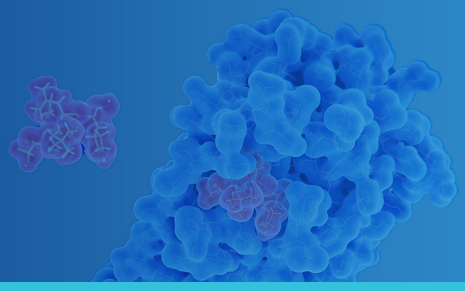
tetrascience

Faster lead characterization by automating SPR data workflows



CUSTOMER STORY

Manual quality control slows SPR assays

A large biopharmaceutical company uses surface plasmon resonance (SPR) for lead characterization. Its team of scientists develops and performs SPR assays to measure binding kinetics between two proteins or a protein and a small molecule.[1] After running samples on a Cytiva Biacore SPR system, scientists analyze the data in the instrument's software and then perform quality control (QC).

The QC process is both cumbersome and error prone, consuming 60 to 80 percent of the scientist's time per assay. Scientists manually transfer files, process data within Excel or Python, and export results to various storage locations (Figure 1). This heavily manual workflow not only introduces variability between scientists but also severely limits the number and complexity of projects that the team can accept.

Challenge:

A top 10 biopharma company performs manual QC of SPR data for lead characterization. The process takes up to 80% of scientists' time, throttling assay throughput.

Solution:

The Tetra Scientific Data Cloud streamlines the entire QC process by automating data ingestion, engineering, and publishing.

Result:

Over 3x higher assay throughput and better quality data.

End-to-end data automation clears the bottleneck

The Tetra Scientific Data Cloud™ streamlines the collection, contextualization, and harmonization of data from SPR experiments (Figure 2). Raw data from the Biacore instrument is automatically ingested into the platform where it is enriched with metadata such as sample ID, project name, and instrument information. Links to the raw data are automatically sent to the ELN to facilitate retrieval by the scientists.

The Tetra Scientific Data Cloud uses automated pipelines to engineer the data into Tetra Data. This liquid, harmonized dataset is accessible by Elasticsearch and REST API. A customer-built web application automatically retrieves the project's data and runs QC analysis. Upon review by a scientist, the results are pushed to the ELN.

Increased throughput and scalability

The new workflow increases throughput by over 3x, saving 180 minutes per assay. This gain in efficiency enables scientists to allocate more time to higher-value work such as assay development. Plus, the QC process is highly standardized, minimizing the variability between scientists. Data is more consistent, searchable, and accessible than before.

Having streamlined QC, the company plans to increase operational capacity by investing in more equipment. It also will expand the Tetra-enabled solution to support other SPR systems and automate data analysis further (e.g., curve fitting). Taken together, these enhancements will greatly accelerate lead characterization.

AI readiness

By replatforming and engineering the SPR data into AI-native Tetra Data, the customer can leverage AI to gain insights and drive better and faster scientific outcomes. Answers to critical questions are in reach: What factors contribute to QC failures? How can SPR assays be optimized? To what extent do SPR results predict the downstream success of therapies?

Learn more

To learn other ways the Tetra Scientific Data Cloud can help leading biopharmas achieve AI insights, visit tetrascience.com.

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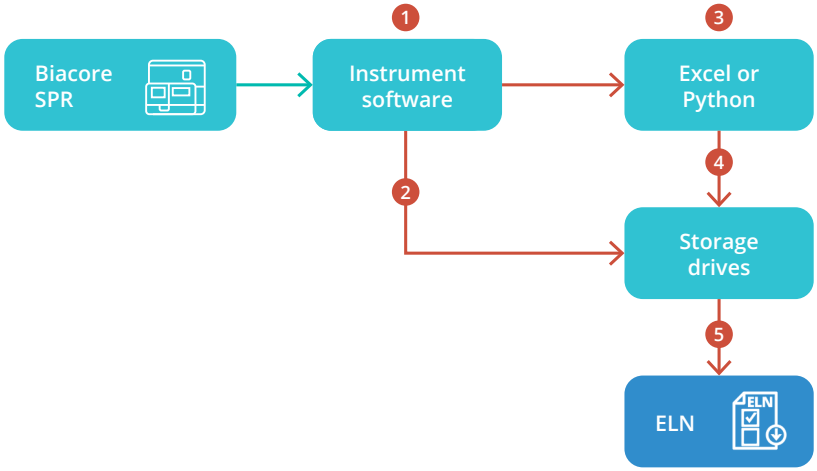
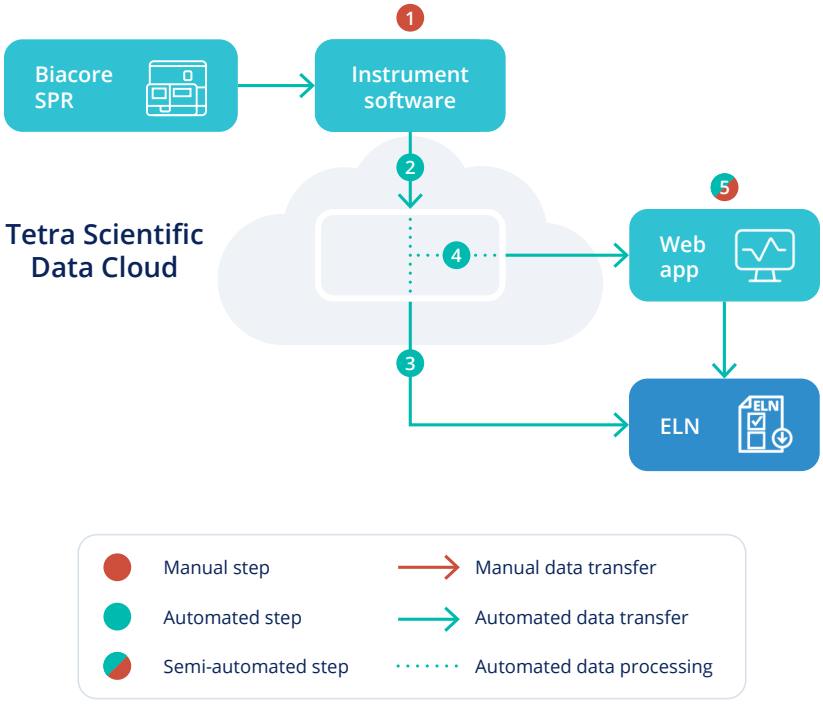
Figure 1. Initial workflow



1. The scientists analyze data in the instrument's software.
2. They manually export raw data (JSON and other formats) to storage drives.
3. They transform and manually review QC data in Excel or Python.
4. They manually transfer processed data to storage drives.
5. They manually add QC results to the ELN.

Figure 2. Tetra workflow



1. The scientist analyzes data in the instrument's software.
2. The Tetra Scientific Data Cloud automatically collects the instrument data and contextualizes it with metadata (e.g., sample and project IDs).
3. Links to the raw data are automatically sent to the ELN.
4. The Tetra Scientific Data Cloud automatically engineers the raw data into harmonized Tetra Data and makes it accessible via Elasticsearch and REST API.
5. A web application automatically retrieves the project's data and processes it via a script. The QC results are reviewed by a scientist and then pushed to the ELN.

References

1. Anna Moberg, "Surface plasmon resonance," Cytiva, https://www.cytivalifesciences.com/en/us/solutions/protein-research/knowledge-center/surface-plasmon-resonance/surface-plasmon-resonance.

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