Grayway

TRANSFORMING MANUFACTURING

THE INDUSTRIAL INTERNET OF THINGS

SEIZING IIoT POTENTIAL FOR BREAKTHROUGH PRODUCTIVITY

WELCOME

The manufacturing sector is rapidly becoming smarter, especially with technological advances such as the Industrial Internet of Things (IIoT). In this issue of the GrayWay, we explore how this phenomenon is shaping the future of the industry. We also look at the flexibility the IIoT brings to manufacturing operations improving both efficiency and ultimately productivity.

With every capital investment manufacturers make, the IIoT plays a critical factor. It may appear as a buzz phrase, but the IIoT is here to stay. The added value it brings to manufacturing is truly the foundation manufacturers will need to remain competitive in an ever-changing marketplace.

Stephen Gray
President &
Chief Executive Officer

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MANUFACTURING CONVERGENCE AND THE INDUSTRIAL INTERNET OF THINGS

Complexities reducing, opportunities expanding

Manufacturing has always been a process — raw material at one end, finished product at the other. But more and more, manufacturing is the site where many processes are converging: computer-aided design (CAD), process simulation, the actual machining processes plus machine tool monitoring and adjusting, plant and shipping logistics and much more, all made possible over the Internet, specifically the Industrial Internet of Things (IIoT).

This is a global phenomenon. Research organizations, universities and technology providers around the world recognize that manufacturing has billions of connectible devices, yet IIoT strategies are still emerging. Survey results from a 2017 international IIoT conference revealed 80 percent believed there is no corporate vision or strategy on digitalization, while only 4 percent reported both vision and execution plans are in place.

Improving plant operations through all these connectible controllers, sensors and other industrial devices is clearly the biggest potential of adopting the IIoT programs. Other targets include better demand forecasting, inventory optimization and improved regulatory compliance.

Two main concepts help frame thinking about the IIoT implementation:

- It's not one size fits all. Experts say the market for defining the IIoT strategy and adoption is driven by individual use scenarios.

- Budget numbers are growing. Estimates show the IIoT-related spending will reach $300 billion by 2020, but not all IIoT segments will grow equally. International Data Corporation (IDC), the premier global research group, has found the market for the IIoT applications and services will increase six-fold, from $10 billion to $60 billion, by 2020 specifically due to user customization. Connected things in industry, including controllers, sensors and microprocessors will double in market size from $20 billion to an estimated $50 billion but will face commodity headwinds.

Draw Your Roadmap

"Despite producing the most data, manufacturing is ranked last in digital transformation efforts," confirms Graham Immerman, director of marketing, MachineMetrics, an IIoT platform provider. "Compared to all other global industries, manufacturing is still caught in a state of reactivity. Lacking a roadmap, the result is hesitancy."

Graham Immerman
Director of Marketing
MachineMetrics

Through the IIoT, manufacturers can collect and analyze data in a way that significantly impacts the bottom line.

Joe Whyte
Director of Serialization
and Connected
Enterprise Solutions
Rockwell Automation

Following an IIoT commitment, the steps that manufacturers should take to digitally transform their operations become clear, says Joe Whyte, director of serialization and connected enterprise solutions at Rockwell Automation.

Step #1: Connectivity

Digital transformations cannot occur overnight. The journey begins with assessing each plant's current network architecture and embracing Ethernet as the core infrastructure standard. Once the current state is understood, a plan should be developed to connect every smart device that can generate data to build one cohesive system over time.

Step #2: Security

With connectivity comes the need for an in-depth security strategy that protects a company's data and ensures that only those who are authorized can access it.
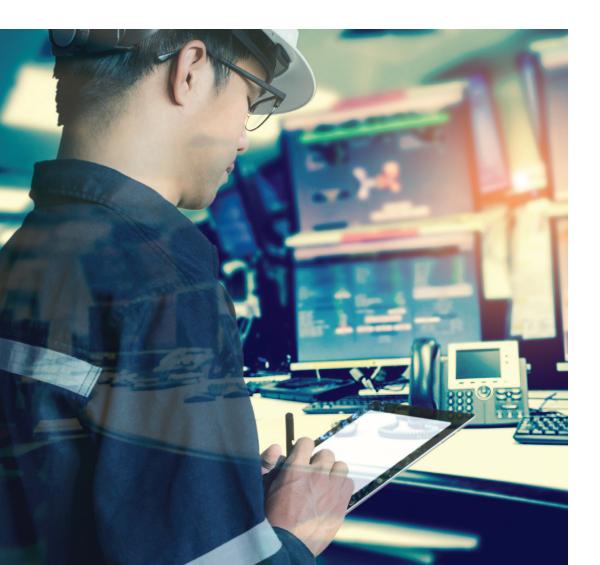
Step #3: Collect Data

When collected, contextualized and analyzed, data delivers value to stakeholders at every level. However, for digital transformations to be cost-effective, a scalable data collection and storage strategy needs to be developed. Data should be collected, stored and analyzed as close to the source of the data as possible to derive immediate and maximum value from the data.

Step #4: Analyze

A scalable analytics strategy should be deployed to deliver value to every stakeholder at every level. Collecting all plant floor data and sending it to an enterprise cloud environment for storage and analysis is cost-prohibitive from a storage perspective and resource-intensive from a data science perspective. Collecting data and applying unique operational expertise and machine learning delivers

production-layer insights. Such analyses provide real value to every stakeholder at every level of a manufacturing operation.

"Transformation requires buy-in from the front office and on the shop floor, but it also requires internal leadership," says Immerman. "It's critical for manufacturers to recognize the important role organizational attributes play in long-term project success and begin discussions about increasing the odds of project success by evaluating organizational gaps."

Fastenal, a manufacturer of fasteners, tools and industrial supplies based in Winona, Minn., began investigating an IIoT solution in 2016. "The objective was to better understand their downtime, machine utilization, quality issues and to embrace the IIoT technology for production efficiency and process improvement," Immerman says.

The company chose MachineMetrics to monitor 11 Swiss machines and three turning centers. They installed monitors in their manufacturing plants so that both operators and managers could understand what was happening. Tablets were also made available for gathering feedback from operators immediately when necessary.

"Transformation requires buy-in from the front office and on the shop floor, but it also requires internal leadership."

— Graham Immerman
Director of Marketing
MachineMetrics

In the three months since implementing MachineMetrics, the company ran 305 hours faster than the previous three months. "At this rate, we have been able to boost production by over 100 hours each month. It's the same as adding over two weeks to each month."

Data collection and analysis plus connectivity over the IIot means your data is working for you, not the other way around.

What was previously silos of information being disseminated and not easily shared, today, IIoT enables manufacturers to work cohesively to connect their global operations.

ENABLING THE IIoT: COLLECTING DATA, ELIMINATING PAIN POINTS

Operation improvements surge with flexibility options

Each and every plant operation sits on a rich mine of data that it can collect for its own continued improvement, but only a small percentage has an IIoT-enabled strategy in place. A significant drawback is efficiently gathering and compiling that data from different makes and models of machines and controls. This challenge has been likened to a permanently ongoing United Nations meeting with no translators.

Concepts for gathering data from the shop floor have been around for decades, but recent advances in standards and infrastructure technology have allowed manufacturers to mine data at the speed of their operations. The development of standards such as Common Industrial Protocol, PackML and MTConnect allow equipment manufacturers and integrators to speak the same language. Implementation of Ethernet communication on the plant floor also allows machines to connect directly to their IT counterparts without expensive and complex translators. This means faster speed to market for changes and greater flexibility as business needs evolve.

Don Pearson
Chief Strategy Officer
Inductive Automation

Yet many pain points remain. Don Pearson, chief strategy officer for Inductive Automation, an industrial platform provider in Folsom, Calif., says, "Connectivity was prohibitively complex and expensive in the early days." Language, for example, can make a big difference. Systems for collecting data traditionally have used supervisory control and data acquisition (SCADA) systems. But over the last 15 to 20 years, many manufacturers have

standardized corporate databases, enterprise resource management and manufacturing execution systems on structured query language (SQL). While it is possible to integrate SCADA with SQL databases, this architecture is not an ideal data logging solution for multiple reasons, experts say.

First, traditional SCADA middleware is complicated to implement, maintain and repair, even with assistance from in-house IT specialists or outside consultants. Second, because these middleware systems do not provide a direct database link, they consume cycle time and reduce production efficiency. Last, constant maintenance is required to ensure these operating systems and hardware remains operational, current and free of security vulnerabilities.

"Now, plant connectivity is delivering information technology results with an operations technology mindset," Pearson says, likening modern industrial connectivity platforms like Inductive's Ignition to a Swiss army knife, providing modular solutions for familiar pain points up and down manufacturing operations.

For example, many systems can't customize front-end user interfaces without hacking the program. "Ignition is one system that gives users the tools to easily develop almost anything," Pearson answers. Through cross-platform functionality, built-in support for established and open industrial network standards and integration of relational databases like SQL, these systems provide tools and flexibility that manufacturers need, points out Pearson.

And where connectivity projects of the past were time-consuming and required significant downtime, new platforms deploy in minutes. Furthermore, hot-pluggable modules allow adding particular functionalities without shutting down systems.

Naturally, cost and memories of IT false starts are notable pain points for manufacturers. "Where software in the past was sold by the individual seat, today it is a server license, so manufacturers can download it and engineers can start applying applications right out of the box," Pearson says. "Customers can start connecting devices and not connecting apps."

Visibility Means Reliability

All this connectivity potential is changing manufacturing operations as well. Machine tool builders, tooling providers and all sorts of technology providers are building the IIoT connectivity into production equipment. "Assuming longevity and reliability exist at the foundation – the machine tool – process improvements can ensue on the march toward efficiency improvements and cost savings," says Scott Walker, chairman, Mitsui Seiki USA Inc.

Scott Walker
Chairman
Mitsui Seiki USA Inc.

"Advances in controls, software and connectivity mean users can look at all aspects of machine functionality, part geometry and tool life in real time. As one customer said to me, in the end it's all about reliable monthly output. The goal is to get workpieces in, consistently process them (unmanned if possible) and get finished parts out. How does that happen? With systems, connectivity, and process reliability built-in from the foundation up."

Convergence will continue, processes and products will improve and the IIoT is the infrastructure.

The IIoT is making manufacturing smarter and companies more competitive.

"Advances in controls, software and connectivity mean users can look at all aspects of machine functionality, part geometry and tool life in real time."

– Scott Walker
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Mitsui Seiki USA Inc.

THE NEW FACE OF MANUFACTURING
InLine Engineers

With the needs of the food and beverage industry rapidly changing, process and packaging design firm InLine Engineers, a Gray company, recognizes the need to be continually evolving to keep up with this highly dynamic industry.

InLine Engineers has worked with companies such as Kellogg Company, The Coca-Cola Company, Folgers, Keebler, Johnsonville, Chelten House Products, Inc., Bel Cheese and Jack Daniel's. With over two decades of experience, InLine works to develop a seamless integration of traditional processes and new technology demands to deploy IIoT solutions effectively.

"We pay attention to detail by executing multiple formal Design Reviews, typically at the 30 percent, 60 percent and 90 percent design phases," said Gary Sisler, director at InLine. "We listen to our customers about how they want to connect all plant processes, collect production and operations data and control selected processes remotely."

The company strives to blend IIoT technology capabilities with their customer's already proven manufacturing methods.

"InLine is passionate about our customers. While an increase in capital projects often overburdens a company's normal staff and prevent them from focusing on their daily production support roles, we act as a force multiplier, improving our customers' engineering bench strength with capable food and beverage- savvy engineers," added Kevin Reid, vice president at InLine.

In May, Gray Construction acquired InLine Engineers to enhance both companies' service offerings to provide unified, turnkey engineering solutions and execution from one resource specifically for the food and beverage industry.

GRAY... WE'RE BUILDING

CHAMPION PETFOODS NEW NORTHSTAR® KITCHENS
ALBERTA, CANADA

Gray Construction Canada Company, part of the Gray Construction family, is designing and building Champion Petfoods LP's new state-of-the-art NorthStar® Kitchens.

Located in Parkland County, Alberta, the new NorthStar® Kitchens will continue serving Champion's Canadian and export markets by cooking ACANA and ORIJEN kibble. Situated on 75 acres of farmland, the 420,000 s.f. greenfield facility will have the capacity to prepare up to 150,000,000 KGS of dry kibble and will also include an on-site distribution warehouse and logistics center.

GraySolutions, a new member of the Gray family providing turnkey Automation and Information Systems Integration, will provide the IIoT foundation for the new NorthStar® Kitchens including industrial networking, enterprise system integration, security design and state-of-the-art traceability for the new facility.

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