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# FROM THE EDGE TO THE ENTERPRISE

Accelerating Business Transformation with the Internet of Things



AGENTS OF CHANGE™

EXECUTIVE SUMMARY

The Internet of Things (IoT) is already disrupting traditional business models. Consider just one revolutionary example: the ability to deliver all kinds of equipment, from industrial generators to jet engines, as subscription services rather than as sold products, thereby turning a capital expense into an operating expense for the customer. This new model of monetizing product utilization is made possible only when equipment providers can connect intelligent devices to gather and analyze data from the equipment, which enables them to create a recurring revenue stream based on value rather than a one-time sale. Connected devices also enhance a product's value proposition by enabling predictive and remote maintenance.

Many organizations seek to take advantage of this trend, but they are stymied by the most basic question of how to connect thousands of existing legacy edge devices in the field and contextualize the data through integrations with disparate enterprise systems. Until an organization resolves the connectivity conundrum, the problems of business intelligence and prescriptive action cannot be addressed. This white paper explores the solutions Wind River® has developed to resolve the connectivity issue and accelerate the integration of data from networked devices, so enterprises can instead focus their energies and resources on evolving their business models to create value.

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## CLOSING THE “LAST INCH”

IoT enables enterprises to remotely manage and monitor myriad smart devices that operate equipment. These edge devices can also feed data via the cloud into enterprise systems, where it can be aggregated and analyzed. It is this analytical capability that yields actionable insights to drive business decisions.

As new products are developed to leverage IoT capabilities, intelligence and connectivity can be built into them from the design stage up. Today, however, businesses have a substantial investment in existing devices running on embedded software that have historically worked in isolation and are typically designed for unique tasks. While companies may be keen to reap the economies, efficiencies, and opportunities that IoT promises, they also have an understandable interest in protecting that prior investment. Much of the industry’s effort, therefore, is focused on figuring out how to connect these legacy devices that until now have stood alone—closing the “last inch” between the software and the hardware.

IoT solution developers must figure out not only how to connect these devices, but also how to secure them. Interconnected devices exchanging data wirelessly are vulnerable to network-borne threats. Security is inseparable from performance and reliability—an insecure network is, by definition, unreliable. Adding further complexity, connecting disparate endpoint devices to enterprise systems entails a number of integration points.

## AN INTEGRATED APPROACH

Resolving these challenges requires an end-to-end view that encompasses the endpoint device, the connectivity layer, the gateway that connects devices to the cloud, applications running in the cloud, and integration with enterprise systems. Wind River technologies work seamlessly together to deliver an end-to-end solution that dramatically reduces development time, eliminates integration headaches, and enables enterprises to start realizing the benefits of IoT solutions more quickly.

The key to resolving the connectivity, security, and integration challenges in IoT starts with the real-time operating systems (RTOSes) that run the devices at the edge. An IoT-ready RTOS must deliver the scalability, modularity, connectivity, security, safety, and features to support highly connected, security-critical, remotely managed IoT solutions. It needs to support

industry-leading communications standards and deliver high-performance networking capabilities.

VxWorks® and Wind River Linux have long set the standard for manageability, connectivity, and security in embedded devices. Today, both are available in versions that are optimized with added technology components for IoT applications. Specifically, each can now be configured with an agent that communicates with Wind River Edge Management System, a cloud-based middleware stack that serves as a centralized console for an IoT solution on the enterprise platform. This built-in integration makes it possible to connect virtually any edge device to the enterprise immediately via IoT, resolving the “last inch” problem for developers and significantly accelerating enterprise adoption of IoT solutions.

Wind River Intelligent Device Platform XT is a scalable, sustainable, and secure development environment that simplifies the development, integration, and deployment of IoT gateways, with pre-configured components for smart connectivity, device and data security, and remote manageability. Leveraging the Wind River operating systems, Intelligent Device Platform XT supports a wide variety of communication protocols for transmitting data from the device through the gateway to the cloud.

Completing the edge-to-enterprise loop, Wind River Edge Management System enables enterprises to centrally manage, monitor, and collect data from edge devices. Once data is in the Edge Management System server, it can be integrated with data from enterprise systems for analysis and reporting.

## SPEEDING DEVELOPMENT TO DRIVE INNOVATION

The Wind River end-to-end IoT solution enables developers to leapfrog having to build their own infrastructure and custom-code their own software for the technology stack, installing the “plumbing” that has to be in place in order for the solution to be developed and deployed. In so doing, it dramatically reduces the cost, time, and engineering resources required for development.

From the business perspective, Wind River technology enables enterprises to shift their focus more quickly from solving technology issues to a more compelling question: how to evolve their business models and create value by using data generated by their IoT networks in new and different ways.

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Enterprises across a range of sectors are uncovering opportunities to turn their IoT capabilities into new sources of revenue:

- A forklift manufacturer that historically sold or leased its products can now provide them as a subscription-based service and charge customers based on usage. Smart sensors on the forklifts report on such factors as tonnage carried, distances traveled, and other variables relevant to the new business model.
- A medical device company evolved its offerings from standalone to connected biofeedback devices that transmit data directly from patient to doctor. In the process, the devices generate valuable data on multiple patients with similar conditions. That data can be aggregated—without compromising patient confidentiality—and sold to medical researchers.
- Jet engine manufacturers have the opportunity to lease engines to carriers based on actual usage in flight, rather than selling them outright, which would reduce the carrier's capital expenses. The sensors that monitor an engine's usage also collect performance, vibration, and fuel consumption data, enabling the manufacturer to advise the carrier on maintenance needs.

## CONCLUSION

The promise of IoT goes far beyond increased productivity and cost reductions. Its transformative potential lies in the ability to drive growth and create value with new business models and revenue streams that would otherwise not be possible. Capitalizing on such opportunities requires creativity and innovation. Solving the connectivity issue from the edge to the enterprise with a pre-integrated, end-to-end solution frees businesses from the burden of building the underlying technology and allows them to focus on the bigger picture: turning new possibilities into realities.

