



WIND RIVER HELIX VIRTUALIZATION PLATFORM

Embedded solution development is significantly more complex today than it once was. This change is fueled by the demand for more intelligence at the edge with a path toward autonomous systems, the need to evolve and modernize legacy systems while simultaneously supporting existing applications, the cost and effort of supporting mandated safety regulations, and keeping pace with innovation. To respond to these forces, software architects and developers need to adopt modern software best practices, such as DevOps and new frameworks, and introduce cloud deployment strategies, including virtualization and application consolidation, to embedded system design. These practices enable design flexibility, accelerated development, greater scope of applications, and efficient manageability.

Wind River® Helix™ Virtualization Platform consolidates multi-OS and mixed-criticality applications onto a single edge compute software platform, simplifying, securing, and future-proofing designs in the aerospace, defense, industrial, automotive, and medical markets. It delivers a proven, trusted environment that enables adoption of new software practices with a solid yet flexible foundation of known and reliable technologies on which the latest innovations can be built. The platform provides various options for your critical infrastructure development needs, from highly dynamic environments without certification requirements to highly regulated static applications such as avionics and industrial, as well as systems requiring the mixing of safety-certified applications with noncertified ones, such as automotive. Helix Platform gives you flexibility of choice for your requirements today, and adaptability for your requirements in the future.

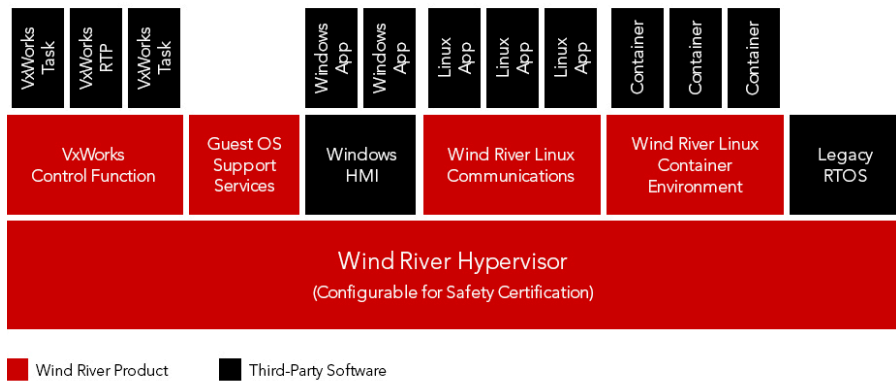


Figure 1. Wind River Helix Virtualization Platform architecture

KEY BENEFITS

- **Delivers proven market excellence:** Helix Platform includes VxWorks®, which has a rich pedigree of single and multi-core development and has been proven in more than 2 billion devices worldwide. The RTOS is trusted by over 9,000 companies and has been chosen to go to Mars with NASA for nearly 25 years, including in the 2018 InSight robotic lander.
- **Speeds and eases certification:** In its nearly 40-year history, Wind River has built an extensive portfolio of safety certification experience with more than 550 programs in more than 90 civilian and military aircraft, and more than 350 customers using the VxWorks safety platform. VxWorks has been [certified](#) to meet both ISO 26262 automotive safety and IEC 61508 industrial functional safety requirement standards.
- **Reduces total cost of ownership:** Helix Platform has been designed to be certified and to simplify the certification of safety-critical applications according to the stringent requirements of the DO-178C Software Considerations in Airborne Systems, IEC 61508 industrial functional safety, and ISO 26262 automotive safety standards. In addition, its modular, open architecture employs robust partitioning that dramatically reduces retesting and recertification of an entire platform when a change is made to one of the partitions. This reduces the total cost of ownership (TCO). New partitions can easily be added to any device without the typical retesting requirement of an entire system.
- **Provides flexibility:** Helix Platform enables development and deployment of static or dynamically configured systems running applications such as machine learning and analytics. It also enables mixed-criticality systems with safety-certified and general-purpose application requirements. Helix Platform allows these applications to coexist on a single platform and to collaborate and communicate while ensuring their independent domains.
- **Lowers cost of application development and deployment:** Helix Platform supports an open, standards-based device virtualization framework that efficiently enables third-party operating systems without the overhead of emulation. This enables high portability across product lines, ultimately lowering upgrade costs by allowing:
 - Simultaneous support for airborne platforms such as ARINC 653 APEX API, POSIX®, and FACE™
 - Support for independent build, link, and load (IBLL), allowing independent, asynchronous development, test, and delivery of software applications per the RTCA DO-297 integrated modular avionics (IMA) standard
- **Eases portability:** The Helix Platform hypervisor is OS-agnostic: It supports any operating system—unmodified—inside a virtual machine. Support for unmodified guest OSes eases portability for legacy applications mixed with modern applications and operating systems. Guest OS support includes VxWorks, Wind River Linux (and other Linux distributions), Microsoft® Windows®, roll-your-own, bare metal, and other operating systems. Helix Platform supports advanced separation technology, allowing legacy code reuse and the ability to utilize open source for flexibility.
- **Increases safety, security, and robustness:** Because the Helix Platform multi-core scheduler uses hardware virtualization technology, it enables deployment of mixed-criticality, unmodified guest operating systems. This allows safe and non-safe applications to

run in parallel on separate cores, increasing safety, security, and robustness. Additional benefits include:

- Reduced bill of materials (BOM) through application consolidation
 - High performance and low jitter
- **Provides high performance and determinism:** Helix Platform is high performance and deterministic for the most demanding embedded, real-time applications. The Wind River Type 1 hypervisor provides full control over how the hardware is configured. It allows for high-performance compute cycles and low-overhead I/O access, using the hardware virtualization accelerators available in today's processors. In addition, it has a minimal footprint that is primarily designed to configure the hardware and delivers high throughput and low latency inter-process communication (IPC).
 - **Accelerates innovation of new solutions:** Helix Platform uses standard workflows to configure, build, develop, and debug. It also allows development of products in a heterogeneous virtualization environment that can include safety-critical applications using a configuration model driven by statically defined XML, or applications using the standard configuration model driven by dynamic user inputs. Additionally, the platform includes:
 - Wind River Workbench development suite based on the Eclipse open tool architecture, enabling wide integration of industry toolchains
 - Wind River Simics® support for system simulation and automation
 - **Provides a broad range of architectures and CPUs:** Helix Platform provides multi-core hardware support and availability on the latest Arm® and Intel® architectures, as well as CPUs from Intel, NXP, and Xilinx that enable both 32- and 64-bit guest OSes.

OPTIMIZED, INTEGRATED DEVELOPMENT SUITE

Wind River Workbench

Helix Platform includes Workbench, offering best-in-class development and debugging tools along with cutting-edge system analysis tools for optimizing the Helix Platform environment. A fully integrated Eclipse-based open development suite, optimized to support design, development, test, and certification of applications, Workbench consists of:

- A project facility to define application resources
- An XML configuration tool to easily define the static configuration required for safety-critical applications

Helix Platform also enables intellectual property and security separation between the platform supplier, the application supplier, and the system integrator. This separation provides a framework for multiple suppliers to deliver components to a safety-critical platform.

Wind River Simics

Simics enables software to run on virtual platforms just as it does on physical hardware. Along with its capabilities for scripting, debugging, inspection, and fault injection, Simics enables developers to define, develop, and integrate systems without the constraints of physical target hardware. Simics provides the access, automation, and collaboration required to enable agile and continuous development practices.

WIND RIVER PROFESSIONAL SERVICES

The [CMMI Level 3](#)–rated Wind River Professional Services organization leverages our years of system design and development expertise to work collaboratively with your design and program teams to interpret system requirements, architect platform options, and provide recommendations for meeting business, technical, and program goals. Architectural assessments can include such activities as hardware recommendations, software architecture recommendations, analyzing the viability of virtualizing your entire system or parts of your system, consolidating applications, and even porting from one operating system to another.

They also can include assessing the security of your systems and making recommendations to harden them against attack. Our Helix Security Framework not only provides an assessment mechanism but also backs it up with resources that can help you implement any recommendations we make.

In addition, the Professional Services team has a Safety Critical Services Practice that can deliver safety certification evidence for additional software components. The Professional Services team of engineers has extensive experience delivering design, integration, and optimization services tailored to the needs of any industry and is fully equipped to provide professional certification services at any level, including certified board support packages (BSPs), middleware, and application software. For more information, visit www.windriver.com/services.

WIND RIVER EDUCATION SERVICES

Wind River offers technical, hands-on training, mentoring, and on-demand learning. For more information, visit www.windriver.com/education.

WIND RIVER CUSTOMER SUPPORT

Helix Platform 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. 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 salesinquiry@windriver.com.

