VxWORKS

The Safe and Secure RTOS for the Internet of Things

Powering billions of intelligent devices, VxWorks® is the world's most widely deployed real-time operating system (RTOS). It delivers unrivaled deterministic performance and sets the standard for a scalable, future-proof, safe, and secure operating environment for connected devices in the Internet of Things (IoT). Leading global innovators such as ABB, Airbus, Alcatel-Lucent, BD Biosciences, Boeing, Delphi, Eurocopter, Huawei, Mitsubishi, NASA, Northrop Grumman, Siemens, and Varian leverage VxWorks to create award-winning, innovative, IoT-ready products effectively and efficiently.

The VxWorks product family supports the broadest spectrum of 32-bit, 64-bit, and multi-core processors, including ARM®, Intel®, and Power Architecture®. Its portfolio of additional middleware and optional advanced technology components, as well as a large ecosystem of validated complementary third-party hardware and software solutions, enables you to differentiate your platforms with best-of-breed capabilities, reduce development costs, and accelerate time-to-market.

FEATURES AND BENEFITS

Enabling the Future of Connected Devices

- **Expandable and upgradable architecture:** A modular, future-proof platform, VxWorks can adapt and evolve to match changing market requirements, your needs, and technology advancements. The VxWorks core kernel is separate from protocols, applications, and other packages, enabling upgrades and new feature additions to be accomplished faster and with minimal retesting of the entire system.
- **Scalable footprint:** VxWorks is the ubiquitous RTOS foundation spanning tiny implantable medical devices, large intelligent systems forming the smart grid, and everything in between. It is scalable to meet your project's unique memory footprint, functionality, and processing power requirements.
- **Broad connectivity:** Connectivity is a key requirement for IoT, so VxWorks supports industry-leading connectivity standards and networking protocols out-of-the-box. Additional networking protocols in VxWorks Plus, such as Routing Information Protocol (RIP) and Quality of Service (QoS), advance VxWorks' networking capabilities even further. The modular nature of VxWorks allows you to add connectivity and networking capabilities after the fact and bring many previously disconnected devices online without reworking the core of your embedded software.

WHEN IT MATTERS, IT RUNS ON WIND RIVER

- **Uncompromising security and safety:** For over 30 years, VxWorks has been the foundation that enables leading innovators in aerospace and defense, automotive, industrial, and medical industries to create differentiated, certifiable safety- and security-critical systems. The optional add-on Security Profile for VxWorks delivers a comprehensive set of features to efficiently and effectively protect devices, data, and intellectual property. The optional add-on Safety Profile for VxWorks delivers advanced safety partitioning capabilities and an optional IEC 61508 SIL3 certification evidence package that helps drive down costs and time-to-certification.

- **ARINC 653–compliant platform:** Wind River® VxWorks 653 Platform is fully compliant with ARINC Specification 653 and can also be deployed in programs requiring alignment with the Future Airborne Capabilities Environment (FACE™) Technical Standard. VxWorks 653 3.0 Multi-core Edition adds support for the latest multi-core processors and provides full virtualization support for ARINC 653, VxWorks, Linux, and Windows® on a shared multi-core processor. In addition, commercial off-the-shelf (COTS) certification evidence for RTCA DO-178C and EUROCAE ED-12C Design Assurance Level (DAL) A is provided with VxWorks 653, eliminating the risk of creating and certifying an operating system and related tools for each new project.

- **MILS support for multilevel secure systems:** Wind River VxWorks MILS Platform implements the Multiple Independent Levels of Security (MILS) system architecture that enables you to safely and securely share the same hardware platform, helping reduce development costs and size, weight, and power (SWaP) requirements.

- **Safety-critical certification support:** Wind River VxWorks Cert Platform provides a COTS solution for delivering safety-critical applications that must be certified to the stringent requirements of RTCA DO-178, EUROCAE ED-12, or IEC 61508 certification evidence in avionics, transportation, industrial automation, and medical device industries.

- **Proven virtualization technology:** Virtualization Profile for VxWorks delivers a real-time Type 1 hypervisor that enables consolidation of multiple standalone hardware platforms on one multi-core processor, helping reduce bill-of-material (BOM) costs and speed time-to-market.

- **Java runtime support:** In addition to existing C/C++ application support, Wind River Micro Runtime provides an optimized embedded Java runtime engine for VxWorks to deploy Java applications specifically for embedded devices that have a smaller footprint requirement on resource-constrained devices. IoT developers can use Micro Runtime to design applications, providing increased development efficiency and code portability; and to provide over-the-air bug fixes, saving money and even generating new areas of revenue.

- **Lower risk and faster integration of third-party technology:** VxWorks' unmatched ecosystem of hardware and software technology partners enables you to differentiate your product offerings with leading-edge features and capabilities and bring your devices to market faster while reducing risks and development costs.

Build Better Products with the Industry's #1 RTOS

- **Guaranteed real-time performance and reliability:** Capable of dealing with the most demanding time constraints, VxWorks is a high-performance RTOS tuned for both determinism and responsiveness. For example, NASA trusted VxWorks to control the $2.5B Mars Curiosity rover and land it perfectly on a planet 352 million miles away.
- **Better reliability with state-of-the-art memory protection:** Memory management unit (MMU)–based memory protection increases reliability. VxWorks incorporates a process-based model that provides user-mode application execution in addition to its traditional kernel-mode execution.
- **Multi-core benefits, maximized:** VxWorks delivers comprehensive multi-core processor support, including asymmetric multiprocessing (AMP) and symmetric multiprocessing (SMP) OS configurations and hardware-optimized multi-core acceleration. The optional Safety Profile and Virtualization Profile enable even greater flexibility in harnessing the power of multi-core, as well as additional consolidation options to reduce SWaP.

ADVANCED MIDDLEWARE WITH VxWORKS PLUS

If you need more robust middleware to meet the advanced needs of the aerospace and defense, industrial, medical, consumer, or networking industries, VxWorks Plus delivers the VxWorks Core Platform plus additional connectivity, security, device manageability, user interface and graphics, safety, and advanced networking protocols and capabilities. For more detailed information on VxWorks Plus, please refer to the VxWorks Plus Product Overview.

OPTIONAL TECHNOLOGY ADD-ON PRODUCTS FOR VxWORKS

- **Safety:** Safety Profile for VxWorks adds advanced time-partitioning capabilities to enable reliable consolidation of multiple applications with different levels of criticality on one platform, single- or multi-core. This consolidation helps you drive down BOM and maintenance costs. An optional IEC 61508-3 SIL3 certification evidence package helps shorten time-to-certification for the entire system.
- **Security:** Security Profile for VxWorks delivers a comprehensive set of features to safeguard devices, data, and intellectual property in the ever-connected world of IoT. Security Profile technologies—such as secure boot, secure run-time loader, advanced user management, network security, and encrypted containers—protect devices and data at every stage, from boot-up to operation to data transmission to while at rest. Security Profile is a software-based solution that can be reinforced for security-critical applications with the hardware-based CodeMeter® security offering from Wibu-Systems.
- **Virtualization:** Virtualization Profile for VxWorks is a real-time embedded, Type 1 hypervisor that enables the combination of multiple workloads on a single multi-core processor, helping drive down hardware costs and allowing new capabilities to be added more quickly. Optimized for developer productivity and fully integrated into VxWorks, the hypervisor utilizes standard VxWorks workflows to configure, build, develop, and debug.

- **Java runtime:** Micro Runtime provides an optimized embedded Java runtime engine for executing your application's binary code on your target device and a full software development kit (SDK) to develop, debug, and deploy Java applications for VxWorks-based devices. Micro Runtime executes bytecodes following the JEFF file format (ISO/IEC 20970:2002), providing benefits for IoT-connected, resource-constrained environments—compact execution file format (reduction by 40–50% vs. JAR file format), execution from storage memory instead of RAM, and more efficient execution.

Safety Profile and Security Profile can be deployed with VxWorks and VxWorks Plus. Virtualization Profile is OS-agnostic; that is, it can run multiple operating systems, including VxWorks and VxWorks Plus (with or without add-on products), Wind River Linux, and others, inside their respective virtual machines on the same hardware.

DEVELOP SMARTER WITH THE WORKBENCH DEVELOPMENT SUITE

Wind River Workbench is an Eclipse-based development suite for creating and building projects; establishing and managing host-to-target communications; and configuring, debugging, and monitoring the VxWorks operating system as well as VxWorks applications running on a simulator or real hardware. Through its powerful combination of capabilities, integration, and availability, Workbench enables standardization on a common environment for device software development, helping you, your project teams, and your company improve effectiveness.

VxWorks simulation and system configuration tools are also included in Workbench.

WIND RIVER CUSTOMER SUPPORT

VxWorks is backed by our award-winning global support organization. We offer live help in multiple time zones, the online Wind River Support Network with multifaceted self-help options, and optional premium services, to provide you the fastest possible time-to-resolution. We are proud to have achieved Service Capability and Performance certification, recognized as the gold standard for delivering world-class customer support. For more information, visit www.windriver.com/support.

HOW TO PURCHASE

Visit www.windriver.com/company/contact to find your local Wind River sales contact. To have a representative contact you, call +1-800-545-9463 or write to inquiries@windriver.com.