



JAPANESE INDUSTRIAL AUTOMATION AND DEVOPS TRENDS

Japan is emerging as a global leader in industrial automation. Japanese original equipment manufacturers (OEMs) are at the forefront of this trend, with unique attention to efficient, intelligent, and automated industrial processes.

Chisa Nakata, president of Wind River® Japan since 2020, has helped Japanese customers with their mission-critical infrastructure across several industries, including aerospace and defense, industrial, medical, and automotive. That's given her unique insight into the region's embedded systems and automation development trends.

What industrial automation trends are you paying attention to?

Chisa Nakata: The initial convergence of IT and operational technology (OT) had little effect on industrial automation, but that's no longer true. In the last five to eight years, embedded automation has adopted edge computing and complex software systems.

Until a decade ago, industrial automation systems equipment relied on hardware computer boards with embedded technology that could not be upgraded without changing boards. Industrial automation OEMs kept their equipment the same for 15 to 20 years without updating them, due to heavy cost and new design efforts. Only in the last decade have industrial automation OEMs begun to use software technology in their equipment design to make faster upgrades/updates, and that continues as the OEMs go to their next generation of industrial automation equipment. Japan has been an industrial automation leader for many years, but now it is leading efforts to adopt software and modern software development methods.

The new IT/OT convergence fosters synergy across vertical industries, such as real-time collaboration in manufacturing and operations. The result is faster, more efficient decision-making and the creation of new services.

The machine economy is gaining momentum. Autonomous machines are improving at communicating, making decisions, and carrying out economic activities independently, without human intervention. This trend has enormous potential.



CHISA NAKATA

Chisa Nakata has been the president of Wind River Japan since 2020. She has previously headed Wind River Japan distributor sales and the sales department. She has been helping Japanese customers across industries such as aerospace and defense, industrial, medical, and automotive to accelerate their digital transformation with Wind River software, especially for mission-critical infrastructure.

Finally, the edge has become a critical area of focus, with DevOps and DevSecOps methodologies changing how edge systems integrate with real-time operations. The explosion of data, the demand for real-time processing at the edge, and network bandwidth limitations are driving significant financial investments. For instance, the global market for edge data centers is expected to grow from \$13 billion in 2023 to \$39.8 billion by 2030, according to a November 2024 [Global Industry Analysts report](#).

How has software development changed?

Software development has a new focus on flexibility, agility, scalability, and automation.

Agile and DevOps: Agile methodologies and DevOps once were initiatives without corporate buy-in. Today, they are expected. These methodologies proved themselves with rapid, iterative software releases in embedded systems as well as other application domains. Teams work closely to integrate automation tools that speed up development cycles and enhance feedback loops. Everyone agrees on the principles of these long-popular methodologies, but OEM product development teams often encounter difficulties in implementation.

Cloud-native technologies: Cloud-native techniques promise loosely coupled systems that are resilient, manageable, and observable, emphasizing open source and vendor neutrality. The adoption of cloud-native tenets in the embedded development community has resulted in scalable, flexible systems that expand and adapt to business needs.

AI and automation: Automation has increased the efficiency of software development processes such as testing, deployment, and monitoring, particularly as tools and processes adopt AI and machine learning.

User-centric design: Developers are paying more attention to user experience. Software in both general and embedded markets is designed with better interfaces, ease of use, and frequent updates.

Security and DevSecOps: As security demands grow, DevOps is becoming DevSecOps, where security is integrated into every software development lifecycle stage.

The result: Companies can (and do) respond faster to market demands, with innovative applications that solve user needs as well as the flexibility to rapidly and easily change production to meet new orders and customer trends. Japan's industrial automation segment is leading the charge in adopting these advancements by strategically moving away from waterfall methods to DevSecOps.

Incorporating DevSecOps ensures security from the start of the development process. For example, Omron, a Japanese industrial automation company, streamlined its global software development by sharing a common infrastructure across multiple teams.

Which industrial automation market segments are changing fastest?

The industrial automation segment has improved its processes, particularly in Japan. Japan's global presence in this sector is influenced by the adoption of technologies such as industrial IoT, edge computing, robotics, and AI and machine learning (ML), which make real-time data collection, analysis, and rapid decision-making possible for manufacturing systems. Edge computing processes data closer to where it is generated before sending data to the cloud. That means critical decisions are made faster.

The most obvious trend is AI and ML. Japan is adopting AI-based machinery and plant network optimization at 63%. That's significantly higher than the global rate of 40% adoption as [reported by Markets & Markets](#). AI and ML are having an impact everywhere, of course, but their use in edge computing means industrial systems can make autonomous, accurate, real-time decisions without human intervention. That moves us all closer to the machine economy, where machines communicate and make decisions independently.

Japan is the [second largest global market for industrial robotics](#), second only to China. Its robotics usage is due to Japan's manufacturing infrastructure and leadership in automation technologies. One reason for the growth in automation and robotics is Japan's aging population and declining birthrate, leading to a shortage of Japanese workers. However, a bottleneck for the introduction of industrial robots into new customers is the time required for

teaching the system. Software solutions via a DevOps environment using AI are an important element in reducing this teaching time.

The use of digital twin technology is also growing in industrial automation. This technology allows companies to create simulations and models of physical systems so that everyone involved understands how the system works before deployment. Many industrial automation companies use digital twins to optimize production and operational processes, with the happy outcome of improved quality and fewer surprises.

Additionally, cybersecurity has become more important in industrial automation as systems become more connected. Securing these systems from potential cyberthreats is critical, especially in protecting sensitive data.

Finally, safety certification is no longer optional; it is essential for developing safety-compliant products in highly regulated sectors. It is also more complex. In the past, certification was simpler because embedded systems had fewer software components and the systems operated in controlled environments. However, with a growing software stack and more critical applications, achieving safety certification now requires more extensive effort.

How does Wind River Studio Developer help industrial automation OEMs and developers?

Wind River Studio Developer helps OEMs address critical challenges such as increasing software complexity, edge data management, security, and lifecycle management. It also facilitates modern practices such as DevOps and DevSecOps, which are essential for meeting customer needs.

Studio Developer supports real-time operating systems and edge computing, offering security, cloud-native development, and ML integration.

In Japan, test automation is critical due to the emphasis on quality. Studio Test Automation simplifies the testing process, saving significant time. OEMs are also highly interested in over-the-air (OTA) updates for post-launch software management, making Wind River Studio Developer's OTA update feature particularly appealing.

>> [Learn more about Wind River Studio Developer](#)

WIND RIVER STUDIO DEVELOPER KEY FEATURES

Wind River Studio Pipelines: Accelerate time-to-market and reduce costs through automation and orchestration of continuous build, test, integration, and deployment.

Wind River Studio Virtual Lab: Speed development cycles with earlier, more frequent and consistent testing. Use uniform, cloud-based management of simulated and physical hardware resources to automate testing and to maximize costly development resources.

Wind River Studio Test Automation: Simplify, expedite, and automate the testing, verification, and validation of embedded operating systems (OS) platforms and applications using cloud-hosted platforms.

Wind River Studio Over-the-Air Updates: Use remote and secure orchestration and automation of multi-device software updates to help manage fleets of devices through the cloud.

Wind River Studio Digital Feedback Loop: Gain real-time analytics and insights from combined OS-level and application-specific data to make data-driven decisions and optimize health, performance, and maintenance of assets deployed at the edge.

Wind River Studio Workspace: Enable instant, on-demand provisioning of preconfigured development environments in your public or private cloud.