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Texmark's the Spot:

Leading IoT Value Discovery
and Building the Refinery
of the Future

What if an enterprise could predict problems before they happen, analyze occurrences and automate resolutions, and apply their new findings toward better future strategies? For a petroleum and chemical refinery in Galena Park, Texas, it has meant safer working conditions for employees, high satisfaction of customer service-level agreements, and a 50 percent reduction in planned maintenance costs. No, this isn't magic, it's the Enhanced Turnkey IoT Solution for Manufacturing. And for this particular client it is enabling them to enhance their operations and best practices, achieve a new standard of performance, and build the Refinery Of The Future.

The Refinery of the Future

In the petrochemical processing industry, efficiency and safety are vital to business success. For Texmark Chemicals, a custom contract chemical manufacturing company in Galena Park, Texas, cutting-edge IoT technology is working in new ways to drive analytic insights for predictive maintenance, asset tracking and lifecycle management, worker safety, and much more. As a crucial link in the petroleum and high-volume chemical production supply chain for some of the world's largest chemical companies, Texmark's work with regulated and potentially hazardous materials also means that safety is a top priority.

To achieve their goal of building the "Refinery of the Future," Texmark engaged Deloitte's Internet of Things (IoT) and Energy and Resources practices for their strategy and industry experience to help define the scope of this progressive new refinery. Deloitte enlisted an industry-recognized ecosystem team comprised of HPE, Aruba, Allied Reliability Group, PTC, National Instruments, SparkCognition, OSIsoft, and Flowserve, to deliver an end-to-end Industrial IoT (IIoT) solution for the energy and resources marketplace.

Growing with the Industry

*Business is changing,
time to change with it.*

Manufacturing and supplying dicyclopentadiene (DCPD)—a polymer precursor for everything from inks to boats—and its related products isn't simple. Its manufacturing involves extraordinary amounts of heat and highly reactive chemicals. As demand for DCPD grows, the global supply chain becomes increasingly complex—requiring more stringent controls, granular visibility, uninterrupted productivity, and regulatory oversight. As the number one merchant producer of DCPD in North America, Texmark looked to IoT to help them gain even more plant visibility, proactive safety precautions, and autonomy for their operations.

For the energy and resources industry as a whole, integrating new edge technologies is no anomaly. With 35 percent of energy and resources organizations already using IoT¹, the industry finds itself among the top three for IoT adoption. With benefits going far beyond cost cutting, reduced risk, and improved efficiency, IoT is already enabling new revenue streams, business transformations and improved decision-making. In fact, energy and resources adopters are seeing an average 19 percent increase in revenue¹, while 55 percent of those same adopters say they are using IoT to increase asset efficiency¹—poising these enterprises for bigger advantages in the future.

Cutting-edge IoT technology is working in new ways to:



Energy and resources industry specifics for IoT adopters¹:

- 19% average increase in revenue
- 95% are seeing tangible benefits of IoT in their business already
- 74% agree that digital transformation would not be possible without IoT
- 85% believe IoT is crucial for the future success of any organization in their sector
- 82% agree that IoT is not a standalone technology and must be linked to analytics, artificial intelligence, and other critical digital initiatives
- 55% say they are using IoT to increase efficiency and make better use of their assets and resources

¹ Vodafone IoT Barometer 2017/18

Going Digital

A multi-phase approach leads to remarkable transformations.

The Challenge

Historically, Texmark has depended on the expertise of its seasoned employees and their ability to conduct physical inspections to keep its systems in working order. With 130 pumps in its plant, Texmark was spending nearly 1,000 hours a year conducting walk-downs and vibration analysis to determine when a pump may malfunction. If an employee ever became sick, took a day off, or reached their retirement age, this could present a potential problem in ensuring their next inspection. Already proving to be time-consuming and labor-intensive, these physical inspections also carried a fair amount of risk. Texmark needed a way to institutionalize this type of intelligence and insight—and an IIoT ecosystem was the answer.

Texmark launched a multi-phase project to implement an end-to-end IIoT solution. HPE and Aruba supported the project with technology and expertise, while leveraging HPE's extensive ecosystem of partners:

From here, the future of the refinery will continue to build on the established foundation. The next phases include:

-  **Advanced video analytics:** Observing and assessing operations against established parameters
-  **Safety and security improvements:** Identifying people and occurrence locations, while sending automated point guidance in the case of an emergency
-  **Connected worker:** Providing mobility-enabled role-based content
-  **Full lifecycle asset management:** Integrating plant data into current work order and asset management systems

Phase 1

The team established a digital foundation by engaging edge-to-core connectivity. By deploying a secure wireless mesh network through Aruba, Texmark enabled location-based services for plant safety and security—at roughly half the cost of a hardwired network.



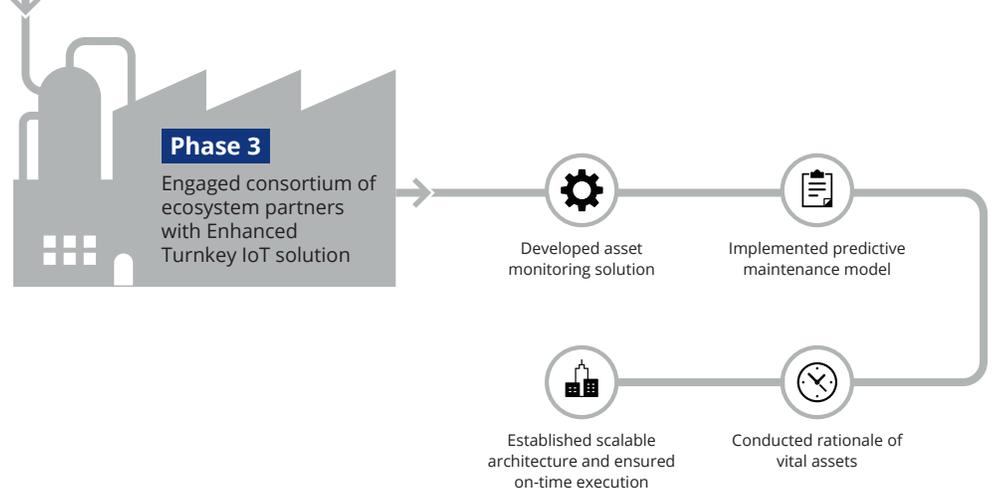
Phase 2

Texmark selected HPE for its Edgeline Converged IIoT platform—providing edge-to-core connectivity to meet its safety and security standards while enabling high-speed data capture analytics.



Phase 3

Deloitte led the execution and collaboration of ecosystem partners by leveraging its Enhanced Turnkey IIoT solution featuring predictive maintenance and asset monitoring. This included conducting rationale of vital assets, helping to ensure on-time execution, and confirming the data architecture of not only the solution at hand, but also of executions at future refineries. This phase was completed by combining best-of-breed analytics, software, infrastructure, security, and services in a holistic, pre-integrated, machine learning project.



The Solution

"We're building a refinery of the future that combs through data and reveals how the entire plant is interconnected. It becomes like a living, breathing organic plant that knows how it should operate; if any part falls out of line, it flags for intervention."

Linda Salinas, Plant Manager, Texmark Chemicals

Using sensors hardwired into the National Instruments CompactRIO measurement systems - which are wired into the HPE EL10 gateway - data is transmitted through the Aruba wireless network into multiple environments, including those from National Instruments/Allied Reliability, SparkCognition/Flowserve, OSIsoft, and PTC. The HPE Edgeline 4000, which is hosted on-premise, allows for data storage, data enrichment, and the creation of digital representations for each pump. Real-time data analysis, model creation from historical data, and machine learning algorithms provided by PTC and SparkCognition/Flowserve are used to provide insights into the data, allowing for both condition monitoring and predictive maintenance.

Through this technology, the Deloitte team created personas for plant managers, operators, and millwrights, and then interviewed them to understand what specific information would be of most value to each. The collected data and insights are displayed in PTC's ThingWorx IoT platform user interfaces to provide real-time feedback in a way that delivers maximum value to each persona.

This 10-week implementation, as well as future phases, exemplifies the consortium's ability to deliver agile solutions in the marketplace, while also developing a blueprint and playbook for future asset instrumentation.

The Value

"Texmark is a leader in innovation, and from the beginning—when my dad founded this company—we embraced ideas that were ahead of their time. Now HPE has given us the opportunity to do that again. This innovative IIoT technology will help us become safer, more competitive, and better at everything we do."

Doug Smith, CEO, Texmark Chemicals

Texmark's new IIoT solution can help make its workers even safer. By monitoring fluid levels, it can alert Texmark immediately if a system starts to malfunction, enable the company to respond before workers or production are endangered, and reduce the risk of spills. In the event of an emergency, it can also help protect workers by sharing their precise location and movements within the facility.

Beyond safety, the solution can also improve Texmark's bottom line. For example—Texmark can use data from IIoT sensors to identify which systems require hands-on evaluations, allowing them to conduct physical inspections in a more focused and efficient manner. Or, rather than taking systems off-line and erecting costly scaffolding to work on distillation columns, Texmark can improve their maintenance planning and potentially reduce costs by more than 50%.

The benefits of Texmark's IIoT solution span across the organization

Value delivered from condition monitoring and predictive maintenance phase

- ← Reduced unplanned downtime
- ↗ Increased mean time between failures
- 🔍 Ability to identify root causes
- 👤 Increased throughput

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Targets for safety incidents and unplanned outages

High

Satisfaction of customer SLAs

50%

Reduction in planned maintenance costs

What is next to come?

Contact us for more information on Deloitte's integrative work with HPE, and our alliance network, and learn how the Refinery of the Future could help your organization:

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