



Case Study

Digital Factory Transformation with 35,000+ Pieces of Manufacturing Equipment Connected in the Cloud

Sanmina, a tier one contract manufacturer, manufactures 250 million products for 700 different OEMs annually. The existing on-premise MES, though advanced, limited management visibility of real time production metrics in each factory and required significant maintenance from operations and IT teams. 42Q unified 50 manufacturing facilities worldwide, providing real time visibility and alerts to key production statistics, and provided a backbone for automation and IIoT.

The Challenge:

Sanmina manufactures 250 million products per year. More of a challenge is that there are over 200,000 different top level assemblies produced each year for 700 different OEM customers with up to 20,000 forecast changes per week. The OEMs operate in diverse industries including telecommunications, enterprise computing & storage, industrial and clean technology. A significant amount of production is for medical, aerospace and automotive products with strict regulatory requirements. The existing on-premise MES required significant maintenance and upgrade effort from the IT and operations teams. It was also limited in its ability to manage supply chains beyond the walls of each factory, and was not well suited for factory automation and other IIoT initiatives.

Why 42Q:

42Q offers a fully featured global cloud based system capable of integrating product yield, WIP and inventory information across a global network of 10,000 suppliers delivering components to 50 manufacturing facilities in 15 countries around the world. Many of these factories supply sub-assemblies to PCBA and systems integration facilities. The solution accommodated Sanmina's diverse manufacturing processes including enclosure fabrication, PCBA manufacturing and complex systems integration. It also complies with regulatory requirements in medical, aerospace and automotive industries.



Approach and Deployment:

- A unified multi-tenant cloud architecture with in-built redundancy provides access from anywhere in the world.
- A method to digitally represent product specifications and manufacturing processes was developed.
- 35,000+ devices including scanners, production equipment, automatic optical inspection machines and functional testers were connected to 42Q, providing data in real time.
- Applications accessible by browser from anywhere in the world were developed to analyze millions of records of data and present it in an actionable manner.

The Results:

A unified virtual cloud factory (digital twin) provides global factory and supply chain visibility, including real time WIP, yield and throughput data for 50 factories.

- Following implementation, plants self deployed the cloud based MES with no support from I.T. or 42Q. Because of this, 42Q was rapidly adopted and its use expanded.
- A visual factory monitors yield, throughput, work-in-process (WIP) ageing, against predefined targets. It provides real-time status at product, workstation, production floor, plant, regional and global levels.
- Production lines in 42Q are programmed so alerts are sent to technicians, engineers or management when WIP, yields or throughput drops below predefined limits.
- Multi-level supply chain visibility provides real-time component delivery information from suppliers, real-time status on work orders in factories manufacturing sub-assemblies including PCBs, enclosures and PCBAs.

