

WINDRVR

MITSUBISHI ELECTRIC PUSHES INTELLIGENCE TO THE EDGE WITH WIND RIVER

VxWorks Powers State-of-the-Art Factory Automation Device Control and Edge Computing Solution

MITSUBISHI ELECTRIC CORPORATION

Industry

Electrical equipment for factory automation, power generation, and transportation

Solutions Used

- VxWorks
- Wind River virtualization technology

Benefits

- Enables reliable, real-time equipment control and edge computing in a single product
- Allows integration of multiple applications on a single virtualized platform
- Helps accelerate digital transformation of manufacturing, enabling customers to leverage advanced edge computing to revolutionize production and redefine the value of manufacturing (the Japanese philosophy of *monozukuri*, or craftsmanship)
- Single-vendor support speeds response time and results

In the rapid evolution of factory automation powered by the Industrial Internet of Things (IIoT), edge computing has moved front and center. Generally, edge computing refers to the placement of computing power or applications into or closer to the physical equipment they control, often independent of centralized control systems. It has played a critical role in accelerating the digital transformation of manufacturing and making the smart factory a reality.

Mitsubishi Electric Corporation, a leading supplier of electronic hardware for factory automation (FA) applications globally, believes that edge computing is the cornerstone of IIoT. Implementing edge computing doesn't just improve device or data security; it also enables load reduction through lower data traffic to the cloud, with data management, processing, and feedback in locations nearer the production site. This can deliver the benefits of demonstrating efficiency through IIoT by enabling a more rapid response to network or device issues, in the case of equipment maintenance, for example.



THE CHALLENGE

Combining Real-Time Device Control and Edge Computing in a Single System

Mitsubishi Electric is the market share leader in Asia in a number of FA categories, including programmable controllers and laser processing machines, and one of the top three FA systems manufacturers worldwide. In 2018, the company launched its first line of industrial hardware products specifically designed for edge computing, the MELIPC Series. There are two main development goals for MELIPC: One is to deliver hardware that specifically supports the type of edge computing promoted by Mitsubishi Electric. The other is to introduce features such as advanced vision technology for the field of device control, which has been difficult to bring to market up until now.

The company is working to strengthen edge computing on an industrial scale by working in a governing role on the Edgexcross Consortium, which promotes the creation and promulgation of Edgexcross specifications. Edgexcross is an open edge computing software platform built by Edgexcross Consortium members going beyond the bounds of companies and industries, and enables FA and IT cooperation.

MELIPC is Mitsubishi Electric's first hardware product created for edge computing. The MELIPC line's flagship computer, the MI5000, combines real-time equipment control with high-speed data collection, processing, diagnosis and feedback in a single machine, thus saving factory floor space and reducing the cost of building IIoT systems. To achieve this, the development team needed a real-time control platform that would flexibly integrate real-time control with proven analytic and diagnostic applications.

THE APPROACH

VxWorks and Wind River Virtualization Technology

Mitsubishi Electric selected the VxWorks® real-time operating system for the computer's control platform, which enables essential control performance in factory automation. VxWorks allows the MI5000 to provide both real-time equipment control and edge computing in a single solution. The combination of high-speed CPU performance and high real-time performance enables the system to collect data from IoT devices while managing them in real time, and edge computing applications make it fast and easy to carry out data analysis.

MI5000 also incorporates Wind River® virtualization technology built for real time. "Wind River's reputation for reliable quality with VxWorks led us to choose its virtualization platform as well," says Ryosuke Watabe, senior manager, Controller Development Section, FA Systems Dept. 1, Nagoya Works of Mitsubishi Electric Corporation. At first, the company contemplated using its own software to build a virtualized platform, but after also evaluating other solutions, it ultimately decided to go with a proven solution—and there was no better choice than Wind River. "When incorporating new technology like a hypervisor, we believe it's wise to stick with one software vendor, especially taking support into account," Mr. Watabe explains.

MELIPC was developed in response to demand for high-performance, general operating systems, such as Microsoft® Windows® applications, on top of a real-time control platform powered by VxWorks. "We installed VxWorks and Windows as guest operating systems on top of the Wind River virtualization platform," says Mr. Watabe. "This allowed us to integrate the functionality of both and gave us the opportunity to verify which functionality was usable on a guest operating system. Because we had one-stop technical support with Wind River, it was easy to isolate any problems that arose. The swift support we received enabled us to achieve the results we were hoping for."

THE RESULT

Driving Digital Transformation in Manufacturing with Advanced Edge Computing

Mitsubishi Electric's stated mission is "to continually improve its technologies and services by applying creativity to all aspects of its business, and, by doing so, to enhance the quality of life in society." To that end, the company has become a standard bearer for IoT in manufacturing and an evangelist for edge computing. Mitsubishi Electric has long promoted a vision of value creation in the manufacturing industry through the use of IoT. It is working to strengthen edge computing on an industrial scale and to empower customers to transform production, enhance value, and solve important business challenges.

Wind River has been part of Mitsubishi Electric's IoT story, and the company expects that relationship to continue into future projects. "We have been using Wind River products and services for more than 10 years," says Mr. Watabe. "We have a high level of trust in the core technology of Wind River products, and we appreciate the support as well. So we hope to continue using them for a long time."

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