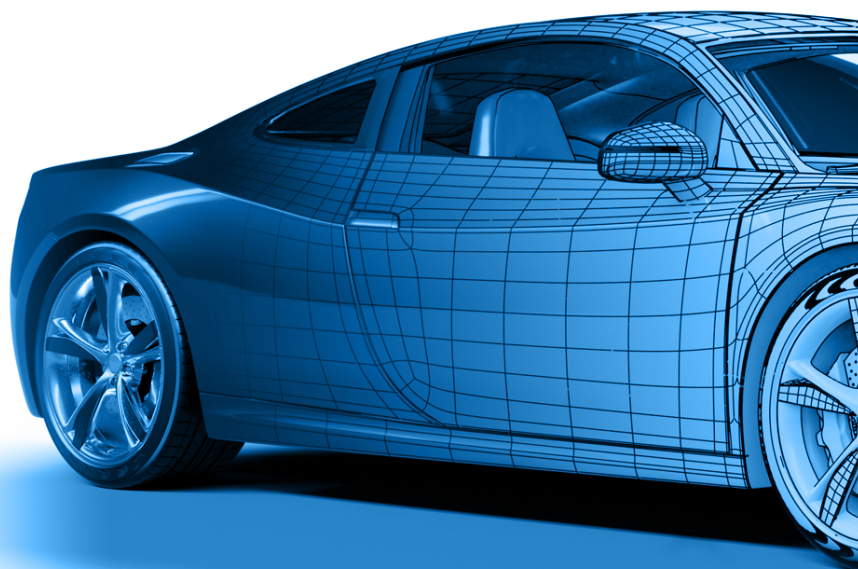
- Certified Cryptographic Libraries
 - Cryptographic Asset Management System
 - Managed Public Key Infrastructure (PKI) Service
-

GATEWAYS

BlackBerry QNX provides a foundational real-time operating system, enabling our customers to build secure automotive gateways.

Products

- QNX Neutrino RTOS
 - QNX Wireless Framework
 - Managed Public Key Infrastructure (PKI) Service
 - BlackBerry OTA Software Update Management Service
-



We offer safety-certified and secure software solutions to build automotive subsystems and ECUs.

INSTRUMENT CLUSTERS

BlackBerry QNX offers a reliable, functionally safe, solution for digital instrument clusters.

Products

- QNX Platform for Instrument Clusters
 - QNX OS for Safety
-

DIGITAL COCKPIT

BlackBerry QNX enables digital cockpits that integrate multiple in-car systems while separating safety-critical systems from non-safety critical systems.

Products

- QNX Hypervisor
 - QNX Platform for CAR Infotainment
-

INFOTAINMENT

BlackBerry QNX offers market-leading technologies for the development of connected and secure infotainment systems.

Products

- QNX CAR Platform for Infotainment
-

TELEMATICS

BlackBerry QNX delivers solutions that connects a car to the outside world wirelessly including OnStar, the world's largest telematics provider.

Products

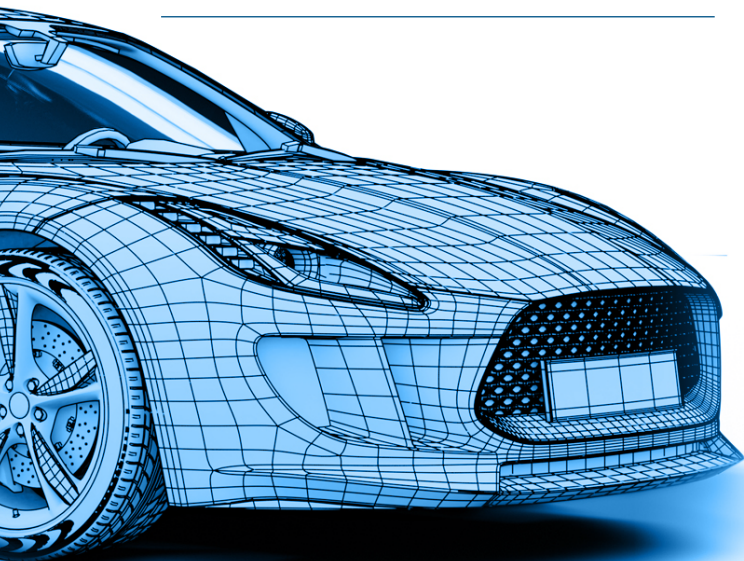
- QNX Wireless Framework
 - QNX Neutrino RTOS
-

ACOUSTICS

BlackBerry QNX provides noise and echo cancellation, in-car communication, handsfree, tuning tools, engine sound enhancement and external pedestrian alert solutions for cars.

Products

- QNX Acoustics Management Platform
-



FUNCTIONAL SAFETY

Functional safety has always been a requirement in industries where failure of a system can lead to severe consequences for human life and property.

What is Functional Safety?

The IEC, the world's leading standards organization, defines functional safety as the part of overall safety that depends on a system or equipment operating correctly. In other words, something must continue to function in order to keep the system safe.

Often, software prevents disaster when the hardware fails. For example, the Airbus A320 jet crash in January 2009, saw the hardware of the engines fail. Flight control software helped facilitate the emergency landing of the plane in New York's Hudson River.

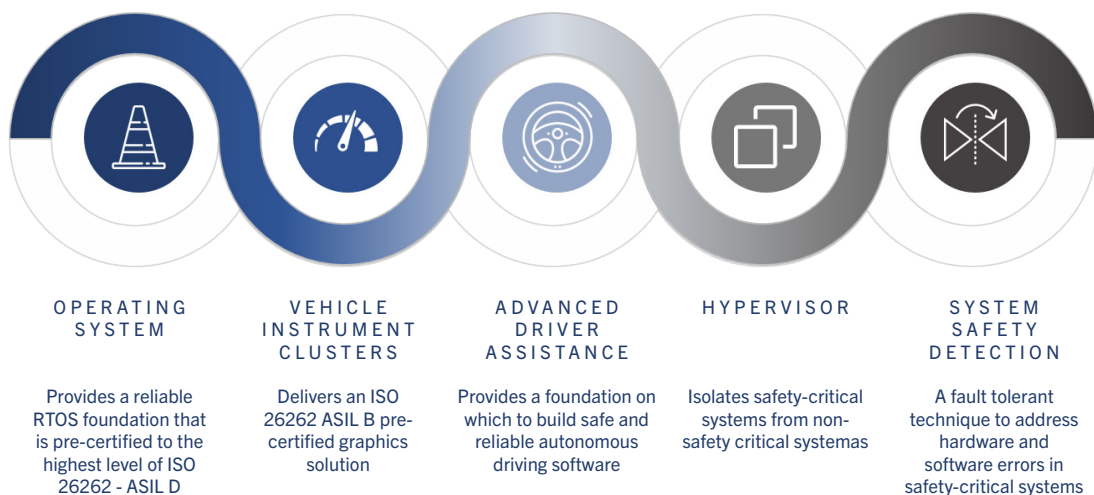
IEC 61508 has been the dominant international standard for functional safety and is the basic functional safety standard applicable to many industries such as rail and industrial control. The automotive-specific safety standard derived from IEC 61508 is ISO 26262, which was first released in 2011.



Building an automotive system compliant with ISO 26262 is a significant task. As these systems evolve to adopt more powerful hardware and sophisticated software, it becomes harder to meet functional safety requirements.

BlackBerry QNX eases the challenges of building ISO 26262 compliant automotive systems through its solutions

BLACKBERRY QNX FUNCTIONAL SAFETY SOLUTIONS



BlackBerry QNX's safety solutions mitigate risk of non-compliance and reduce development and certification costs.

SECURITY

Auto cybersecurity is on national agendas because automobiles are increasingly connected to the Internet and other systems that bad actors can commandeer and render dangerous, amongst other undesirable outcomes. The problem is complex and the point-solutions that exist today are fragmented leaving a very porous and “hackable” system.

Trends impacting automotive security

There are four industry trends that make modern vehicles vulnerable to cyberattacks and potential failures:



VEHICLE
ACCESS



SOFTWARE
CONTROL



AUTONOMOUS
DRIVING



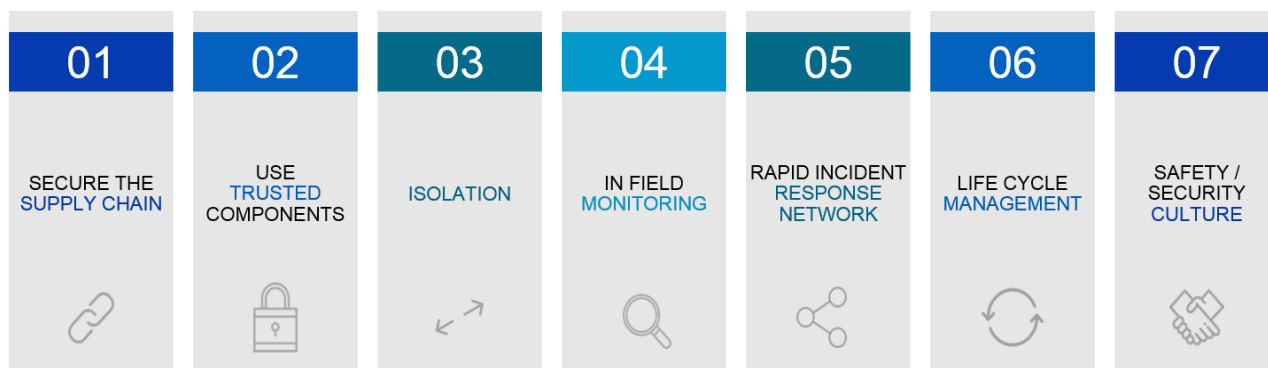
CHANGING STATE
OF SOFTWARE

Why should the industry be concerned?

The global market for automotive cybersecurity is expected to grow to \$759M USD in 2023 (Source: Automotive Cybersecurity and Connected Car Report from IHS Automotive). Vehicle and consumer safety, costly recalls and brand reputation are at stake for automakers when a vehicle’s software is compromised by a cyberattack.

BlackBerry's 7-Pillar Recommendation for Automotive Cybersecurity

To address these concerns, help mitigate security risks, and build the foundation for a reliable and secure car, BlackBerry has developed a 7 Pillar Recommendation for Automotive Cybersecurity.



BlackBerry's long and storied history of cybersecurity expertise combined with the embedded software experience of BlackBerry QNX makes BlackBerry well-armed to address the challenges of security and safety for the automotive industry.

BlackBerry's "7 Pillar Recommendation" is a holistic framework to protect a vehicle from cyberattacks. Within this framework, BlackBerry has developed a set of products, tools, and services that are available for the automotive industry to adopt.

Protecting a single sub-system or ECU begins with establishing a root of trust by ensuring that silicon chips can be properly authenticated. BlackBerry provides an asset management system (AMS) that does exactly that. The root of trust can be used to create a chain of trust by signing successive layers of software. The next step is to use an operating system, like QNX Neutrino RTOS, and platforms that provide an advanced and secure software foundation for autonomous drive and connected cars. When systems need to be isolated, BlackBerry QNX's type 1 higher performance Hypervisor can be used.

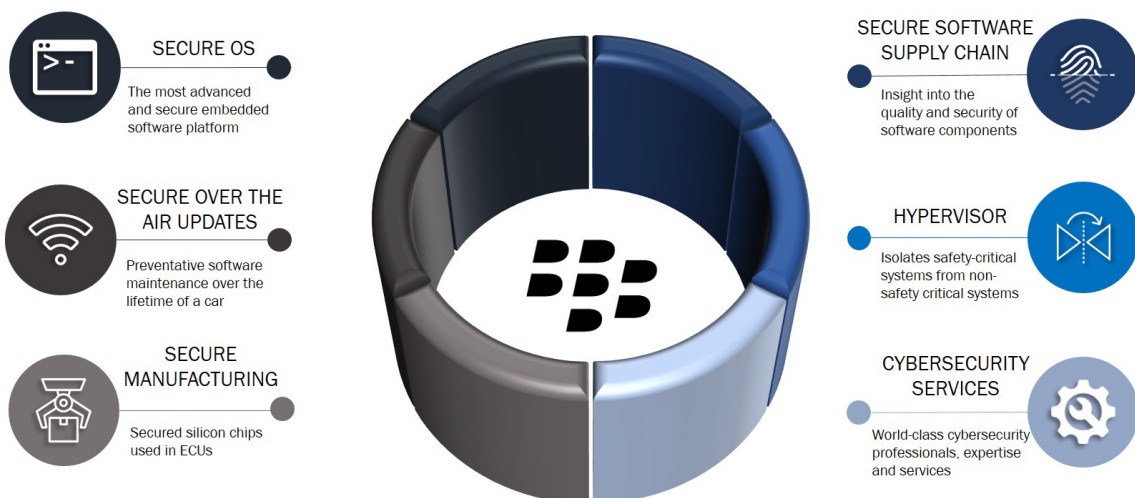
As software complexity from the multi-tiered supply chain of a vehicle grows, there is an increasing need to ensure that this software is checked for its security posture. BlackBerry Jarvis offers a Security Application Static Testing (SAST) tool to inspect binary files in an easy, quick, scalable, and cost-effective manner, and delivers deep insights into the quality and security of software components.

A vehicle's software can be maintained over its lifetime with the BlackBerry OTA Software Update Management Service, that provides proactive secure software updates to the vehicle, which may be used to address old and new cybersecurity threats.

BlackBerry also offers managed PKI (certificates) and Security Credential Management Systems that can issue, manage and revoke certificates which serve to authenticate V2X communication that will facilitate autonomous driving.

These automotive security offerings are augmented by the BlackBerry Professional Cybersecurity Services organization, whose sole aim is to assess and thwart cybersecurity risks for organizations.

BLACKBERRY QNX SECURITY SOLUTIONS





QNX, A TECH
COMPANY
THAT IS TO
CONNECTED CARS
WHAT MICROSOFT
IS TO PCs.

- Time Magazine

SERVICES

BlackBerry QNX provides quality engineering support to help Tier 1 system integrators and Automakers eliminate program delays and meet or exceed project milestones and start of production (SOP) commitments.

Based on extensive hands-on experience in automotive development, support, and integration in all areas of the BlackBerry QNX product portfolio, our team of senior engineers applies field-proven engineering and project-management practices that leads to successful results.



Proven Experience

Thousands of person-years in development, support, integration



Integration & Optimization Experts

Maximize performance on custom hardware, faster time to market, integration experts



Global Footprint

Regional experienced teams in US, EMEA, and APAC



Deep Expertise

Experts in all areas of in-car embedded device software



Commitment

Dedicated, dependable, and trusted staff



Global Footprint

100% Success at meeting Start of Production (SOP) deadlines



 **BlackBerry** | **QNX**

ENGINEERING SERVICES

20 Years of Experience and Trust
270 Automotive Programs
100% On-time Start-of-
Production (SOP) Delivery



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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 safety certified and/or mission-critical applications.

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