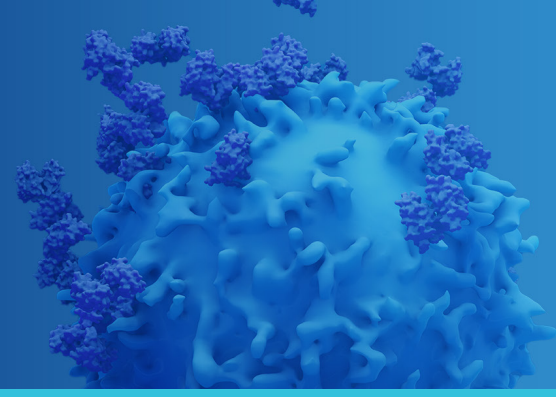


# Streamlined flow cytometry for antibody screening



## CASE STUDY

### Background

Flow cytometry is a powerful tool for studying biologics. Using fluorescently labeled antibodies and antigen-expressing cells, scientists can assay the interaction between the two—one cell at a time, up to thousands of cells per second.

A leading biopharmaceutical company uses flow cytometry for lead identification and characterization. R&D groups in the therapeutic proteins department send antibody samples to a dedicated team of scientists who develop and run the assays. The team analyzes approximately 20,000 samples per day, and demand is growing. As such, the company needs to increase the velocity of its high-throughput screening workflows.

### Challenge

The raw data generated from flow cytometry is complex and requires preparation before downstream analysis. This process includes data collection, gating (i.e., identifying relevant cell populations), and quality control (QC). Performed manually, these steps can take hours per screen, creating a bottleneck for high-throughput approaches. They are also tedious and error prone, which threatens data quality.

Facing these issues, the biopharma company looked to increase the throughput of its antibody screening method by streamlining the scientific data workflow.

### Summary

#### Challenge

Manual data preparation of flow cytometry data is a bottleneck for high-throughput antibody screening.

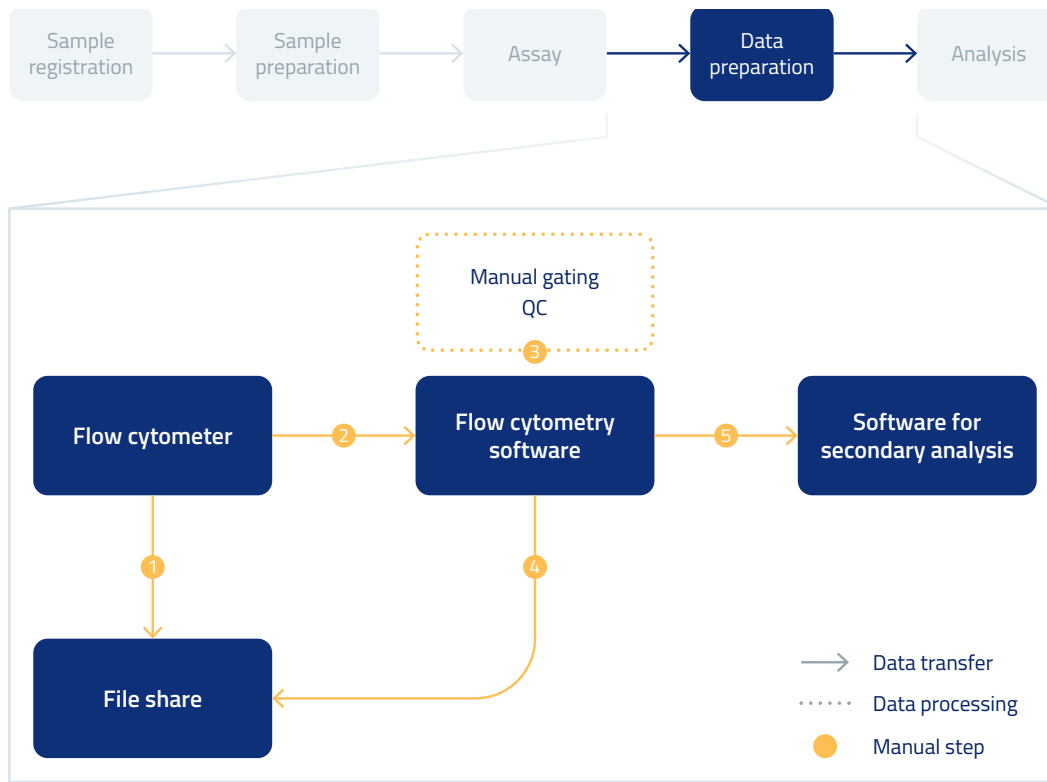
#### Solution

The Tetra Scientific Data Cloud™ streamlines the collection, gating, contextualization, and QC of flow cytometry data via automation and visualization tools.

#### Results

- **25X** faster data preparation, including gating and QC
- Up to **48 hours** saved per screen
- Over **3X** screening throughput by supporting a multiplexing approach
- Higher-quality data, centralized and searchable in the cloud

## Initial workflow

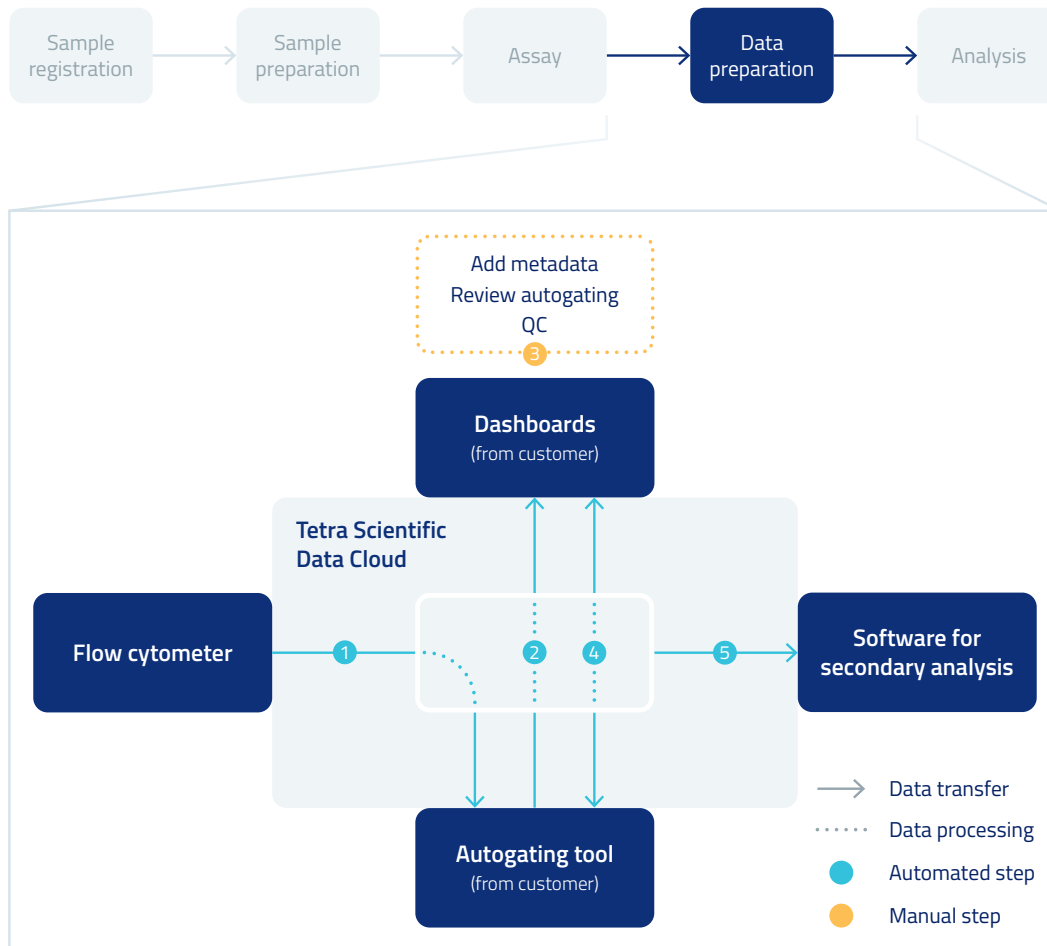


- 1 The scientists export raw data (FCS files) from the instrument and manually upload them to a file share.
- 2 They also transfer the data to a personal computer for primary analysis.
- 3 They open files in FlowJo and perform manual gating and QC.
- 4 They upload the processed data to the file share.
- 5 They open the processed data in a secondary analysis program to calculate antibody binding affinity and other properties.

## Solution

The Tetra Scientific Data Cloud was deployed as part of an integrated solution to accelerate the preparation of flow cytometry data. This included the automation of data transfer and transformation, as well as the implementation of dashboards to easily label and assess the data.

## Tetra workflow



- 1 The Tetra Scientific Data Cloud automatically collects raw data (FCS files) from the flow cytometer and sends it to an autogating script developed by the customer.
- 2 The Tetra Scientific Data Cloud prepares the gated data for consumption by a set of Spotfire dashboards.
- 3 Using the dashboards, the scientists quickly add metadata (e.g., antibody IDs and cell lines) and evaluate data quality and gating. Metadata enrichment enables downstream search and analysis.
- 4 If needed, the scientists tune the gating parameters in the dashboard. Autogating is rerun on the raw data, and the dashboards are automatically updated with the new results.
- 5 The engineered data is then ingested by the secondary analysis software. The Tetra Scientific Data Cloud stores all the data—raw and engineered.

## Results

The new workflow speeds up the collection, gating, contextualization, and QC of flow cytometry data by **25X** on average, saving up to **48 hours** per screen. The elimination of error-prone manual steps also leads to more consistent and higher-quality data. This data, centralized in the Tetra Scientific Data Cloud and enriched with metadata, is more searchable and accessible than before, facilitating downstream use.

With data preparation no longer being a bottleneck, the scientists implemented a new screening method that leverages multiplexing (i.e., using multiple cell lines per sample). This approach cuts the number of samples needed per screen but generates larger, more complex data sets per run. The new data workflow, which is highly scalable, can handle these data sets with ease. As a result, the overall screening throughput in the lab increased by over **3X**.

## Significance

- By partnering with TetraScience, this biopharma company significantly optimized and accelerated its antibody screening workflow, resulting in faster lead identification.
- The gains come without any increase in instrument footprint or personnel.
- Scientists can reallocate time spent on manual tasks to more valuable work like assay development.
- The Tetra Scientific Data Cloud automatically prepares scientific data for secondary analysis and advanced analytics, where additional value—such as therapeutic insights and better asset utilization—can be realized.

## What's next?

By replatforming and reengineering data, the Tetra Scientific Data Cloud lays the foundation for artificial intelligence, leading to radically accelerated and improved scientific outcomes.

**To learn more about the Tetra Scientific Data Cloud, visit [tetrascience.com](https://tetrascience.com).**