# Fueling global innovation with unified analytics

**databricks**

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**DAN JEAVONS**
GM of Data Science, Shell

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## Shell uses Databricks to help democratize data globally and transform into the energy company of the future

Shell has been at the forefront of creating a cleaner tomorrow by investing in digital technologies to tackle climate change and become a net-zero emissions energy business. Key to its strategy is the challenge of mining large volumes of data and leveraging analytics and AI to drive innovation forward. Initially slowed by data processing at scale, Shell chose Databricks to be one of the foundational components of its Shell.ai platform. Databricks provides Shell with its Unified Data Analytics Platform that has empowered hundreds of their engineers, scientists and analysts to innovate together through the democratization of data analytics and AI.

## MILLIONS
of dollars saved in potential engine repair costs

## 250
data team members supporting 160+ high-value use cases

## 9x faster
5 minutes to validate a label reduced from 45 minutes

> "The usage of Databricks over the years has broadened significantly. We started out using Databricks as a big data and AI platform but the scope has broadened. We have an entirely different class of citizen engineers and data scientists who are using it as a modern business intelligence tool to make smarter business decisions."

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GM of Data Science, Shell

# The challenges of extracting insights at scale

Throughout its 100-plus-year history, Shell has generated pioneering ideas that have influenced the way we consume energy.

> **"We, as an industry, are going through a massive transition,"** explained Dan Jeavons, GM of data science at Shell. **"Digital technology is absolutely core to making our existing business more effective and efficient. As the industry continues to expand into new areas of energy that are more sustainable and reduce environmental impact, data and digital technology are now table stakes."**

While digital transformation is a primary initiative for every energy company, challenges remain with legacy technology infrastructure, the complexities of an exponential growth in data, and the lack of data engineering and science skills needed to build data-powered solutions.

Shell has met these challenges head-on by creating a Data Science Centre of Excellence (CoE), where teams continually work to identify the highest value use cases across the entire value chain. However, although they were identifying opportunities to innovate with data, Shell had

the challenge to scale its data infrastructure for analytics, big data processing and machine learning. Shell's data strategy and Shell.ai platform were key enablers for scalability, which has helped to fuel Shell's continued evolution into an energy company powered by data and AI.

# Unifying data and AI across the enterprise to fuel innovation

Shell chose the Databricks Unified Data Analytics Platform as one of the key tools within the Shell.ai Platform. "We're in an age where we need to radically transform the way in which Shell does business, the capabilities that Databricks provides will help us to do that," said Dan.

Databricks provides Shell's data team with a scalable, fully managed platform that unifies their entire data analytics lifecycle. The interactive workspace has not only democratized access to data but has fostered cross-team collaboration across data engineering, data science and the analyst team. Databricks enables data scientists to train their models in a more or less self-service manner against entire data sets (both batch and streaming) and quickly deploy models into production. Even more importantly the door has been kicked wide open for analysts to also obtain valuable insights from their data.

**"Shell has been undergoing a digital transformation as part of our ambition to deliver more and cleaner energy solutions. As part of this, we have been investing heavily in our data lake architecture. Our ambition has been to enable our data teams to rapidly query our massive datasets in the simplest possible way. The ability to execute rapid queries on petabyte scale datasets using standard BI tools is a game changer for us. Our co-innovation approach with Databricks has allowed us to influence the product roadmap and we are excited to see this come to market," said Dan.**

This low barrier of entry has opened up analytics beyond machine learning, including business intelligence and reporting. In fact, Shell's focus on data and analytics has enabled over 250 data analysts (or citizen data scientists), and 800 citizen data scientists to be more productive with all the data available to them.

"The usage of Databricks over the years has broadened significantly. We started out focusing on Databricks as a big data and AI platform but it has now become much more. We have an entirely different class of citizen engineers and data scientists who are using it as a modern business intelligence tool to make smarter business decisions," said Dan Jeavons.
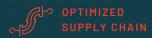
# Transforming Shell into the energy company of the future

Shell's CoE is now able to explore and deploy new data-driven solutions focused on improving supply chain operations as well as unlocking high-valued use cases that bring to life differentiated capabilities for their customers and their own businesses.

From an operations perspective, one of the biggest challenges any major industrial company faces is efficiently managing its inventory and supply chain. Shell stocks thousands of spare parts across its global facilities, and its inventory analysts were struggling to understand what level of spare parts they should hold in their warehouses. With Databricks, Shell was able to leverage its full historic data set to run 10,000+ inventory simulations across all its parts and facilities. Shell's inventory prediction models now run in 45 minutes — down from 48 hours — significantly improving stocking practices and saving a lot of money annually.

*"Databricks has proven to be of enormous value to Shell. The inventory optimization tool, which is built on Databricks, was the first scaled-up digital product that came out of my organization. as It is deployed globally, across our businesses and realizes millions of dollars of savings every year,"* said Dan.

Shell has also developed a recommendation engine for its new loyalty program called Go+ . Running on Azure and Databricks, the AI software can look at the full transaction history of a customer and use the information to tailor the offers and rewards to the preferences of the individual, combining their data with other aggregated data. This could range from promoting solar panels for the home or a coupon for a candy bar while filling up the car. "We've got about 1.5 million customers in the UK who are using Go+, and we've issued 26 million rewards to date, and we are now rolling out the core loyalty platform on a global basis to support other markets." said Dan.

### OPTIMIZED SUPPLY CHAIN

**Predicting inventory maintenance and stocking issues to boost supply chain efficiency and save millions annually**

### LOYALTY PROGRAM RECOMMENDATIONS

**Sophisticated profiling models deliver product recommendations to 1.5 million customers**

### LUBRICANT ANALYSIS

**Leverage IoT sensors to monitor durability of large-scale engines and serve insights to customers to reduce maintenance costs**

# Transforming Shell into the energy company of the future

Data and AI have also unlocked new opportunities for Shell to engage with customers. Shell Remote Sense is a new initiative focused on optimizing the durability and performance of large-scale engines on ships and cruise liners.

> **"We've been acquiring decades of lubricant samples, which provide insights into engine performance,"** explained Dan.

Shell processes over 750,000 lubricant samples per annum and delivers customer insights about lube oil quality and how it's performing. However, by connecting IoT services to the Azure cloud they are now able to ingest those customer samples in real-time using their historical data sets to provide their customers with real-time diagnostics on their lubricant's performance. All of this is powered by Databricks. Additionally, this is helping them move away from a labor and resource intensive process of collecting and sending samples to a lab, replacing it with a better customer service by giving Shell's customers real-time diagnostics in the field via a web portal. This not only saves customers potentially millions of dollars in the cost of repair or engine downtime, but Shell also saves significantly on time and operational costs.

# A data-driven culture that delivers results

Today Shell is redefining its boundaries of the oil and gas industry through data and AI. With Databricks as a key component of the Shell.ai platform, Shell is able to run data analytics and deploy machine learning models that improve operational efficiencies.

Using a common platform has empowered engineers, data scientists and analysts to be more agile, collaborative and data driven. Shell currently has over 160 AI projects running, and it's only just getting started. In the coming years, Shell aims to make leaps in technological advancements powered by data and AI — from trillions of IoT sensors all generating data to 3-D printed equipment and parts that will disrupt the global supply chain and greatly reduce costs.
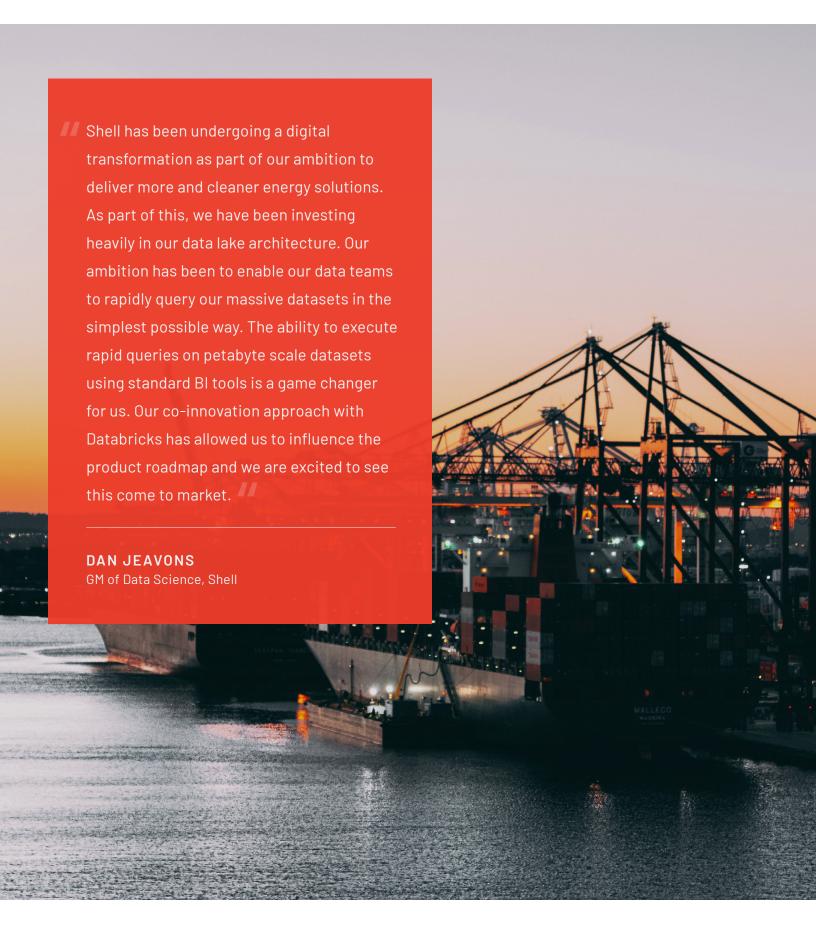
In a time of unprecedented technological progress in the efforts to save our planet, Shell continues to lead the way as one of the most innovative companies in the world. Shell's digital and IT teams play an important role in the evolution of Shell from a traditional oil and gas focus into a sustainable energy— and Databricks is a key part of the Shell.ai platform.

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# About Databricks

Databricks is the data and AI company. Thousands of organizations worldwide —including Showtime, Shell, Conde Nast and Regeneron — rely on Databricks' open and unified platform for data engineering, machine learning and analytics. Databricks is venture-backed and headquartered in San Francisco with offices around the globe. Founded by the original creators of Apache Spark™, Delta Lake and MLflow, Databricks is on a mission to help data teams solve the world's toughest problems. To learn more, follow Databricks on Twitter, LinkedIn and Facebook.



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