

Hardware Key to Meeting 5G and Edge Computing Challenges

5G is rapidly expanding the possibilities for edge computing and advanced networking in industrial IoT (IIoT), allowing manufacturers to better take advantage of data, automation, and artificial intelligence to truly transform operations.

But while manufacturers enjoy the benefits of high-bandwidth, low-latency connectivity, the sheer speed of 5G technology catches their attention—enabling networking experts to build more sophisticated and efficient industrial networks.

“In 5G development, the innovation is the virtualization of the entire network structure,” says [Jesse Chiang, Senior Director of Product at IBASE, a manufacturer of edge computing and networking hardware for the industrial sector](#). “Network functions virtualization (NFV) enables technologies like software-defined wide area networks (SD-WANs), making it easier to manage the data flow and helping to bring down data transfer costs.”

With this in mind, it’s clear why industrial systems integrators (SIs) and networking providers are starting to explore the possibilities that 5G offers. Unfortunately, what they learn early on is that the 5G network hardware element of the industrial IoT equation can become a major stumbling block.

“Hardware for industrial IoT really has to check a lot of boxes: versatile, high performance, high availability, secure, easy to install, and rugged enough to handle harsh environmental conditions,” says Chiang. “For most SIs and software specialists, it’s just not cost-effective to engineer such complex 5G network hardware on their own—to say nothing of the business opportunities that would be lost during a lengthy development process.”

Thankfully, to overcome this difficulty, industrial 5G hardware manufacturers are starting to leverage their expertise and build products that allow SIs and software experts to take advantage of the technology standard’s promise.

Building for the Industrial Edge

Hardware manufacturers can help address the unique challenges of industrial 5G and edge computing in two principal ways: equipment design and component selection.

IBASE, for example, made several design choices to meet the demands of IIoT environments (**Video 1**):

- Modularization to enable SIs and end customers to configure hardware platforms to their exact specifications, and to expand and scale up as needed.
- Redundant power supplies and cooling fans so that hardware components can be serviced or replaced without interrupting factory operations, ensuring high availability.
- Thermal design tested in simulations to guarantee that equipment will function in harsh operating conditions.
- A compact form factor to help devices fit into cramped or limited spaces if required.

On the component side, Chiang explains, manufacturers must be able to maximize on performance while eliminating unknowns. “To develop edge or networking solutions for IIoT, you need a reliable platform on which to build. That means 5G hardware built with high-performance components that have well-understood, well-defined capabilities—so that they won’t fail you in the field,” he explains.



Video 1. IBASE builds 5G intelligent solutions for the factory with modularization, performance, connectivity, and thermal dissipation in mind. (Source: [IBASE](#))

IBASE leverages its technology partnership with Intel to accomplish this goal:

For example, its equipment includes:

- Intel® processors to handle control, compute, management, and packet processing while optimizing for networking performance.
- Intel® QuickAssist Technology (Intel® QAT) to provide acceleration for data encryption and compression/decompression processing tasks.
- Intel Hyperscan, a regular expression matching library that IBASE uses to accelerate deep packet inspection (DPI) in its industrial security products.

“In addition to tremendous computing power, Intel has equipped its processors with excellent networking capabilities. Intel is also putting a lot of effort into 5G development, which will help us keep up with the most advanced technology in the years ahead,” he says.

A Growing Range of 5G and Edge Computing Products

With the emergence of hardware built for 5G IIoT solutions, IBASE is already preparing for the future of possibilities in the industrial computing space.

For example, its product roadmap includes a range of 5G-compatible multi-access edge computing (MEC) servers designed to provide a stable, performant platform for AI-enabled solutions at the industrial edge. To meet the growing need for secure 5G networking—especially in situations where network nodes are spread out and local IT resources are limited—the company is also developing a line of Universal Customer Premises Equipment (uCPE) devices that will enable SD-WANs and network security applications.

In the coming years, hardware designed for 5G and edge computing will allow industrial SIs, edge AI specialists, and secure networking providers to deliver a number of important benefits to their customers, according to Chiang.

“SD-WANs will make managing networks much more efficient, reducing labor and equipment costs,” says Chiang. “And with more and more 5G deployments, edge computing is going to become an everyday reality in factories, ushering in the next wave of digital transformation in the manufacturing sector.”