

# Life Sciences Giant Teams with ZAETHER to Implement UNS

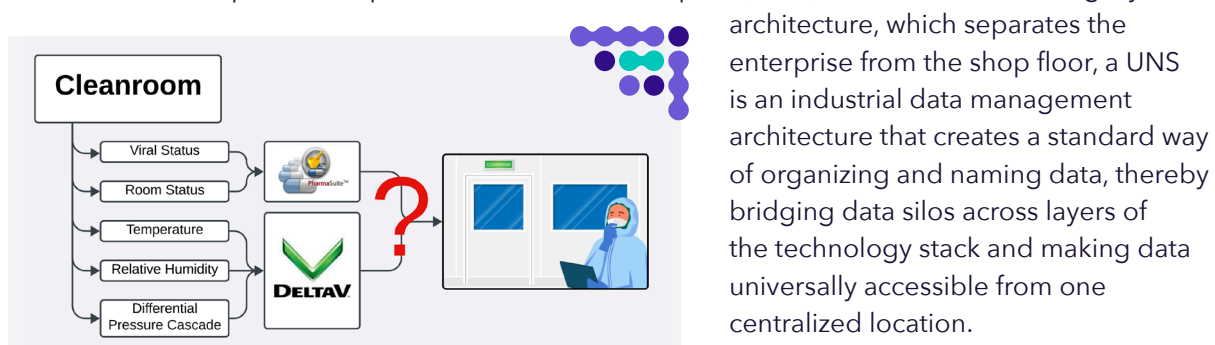
## The situation

In 2019, a Fortune 500 diversified life sciences company opened a \$90 million facility built to manufacture viral vector gene therapies for its biotech customers.

Determined to make it a state-of-the-art facility, the company's leaders saw an opportunity to reengineer its existing data management approach. The problem was that data silos separated instruments, equipment, and systems, affecting everything from production efficiency to quality to security. Point-to-point integrations between systems were cumbersome and complex. There was a lack of data contextualization and too many inconsistent data formats, requiring additional validation efforts.

For example, because some cleanroom data (viral status and room status) were fed through the PharmaSuite® MES, but other data (temperature, relative humidity, differential pressure) were handled separately by the DeltaV DCS, operators had no way to check and monitor cleanroom status once they were gownned. This lack of an integrated view increased compliance, quality, and safety risks while impairing operational efficiency.

The company turned to ZAETHER to lead a Front-End Engineering Design (FEED) study to explore what would be required to implement a Unified Namespace (UNS). Unlike a traditional legacy



## The challenge

In conducting the FEED study, ZAETHER solution architects and the client's automation engineers were charged with developing several alternative preliminary designs for the UNS and assessing their technical feasibility for full implementation, including technical/logical considerations, potential issues, and a high-level project timeline.

As part of the study, the client also sought ZAETHER's help in selecting and designing an MQTT broker and Data Operations platform to receive, filter, and deliver Industrial Internet of Things (IIoT) messages using the MQTT protocol, as well as evaluating and selecting an IIoT-ready Human Machine Interface (HMI) to visualize and monitor data in real time.

As a preliminary use case for the FEED, the ZAETHER team needed to:

- Integrate with the onsite Distributed Control System (DCS) to gather environmental monitoring data
- Integrate with the onsite Manufacturing Execution System (MES) to provide room state information
- Design, implement, and configure the UNS infrastructure to ingest, process, and deliver data from the source systems to HMIs throughout the facility
- Survey available IIoT-ready HMI offerings and provide a technical recommendation for which HMI to deploy throughout the facility

## The solution

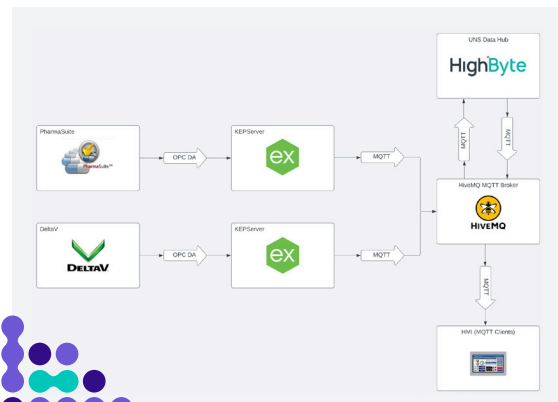
The facility's existing Operations Technology (OT) infrastructure provided a well-defined, secure network architecture and virtualized servers for the site's manufacturing support and engineering applications, including Emerson DeltaV DCS, FactoryTalk PharmaSuite MES, and KEPServerEX Connectivity Platform.

The team identified integration pathways to bring data from source systems into the planned UNS:

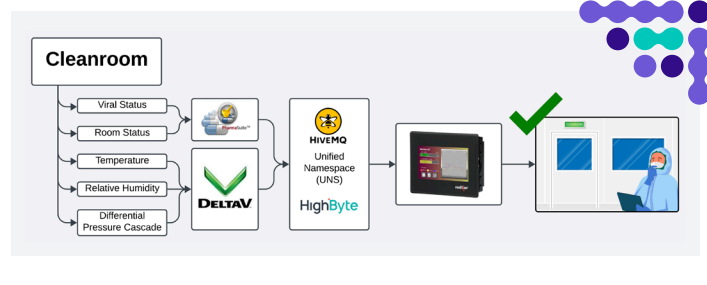
- **DeltaV:** DeltaV would be integrated with the UNS via KEPServerEX, an industrial automation connectivity platform that supports many protocols, both legacy and modern. Because KEPServerEX works with the OPC interoperability standard, it easily integrates with DeltaV's built-in OPC Data Access (OPC DA) server and allows for translation to other protocols, including OPC Unified Architecture (OPC UA) and MQTT.
- **PharmaSuite:** The team determined that the installation of the FactoryTalk Services Platform (FTSP) would enable data to be read from PharmaSuite and written to KEPServerEX tags via OPC DA.

With the potential pathways established, the ZAETHER team developed several design alternatives for the UNS and evaluated the pros and cons of each to determine the best fit for the client. The ZAETHER and client teams worked together to develop a design that limited demand on network resources by making near-exclusive use of the MQTT protocol, with OPC DA used only for connection between the source systems and the KEPServerEX translation layer.

After assessing various MQTT brokers and Data Operations platforms, the ZAETHER team designed and recommended a UNS that took advantage of the highly scalable nature of the HiveMQ broker and the powerful, low-code configuration of the HighByte Intelligence Hub data operations platform. During design, strong emphasis was given to simplifying the Good Manufacturing Practices (GMP) lifecycle management of the solution, in particular by ensuring that future integrations required minimal updates to the UNS and no updates to pre-existing UNS integrations.



Finally, the team performed a survey of commercially available IIoT-ready HMIs. Seven HMI models were identified and evaluated on a range of criteria, including cost, extent of native MQTT support, graphics quality, and software ease of use. Ultimately, the ZAETHER team recommended the Red Lion CR3000 HMI for its balance of functionality and cost.



Upon final review, the client accepted the ZAETHER team’s recommendations, and the engagement shifted to a Proof-of-Value implementation where the team was able to demonstrate end-to-end data flow from the source systems through the UNS to a “desktop demo” Red Lion HMI.

## The results

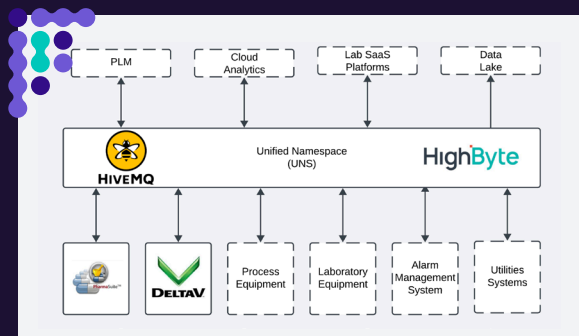
Within a matter of weeks, the ZAETHER team and its client partners had designed and specified a UNS architecture for the company's viral vector facility, harmonizing its legacy components and providing a springboard for greater scalability, agility, and innovation while reducing integration costs.

At the conclusion of the engagement, the ZAETHER team delivered a report summarizing considerations and prerequisites for full deployment, as well as estimated resourcing and a schedule for activities associated with full deployment.

Pleased with the work of the ZAETHER team, the site automation team provided an internal demo to site leadership and manufacturing management. The demo was well received, with manufacturing management seeing the value that the UNS provides for both near-term and future integrations.

At this writing, ZAETHER is working with the client on developing the project for full deployment, including:

- Full design and configuration of UNS software
- Full integration to production environments of DeltaV and PharmaSuite
- Hardware design and installation services



The next step is to align on a plant outage period to perform the physical installation tasks that impact cleanrooms.