SOLUTIONS FOR THE ENERGY SECTOR

Driving Digital Transformation

ENERGY SECTOR CHALLENGES

- Increase efficiency
- Permanently reduce OPEX
- Update or replace legacy, single-purpose systems
- Improve flexibility and agility to deploy new technologies
- Connect and manage plant systems and equipment
- Ensure system security to prevent outside intrusion

WIND RIVER SOLUTIONS

- **Wind River Helix Virtualization Platform:** A flexible edge compute software platform that can manage unmodified guest OSes running in virtual machines, consolidating workloads for energy production facilities
- **Wind River Titanium Control:** On-premise cloud infrastructure platform that enables digital transformation from legacy hardware to a virtualized automation environment, reducing OPEX and increasing agility
- **VxWorks:** The world's leading RTOS, enabling deterministic applications scaling from very small compute packages
- **Wind River Linux:** Industry-leading open source operating system for connecting, securing, and running embedded systems and applications

THE CHALLENGE

Large-scale energy producers face enormous challenges while seeking sustainable solutions in the face of rising demand. Production facilities are under pressure to dramatically increase efficiency and reduce costs while maintaining current output, security, and safety standards. Meanwhile, many facilities are burdened with legacy, single-purpose automation systems, often nearing the end of their useful lives. The cost of updating these legacy systems is astronomical, while simply replacing them with more current versions will not deliver the efficiency gains or long-term OPEX reductions necessary to remain competitive. Finally, energy production facilities are in continuous operation, so they cannot be shut down to undergo a single, comprehensive upgrade.

Today's connected technologies offer the opportunity to improve efficiency and cut costs, but they bring yet another challenge: security. The more connected systems become, the more vulnerable they are to external tampering. And even legacy hardware not directly connected to the Internet can be subject to attack.

THE APPROACH

Wind River® delivers a comprehensive set of solutions that enable energy producers and manufacturers to accelerate the digital transformation of energy facilities and factory floors and quickly start to reap the benefits. A combination of Industrial Internet of Things (IIoT) technologies, virtualization, containerization, and software-defined architecture from Wind River allows energy producers to centralize and virtualize their industrial control systems

so they can move beyond the constraints of legacy systems and fully optimize their operations. The use of open standards allows producers to permanently reduce OPEX by using commercial off-the-shelf (COTS) hardware rather than maintaining a customized infrastructure.

Wind River Helix Virtualization Platform

Wind River Helix™ Virtualization Platform is a software development environment that can manage unmodified guest operating systems running in virtual machines (VMs) in equipment, machines, and devices. Helix Platform's real-time, embedded, Type 1 hypervisor runs on Arm® or x86 multi-core processors and can manage independent VMs running VxWorks®, Wind River Linux, and other unmodified guest OSes, such as Windows® and Android.

With these capabilities, energy and fuel production equipment developers can consolidate and reliably run multiple applications—such as distributed control systems, data analytics, safety-critical and non–safety-critical applications, and legacy applications—all on a single edge compute platform. Additionally, the hypervisor can securely partition a VM running a safety-critical application to ensure that there is no interference or conflict from any other application or function running in another VM. This virtualization platform can be the foundation for an industrial workload consolidation solution at the industrial edge, whether at a refinery, oil rig, factory, or solar farm. Helix Platform includes the VxWorks RTOS, Wind River Linux, Wind River Simics®, and Wind River Workbench.

Wind River Titanium Control

Titanium Control is an ultra-reliable, on-premise cloud infrastructure platform that delivers the uptime and performance needed for energy and industrial applications and control services at any scale. Its open architecture gives operators the flexibility to:

- Accelerate deployment by eliminating the need to integrate, test, and document multiple technology components from different vendors.
- Incorporate components from multiple sources and avoid vendor lock-in.
- Replace components quickly without affecting other areas of operation.
- Take advantage of technological innovations as they become available.
- Adjust quickly to changing market demands.

By virtually any measure, Titanium Control meets the demand:

- **Uncompromising reliability:** Titanium Control meets and often outperforms legacy system standards for reliability, uptime, and low latency. When operational processes must not fail, Titanium Control ensures that services run when, where, and how they need to, always.
- **Security:** An extensive, built-in, fully integrated, and multilayered security framework protects systems against network-borne threats.
- **Reduced costs:** Titanium Control lowers the cost of deployment, repair, and replacement compared to legacy systems and equipment and further reduces costs by allowing the use of standard, off-the-shelf servers.
- **Real-time KVM:** Titanium Control adds kernel and user space optimizations to the KVM virtualization hypervisor to deliver consistent and deterministic, predictable performance.
- **Significantly lower TCO, higher ROI:** Wind River has developed a comprehensive modeling tool to compare total cost of ownership and return on investment with Titanium Control against existing physical infrastructure. Taking into account factors including reliability, scalability, cost of support, software, servers, physical controllers, and more, customers can anticipate enormous potential savings—in the billions, in some cases—by converting their automation platform to Titanium Control.

WIND

VxWorks

VxWorks is the world's most widely deployed real-time operating system, powering some two billion devices. It delivers unrivaled deterministic performance and sets the standard for a scalable, future-proof, safe, and secure operating environment for industrial equipment and connected devices in IIoT.

Key features are:

- **A proven real-time operating system:** VxWorks is proven in mission-critical applications where security is paramount.

- **Security:** VxWorks provides best-in-class, pre-integrated security functionality, including foundational security capabilities for devices as well as enhanced device, com-munication, and management security.

- **Safety-critical certification support:** The VxWorks certi-fication platform provides a COTS solution for functional safety applications that must be certified to IEC 61508.

- **Multi-core capabilities:** VMs can consolidate core safety-certified and nonsafe code on a single VxWorks real-time safety platform.

- **Virtualization integration:** VxWorks is included with Helix Platform and can run applications in a VM, provid-ing a real-time operating environment.

Wind River Linux

Wind River Linux is the embedded operating system of choice for device software developers who want a combination of open source flexibility and commercial grade reliability. It provides improved out-of-the-box experience with optimized cross-architecture runtime. Virtualization and application container capabilities provide the opportunity for workload consolidation and a flexible application environment.

Wind River Linux is a Yocto Project Compatible open source baseline and one of the project's largest contributors of technology. Developers can leverage the flexibility of an optimized open source platform without compromising security. Wind River Linux development and maintenance processes have been certified to the ISO 9001:2015 quality management system standard.

The KVM hypervisor is a component of Wind River Linux, allowing it to run applications in various VMs running Wind River Linux, VxWorks, or another guest OS. In addition, container features enable developers to use technologies such as Docker to build container solutions, while relying on Wind River Linux's extensive security features that provide ongoing threat mitigation against common vulnerabilities and exposures (CVEs) in deployed systems.

THE RESULT

The Wind River product suite provides energy producers with a complete solution for transforming automation in the most demanding environments: an industry-leading operating system connecting to an ultrareliable, on-premise virtualization platform and a set of software tools to make development easier and more efficient..

With 30 years of experience building safe and secure embedded systems, Wind River is well versed in the exact-ing, real-time requirements of manufacturers. Today, we are enabling the next generation of IIoT and virtualization technologies to drive the digital transformation of industrial manufacturing.

To learn more about VxWorks, virtualization, or Helix Platform, visit www.windriver.com or contact salesinquiry@windriver.com.