



In-Chassis PLC Transaction Manager Bridges OT and IT For Automation Systems Integrator

Bridging operational technology (OT) and information technology (IT) systems has become an essential element of success for today's data-driven manufacturing enterprises. From consumer packaged goods to pharmaceuticals to food and beverage, there's a growing need for plant floor control systems and enterprise computing systems in many industries to be able to exchange information with each other.

However, this data integration is easier said than done. Connecting the programmable logic controllers (PLC) that run the plant floor operations with the SQL databases that are typically the heart of enterprise IT systems has its share of challenges. For one, it may be unclear who's taking ownership of the integration – whether the IT, production or engineering department. Compounding this challenge is the fact that IT and OT engineers don't really talk to each other. And finally, this kind of data integration involves extensive custom software development, which can easily drive up engineering costs and delay production.

ESCO Automation Faces Challenges

These were just some of the issues the engineers at ESCO Automation encountered. As a total systems integrator, ESCO works on automation projects ranging from small logistics kiosks that check trucks in and out of plants, to very large automated material handling systems with miles of conveyor. With locations in Iowa, Colorado and Indianapolis, ESCO offers a wide range of services including electrical construction and engineering, safety training and analysis, arc flash analysis and automation. Depending on a project's size and performance requirements, the company typically uses Rockwell Automation ControlLogix® and CompactLogix™ as its go-to control platforms.



ControlLogix® single-slot module (left) and CompactLogix™ double-wide module (right).

Although the scope of ESCO's automation systems vary, the projects tend to have three things in common. The first two are performance and reliability. "Whether our customers require front-end engineering or innovative design builds, our goal is to deliver high-performing, reliable automation systems that can drive their success," says Jon Johnson at ESCO. The third element involves connecting customers' PLCs to IT systems, typically in the form of SQL databases, to bridge the gap between connected enterprise systems and the shop floor — a task that had been driving up system complexity, time and cost.

"The traditional approaches to IT/OT data integration involve developing custom software or configuring the SQL databases," explains Mike McCuddin at ESCO. "These methods — which include log shipping, database mirroring and server clustering — have their pros and cons, as well as different levels of complexity that have many possible fault points. We wanted a simpler solution."

Complexity is the Enemy of Availability

These issues came to a head in a recent application that involved the design of a custom track-and-trace automation system, which had several design challenges:

- Downtime had to be avoided at all costs.
- The system had to meet high throughput requirements — e.g. filling 240 containers per minute, adding up to 70,000 containers per day.
- The system had to accurately track and control products through three migrations: supply, transport and destination.
- The system had to minimize the layers of complexity between process and data, all while minimizing the amount of software development.

tManager to the Rescue

To meet the requirements of this application, as well as other applications requiring seamless enterprise-to-controller connectivity, ESCO consulted Softing, a leading provider of products for industrial automation and IT networks. Softing recommended its tManager® Enterprise Appliance Transaction Module, which enables bidirectional data exchange between enterprise systems and ControlLogix and CompactLogix PLCs. Once the device is inserted into the PLC rack, the in-chassis module automatically enumerates PLC and database tags and structures — no software coding or scripting required. And with licensed access to the Rockwell backplane, tManager eliminates the need for a separate computer or operating system.



As an in-chassis module, tManager automatically enumerates PLC and database tags and structures.

Other advantages of tManager include:

- **High reliability for critical systems:** tManager maximizes data availability via store, forward (local buffering), failover and PLC status tags.
- **The ability to make edits without halting production:** tManager supports advanced data structures, user-defined types, XML encoding and arrays.
- **Easy to install, operate and maintain:** Because of the way the configuration software is designed, anyone familiar with Allen-Bradley PLCs can set up tManager with ease. Once configured, tManager handles all data transfer and transactions within the hardware.

tManager brought these benefits to ESCO's track-and-trace automation system, which also included 14 PLCs, six tManager cards, 100 barcode scanners, 1,000 connected devices, 100 tManager triggers and miles of conveyor track. As part of this full solution, tManager downloads production recipes from the end-user's manufacturing execution system (MES) to ControlLogix PLCs with a transaction speed of 4 milliseconds. It also saves space and reduces maintenance needs. And unlike a PC, which can be a target for hacking and viruses, tManager resists viruses and avoids antivirus updates and ongoing patches.

Thanks to tManager, the end-user reaped additional benefits as well. For example:

- tManager fully automated the plant, reducing the number of staff.
- It successfully met the application's availability and performance requirements.
- Tracking is now present throughout the entire material handling process.
- There is a clear separation of duties between the IT and OT departments.
- The automation system can move more material with greater visibility and fewer errors.

"tManager has successfully reduced the system's complexity and simplified the lines of responsibility between IT and OT," says Dillon Kepner at ESCO. "We're excited to bring this innovative device to more automation projects in the future to take our customers' performance to the next level."

Learn More About tManager

As a part of the Rockwell Automation Technology Partner program, tManager can directly access backplane data and control tags. This PLC in-chassis transaction manager moves plant floor data between enterprise systems and PLCs and also lets users connect PLCs to their favorite Cloud application, analytics app or dashboard — all in 10 minutes or less.

tManager is compatible with a variety of databases including Microsoft SQL Server, Oracle Database, MySQL, AWS IoT SiteWise and Azure Cloud. Via the front Ethernet port, users can also connect tManager to additional PLCs by Allen-Bradley, Siemens, Schneider and Modbus.

To learn more about ESCO Automation, please visit www.theescogroup.com.

To learn more about Softing and tManager, please visit www.industrial.softing.com/us.