

ACCESSIBLE ANYWHERE: HOW PFIZER DEPLOYED THE PI SYSTEM™ TO ENABLE PRODUCTION ANALYSIS ACROSS THE ORGANIZATION

For over 170 years, Pfizer has worked to bring breakthroughs that change patients' lives through medicines, vaccines, and therapeutics around the world. While patients receive treatments in the form of a simple pill or injection, the process of discovering, developing, and manufacturing a drug is incredibly complex. It requires precision research and monitoring, relying heavily on operational data for visibility during the process.

However, for Pfizer's Small Molecule Division in Groton, Connecticut, operational data was siloed and only available within the physical building, increasing manual work, hindering collaboration and creating data latency issues. To reach its goal of doubling the innovation success rate while decreasing time to market, Pfizer needed a new data strategy. Using OSIsoft's PI System, Pfizer embarked on a journey to digitize the drug discovery process and create a single source of truth for self-service operational insights that are accessible anytime and anywhere.

A DEMOCRATIZED DATA STRATEGY

A long-time PI System user with a newly signed [Enterprise Agreement](#) (EA), Pfizer focused their initial digitalization efforts on their portable, continuous, miniature, and modular (PCMM) machine for oral solid dose. Pfizer's PCMM technology is a first-of-a-kind manufacturing system that accelerates the speed of tablet production. The machine is highly automated and contains over 2,000 tags collecting asset and process data into a local GMP validated historian.

Previously, data was manually queried using PI DataLink then moved into a raw CSV file before being scrubbed and exported to MS Excel. With the current process, it was impossible to pull and analyze data in real time. "We've got the PI System, we have the historian, but all the data was still really difficult to get to," said David Eisenberg, Manufacturing Engineer at Pfizer, during PI World San Francisco 2019.

With a goal of making real-time data accessible, Pfizer setup a digital integration strategy based on three objectives:

CHALLENGE

Data in multiple systems led to cumbersome, manual processes while preventing collaboration

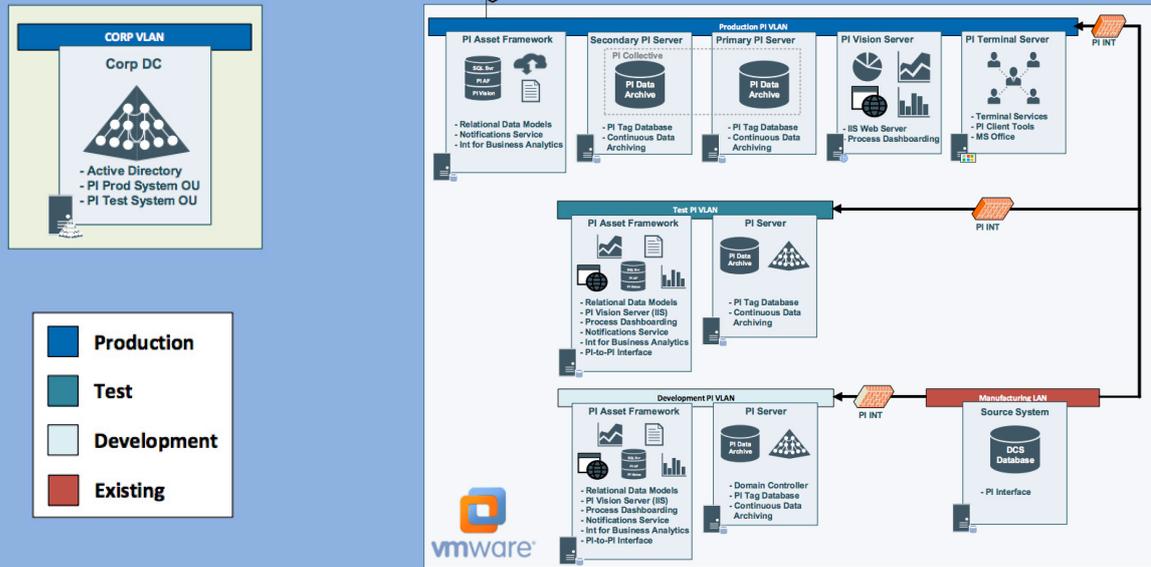
SOLUTION

A three-stage PI System to digitize the drug discovery process

BENEFIT

50% faster compliance reporting, 90% faster alarm resolution, and 50% reduction in BMS reporting

DATA CLOUD PROJECT



Up in the Cloud: A hierarchical overview of Pfizer's PI System architecture that utilizes the AWS cloud.

aggregating and contextualizing data, creating a collaborative enterprise environment, and implementing visualizations and analytics to empower decision makers. Leveraging expertise from NECI, an OSIsoft system integrator, the team designed a solution that would publish all data models from the local PI System in the Amazon Web Services (AWS) cloud, enabling users in any location to perform reporting and analysis in Tibco's Spotfire.

As a first step, NECI performed a front-end design study to understand group goals for operational data. Mixing responses with expertise, NECI designed a dynamic, robust solution that would leverage Spotfire reports for process data while also collecting building management system (BMS) data. Thanks to NECI's study, Pfizer was well on its way to a cloud-based solution, but success hinged on one element: context. "We all know data is only as good as the context we build around it," said Christopher Beaupre, Manager of Data Integration Services at NECI.

THE POWER OF CONTEXT

NECI deployed contextualized equipment-level and process-level data models within [Asset Framework](#) (AF), a part of the

PI Server, to satisfy all stakeholders—even building an AF structure for each production room. With the AF models adding rich context to the data, the team created a preliminary dashboard in PI Vision. This floor plan dashboard overlaid all environmental and process data in one screen, allowing the process, automation, and facilities groups to see a hierarchical representation of each room.

Coupling analysis with context, they leveraged analytics in AF to discover inefficiencies and build post-process entries into the models for the PCMM machine. For example, with no equipment in place to calculate yield, a simple analytic was deployed to calculate yield based off feeders and tablet production speed. To provide batch context to the tablet generation process, they also deployed an analytic that captured the PI System's Event Frame snapshots of the start and end of each batch to analyze and compare various points in the process.

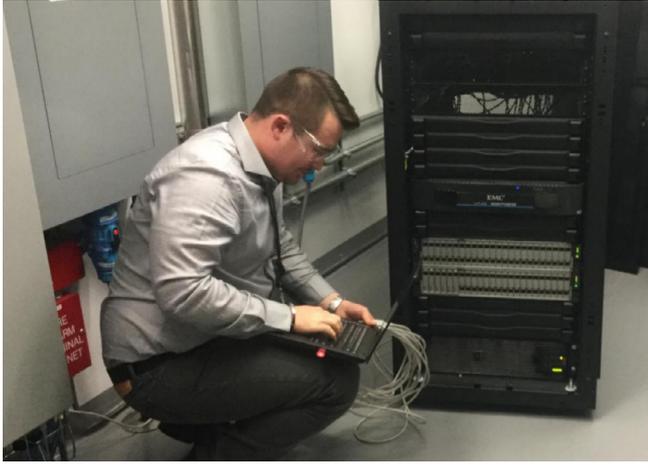
TAKING IT TO THE CLOUD

After setting up the PI System on the PCMM machine, Pfizer used the PI Integrator for Business Analytics to publish contextualized data models to AWS for visualization in Spotfire. Data is sent to the cloud using a



By Pfizer already having an Enterprise Agreement, I am like a kid in a candy store. I can just use and install as many tags as I like in the PI System without any extra costs."

— David Rabon,
Team Lead, Automation
Services at Pfizer



Before OSIsoft PI System Installation / After OSIsoft PI System Installation

PI-to-PI Interface, enabling operators to perform ad hoc analysis and troubleshoot in the cloud.

Once the cloud-based infrastructure was built for the PCMM machine, Pfizer also deployed the PI System for the utilities and building automation group in Pfizer's Groton location. The location had just built its own automation data lake, bringing together 8-12 systems and historians, all of which were accessed using a virtual machine. However, time stamps varied between systems, so root cause analysis proved to be difficult. In response, they built two PI System servers that replicated the PCMM solution and were controlled by two different QA groups. Now, GMP and non-GMP data as well as Good Laboratory Practice (GLP) and Good Clinical Practice (GCP) data are available on local PI System servers. The servers sit on the enterprise network, enabling users to pull data from the site-specific systems or to leverage data from the cloud.

THE RESULTS ARE IN

Immediately Pfizer began to see a return on investment on the PI System and favorable licensing terms with the Enterprise Agreement. Using PI Vision, the utilities and building automation team can now drop multiple templates into one screen, decreasing the time it takes to perform root cause analysis.

For example, in the event of a temperature spike, the team can analyze air handler, electrical system, and even municipal power supply data all from one screen. They also setup Event Frames on each of the 200 air handlers to catch leaking valves before temperature spikes, saving an estimated \$10,000 per month.

The team created a data model that allows them to look at the PCMM machine feeders across five different locations and use PI Vision for live, in-batch monitoring. They can quickly analyze complex processes, including screw speed as the machine feeds product into the hopper. Batch summary reports give overviews of key values, saving hours of manual work. Users have a self-service portal where they can select which tags they want to analyze and export that information right from the cloud.

Thanks to PI System, Pfizer now spends more time on root cause analysis. Compliance reporting is 50 percent faster, SMEs save 5-10 hours per week and root cause analysis is 30 percent faster, all of which enables Pfizer to develop lifesaving medications faster for patients around the world.

[For more information about Pfizer and the PI System, watch the full presentation here.](#)

PARTNERS:
NECI & Tibco



Watch this [2-minute video](#) to learn more about Pfizer and the PI System.