# SlackBerry QNX



Electronic Control Unit (ECU) consolidation is a growing trend in automotive electronic design. The vehicle cockpit is evolving with multiple sub-systems such as infotainment, digital instrument clusters, and heads-up displays running on a single high-performance system-on-chip (SoC). Such systems run software of mixed criticality and even different operating systems, thereby driving the requirement for safety certification. The QNX Platform for Digital Cockpits is a leading-edge, fully-integrated, software solution that provides automakers a fast path to building safe and secure next-generation cockpits on leading SoCs.

### **Overview**

Increasingly, consumers expect an in-vehicle experience that mirrors the personalized and seamless connected experience they have in their home or office. Automakers are tasked with creating this user experience while ensuring that critical systems are safe, secure and reliable.

The QNX Platform for Digital Cockpits, designed to help automakers meet this demand, delivers a complete cockpit software solution built on proven digital instrument cluster, infotainment and hypervisor technologies. Additionally, to support Android for infotainment, the platform is architected to run Android in a guest virtual machine (VM). This architecture enables support for Google Automotive Services as well as any Android applications that automakers wish to include in their production systems. To mitigate potential Android vulnerabilities, security measures have been implemented to prevent the direct exchange of data between Android and critical systems and networks such as the Controller Area Network (CAN).

QNX Platform for Digital Cockpits introduces a set of shared device frameworks based on industry-standard VirtIO. These new frameworks provide a straightforward, efficient, and extensible mechanism for sharing physical hardware devices between guests. For example, graphics, video, audio, input/touch can readily be shared between QNX and Android operating systems on the platform, providing the performance benefits of device para-virtualization.

The platform includes reference implementations that may be used as-is to jumpstart development and can be customized to suit any architecture. For instance, the infotainment functionality and user interface (UI) may be owned and controlled by QNX, with Android applications granted controlled access to the display and other devices. Furthermore, the platform provides maximum design flexibility allowing for any combination of exclusive or shared access to hardware resources, regardless of the OS mix being used.

#### **Benefits**

- Fast time-to-market of low, mid or high-end digital cockpit platforms with pre-integrated reference implementations
- Built-in pre-certified safety components facilitate system-level ISO 26262 certification

- Fully-configurable platform architectures:
  - o Multiple guest architecture: QNX safety-certified cluster VM + QNX infotainment VM + Android VMs
  - o Single guest architecture: Android VM (with all other QNX processes executing in the hypervisor host domain)
- Efficient and extensible shared device frameworks (graphics, audio, video, touch, etc.) greatly ease the customer's design and development burden
- Support for up-to-date Google Android releases with conformance to Compatibility Definition Document (CDD) and compliance test suites
- Ongoing support of Android updates and security patches
- Designed-in Android security mechanisms to prevent security exploits includes QNX Secure Cockpit HAL (hardware abstraction layer) to control and isolate Android hardware access
- Support for leading ARMv8 and x86-64 automotive hardware platforms

## **Product Features**

The QNX Platform for Digital Cockpits is based on new and existing components:

- QNX Hypervisor
- QNX Hypervisor for Safety (ISO 26262 ASIL D)
- QNX Shared Device Frameworks
- QNX Platform for Instrument Clusters
- QNX Neutrino OS
- QNX OS for Safety (ISO 26262 ASIL D)
- Android "P" (or later) reference
- QNX Secure Cockpit HAL
- QNX CAR Platform for Infotainment middleware: Multimedia, Speech Integration Framework, Apple CarPlay, Android Auto, Baidu CarLife, Web browser, Bluetooth, Qt UI framework
- QNX Acoustics Management Platform
- BlackBerry Over-the-air (OTA) software updates

#### **Reference Implementation**

The QNX Platform for Digital Cockpits provides the essential building blocks for configuring any number of cockpit architectures and implementations. The following image depicts one example of a reference implementation supported by the product.



#### Software Ecosystem

BlackBerry QNX supports an extensive automotive ecosystem. The list below depicts vendors we are currently working with. Please contact your local QNX representative for enquiries about other vendors.

- Speech recognition: Google Assistant, Baidu DuerOS, IBM Watson; other solutions (CMU Sphinx, Wit.ai)
- Natural language processing: QNX, open source options for cloud and embedded
- TTS: Open source cloud and embedded options
- Navigation: HERE Auto, Google Maps, Baidu Maps
- Smartphone Connectivity: Apple CarPlay, Android Auto, Baidu CarLife
- CAN/AUTOSAR stacks
- HMI: The Qt Company, Socionext CGI Studio, Crank Software, DISTI, Elektrobit, others

#### **Automotive Services**

BlackBerry QNX has a dedicated team of engineers that specialize in automotive cockpit solution stacks to address customers' development challenges. To further extend our services capabilities to support Android, BlackBerry QNX has partnered with Tata Elxsi, a leader in automotive services spanning almost 30 years. Together, BlackBerry QNX and Tata Elxsi provide dedicated support for meeting customer requirements. From porting to a different hardware platform, integrating a new speech engine or UI technology, helping to meet system KPIs, and supporting Android updates, our services teams become an extension of the customer's development team, focused on meeting production deadlines on time, and on spec.

The development, release, features or functionality of this software is subject to change. Please contact your BlackBerry QNX representative for more information.

# 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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