

WIND RIVER HYPERVISOR

Consolidate multiple operating systems onto the same single-core or multi-core processor to reduce the size, weight, power (SWaP), 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 re-certifications costs.

Wind River Hypervisor is a complete solution that includes broad operating system support, integration with Wind River's 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, Power.ORG e500 and e500mc, and ARM
- **Operating systems:** Any operating system; integration with Wind River's VxWorks and Wind River Linux
- **Virtual board interface:** APIs to port operating systems or applications not requiring an operating system
- **Memory protection:** Device and memory protection between virtual boards
- **Configuration:** GUI-based system configuration where changes do not require rebuilding the guest OS or applications; ability to graphically view and configure device allocations among virtual boards
- **Event-driven execution:** Passive, lock-free; no active threads to compete for compute cycles with your application
- **Core scheduling:** Priority-based and time-partitioned scheduler; support for other schedulers
- **Communication:** Internal virtual layer 2 Ethernet switch for TCP/IP communication; message-passing protocol for communication between cores or virtual boards; socket-like API and shared memory as a fast zero-copy communications medium between operating systems

- **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 as well as devices virtualized inside the hypervisor
- **Virtual board management:** Actions such as create, delete, start, stop, move, and reload virtual boards and restart guest operating systems
- **Debugging:** Agent-based debugging of VxWorks and Linux applications over serial and Ethernet connections and 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

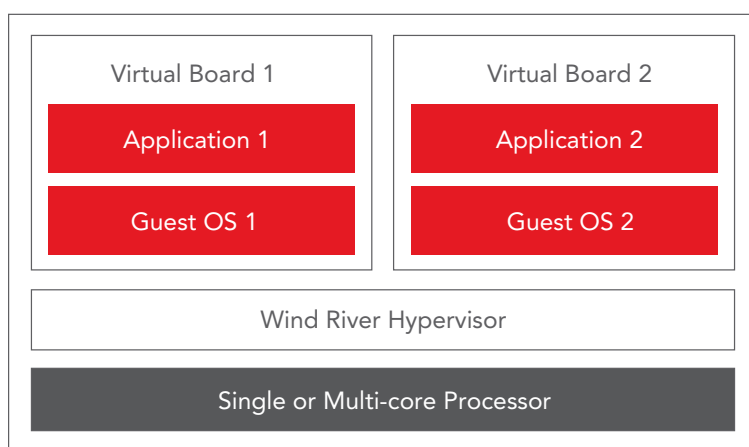


Figure 1: Virtualized system

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.

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: 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 built from the ground up 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 purposefully built 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.

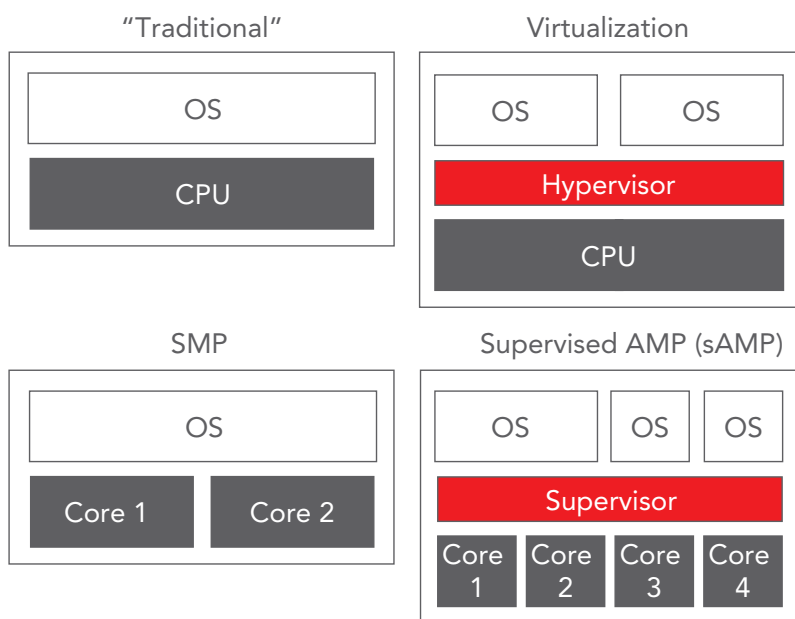


Figure 2: Multi-core software configurations

EDUCATION AND SUPPORT SERVICES

- Wind River Hypervisor training course
- Hypervisor Rapid Integration Mentoring
- Wind River Professional Services, to customize Hypervisor or integrate other operating systems

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.

TECHNICAL SPECIFICATIONS

Operating Systems

- Wind River's VxWorks
- Wind River Linux
- Microsoft Windows XP and Windows 7
- Other 32-bit unmodified operating systems
- Future operating systems to be added (list available on request)

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
- 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.
- Wind River 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.

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