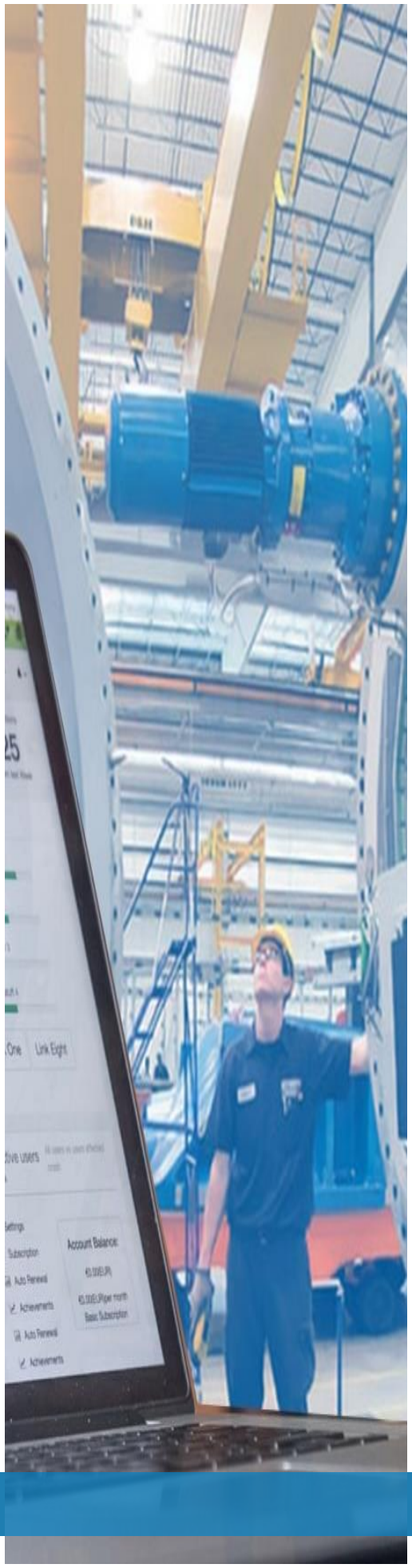

High tech aerospace manufacturer: Data infrastructure creation and pipeline automation

CHALLENGES

A major manufacturer in the high-tech aerospace industry had developed a strong, lightweight carbon fiber-based airplane coating designed to protect planes from UV rays, lightning strikes, and even static electricity. However, creating this coating was an involved process. A given batch of coating needed to go through processing at up to three different facilities.

The manufacturer had a geographically dispersed IT environment with no infrastructure in place to connect the disparate systems leveraged across the organization. This, combined with the fact that supplies from different lots and suppliers were used at different sites, created a traceability challenge.

Traceability was a key issue for the aerospace manufacturer as there would often be variations in the quality of finished batches of the coating. There was no ability to track the facility responsible for manufacturing a given batch of coating, let alone tracking the specific supplies or machinery used in the manufacturing process. It limited the ability for the aerospace manufacturer to conduct root cause analysis._The manufacturer reached out to Neal Analytics to help gain clarity into their end-to-end manufacturing process traceability and enable better root cause analysis of finished product variations.

SOLUTIONS

Neal Analytics worked together with the organization to understand the entirety of their business challenge. Neal then helped the manufacturer leverage and gain insights from their existing and geographically disparate systems while enabling the organization to clearly identify the specific site, machinery, and supplies being used in each specific batch of the final product.

To help the organization gain a better view of their data, Neal Analytics automated data movement from over ten on-premises systems across five of the organization's manufacturing facilities to Azure Data Lake Storage via Data Factory.

The types of data in the data movement process included sensor data from manufacturing machinery, records of the supplies used in the process (including IoT numbers), and other manufacturing data that enabled the organization to quickly drill down and conduct root cause analysis for products with quality variations.

Bringing all this data into an Azure Data Lake created one central area for the data to reside, facilitated using USQL scripts to load the data to Azure Data Lake Analytics tables. This enabled appropriate data transformation to eliminate traceability gaps. Once transformed, data was loaded into Azure SQL Data Warehouse tables (now known as Azure Synapse Analytics) using PolyBase, making it easily usable in downstream activities such as data visualization or machine learning.

To help the organization take advantage of the downstream possibilities, Neal Analytics also built Power BI dashboards designed to support easier reporting.

RESULTS

By working with Neal Analytics, the aerospace manufacturer was able to take a series of fragmented data systems and gain a 360^0 view of their manufacturing process. The Azure Data Lake connecting the disparate data sources has helped the organization eliminate gaps in traceability, enabled them to identify the causes for product quality variations more rapidly, and supported simplified reporting via Power BI data visualization. This, in turn, helps the organization reduce costs by supporting prompt remediation of issues and errors in manufacturing.

Since the data lake can ingest and process data much more quickly and efficiently than their on-premises environments, the organization has also gained access to an automated data pipeline that supports continuous analysis of final product quality. This has enabled the organization to predict the final product quality while it is still in the factory.