Using the Omron NJ-SQL MAC to Make Connected Infrastructure More Secure

Networks are critical to advanced manufacturing processes, but indiscriminate inter-networking makes operational environments on the factory floor more vulnerable to cyber attacks. While organizations use firewalls, authentication, and encryption to enhance security, these measures are not always sufficient to protect connected systems.

Omron recently consulted with a multinational healthcare company on using the Omron NJ-SQL machine automation controller (MAC) to add an additional layer of protection between its operational and enterprise networks.

“Industrial PCs provide potential pathways for viruses to spread,” says Omron strategic account manager Rob Sepa. “With the NJ-SQL, we can isolate the plant floor from attack while doing a more efficient job of capturing and communicating data to back-end SQL systems.”

The Omron NJ platform is widely used in manufacturing for automation control, data collection, and monitoring. It also allows manufacturers to replace obsolete industrial PCs or provide an additional layer of security for any PCs the plant operator needs to retain.

**NJ-SQL offers a secure alternative to industrial PCs**

Industrial PCs are often in service for many years. These systems frequently end up running on unsupported versions of the Microsoft operating system (OS). But even when the OS is supported, the hectic nature of modern production environments means that many of these PCs are not updated and patched. In either case, security becomes more problematic, especially if they are being remotely accessed over enterprise networks.

Environments where all industrial PCs are visible on the enterprise network are much more at risk. An infection on one machine can spread to all machines on the network. While a firewall might prevent the attack from reaching the enterprise network, plant efficiency will likely suffer until the vulnerability is identified and patched.

In contrast, the QNX OS used by the NJ-SQL MAC is incredibly stable and should never require updating or patching over its expected two to three decade lifespan. The OS’s microkernel architecture makes the controller inherently more stable and secure.

“In some industries, industrial PCs have to be revalidated every few years,” says [Omron SME]. “Revalidation can cost $20,000 per device. That expense is eliminated with the NJ platform.”

Installing the NJ-SQL MAC in front of a PC prevents direct communication between the factory floor and the network. With this isolation, PC updates and patches are less critical since attacks cannot use the NJ-SQL to spread. If a PC located behind the NJ-SQL MAC becomes infected through a USB port or other means, the attack cannot cross the controller and spread to back-end systems.

**Omron support network keeps production on track**

The NJ-SQL includes a hardened Intel® Atom™ processor and an integrated solid-state drive. A built-in interface supports connectivity for up to three...
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Direct communication helps speed up production

Data logging and real-time data are critical in automated manufacturing processes. Industrial PCs typically use supervisory control and data acquisition (SCADA) and additional middleware to communicate with SQL databases.

This approach consumes 500 to 1,000 milliseconds of the production process as the SCADA system polls monitored devices. With the NJ-SQL and direct communication between the plant floor and SQL database, polling monitored devices takes just 10 to 100 milliseconds.

“Shaving milliseconds off the total cycle time can have a tremendous impact on overall operational efficiency,” says [Omron SME]. “If you reduce polling time from 1,000 milliseconds to 30 milliseconds, you can potentially produce 10 percent more product with the same equipment, on a 10 second cycle time.”

Achieving this degree of efficiency improvement is normally engineering intensive. But with the NJ-SQL production-friendly design makes it easy to optimize overall equipment efficiency (OEE) and produce more output with the same equipment.

“The NJ is a well defined and proven product,” Sepa says. “It improves security while giving manufacturers better automation control and faster access to SQL data.”