

Customer Solution Story

Data Management
and Analytics

Industrial Automation Firm Cuts Costs up to 90 Percent with Big Data Solutions

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Rockwell Automation

Rockwell Automation

Like other major companies worldwide, Rockwell Automation needs better, faster, and cheaper ways to manage and analyze ever-larger amounts of data. It has taken major steps forward in meeting that need with a comprehensive data approach based on Microsoft Azure technologies. The company's data strategy is paying off with solutions that come to market faster, cost less to build and maintain, and enable the company to build its business and to serve its customers in entirely new ways.

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Situation

Juan Asenjo didn’t want his company to become a victim of its own success.

Rockwell Automation calls itself the world’s largest company, by revenues, dedicated to industrial automation. Over the four years ending in September 2013—that is, during the worst economic conditions in generations—Rockwell Automation’s net profits rose by about 240 percent.

More business with more customers is, of course, a good thing. But it’s also a challenge when it means more control systems to monitor, analyze, and support. A single customer for the company’s customer support monitoring and analysis operations can have thousands of the company’s sensors and programmable logic controllers, each delivering up to tens of thousands data points per second measuring temperature, pressure, vibration, etc. *That’s* big data.

Outgrowing its Data Capacity

Three years ago, the company outgrew the capacity of its internal data centers, and Rockwell Automation turned to Microsoft Azure. That helped, but the company needed a solution that would support big data.

“We were generating too much data for our data warehouse,” says Asenjo, who

is Lead Architect for Remote Monitoring at Rockwell Automation. “We needed a big data solution to handle the volume.”

Building that solution itself would have required integration with the company’s existing systems, as well as integrating on-premises with cloud, and batch processing with live streaming. All that integration, in turn, would have produced a hugely impractical and unaffordable development nightmare. And Rockwell Automation still would have lacked a single, holistic view across its entire system—which it needed for system management and maintenance.

Needing Innovative Capabilities

Moreover, needing to manage more data was only part of the challenge facing Rockwell Automation. Needing to manage data in faster and more innovative ways was another. For its petroleum industry customers, for example, Rockwell Automation needs not only to monitor a complex supply chain that encompasses undersea wells, remote refining facilities, and neighborhood gas stations—it also needs to help its customers improve efficiency, drive better performance, enable innovation, and keep fuel flowing all through that chain.

“What we’re talking about delivering is a degree of collaboration and visibility unheard of in the oil and gas industry,”

Overview

Customer: Rockwell Automation
Customer Website: rockwellautomation.com
Customer Size: 22,000 employees
Country or Region: United States
Industry: Manufacturing--Oil and gas

Customer Profile

Rockwell Automation, based in Milwaukee, Wisconsin, provides industrial automation and information solutions to customers in more than 80 countries.

says Doug Weber, Business Manager, Remote Application Monitoring for Rockwell Automation. "To do that, we need a rich flow of data."

Solution

To enable that rich flow of data, Rockwell Automation has devised and continues to refine a comprehensive data strategy based on a range of Microsoft technologies.

For example, to:

- **Manage and analyze massive amounts of data**, the company uses Azure HDInsight, the cloud-based managed Hadoop service.
- **Advance its data insights into the realm of predictive analytics**, it is building Capacity Planning and Predictive Maintenance capabilities using Azure Machine Learning.
- **Manage the complex interactions of data** across multiple systems, it is using the Azure Data Factory service.
- **Put actionable analysis in the hands of field workers**—both its own support technicians and its customers'—it is developing highly intuitive interactive dashboards including Microsoft Power BI.
- **Manage large data workloads**, it uses several Azure SQL Database databases and applies different Service Tiers to meet the various data processing requirements of its customers. It also takes advantage of Geo-Redundancy and Point-in-Time restore to provide needed levels of reliability and manageability.

Learning to be More Efficient

The company's Azure-based data strategy was on display in a recent proof of concept (POC) that used data analysis to boost energy efficiency. The test focused on optimizing the use of multiple pumps feeding an engine manifold—a setup common to municipal water plants and indeed any factory with multiple boilers. Traditionally, plant managers decide which pumps to run and when to run them based on home-grown algorithms and rules-of-thumb that may be far from optimal.

In the POC, Rockwell Automation used Azure Machine Learning to understand which pumps, run at what speeds, maximized water supply while minimizing energy use. The result demonstrated a 1 percent increase in energy efficiency—a significant savings, especially for a large system, according to Weber.

"A solution like this, based on Azure Machine Learning, could save a large municipal system several million dollars a year," he says.

Solving the Integration Challenge

In a different example, Rockwell Automation uses several Azure technologies to solve the challenge of integrating complex data systems. It uses the cloud-based Azure Data Factory service to compose, orchestrate, and manage highly available and reliable data pipelines, which consist of sets of data and the services orchestrated to process them.

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Business Situation

A growing business has put increased demands on the company's data resources. But increased capacity was only one need. Perhaps more important was the need to use data in faster, more innovative ways to serve customers better.

Solution

Rockwell Automation has developed a data strategy based on a growing range of Microsoft technologies.

Benefits

- Cuts development time by 80 percent
- Provides full data visibility
- Cuts costs up to 90 percent
- Enables broader, faster business solutions

"We saved weeks of development time with the automation in Azure Data Factory, so we could concentrate on the specific ETL scripts that optimized the solution."

Juan Asenjo, Lead Architect
for Remote Monitoring,
Rockwell Automation

With Azure Data Factory, Rockwell Automation developers can build data-driven workflows that join, aggregate, and transform data sourced from on-premises, cloud, Hadoop, and Internet services. They can also set up complex data processing orchestration with little programming. Azure Data Factory includes tools for easy end-to-end monitoring and management of those pipelines, which reduce the traditional time and cost required to operate them.

This was exactly what Rockwell Automation wanted to support its use of Hadoop to monitor and analyze the performance of customers' manufacturing and processing systems. When Microsoft offered it the chance to test Azure Data Factory in a pre-release version, Asenjo and his colleagues accepted.

They decided to use the Azure Data Factory service in a POC designed to address their pressing need for a fast, reliable way to interpolate time-series sensor data prior to analysis. The company had already been performing data interpolation on a relatively limited and on-demand basis using relational databases and time-consuming handwritten code.

Asenjo and his colleagues hoped that by using Azure Data Factory, they could interpolate more data in Azure more quickly, reducing the amount of raw data that they had to collect from sensors and convey to the cloud, speeding the process and reducing its cost.

The developers used Azure Data Factory to create a data pipeline with a few clicks and then linked it to Azure SQL Database, Blob Storage, and HDInsight. They also were able to automate the orchestration

and execution of Pig and Hive scripts on Hadoop/HDInsight instead of running these scripts manually or having to worry about managing the cluster themselves.

In the test, raw sensor data was stored in Blob Storage and processed with HDInsight. A complete set of interpolated data was returned to Blob Storage, with fresh or recent data moved to Azure SQL Database, where the BI layer will present the data to the users. The result was the transformation of raw data into information assets that can be consumed by Azure Machine Learning, and Power BI to produce trusted insights.

Benefits

Rockwell Automation calls its use of Microsoft data technologies a growing success that could have profound impacts on its business. It sees these technologies resulting in faster time to market, full data pipeline visibility, reduced costs, and innovative ways to serve its customers.

Cuts Development Time by 80 Percent

Asenjo and his colleagues developed and deployed their Hadoop integration solution in two weeks, as opposed to the 10 weeks it would have taken without Azure Data Factory. They achieved this 80 percent savings of time and cost because they did not need to install and configure a scheduler system, build generic templates to orchestrate data transformations, or create the Pig and Hive scripts manually.

"We saved weeks of development time with the automation in Azure Data Factory, so we could concentrate on the specific ETL scripts that optimized the solution," says Asenjo.

Similarly, Asenjo and Weber see faster time to market as one of the benefits of Azure Machine Learning.

“We can take analytics to an entirely new level—the level of predictive, actionable analysis—with Azure Machine Learning,” says Weber. “But we can do even more with it. The time to develop a solution using Azure Machine Learning is so much reduced, compared to writing a fully custom-coded application. That makes it easier for us to roll out this solution to more customers, and to build more solutions around more uses than we could otherwise.”

Provides Full Pipeline Visibility, Cutting Costs up to 90 Percent

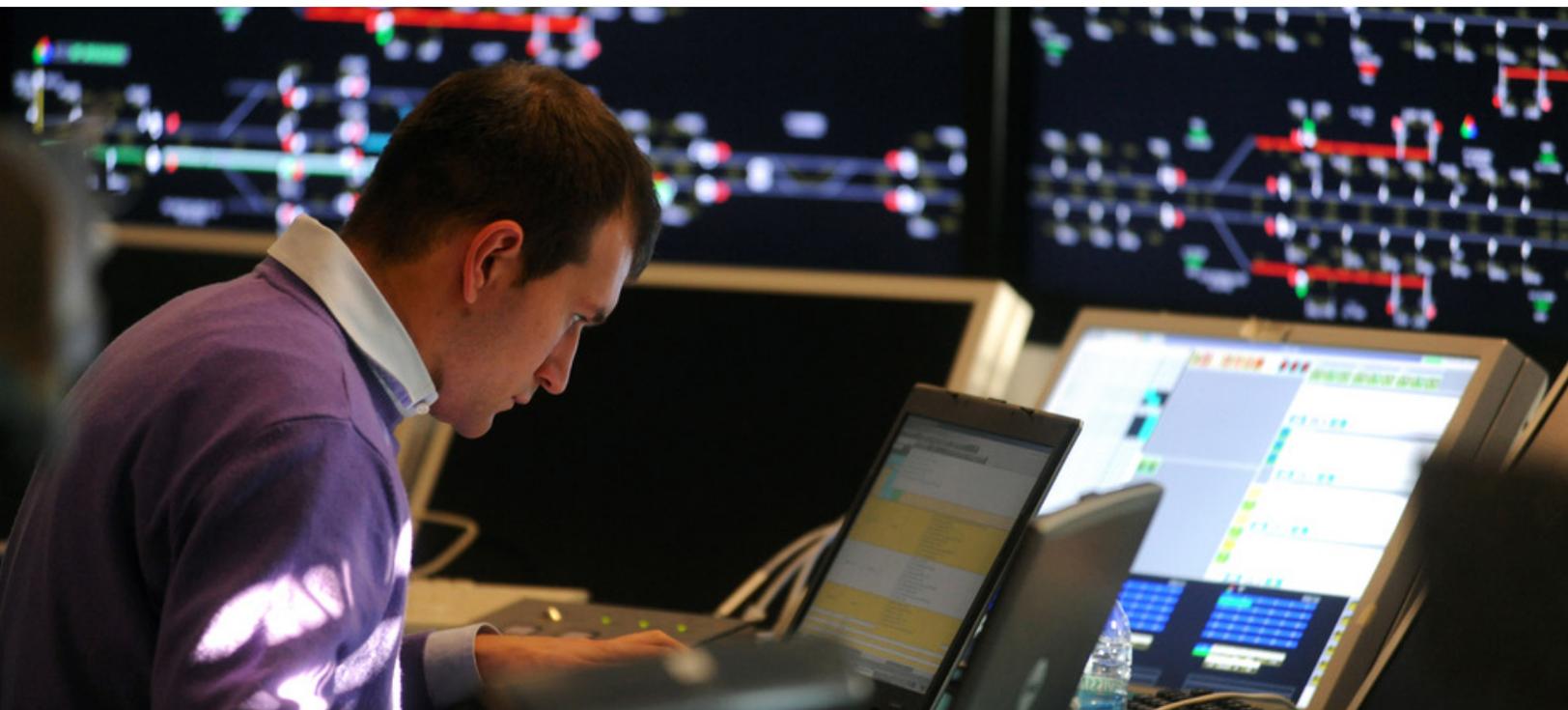
In production use, the solution will generate continuing savings from reduced maintenance and support. That savings could be as high as 90 percent, according to John Dyck, Director of Software Business Development at Rockwell Automation. “By using Azure

Data Factory, we gain full visibility across our data pipelines,” says Dyck. “That means we can support and manage those pipelines faster and easier.”

“We plan to deploy Microsoft Azure technologies across all of our monitoring applications, because they enable us to orchestrate data more effectively across increasingly complex environments,” he says. “We can serve remote customers, wherever in the world they are, at a level of efficiency that hasn’t been possible before. It’s been very complex to orchestrate data movement across countries, for example. These technologies mitigate that complexity.”

Enables Broader, Faster Business Solutions Using Big Data

The ability to scale out data in Hadoop makes it an ideal solution for working faster and more easily with larger amounts of data. So, Rockwell Automation will likely accelerate its adoption of Hadoop, according to Dyck. For example, instead



of processing data sets only on demand, the company can have data interpolated and waiting for users to request it. That will reduce the processing time for reports from minutes to seconds.

Rockwell Automation can use HDInsight and Azure Data Factory to help its customers meet reporting requirements of the US Environmental Protection Agency, which generally require manufacturers to maintain five years' of data. It can even use the solution to maintain quality management data for as long as its customers wish—which can be up to 10 years.

"We can clearly expedite our adoption of big data with Azure Data Factory," says Dyck. "It will make a huge difference in how much data we can use and how we use it. This is one more way that Microsoft data technologies could have a tremendous impact on our business."

Data Management and Analytics

Organizations realize a competitive edge when more employees are empowered with data. Microsoft's unique approach to data technology delivers this capability—whether through insights and analytics or with powerful reporting

for line-of-business applications. In a world where business demands the speed to compete, Microsoft data solutions cut the time it takes to go from raw data to results for everyone.

For more information about data management and analytics, go to:

www.microsoft.com/en-us/server-cloud/cloud-os/data-insights.aspx

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