



**Customer**

Schneider Electric

**Products and Services**

Azure

Azure Databricks (AI)

Azure IoT Edge

Azure Machine Learning

Internet of Things (IoT)

**Industry**

Energy

**Organization Size**

Corporate (10,000+ employees)

**Country**

France

Schneider Electric minimizes costs and worker risk with Azure Machine Learning service predictive maintenance



Global power management and industrial automation company Schneider Electric leads digital transformation for customers all over the world. Headquartered in Paris, the company developed Realift

Rod Pump Control, a predictive Internet of Things (IoT) analytics solution based on Microsoft Azure Machine Learning service and Azure IoT Edge. Oil and gas producers use it to pinpoint which remote equipment needs repair, achieving substantial savings on maintenance, optimizing production and profit, and increasing safety for workers and the environment.

"With automated machine learning in Azure Machine Learning service, we can focus our testing on the most accurate models and avoid testing a large range of less valuable models, because it retains only the ones we want. That saves months of time for us."

—Matthieu Boujonnier: Analytics Application Architect and Data Scientist

Schneider Electric

Oil and gas producers operate in remote areas where it's difficult to deploy crews quickly and safely. It can also be challenging and expensive to get one of the few, highly specialized engineers with the expertise in oil field equipment out to those locations. Schneider Electric (<https://www.schneider-electric.com/ww/en/>) data scientists created a predictive IoT analytics solution based on Microsoft Azure Machine Learning service (<https://azure.microsoft.com/en-us/services/machine-learning-service/>) that uses AI to solve these issues. One year later, the data scientists have used feedback from teams on the ground, along with an expanding palette of Microsoft machine learning tools, to extend the solution's capabilities and offer customers even greater benefit.

## Managing from afar

The oil and gas sector faces increasing challenges, including a trend toward other types of energy and diminishing oil sources that spur the need to operate in the most remote areas of the planet and optimize existing wells. The high cost of this commodity translates to enormous downtime costs for nonproducing wells. Addressing a typical maintenance issue takes several people and at least three

days of system downtime at a cost of up to USD20,000 a day, not including parts and labor, according to Matthieu Boujonnier, Analytics Application Architect and Data Scientist at Schneider Electric. So finding and fixing potential problems before they start is crucial to maximizing profit.

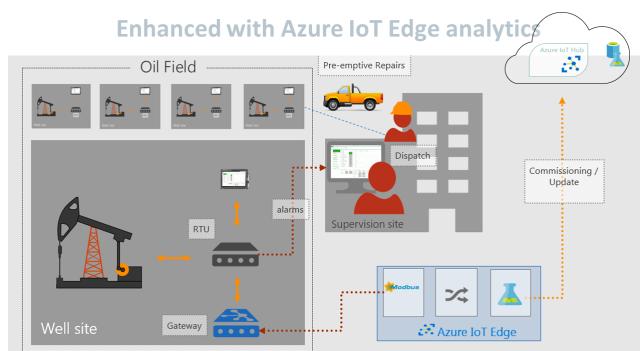
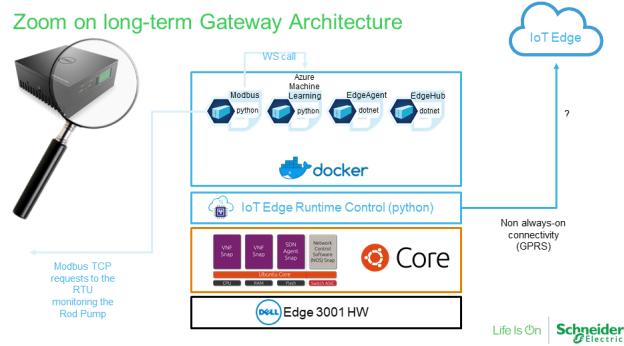
Even when routine inspections show that a pump is working properly, it may not be working at peak efficiency, says Boujonnier. "Pumps can run at 20 to 30 percent efficiency," he says. "That's a lot of money for companies to be leaving on the table, which happens when you have no idea how efficient your pumps are." And the less often crews must venture out to fix oil field equipment, the safer they are. Schneider Electric offers oil and gas companies an easier, safer way to monitor and repair equipment with Realift Rod Pump Control, an IoT-enabled, open architecture platform underpinned by Azure Machine Learning service and [Azure IoT Edge](https://azure.microsoft.com/en-us/services/iot-edge/) (<https://azure.microsoft.com/en-us/services/iot-edge/>) . The company's end-to-end analytics pipeline also combines Azure Machine Learning service with [Azure Databricks](https://azure.microsoft.com/en-us/services/databricks/) (<https://azure.microsoft.com/en-us/services/databricks/>) .

## Plumbing the depths of machine learning

Interpreting the graphical output of pump status data is complex. Often highly specialized petroleum engineers must decode the feedback of IoT sensors to understand what is happening hundreds of feet below the earth's surface. Schneider Electric data scientists like Boujonnier and Loryne Bissuel-Beauvais develop models with that data, comparing incidents to data from normal machine status and generating multiple models that start a continuous learning cycle. They made the process easier and faster by combining IoT Edge with the [automated machine learning capabilities in Azure Machine Learning service](https://azure.microsoft.com/en-us/blog/new-automated-machine-learning-capabilities-in-azure-machine-learning-service/?WT.mc_id=oreilly-webinar-lazzeri) ([https://azure.microsoft.com/en-us/blog/new-automated-machine-learning-capabilities-in-azure-machine-learning-service/?WT.mc\\_id=oreilly-webinar-lazzeri](https://azure.microsoft.com/en-us/blog/new-automated-machine-learning-capabilities-in-azure-machine-learning-service/?WT.mc_id=oreilly-webinar-lazzeri)) . "Models evolve over time," says Bissuel-Beauvais. "And we use automated machine learning to speed that process, from four months for our first-generation models to a day for our newest models."

Boujonnier concurs. "With automated machine learning in Azure Machine Learning service, we can focus our testing on the most accurate models and avoid testing a large range of less valuable models, because it retains only the ones we want. That saves months of time for us." He and his team rely on Azure Machine Learning service ensemble methods to aggregate their predictions in just a few days rather than the month it once took to add single models. Schneider Electric data scientists expedite model development and collaborate seamlessly with Azure Machine Learning service features that track performance metrics, datasets, and run history (including model metrics plus script, model, and code versioning). This also makes every aspect of an experiment reproducible. The tight interoperability with Jupyter notebooks—the exploration environment favored by many data scientists—further enhances productivity. Likewise, Azure Machine Learning service is interoperable with IoT Edge for easy deployment and management.

Data scientists use the automated machine learning capabilities to intelligently select the optimal machine learning models and automatically tune machine model hyperparameters to save time and improve efficiency. Settings for oil field pumps, for example, don't maintain peak effectiveness over years. Schneider Electric had implemented many of its pumps years before. When the company deployed the Azure Machine Learning service-based solution, it helped operators increase efficiency by 10 to 20 percent in just two days. "In the past, it's taken operators days to locate which of several nearby pumps has an issue," says Boujonnier. "Now they check status daily for every pump online, identify any problems, and go directly to the affected pump with the correct equipment." Timely maintenance can extend the life of a pump, with proactive detection stretching a pump's service from 3 years to as much as 10 years.



*To view larger versions of the diagrams, see the downloads in the left sidebar.*

Schneider Electric evaluates tools from different providers to ensure optimal performance when it procures software, and the data science team tested Azure Machine Learning service against competing solutions. The team sought a solution that could be used by other employees, not just data scientists, throughout the company. "We didn't expect such a new solution on the market to be the best, but Azure Machine Learning service was," says Boujonnier. "And it works well with the Python ecosystem, making it easy to include in our current analytics pipeline."

## Keeping people safe, keeping costs down

Grounded in the company's trusted relationship with Microsoft, Schneider Electric's choice of Azure technologies has helped it realize cost-saving efficiencies. "For example, all the data scientists on our team enjoy using Azure Machine Learning service. Why? Because it's fully interoperable with all the other tools they use in their day-to-day work—no extra training is needed, and they get more done faster now," explains Boujonnier.

More importantly, the oil and gas companies' engineering and maintenance teams now use the solution's predictive analytics to minimize their oil field visits—safety rises as trips to the rigs decrease. And these companies can make the most of their existing oil fields, reducing impact to surrounding areas and minimizing production costs. "New fields are costly," says Boujonnier. "We use Azure Machine Learning service to give our customers the information they need to be more efficient. And problems on a rig can have devastating environmental impacts. With predictive models, we can help local operators detect dangerous conditions before environmental harm occurs."

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—Loryne Bissuel-Beauvais: Data Scientist  
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