

Digital Transformation for Industrial Control: Six Things You Need to Know

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KEY TAKEAWAYS

- Industry 4.0 leverages IT technologies to grow revenue and reduce operational costs.
- Wind River's products address the six key challenges critical infrastructures face.
- Case Study: The impact of Wind River predictive maintenance for mining equipment.

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OVERVIEW

Initially a vision sponsored by the German government and outlined at the Hannover Faire in October 2012, Industry 4.0 is now seen worldwide as the next phase in manufacturing. Industry 4.0, which combines production and network connectivity to create smart factories, is expected to drive revenues for industrial companies higher while decreasing costs associated with aging equipment and downtime.

As businesses make the move to Industry 4.0, they are finding that typical IT solutions don't meet the expectations they have for their critical infrastructure applications. Wind River's solutions address the six main challenges businesses face: reliability, management, performance, scalability, security, and open standards.

CONTEXT

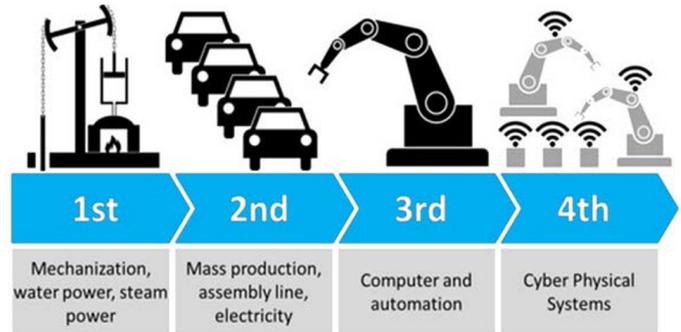
Charlie Ashton and Thilak Kumar discussed how Wind River helps businesses address the challenges they face as they adopt Industry 4.0.

KEY TAKEAWAYS

Industry 4.0 leverages IT technologies to grow revenue and reduce operational costs.

Industry 4.0 is considered the fourth phase in the progression of manufacturing. It involves using IT technologies like Industrial Internet of Things (IIoT) and virtualization to revolutionize industrial production. This phase is expected to grow top-line revenues while reducing operational costs through software-based control systems.

Replacing outdated industrial control systems with software-based control systems can drive down operational costs while improving system flexibility and security.



A PricewaterhouseCoopers study estimated that industrial companies using Industry 4.0 technology will generate:

- 2.9% more in additional annual revenue
- 3.6% in cost reductions annually over the next five years

[Industry 4.0] is all about deploying secure, robust, flexible software-based solutions as an alternative to the typical legacy fixed-function hardware that's out there today.

Charlie Ashton

Wind River's products address the six key challenges critical infrastructures face.

Businesses transitioning to software-based control systems often find the move to be extremely challenging because many of the standard solutions developed for IT are inadequate for industrial control systems.

Wind River helps industrial companies address these challenges. Founded in 1981, Wind River is now part of Intel's Internet of Things (IoT) group. Wind River's Titanium Control solution provides help for six key challenges that manufacturers face, offering secure, on-premise virtualization for critical infrastructure applications.

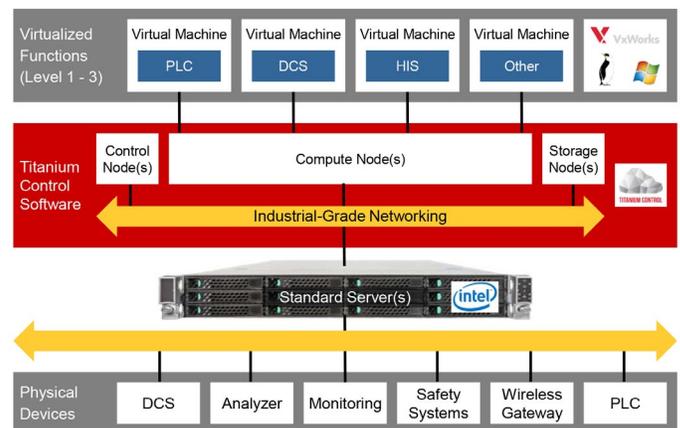
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Six key areas where critical infrastructure needs are often unmet by current solutions

Factor	Expectations
1. Reliability	<ul style="list-style-type: none"> – Fault tolerant to multiple software and hardware faults; no single point of failure – Industrial-grade six-nines (99.9999%) availability – Minimal loss of service or data on failover
2. Management	<ul style="list-style-type: none"> – Support for remote platform monitoring, diagnostics, and updates – No unplanned downtime for hardware or software updates – Integration with IT-based Level 4/Level 5 management, orchestration, and supervisory functions
3. Performance	<ul style="list-style-type: none"> – Low latency and low jitter for time-critical applications – Deterministic networking for real-time communication over Ethernet – Enhanced platform awareness and monitoring for automated dynamic reallocation of resources
4. Scalability	<ul style="list-style-type: none"> – Common software platform used from small-footprint edge controllers to cloud-based analytics – 100% software compatibility across all deployed platforms – Seamless scaling and migration of workloads across end-to-end infrastructure
5. Security	<ul style="list-style-type: none"> – Secure chain of trust from physical hardware extending into virtual machines (VMs) – Network-level authentication, authorization, and accounting with secure identities – Data encryption with full support for third-party firewalls, anti-malware, and other security functions
6. Open Standards	<ul style="list-style-type: none"> – Support for industry-standard operating systems (OSes) running control functions in VMs – Robust, open ecosystem of validated third-party application software packages – Compatibility with standard high-volume enterprise-class and commercial off-the-shelf (COTS) servers

Wind River's Titanium Control is purpose-built for industrial control applications. The proven architecture provides several features that help companies meet infrastructure needs, including:

- Dynamic scalability from a single server to hundreds of servers
- Simplified licensing of a single solution with compute, control, and storage in one package
- Fault tolerance and guaranteed six-nines uptime
- Full support for remote monitoring, diagnostics, and updates
- Support for a large number of time-critical third-party applications used in industrial ecosystems
- Support for industry-standard OSes, including Linux, KVM, OpenStack, Ceph, and DPDK



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Case Study: The Impact of Wind River Predictive Maintenance for Mining Equipment

To illustrate the benefits of Titanium Control let's consider the example of a manufacturer of heavy mining equipment. Using predictive modeling and remote diagnosis and troubleshooting, Wind River is able to help this manufacturer reduce costly equipment downtime, which was a major problem for the manufacturer's customers. One of the mining equipment maker's customers was experiencing \$140 million in annual losses due to equipment downtime of its legacy infrastructure.

Because equipment repair required a specialist to visit onsite, the average downtime was between 10 and 20 days. Additionally, the remote operations center was not equipped to monitor, troubleshoot, or fix issues in real time. By implementing a smart mining infrastructure with a connected solution architecture, Wind River is able to help the manufacturer and its mining customer predict failures and reduce equipment downtime with predictive modeling, remote diagnostics, and troubleshooting.

With the Wind River solution, even if the mining equipment company is able to reduce downtime by 20%, the savings is estimated to be about \$28 million.

Thilak Kumar

ADDITIONAL INFORMATION

For more information on Wind River's Titanium Control platform and other solutions, visit www.windriver.com.

BIOGRAPHIES

Charlie Ashton

Senior Director of Business Development, Wind River

Charlie Ashton is an accomplished marketing and business development executive with extensive experience in the embedded systems industry. At Wind River, Charlie is responsible for business development activities for the networking and telecommunications industries. A prolific writer and commentator, his frequent blog posts and trade articles can be found throughout the embedded and software communities' literature. Charlie has held management roles in both engineering and marketing at software, semiconductor and systems companies including 6Wind, Green Hills Software, Timesys, Motorola (now Freescale Semiconductor), AppliedMicro, AMD, and Dell. Charlie graduated from the University of Reading in England with a BS degree in Electrical Engineering.

Thilak Kumar

Senior Manager, Field Engineering, Wind River

Thilak Kumar Ramanna currently heads Field Application Engineering for Asia Pacific at Wind River, an Intel Company. He comes with more than 17 years of experience in architecting and delivering Technology Solutions, Sales and Business Development. He has been with Wind River for over 9 years and is responsible for evangelization and adoption of Wind River Technology Platforms and Solutions.

Thilak has been a frequent speaker and column writer on topics associated with Internet of Things and Embedded Systems. He has two international publications in the area of machine learning to his credit. He holds a Masters in Software Systems from BITS, Pilani, India.