WIND RIVER HYPERVERSOR

Consolidate multiple applications onto the same single-core or multi-core processor to increase capacity, colocate legacy software assets with new innovative features, or reduce the size, weight, power, and cost of your embedded devices. Wind River® Hypervisor is a type 1 embedded hypervisor with a very small footprint, minimal latency, deterministic capabilities, and optimizations for maximum performance. Its safe and secure partitioning capability is designed to isolate and separate applications of mixed levels of criticality and decouple the life cycle of certified and noncertified applications to mitigate recertification costs in safety-critical systems.

Wind River Hypervisor is a comprehensive solution that includes integration with VxWorks® and Wind River Linux, a complete toolchain, an experienced professional services team, and a global support organization. It supports any operating system; and because Wind River works closely with semiconductor vendors, Wind River Hypervisor supports the broadest range of processor architectures.

KEY FEATURES

• Broad hardware support: Intel® Core™, Intel Xeon®, Intel Atom™, PowerPC e500 and e500mc, and ARM Cortex™-A9

• Any operating system: Integration with VxWorks and Wind River Linux

• Safety profile: Configuration that supports safety-critical systems requiring certification to standards such as IEC 61508 (up to SIL 3), RTCA DO-178B/C (up to Level A), and CENELEC EN50128 (up to SIL 4)

• Virtual board interface: APIs to port operating systems or applications not requiring an operating system

• Memory protection: Device and memory protection between virtual boards

• GUI-based configuration: No requirement to rebuild the guest OS or applications; ability to graphically view and configure device allocations among virtual boards; ability to automatically discover hardware devices and download configuration data on Intel architecture devices

• Event-driven execution: Passive, lock-free; no active threads to compete for compute cycles with your application

• Core scheduling: Priority-based scheduler (standard profile) and frame scheduler (safety profile); support for other schedulers

• Inter-virtual-board communication: Virtual layer 2 switch for TCP/IP communication between cores or virtual boards; socket-like API for message-passing between cores or virtual boards
• **Direct device access:** Flexible device model to configure how each device is handled—direct access to devices from virtual boards to minimize overhead, shared devices at the virtual board level, or devices virtualized inside the hypervisor (such as serial, virtual Ethernet, or shared graphics); also supports SR-IOV for certain devices

• **Agent-based debugging:** Debugging of VxWorks and Linux applications over serial and Ethernet connections; support for hypervisor-aware JTAG-based debugging of multiple collaborating cores on a multi-core chip; multiplexed serial access to the virtual serial ports of each guest

• **Virtual board management:** Life-cycle management of flexible combinations of single-core virtual boards, multi-core virtual boards, or multiple virtual boards per core; support of actions such as create, delete, start, stop, move, and reload virtual boards and restart guest operating systems; power management framework to customize the power usage of the system

• **Golden images:** Multi-core/multi-OS examples that automatically boot VxWorks and Wind River Linux from a single prebuilt binary image and boot Microsoft Windows 7 from a licensed installation, if detected

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**USE CASES**

**Consolidate Applications of Mixed Levels of Criticality**

Increasing numbers of embedded devices face expensive certification processes to comply with safety and security regulations. While the performance and cost benefits of consolidating to multi-core processors are real, doing so without the required separation triggers expensive recertification or certification of noncertified applications.

The Wind River Hypervisor safety profile supports developing safety-critical applications in systems requiring certification to standards such as IEC 61508 (up to SIL 3), RTCA DO-178B/C (up to Level A), and CENELEC EN50128 (up to SIL 4).

Use Wind River Hypervisor to isolate and separate workloads of mixed levels of criticality on the same single- or multi-core processor to increase application security and reliability—without recertifying. With this separation, you can modify standard applications to drive device innovation without the need to recertify the standards-compliant applications.
Wind River has extensive experience building reliable safety-certifiable products such as Wind River VxWorks Cert Platform and Wind River VxWorks 653 Platform. Wind River Hypervisor builds on that expertise, bringing increased security and reliability of embedded devices in regulated industries through embedded virtualization.

**Meet Real-Time Performance Requirements**

Many embedded devices are challenged to increase processing performance and meet requirements for real-time performance. With embedded virtualization you can consolidate both real-time and general-purpose applications on one platform that meets aggressive hardware constraints for performance, size, power, and cost. Wind River Hypervisor is engineered for low latency, determinism, and multi-core performance, all in the smallest possible footprint. It is configurable, customizable, and highly optimized to meet real-time requirements. It is designed to facilitate consolidation of multiple operating systems on today's multi-core processors. And it boasts highly optimized communication between virtual machines and a flexible set of software configurations for maximum performance, including symmetric multiprocessing (SMP) and asymmetric multiprocessing (AMP).

**Migrate Legacy Software with Minimal Retesting**

Existing software applications represent a significant investment. And while the performance promises of new multi-core processors are compelling, it is critical that legacy applications can be migrated to new platforms without costly retesting of middleware stacks and applications and without unnecessary effort integrating solutions from multiple sources. Wind River Hypervisor isolates legacy applications into a single virtualized partition so you can port existing code with minimal effort. Consolidate legacy applications in virtualized partitions alongside general-purpose operating systems to innovate device applications—enhance the human-machine interface or offer a scaling range of product features—with minimal retesting and integration efforts. Because Wind River Hypervisor supports unmodified guest operating systems, existing code executes in the environment in which it was designed while the hypervisor abstracts the underlying hardware.
TECHNICAL SPECIFICATIONS

Guest Operating Systems
- VxWorks (32-bit and 64-bit single-core and multi-core virtual boards)
- Wind River Linux (32-bit and 64-bit single-core and multi-core virtual boards)
- Microsoft Windows 7 (32-bit and 64-bit single-core and multi-core virtual boards)
- Red Hat Linux (32-bit and 64-bit single-core and multi-core virtual boards)
- Other operating systems can be added

Note that applications can run without an operating system using the virtual board programming interface and execution environment.

Architectures
- Intel Atom, Core i3/i5/i7, Xeon
- PowerPC e500, e500mc
- ARM Cortex-A9
- Future architectures to be added (list available upon request)

RELATED PRODUCTS

- Wind River VxWorks MILS Platform, for Common Criteria certification requirements or integration of multiple levels of security on a device, provides the foundation for multilevel secure (MLS) solutions, with virtualization of guest operating systems using Wind River Hypervisor technology.
- VxWorks 653 is Wind River’s robust operating system for controlling complex ARINC 653 integrated modular avionics (IMA) systems.
- Wind River Workbench On-Chip Debugging tools provide configuration and true multi-core debugging.
- Wind River On-Board Program provides embedded development kits that enable developers to begin application development within minutes of opening the kit.

EDUCATION AND SUPPORT SERVICES

Wind River Professional Services
A CMMI Level 3–certified organization, Wind River Professional Services delivers extensive expertise, enabling you to reduce risk and focus on development activities that add value and differentiate your design. Our focused, industry-specific services practices help solve key development challenges and meet market deadlines while keeping development costs down. Offerings span the entire project life cycle, including architecture, design, development, porting, integration, and maintenance services, as well as consulting and training.

Wind River Education Services
Wind River Education Services offers flexible training options to meet your business and learning needs, including public standard education courses or private courses at your worksite, custom courses tailored to your team’s needs, mentoring for specific project challenges, and on-demand learning that provides around-the-clock access to advanced and specialized topics.

Wind River Customer Support
Wind River Hypervisor is backed by the most comprehensive customer support network in the embedded software industry, delivering 24/7 multilingual support at six support centers and 21 additional hubs worldwide, with more than 150 experienced engineers averaging more than 10 years of device software experience. Wind River Customer Support is Service Capability and Performance (SCP)–certified and offers options for standard, premium, and extended support packages.

HOW TO PURCHASE
Visit www.windriver.com/company/contact-us/index.html to find your local Wind River sales contact. To have a sales representative contact you, call 800-545-9463.