



SMART DIGITALIZED PRODUCTION PROCESS ENHANCES QUALITY CONTROL

A collaboration between Supermicro and Beijer to deliver an enhanced quality control solution for Industry 4.0



SYS-E100-9W-IA



SYS-1019P-FHN2T

Executive Summary

Along with the prevalence of Industry 4.0, more and more traditional factories adopt smart manufacturing solutions. IoT technologies simplify the collection and monitoring of data from the production line, and AI/ML technologies vastly improve product quality control processes. Supermicro SYS-E100-9W-IA and SYS-1019P-FHN2T integrated with Beijer iX software provide a powerful data acquisition and visualization edge computing solution. This solution enables factories to collect and exchange data from the PLC or controller and connect to production manufacturing systems like MES and ERP.

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SUPERMICRO

Supermicro (Nasdaq: SMCI), the leading innovator in high-performance, high-efficiency server and storage technology is a premier provider of advanced server Building Block Solutions® for Enterprise Data Center, Cloud Computing, Artificial Intelligence, and Edge Computing Systems worldwide. Supermicro is committed to protecting the environment through its “We Keep IT Green®” initiative and provides customers with the most energy-efficient,



Traditional Quality Control

Manufacturers must transform into smart manufacturing to maintain the competitiveness of the enterprise. One of the key competitive benefits is ensuring product quality when production capacity increases faster. Unfortunately, traditional manufacturers are facing one or more of the quality control challenges below:

- Unable to predict the quality issue before it happens
- Not enough resources to track some critical process data, which limits the ability to identify the root cause of the quality failures clearly
- Wasted cost and time while still delivering a failed quality product
- Unexpected downtime due to quality failures and low OEE

The Supermicro-Beijer solution

IoT and AI technology create a revolutionary quality control procedure with Supermicro SYS-E100-9W-IA and Beijer iX software.

Manufacturers can collect the process data from the controller by applying IoT technology in the production line and combining the work orders from the MES system to become a valuable production data center for advanced data analysis and historical data, which can be tracked if needed.

The smart and flexible work order arrangement and optimized resources are the key factors for smart manufacturing. The process data from controllers are an important reference for the operation of the production equipment like OEE, running hours, alarm history for the risk of availability even the predictive maintenance information. These data combining the working orders can help the smart manufacturing system/management level analyze the optimized production plan and resources arrangement for both the manpower resource and the production equipment.

For the basic function, factory operations can have more data to track and identify the failure process data from the production history when the operator is running product inspection procedures to filter the specific failure pattern of the product.

Combining the data from work orders and the controller in machinery, we can have a complete track list for “when,” “where,” “which machine or production line,” “what is the production recipe setting the record,” and so on. If there is any failure or quality issue, there would be completed information to trace back all of the details, including operators, machinery, and setting factors/data for the recipe to analyze and filter the root cause.

For advanced smart production, this is the concept of “Smart Manufacturing” for Industry 4.0. It is a new type of manufacturing. This is because, by analyzing the relationship between failure process data and failure pattern, operations can have the database to predict which failure process data will cause the specific product failure. The engineers can also implement the AI technology to build the AI model and do a training model with those prediction results. These features are for software. But such kind of software functions needs high computing power. A typical computer like IPC cannot afford it. It requires the performance as server grade. This is the core competence of Supermicro. The production system can get real-time notification when detecting abnormal process data by implementing AI inference into the process database. The administrator can take action before the workpieces go to the next work stage. The status of the production equipment can also be collected and stored in the database. The engineers can also implement the AI technology to do the predictive

maintenance to reduce the unplanned downtime and be notified when some critical parts of production equipment need to replace or maintain.

Thanks to the excellent and steady hardware from Supermicro and powerful, flexible software from Beijer, the manufacturers can enhance their product quality, reduce the cost, and maintain high OEE without unplanned downtime.

Integration of iX software on Supermicro Hardware

iX Software is a comprehensive data acquisition and visualization software that runs on Supermicro edge hardware. iX software supports the most popular PLC drivers to communicate and read data from the various controller and IoT gateway types. In addition, iX software also contains many rich and vivid widgets for users to design their unique war-room dashboard.

iX software is designed for industrial environments. It supports up to 90 different PLC drivers and can turn Supermicro hardware into a highly compatible edge server. Furthermore, by supporting additional PLC drivers, users can collect the data from the various controllers with different brands and protocols and display this data with a built-in Dashboard engine in the war-room dashboard.

iX software empowers you with modern tools to communicate. The software combines top-class graphics and smarter functions that provide intuitive operation on the spot and have almost limitless connectivity to your other equipment through the extensive list of drivers.

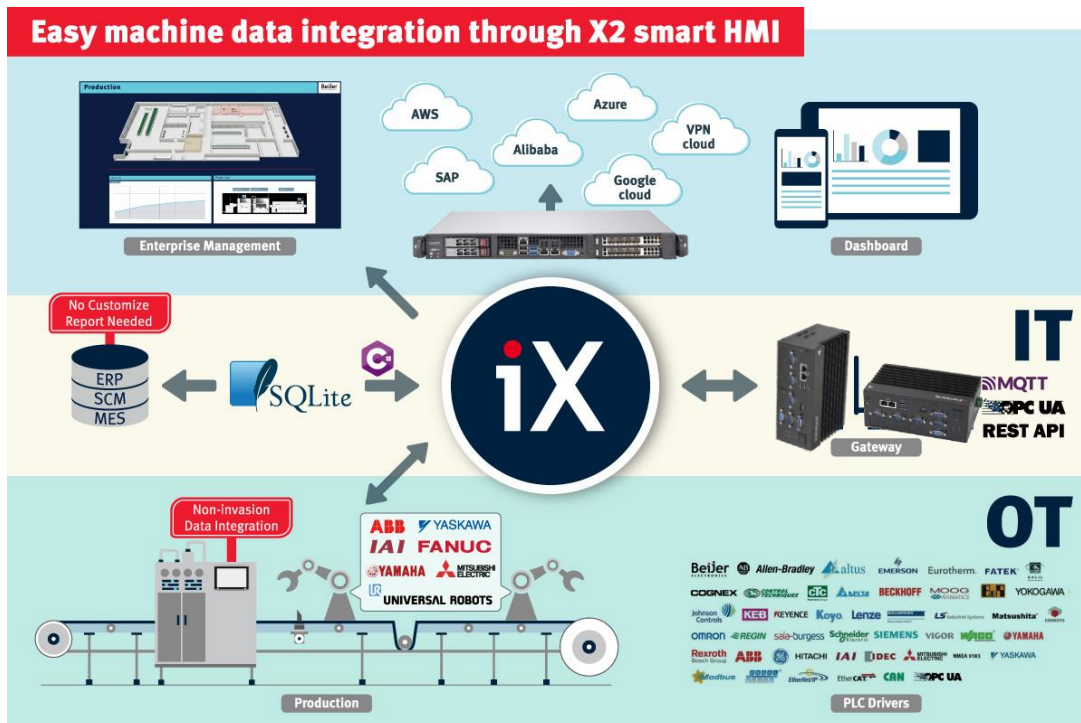


Figure 1 – Supermicro Industrial IoT solution architecture.

SUPERMICRO SERVER FOR IX SOFTWARE



SYS-E100-9W-IA



SYS-1019P-FHN2T

Supermicro gateway and edge servers validated and qualified with iX software

Why Supermicro Edge Devices?

Supermicro Fanless Edge devices such as the SuperServer SYS-E100-9W-IA are the ideal solution to address the demands of Industrial applications. The SYS-E100-9W-IA provides legacy connectivity such as COM ports for RS-232/422/485 interfaces to bring management capability to existing manufacturing equipment. Easily DIN rail mounted within the equipment or remotely for convenience of installation, this fanless system is built to withstand the environmental conditions found in manufacturing facilities.

The SYS-1019P-FHN2T provides the computing power and data storage functionality for the iX war-room dashboard engine to visualize all the sensor data, MES, and ERP from the database. Based on the 2nd Gen Intel Xeon Scalable processor, the 1019P series of products offer superior performance in an extended availability platform. With up to 28 CPU cores per device, the 1019P can serve as the node device for many individual systems or machines and run the management system for those devices. In addition, with two PCIe x 16 slots for optional 4 x 10G Ethernet connections or optional AI accelerator, operation managers can manage their entire facility with a single device to optimize operational efficiency.

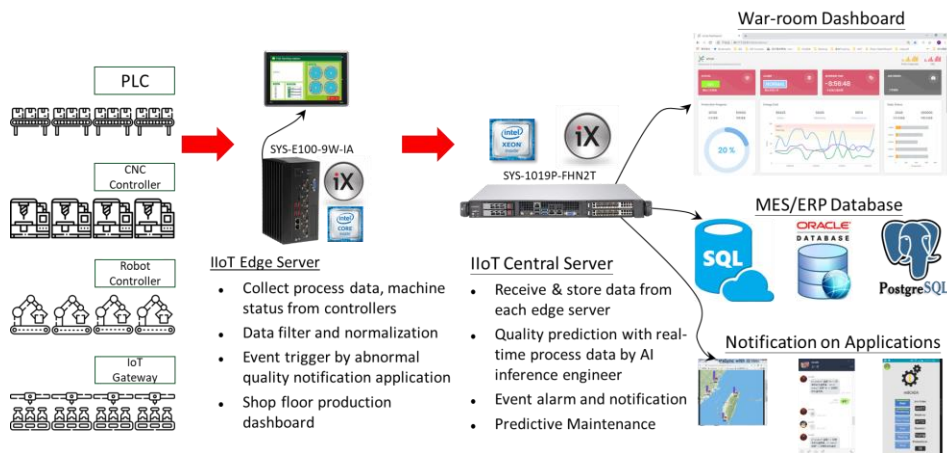
From an operation technology perspective, the SYS-E100-9W-IA Fanless edge computer integrates different brand PLCs in all production line equipment in the factory for real-time monitoring of production operating information. In addition, the SYS-E100-9W-IA could also be interlocking to indicate lighting status on equipment and analyze downtime by C# script to predict unexpected downtime.

The SYS-E100-9W-IA is unifying OT/IT protocol as cutting-edge smart manufacturing technology in PC-based automation control and seamlessly transforming factory floor information into the IT infrastructure. Execute data analysis software on SYS-1019P-FHN2T edge server of each partition to analyze the big data of equipment operation and utilize AI inference module to optimize equipment production parameters in real-time.

All production information is displayed on the digital board room, allowing the decision-makers to get insights at a glance with the visualized information for real-time decision making.

Solution Overview

This solution provides a single software platform to achieve the purpose of data collection and data visualization by running iX software on a Supermicro device.



Conclusion

Now more than ever, companies need to accelerate the adoption of Industry 4.0 to transform into smart manufacturing. The Supermicro-Beijer solution enables a manufacturer to seamlessly capture edge data and transform it into insights. This integrated solution provides product quality prediction and predictive maintenance, allowing manufacturers to get real-time information from the shop floor and take action before failure occurs. This eliminates potential downtime caused by late detection, reduces costs, and improves efficiency. Moreover, the Supermicro-Beijer solution improves market competitiveness and reduces manufacturers' total cost of ownership.

BEIJER ELECTRONICS

Beijer Electronics is a company that designs and manufactures human machine interface terminals and automation software. The company is based in Malmö, Sweden with presence in Europe, Asia and Americas with own offices and through distribution.

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