Making IoT Magic

CIO

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Making IoT magic

Connecting devices is just the first act in an Internet of Things production. The magic happens when analytics transform data into business intelligence. CIOs need to play a role.

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Fred and Ginger, peanut butter and jelly, the Internet of Things (IoT) and... analytics?

Despite all the hoopla over what's possible with connected products, the connecting part is easy compared to what it takes to develop and deploy analytic systems that transform the data deluge into something that gives companies a competitive business advantage.

"Analytics is at the core of the IoT value proposition -- it's the central component for enabling the automation and promise of IoT, whether for consumer or enterprise markets," says Ryan Martin, an analyst at ABI Research. Given the importance of analytics to the value of connected systems, ABI is projecting the market for tools that integrate, store, analyze and report on IoT data to hit $30 billion in 2021.

With data pouring in at warp speed, the biggest challenge facing many companies is to figure out how to create value in the form of new insights or as a foundation for new business models and revenue streams, according to Ken Piddington, CIO at MRE Consulting, a professional services firm.

Currently, many companies at the forefront of the IoT movement are focused on improving operational efficiencies or leveraging IoT analytics to support proactive and predictive maintenance. While CIOs are often not the principal force behind these and other IoT initiatives, they do have a key role to play in identifying the opportunities, understanding the business goals and objectives, and building out the technology infrastructure -- including connectivity, analytics, storage, and store-and-forward mechanisms -- that will enable companies to capitalize on the IoT's potential.

Make a business case

Remaining focused on business outcomes -- and refusing to be beguiled by shiny new technologies -- is a must for CIOs who covet a seat at the IoT table. "Many CIOs think of IoT as cool technology, but their business peers don't care about the technology, they only care about the business outcomes that are a result of using the technology," Piddington says.

CIOs can build credibility and earn the trust of their business peers by making a business case for IoT analytics and by carefully choosing strategic pilot projects that can demonstrate value through incremental, inexpensive wins.

Dennis Hodges, CIO of Inteva Products, a global automotive supplier, says a solid proof of concept can pave the way. For example, by deploying a manufacturing analytics tool in a pilot test of an IoT initiative to drive efficiency at a single plant, he says he was able to demonstrate the value of the IoT technology and get local plant operators to lobby for funding a broader initiative.

The analytics tool was a software-as-a-service (SaaS) offering, and that was key to the success of the effort. "The subscription model let us spin up a proof of concept for not a lot of money to show the team the value, and we had a win that way," he says.

Leading the partnership charge is another good tactic for CIOs who want to be part of IoT initiatives. Fostering alignment with key leaders of business units and sorting through the hundreds of IoT development platforms (by some industry accounts, there are close to 300) to identify the best technology partner plays to the CIO's strengths -- strengths lacking among executives in other areas of the business, according to Tony Rizzo, entrepreneur in residence specializing in mobile, IoT and wearable technologies at Blue Hill Research.

Rizzo argues that CIOs should also be assembling data analytics teams, recruiting people with the requisite skills and facilitating the dialogue to understand exactly how business users can derive value from the data. The biggest miscue companies make with IoT systems is instrumenting a complex sensor network to collect data without thinking through exactly what they're trying to accomplish, Rizzo says.

"You end up monitoring this particular set of things, and it doesn't allow a company to deliver better service to customers or use better parts or get data to designers to create the next level of product," Rizzo says. "A lot of people aren't thinking this through, and that's the problem IoT projects are running into. It falls on the CIO's plate to find a balance between success and failure."

Here are the stories of three companies that are taking proactive approaches to IoT analytics -- with the help of CIOs who are striving to strike that balance.

Turning dormant machine data into actionable insights

Like most manufacturers, Inteva is no stranger to the idea of connecting "things." Its plant floor machinery has been networked and collecting data for years. Yet the volumes of data points -- temperature readings or records of how many times a stamping machine did its thing -- have typically remained locked up in siloed systems, too much of a bother to access and not particularly useful for generating business insights.

As Inteva retools its production environment for the age of the Industrial Internet of Things (IIoT), that scenario is starting to change. The confluence of more sophisticated equipment, ubiquitous connectivity and, more recently, IoT analytics capabilities, is helping Inteva mine the treasure trove of once-dormant data for intelligence that can lead to better decision-making. Just six months into its new IoT analytics initiative, Inteva is already seeing substantial results. Production has become more efficient, scrap has been dramatically reduced and quality is up, and that's just the start of what's possible, according to Hodges.

"We've been collecting data for years, but no one ever went back to see what was actually going on," he says. "Much of that data was displayed somewhere in real time. But it was never captured anywhere, so it was ethereal. If you didn't look at it right then and there, you missed it. Collecting the data and knowing what to do with it -- that's the big change."

Traditionally, Inteva machine operators roamed the floors, monitoring equipment on the line

and manually recording things like environmental factors and production glitches. The problem was that there was no capability to draw correlations between data points -- to know, for example, if a southern factory running machinery on a hot summer day would be better served operating a night shift, or if there were specific times when electricity was cheaper for production runs. "The ability to draw correlations between the process and a machine's health starts giving us insights we never had before," Hodges says.

Using a SaaS-based manufacturing analytics tool called Sight Machine, Inteva is now automating the collection and analysis of data from connected production floor equipment to gain visibility into various factors that help it operate more efficiently. One of the biggest potential benefits Hodges anticipates is being able to perform preventive maintenance so there's no downtime on expensive machines.

"In manufacturing maintenance, so much money is spent on emergency repair or investments in redundant equipment," he says. But analytic systems help paint a picture of when a machine is suffering from wear and tear or is about to fail. "That digital awareness really helps us start improving performance," he says.

Inteva is currently using Sight Machine in a pilot project on a single plant line, but it's looking at opportunities to roll out the technology across the board. Starting with a contained proof of concept that's cost-effective is critical for gaining traction, Hodges says.

It's also critical to move toward a forward-thinking approach to decision-making, but that presents its own share of challenges.

"Operations is a whirlwind in a plant, so looking ahead to what we're going to do tomorrow to improve things is difficult," Hodges says. "Everything is typically about what we've done in the last 30 minutes, not even the last day."

Working collaboratively with a key business sponsor -- in Hodges' case, the vice president of operations -- has been critical for fostering buy-in and getting the business to move forward.

Hodges says the CIO's role in IoT analytics is that of a translator and orchestrator. For his part, he says he played those roles by championing the limited proof of concept to demonstrate the value of the system to the local operations management team -- so they would, ideally, promote it to other executives.

"The VP of operations is going to listen to the plant manager before he listens to me," Hodges says. "My role is to work with the team, not to come in and tell them how to do things."

An IoT tango between IT and business

Few things are as important to hospitals and blood donation centers as maintaining a healthy blood supply. For Haemonetics, a provider of blood and plasma supplies and services, the Internet of Things and a dose of analytics are lining up to be the right prescription for future growth.

Haemonetics provides everything from blood processing and diagnostic devices to software for donor and transfusion management. After decades of pouring dollars into device maintenance, Haemonetics sensed an opportunity for connected devices to foster better integration between the various parties in the blood supply chain, so the company set out to create new product capabilities and develop a business model tailored to the IoT ecosystem.

"We have two customers -- the donor centers collecting the blood and the hospitals and medical institutions using the blood -- and traditionally, there's been no good connection between them," says Walt Hauck, vice president of worldwide product development at Haemonetics. "We started connecting devices for the business purpose of providing better service and business process integration for our customers."

Retrofitting equipment with sensors and communications capabilities and developing a new generation of devices with built-from-the-ground-up IoT connectivity were just the first steps in Haemonetics' journey. The real challenge was figuring out how to best use the data collected from the connected devices for new business opportunities and competitive advantage.

The result was the HaemoCloud, a suite of products designed to enable Haemonetics blood management devices to communicate with hospital IT systems and provide real-time operational data for service and support operations. HaemoCloud includes HaemoCommunicator, a system that collects data from thromboelastography devices (which assess bleeding and thrombotic risks) and cell salvage machines (which manage blood recovery during surgical procedures). HaemoCommunicator sends the data to the HaemoCloud, where it lands in a Hadoop system for monitoring and near-real-time analysis.

The IoT-enabled analytic systems provide Haemonetics with insight into how equipment is performing so it can address maintenance issues for customers before systems are at risk of failure.

"We can see that a device placed up against a wall tends to have its filter fill up faster or run hot, and we can send out a service team to clean that customer's filter rather than having to eventually replace a $5,000 part," Hauck says. "Simple things like that add a ton of value."

In addition to playing a useful role in equipment maintenance and repair operations, IoT analytics can yield improvements in patient care.

The HaemoCloud platform, built using Bright Wolf's IoT development platform, sifts through specific device data along with anecdotal information on procedures and other relevant data points to draw out insights, such as why a machine has an abnormal number of midstream failures or comes to a particular test conclusion. Previously, Hauck says Haemonetics might not have known about issues such as those for months -- until, say, something came up in a casual conversation between a sales rep and a doctor, and even then, there was no context to know if the activity was a full-scale problem or just an anomaly.

"The field sales organization had no data -- they'd just have a report that doctor so and so said the result was not what was expected," he says. "The way we're taking data and doing analytics, we can help doctors practice medicine better and foster better patient care."

As head of product development, Hauck was the primary driver behind the new Haemonetics IoT platform. But he previously held CIO positions at Pfizer and Dun & Bradstreet, and he says a company's CIO must be actively involved in IoT initiatives.

At Haemonetics, the CIO typically focuses on internal IT projects, but he has played a key role in the IoT analytics efforts, both as a source of guidance and expertise and as an orchestrator of the key technology platforms. Specifically, Hauck says his CIO partner has taken the lead on key components of HaemoCloud, such as the security and authentication architectures, which are critically important in healthcare offerings. The CIO also led the evaluation of the company's prospective cloud partners.

"It's been an intimate balance between us and corporate IT," says Hauck. "We don't run independently -- we run together."

IT does the IoT blocking and tackling

As is the case at many companies, the product development organization was in the driver's seat of an IoT initiative at Flowserve. But the project wouldn't have traveled very far without the CIO as a highly engaged co-pilot.

That's according to Eric van Gemeren, vice president of research and development at Flowserve, a manufacturer of flow control products used by businesses such as oil and gas companies and chemical manufacturers. Under van Gemeren's direction, Flowserve is using PTC's ThingWorx IoT development platform and IoT analytics systems to retool and differentiate its offerings, adding predictive maintenance capabilities to prevent equipment and plant system failures and satisfy customer demands for continuous uptime.

While van Gemeren's R&D group is externally focused and takes the lead on developing Flowserve's new IoT products and services, the CIO's IT team has played an important behind-the-scenes role, mapping out infrastructure and integrating key supporting technologies.

"These underlying [IoT] products require a lot of standard IT technology and a level of familiarity with things like TCP/IP and Ethernet that we in the engineering space don't typically have," says van Gemeren. "The CIO is partnering with us, particularly on the implementation piece."

The collaboration has resulted in online reliability-monitoring capabilities that go beyond what has traditionally been offered, says van Gemeren. While Flowserve has been monitoring and collecting data from its plant floor equipment for years, it hasn't been able to do much in the way of serious analytics due to bandwidth limitations and inadequate processing capabilities on the edge where the equipment resides. The fact that the data would historically be locked up in automation vendors' systems didn't help matters.

The old way had customers drowning in a sea of data, van Gemeren says. "If you have thousands of control points operating inside a plant and you're told that the temperature has been exceeded on a single piece of equipment, what does that mean and is it a big deal?" he says. "Our customers were jumping at shadows and had to investigate every alarm." When

maintenance technicians were sent to do troubleshooting, they found nothing wrong about half the time.

The IoT analytics tools have helped Flowserve dramatically reduce maintenance expenses. The company can use the technology to remotely diagnose and troubleshoot problems, and the systems can anticipate equipment failures and initiate proactive maintenance steps. In addition, insights gleaned from the data help customers save money and operate more efficiently by optimizing energy consumption for plant equipment, says van Gemeren. "Our intelligence helps customers keep plants running longer with fewer interruptions," he says. "Because we're providing true analytics, they're no longer jumping at shadows."

Besides yielding a service that has been a hit with customers, the IoT initiative involved a win-win collaboration between R&D and IT. "We're helping them understand the difference between deploying technology internally and the commercialization of technology," van Gemeren says. "We bring structure and discipline to the processes around that, and they provide the know-how and the blocking and tackling."

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