Case Study: Automotive Manufacturer Accelerates Digital Transformation

Unifying over 100 machines with live data in a Unified Namespace

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CASE STUDY: AUTOMOTIVE MANUFACTURER ACCELERATES DIGITAL TRANSFORMATION

Unifying over 100 machines with live data in a Unified Namespace

In 2020, Moriroku® Technology North America (MTNA) faced a common challenge in manufacturing: outdated reporting systems that lacked real-time data from production machinery. Their diverse array of machines, each with different control hardware, relied on operators for end-of-line updates roughly every 15 minutes. This manual process resulted in delayed insights, human errors, and limited visibility into production performance.

Robotic painting process for automotive exterior components

WHO IS MTNA?

MTNA, a Tier 1 automotive supplier and subsidiary of Moriroku Holdings Company, Ltd., a publicly traded company on the Tokyo Stock Exchange, operates four plants across the U.S. and Canada.

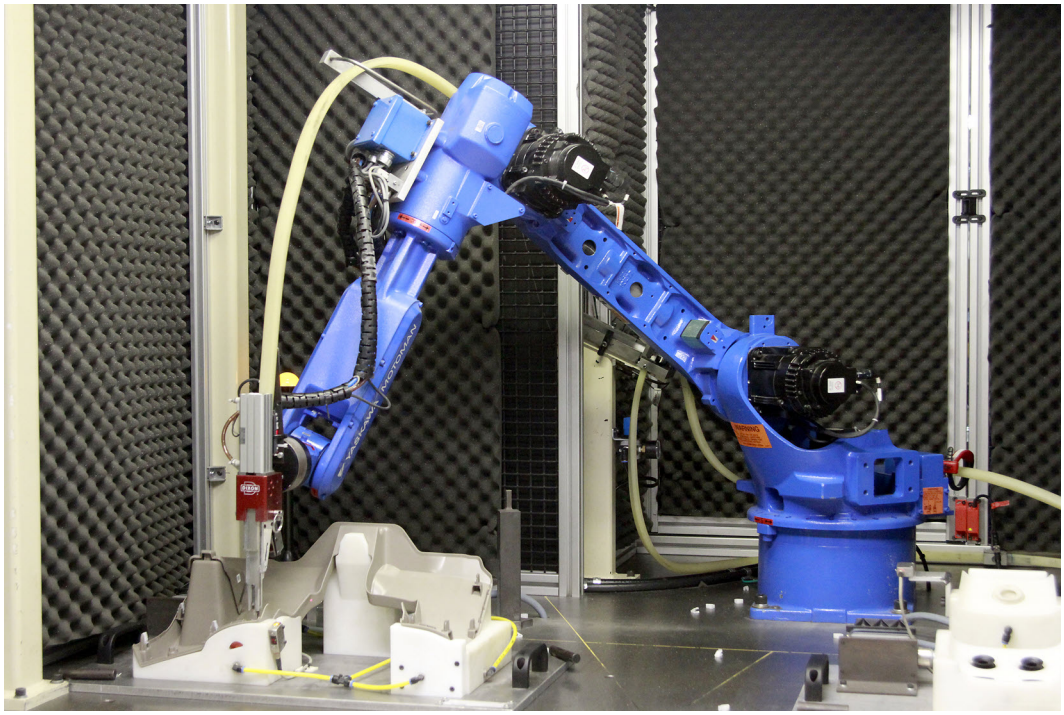
Specializing in plastic injection molding, MTNA produces a wide range of interior and exterior vehicle components, including trim, moldings, spoilers, consoles, and dashboards. Their expertise in precision automotive manufacturing has positioned them as a trusted partner for automakers seeking reliable and high-performance plastic parts.

VISION 2030

After the global pandemic exposed supply chain vulnerabilities and operational inefficiencies, Moriroku's management launched *Vision 2030*, a digital transformation initiative to enhance resilience, efficiency, and competitiveness in a rapidly evolving market.

For the operations team, Vision 2030 signaled a shift to real-time data integration, replacing manual, error-prone end-of-line reporting with live updates delivered to a Unified Namespace (UNS)—a centralized structure that organizes and shares real-time enterprise data. This transition aimed to streamline decision-making, boost efficiency, and minimize downtime.

Aerial view of MTNA's facility in Listowel, Ontario



Assembly robots join injection molded parts.

EXISTING DIGITAL INFRASTRUCTURE

The vision for the future would incorporate existing aspects of MTNA's digital infrastructure, namely their MES (manufacturing execution system), QMS (quality management system), CMMS (computerized maintenance management system), and a new IIoT/SCADA platform, Ignition® by Inductive Automation®, running in the cloud.

"MES is the core of our data, but we've been struggling for years to get real-time data," says MTNA's Chief Specialist for IT Development Marten Gorter. "We wanted real-time data from the machines that we can contextualize and make useful for stakeholders in various departments of the business."

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- Marten Gorter, MTNA

PILOT 2020

MTNA faced the challenge of integrating 20 to 30 diverse injection molding machines per facility across four plants. These machines, varying in age, control hardware, and

Injection molded parts advance through production on conveyors.

A painting robot applies a consistent, high-quality finish with precision.

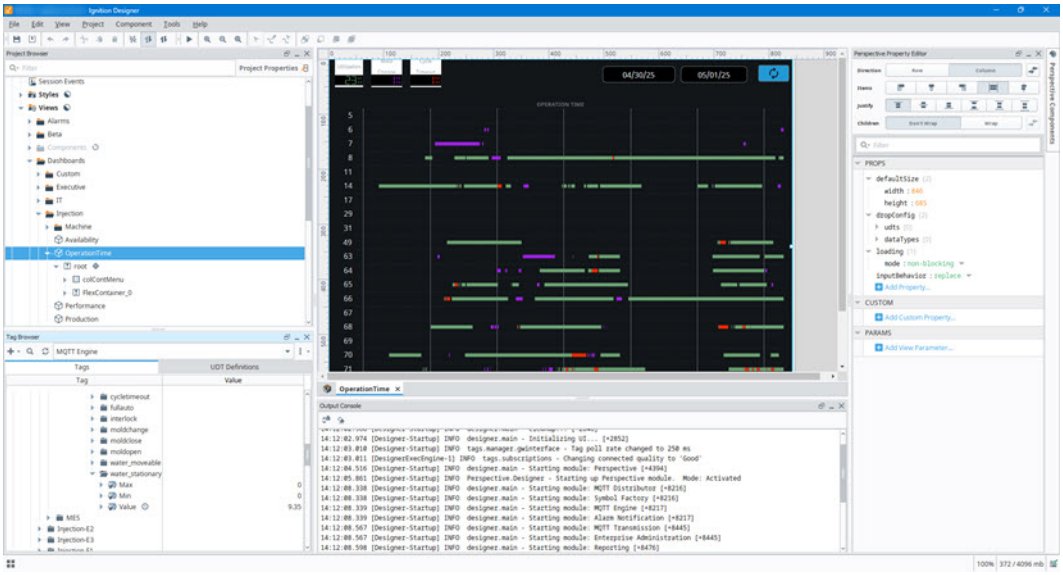
protocols, needed to be brought together into a unified digital infrastructure. The company required a scalable solution that avoided reliance on specific PLC brands or proprietary systems, ensuring flexibility for future growth.

At their Rainsville, Alabama plant, MTNA's IT VP, Jeremy Johnson, didn't dive into digital transformation all at once. Instead, he started small—with a single machine and a single-board PC. It's how big visions are born: one small step and one pilot program, paving the way for something extraordinary.

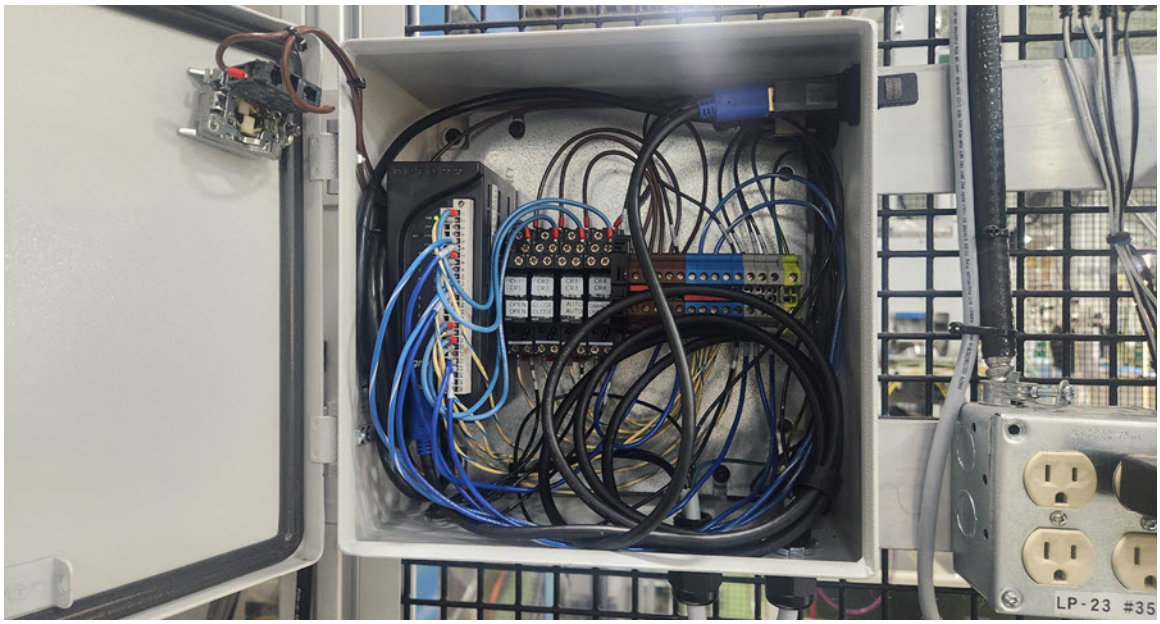
LET'S TRY: RASPBERRY PI

The goal was to find a low-cost, simple-to-implement solution that could seamlessly connect machines of all ages and manufacturers to MTNA's evolving digital infrastructure.

The solution needed to support MQTT Sparkplug® B, enabling an efficient report-by-exception approach for seamless integration with the company's new Ignition system hosted in Microsoft® Azure®. Johnson prioritized low cost, simplicity, and broad compatibility with a vision that extended beyond just connecting injection molding machines. His long-term goal was to integrate all plant equipment—from paint lines to maintenance systems—into a unified, scalable architecture built around a Unified Namespace (UNS).



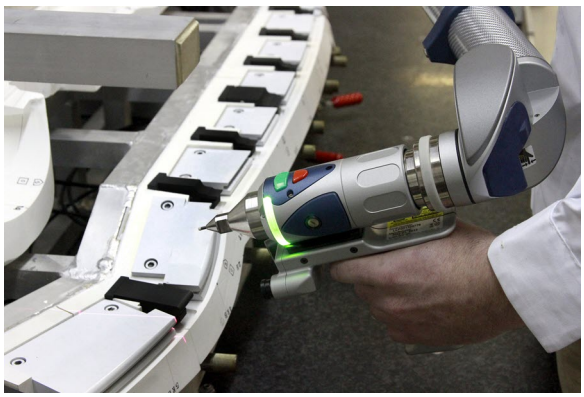
This dashboard shows specific time periods of machine operation using data that is sent to the Ignition Cloud on Microsoft Azure.



***groov* RIO collects real-time sensor data for MTNA's process monitoring—no PLC required.**

The team initially experimented with a Raspberry Pi® single-board computer (SBC) as a potential solution.

"We ultimately decided against using the Raspberry Pi in a production environment," explains Gorter. "While it's a great tool for prototyping, it just didn't meet the standards for industrial use. It would have introduced unnecessary overhead—installing and maintaining an OS, managing updates, and configuring administrative tools. On top of that, it lacked the analog input capabilities we needed for this project."



An MTNA technician uses a 3D scanner to inspect parts.

NEXT MOVE: *groov* (RIO)

While the Raspberry Pi proved valuable for early experimentation, its limitations underscored the need for a scalable solution built reliably to withstand industrial environments.

Johnson continued researching online for potential solutions to overcome the limitations identified within the SBC proofs of concept. It was then that he discovered the *groov* RIO® by submitting a product inquiry through Opto 22's website.

After MTNA learned about its software-configurable I/O and built-in MQTT Sparkplug B capabilities—which enabled integration with their Ignition platform—the *groov* RIO, at under $1,000, quickly stood out as the ideal solution that checked all the boxes.

"*groov* RIO is simple. You have I/O, plug it in, connect an analog or digital signal, perform some simple configuration, and you are off to the races," says Gorter. "What truly sold the solution was our ability to build an entire proof of concept with minimal upfront cost and demonstrate tangible results to management. They could

MTNA monitors a production dashboard built in Ignition.

see the impact without committing to a significant capital investment."

FROM SIGNALS TO INSIGHTS: MONITORING INJECTION MACHINES

So, what was the actual solution? MTNA's operations team identified specific signals from their injection molding machines that were crucial for real-time monitoring and performance tracking. These included:

- **Full-auto signal—**indicates when the machine is running in fully automated mode, ensuring maximum productivity
- **Mold change signal—**tracks when molds are being switched, a key step in production transitions
- **Mold open/close signals—**mark the critical stages of each production cycle, helping to monitor cycle times and process efficiency
- **Water flow signal—**monitors water flow to ensure proper cooling and maintain consistent process stability

Using analog and digital inputs on a *groov* RIO (GRV-R7-MM1001-10) to capture these signals, they gained a comprehensive view of a machine's operation. From there, using *groov* RIO's built-in MQTT Sparkplug B client/publisher, they pumped the data into their cloud broker, which serves as the foundation for their UNS.

SCALABLE ROLLOUT

"The proof of concept on a single machine at our Rainsville, Alabama, facility was straightforward," says Gorter. This initial success gave MTNA's operations team the confidence to begin a phased rollout across their facilities.

"We were working with Inductive Automation at the same time, and using *groov* RIOs together with Ignition made the process incredibly simple," Gorter explains.

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- Marten Gorter, MTNA

Ignition Perspective provides a mobile interface for the injection machine operators.

The solution's scalability ensured a seamless deployment. For each machine, the team followed a repeatable process: commission and connect *groov* RIO, configure inputs for critical signals, and publish the data into their UNS using MQTT Sparkplug B.

By the end of 2022, Moriroku had implemented the solution on more than 100 machines across multiple facilities. "The consistent setup process allowed us to scale quickly without compromising reliability," adds Gorter.

RAPID RESULTS

Real-time monitoring has provided MTNA with accurate, live data directly from their injection molding machines, replacing outdated 15-minute operator-driven updates. They can now track machine performance and availability without delays and inaccuracies from manual reporting.

As Marten Gorter puts it, "Now, we can write next-gen systems that plug into our UNS and make real-time decisions based on live data down to the second."

MAKING VISION 2030 A REALITY

With the success of their injection molding implementation, MTNA is setting its sights on broader horizons. Plans are underway to expand monitoring into their assembly areas, incorporating vision detection systems to improve quality control. For larger and more complex machinery with higher I/O counts, the team is also evaluating Opto 22's *groov* EPIC (**E**dge **P**rogrammable **I**ndustrial **C**ontroller).

Reflecting on the journey, Moriroku emphasizes the value of collaboration with the Opto 22 team.

"It wasn't just product support—it felt like business vision support," Gorter says. "The passion from the Opto 22 team kept us moving forward. When we hit roadblocks, like

MTNA machines are used for high-volume injection molding.

MTNA monitors paint lines in Ignition.

challenges with Node-RED, they didn't just fix the problem. They sat with us, opened it up, and guided us with new approaches, almost like a roundtable discussion. That level of engagement made all the difference."

Jeremy Johnson added, "As we embarked on our Vision 2030 journey to modernize and unify our manufacturing data infrastructure, we knew we needed a partner who could not only provide robust technology, but also share in our vision. Opto 22 delivered on both fronts."

He continued, "The *groov* RIO stood out as an incredibly versatile and scalable solution that allowed us to integrate a diverse fleet of machines into a centralized, real-time architecture with remarkable ease. But what truly set Opto 22 apart was the collaborative spirit of their team—deeply engaged, incredibly knowledgeable, and always ready to guide us through challenges with creativity and care. Their support has been instrumental in transforming our ideas into tangible outcomes, and we look forward to continuing this strong partnership as we expand our Unified Namespace strategy across all MTNA facilities."

ABOUT MTNA

Moriroku Technology North America (MTNA), a subsidiary of Japan-based Moriroku Holdings Company, Ltd., is a Tier 1 automotive supplier that specializes in plastic injection molding to produce a wide range of interior and exterior vehicle components like trim, moldings, spoilers, consoles, and dashboards. Operating four plants across the U.S. and Canada, their expertise in precision automotive manufacturing has made them one of the most trusted partners for automakers.

For more information, see https://www.mtnaoh.com

ABOUT OPTO 22

Opto 22 was started in 1974 by a co-inventor of the solid-state relay (SSR), who discovered a way to make SSRs more reliable.

Opto 22 has consistently built products on open standards rather than on proprietary technologies. The company developed the red-white-yellow-black color-coding system for input/output (I/O) modules and the open Optomux® protocol, and pioneered Ethernet-based I/O.

Famous worldwide for its reliable industrial I/O, the company in 2018 introduced *groov* EPIC® (edge programmable industrial controller). EPIC has an open-source Linux® OS and provides connectivity to PLCs, software, and online services, plus data handling and visualization, in addition to real-time control.

groov RIO Ethernet-based edge I/O modules, introduced in 2020, include I/O and IIoT software in a compact industrial package that goes anywhere.

All Opto 22 products are manufactured and supported in the U.S.A. Most solid-state SSRs and I/O modules are guaranteed for life.

MADE IN THE USA

The company is especially trusted for its continuing policy of providing free product support, free online training, and free pre-sales engineering assistance.

For more information, visit opto22.com or contact **Opto 22 Pre-Sales Engineering**:

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