

Driving high-impact scientific outcomes with Tetra Sciborgs

The flow cytometry core facility at a leading global biopharmaceutical company faced a set of complex challenges. It manages a heterogeneous fleet of flow cytometers that are used by multiple groups within R&D. Data workflows varied across the scientists. Broadly speaking, they exported flow cytometry data to their own department's server for subsequent analysis in applications like OMIQ or FlowJo. Without standardized processes in place, the scientists relied on manual methods to transfer and process data. They often struggled to find older data in their network drives, and when they did, it usually lacked sufficient experimental context for interpretation or reuse. Data older than a year was essentially lost, forcing scientists to repeat studies. Plus, the siloed data hindered collaboration between departments.

The status quo also provided little visibility into the core's instruments. Staff members would have to remote into systems one by one to see calibration and usage data. Tracking instrument performance was painstaking work that was only conducted during troubleshooting. Overall, the core was unable to monitor how much flow cytometry data was generated, where it went, and how it was used.

Altogether, the breadth and depth of these challenges required a comprehensive strategy, which had proven elusive for the company.

Use case discovery

The biopharma company turned to TetraScience for a way forward. In response, TetraScience suggested a Tetra Sciborg package, an outcomes-based offering that combines a library of deployment-ready use cases, supporting artifacts, and best practices to accelerate and improve scientific outcomes. This offering is delivered by a team of experts called Tetra Sciborgs—SBAs and scientific data architects (SDAs)—who deeply understand the science performed in biopharma and its associated data. Most notably, they know how to fully leverage the Tetra Scientific Data and AI Cloud™ for maximum scientific and business impact. In short,

Sciborgs act as the connective tissue between TetraScience and the biopharma organization.

The engagement began with use case discovery. The Tetra SBA conducted a comprehensive survey of the current data landscape within the flow cytometry core. She interviewed subject matter experts, including the core facility staff and

Challenge:

At a top 25 biopharma, both the staff managing a fleet of flow cytometers and the scientists using them relied on inefficient processes to curate, process, and analyze data.

Solution:

Tetra Sciborgs optimized flow cytometry workflows with a science-led approach that combines the Tetra Scientific Data and AI Cloud, deep domain expertise, and a library of scientific use cases and supporting artifacts.

Outcomes:

- Redirect scientists' time spent on manual data processes to more valuable work
- Collect and engineer data automatically in the cloud for rapid search and analysis
- Visualize and trend instrument calibration data, enabling predictive maintenance
- Recover over \$50,000 per year through time savings

users, to understand current workflows and pain points. Leveraging templates for use case discovery, the SBA gathered technical requirements and mapped out existing (as-is) and desired (to-be) workflows. Additionally, she

projected the business value for each identified use case. Following this assessment, the customer and SBA agreed to prioritize automated integration with OMIQ, a cloud-native analysis software.

Use case #1: OMIQ integration

Many scientists at the biopharma company use OMIQ to analyze flow cytometry data. They would manually export data from the flow cytometer to their team's dedicated network share and then upload it to the OMIQ platform (Figure 1). The process was slow due to large file sizes. Instead, the Tetra SBA proposed a fully automated workflow. The Tetra Scientific Data and AI Cloud would automatically ingest data from the flow cytometer, add essential metadata, and push the data to OMIQ.

Using the technical requirements gathered by the Tetra SBA, the Tetra SDA crafted the optimal architecture for the solution. This effort required collaboration with internal groups at TetraScience, the customer's IT team, and external partners. The final design comprised a mix of new and existing components in the Tetra use case library, including a SharePoint connector and API-based integration with OMIQ.

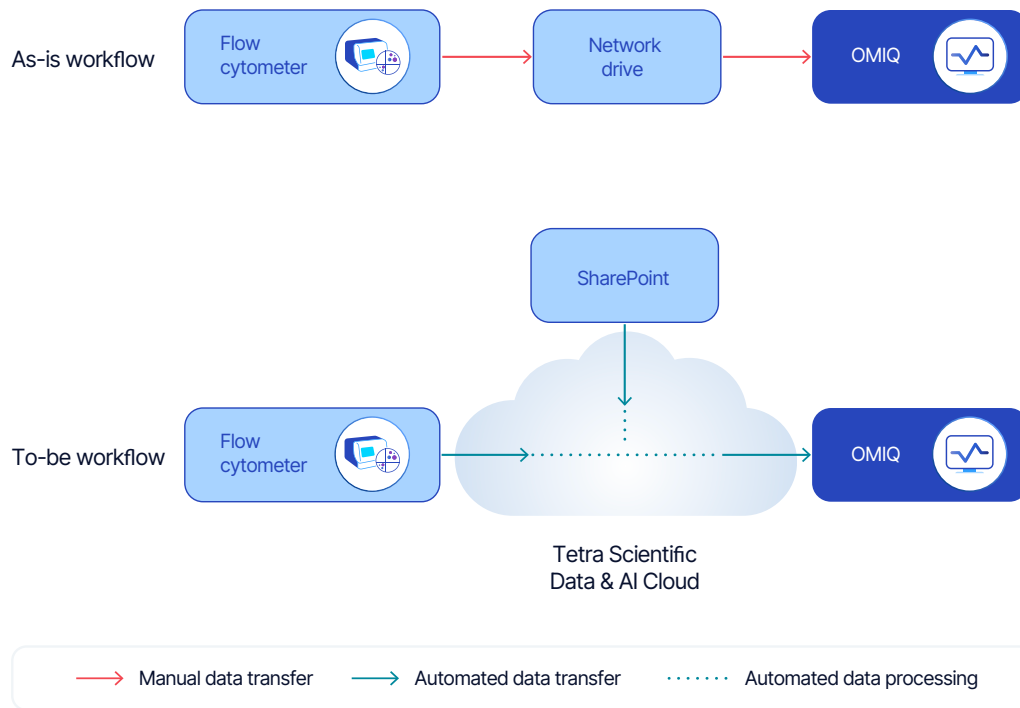
- The **SharePoint connector** adds necessary metadata, such as user and project names, to the flow cytometry data. This information was located in an Excel file maintained by the core and stored in SharePoint. Because the connector was still in development, the SDA worked with the product team at TetraScience to expedite a pre-release version.
- **OMIQ integration** was enabled through collaboration between TetraScience and OMIQ. The SDA worked closely with OMIQ to understand the technical specifications of its API and identify how best to leverage it for this use case.

Throughout the entire process, from discovery to implementation, the Tetra Sciborg team served as a single point of contact for the biopharma. They employed an agile-based methodology, communicating regularly with the customer's scientific and IT teams. This included sharing solution design documentation and project updates through tools like Jira. The approach ensured transparency throughout the engagement. With a full understanding of the project's context, the Sciborgs could

quickly address customer inquiries, troubleshoot issues, and incorporate feedback.

The new workflow streamlines flow cytometry analysis for the scientists, saving about 15 minutes per plate per experiment. This amounts to an annual savings of over \$50,000 in scientists' time. The solution also centralizes and contextualizes the data in the cloud, making it far easier to search and access all flow cytometry data generated in the core facility.

Figure 1. Data workflow diagrams for OMIQ integration



Use case #2: Instrument calibration trending

The success of the initial use case earned the customer’s trust in the Tetra Sciborg offering. This led to an on-site visit by the Tetra Sciborgs that uncovered a new use case—visualizing instrument calibration data.

Flow cytometers require daily calibration to ensure high-quality data. To check their calibration status, the core staff had to remotely access the software for each instrument, find the latest PDF report, and interpret the results. This task was tedious, especially for a fleet of more than 30 flow cytometers. When instruments repeatedly failed calibration, staff members would gather data from recent weeks or months and generate Levey-Jennings plots to identify patterns or irregularities that could reveal the underlying cause. This analysis was conducted retroactively, never proactively, because the core had no way to view longitudinal calibration trending across all instruments or receive real-time alerts about calibration status. Often,

instrument issues went unnoticed until they worsened to the point of needing repairs, jeopardizing data quality.

After observing these challenges firsthand during the on-site visit, the Tetra SBA proposed a solution: build dashboards to easily monitor whether the instruments passed or failed calibration. The dashboards would be automatically populated with calibration data across instruments and provide access to more detailed information. This would allow staff to quickly identify and troubleshoot issues.

Following a similar discovery process as before, the SBA created as-is and to-be workflows (Figure 2), captured the technical requirements, and estimated the business value. Based on this groundwork, the customer greenlit the project. With the help of the SDA, the design of the new workflow was fleshed out and aligned with the customer’s IT team. The solution relies on the Tetra Scientific Data and AI Cloud to automatically

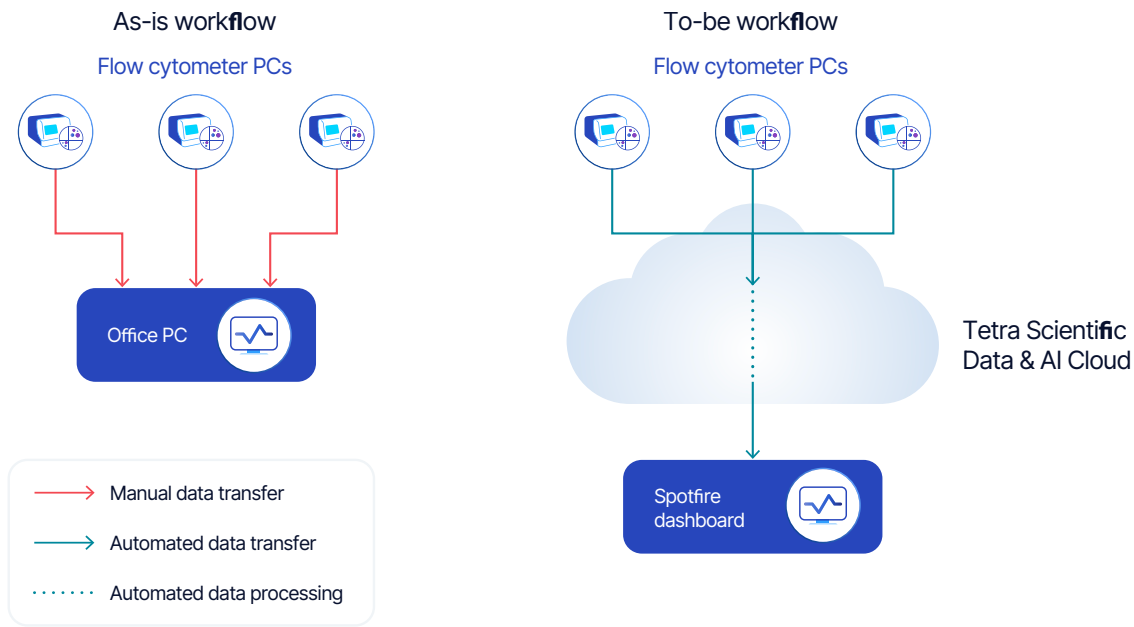
collect calibration data from the instruments and engineer it into analytics- and AI-ready Tetra Data, which then powers a Spotfire dashboard.

Now, the flow cytometry core staff can quickly check the calibration status of their instruments via color-coded tiles on the dashboard. By clicking on a tile, they can drill down into the instrument setting and calibration details and determine if any

action is needed. Moreover, they can track instrument settings over time and proactively adjust those that are trending out of specification to ensure data quality.

The dashboard not only liberates the staff from hours of manual work per week but also enables a shift from reactive to proactive maintenance strategies. The upshot is higher-quality data, less instrument downtime, and lower operational costs.

Figure 2. Data workflow diagrams for instrument calibration trending



The value of Tetra Sciborgs

Tetra Sciborgs delivered impactful solutions that the biopharma company couldn't have achieved alone. The outcomes required the combination of a unique cloud platform; the deep domain expertise in science, data, and technology of the Sciborgs; an

extensive toolbox of artifacts; and access to the Tetra Partner Network, the largest ecosystem of scientific innovators. The customer acknowledged these efforts, saying, "No one else has been able to solve our challenges."

"No one else has been able to solve our challenges." – *Scientific Business Analyst at the biopharma*

By working with Tetra Sciborgs, the biopharma gained a better understanding of:

1. Its current state in the scientific data journey
2. Where it can go (by identifying opportunities for improvement beyond the initial scope)
3. How best to get there (by optimizing and accelerating deployments for specific scientific outcomes)

TetraScience has become a trusted partner for this biopharma, and together we will achieve even greater scientific outcomes in the future.

See how Tetra Sciborgs can improve and accelerate your scientific outcomes. [Explore Tetra Sciborgs](#)