Data Visualization to Improve Pipeline Pilot Server Performance

CASE STUDY

PROJECT AT A GLANCE

Business Sector:
- Pharmaceutical

Informatics Systems
- BIOVIA LIMS 4.2
- BIOVIA Pipeline Pilot
- Tableau 2020

Service Offering
- Strategic Planning
- Data Visualization
- Business Analysis

Elements:
- 6 Site
- 1 Month
- 2 CSols Team Members

A major life sciences company that utilized BIOVIA LIMS throughout their Manufacturing, Quality, and Development groups needed support to optimize Pipeline Pilot protocols for reporting and workflow functions within the BIOVIA LIMS environment. CSols, Inc. was selected to augment the staff of the Laboratory Information Systems department to work on this project.

Objectives and Challenges

The goal of this project was to analyze the performance of the Pipeline Pilot server to identify and prioritize protocols that could be optimized for more efficient load and run times.

Pipeline Pilot protocols have several custom-coded components, which were written using then-current best practices. Some were known to be in need of performance optimizations. Some of the protocols made compromises in performance that did not scale well as the size of the database grew over time.

Poor protocol performance caused the following challenges:
- business frustration from the slow response of the system;
- errors due to overlap of scheduled execution (for instance, a protocol will run every 15 minutes, but the run time is 20 minutes, so the previous instance will not finish before the next instance begins and this can cause issues); and
- extra costs if the problem is not properly diagnosed and additional hardware is purchased to alleviate performance issues.

Once these protocol problems were identified, the bigger project of optimizing, repairing, and implementing changes to the LIMS environment could begin. Project managers, developers, business analysts, and validation engineers are involved in the performance improvement process. They do this in coordination with business end users and QA to make sure that optimizations will not change the content and function. The

CSols consultants utilized their expertise to supplement and advise all of the project roles, and utilized their relational skills to interface with the business in a productive and efficient way. Business analysis and developer roles were filled by CSols employees, working with a broader group within the department to ensure multi-site acceptance and compliance for the changes.

The project encountered many challenges along the way, such as:
- Tight timelines
- Multiple disparate systems with various levels of infrastructure maturity
- Missing source code and unknown business logic in already compiled, customized Nautilus extensions
- Physically transferring the extracts and imports with encrypted USB hard drives from the original server location to the new server, which were geographically separate
- Logistics planning had to be coordinated closely to minimize downtime

CSols's Role in the Solution

As the Reporting and Data Visualization developer for the group, the CSols employee was able to help significantly with the identification portion of the project. It was not as simple as going to a screen and pulling up the problem; it required taking a broad look at the performance using the automatically generated Pipeline Pilot server logs. With appropriate skills in tools like Tableau, these logs can be turned into useful visualizations, and a dive into the data can make not-so-obvious things easily identifiable.

Some take-aways that the client learned from the data visuals include the following:

- Which protocols are run most often and take up the most server resources (in terms of run time)
- Trending of run time per protocol
- Time of day for various activities like user logins and protocol run times

Pulling data from lab software to analyze for process improvements is not a task that many labs or businesses take on. This is because it takes skill to not only know how to use the software to access the needed reports, but also to understand the trending analytics that comes out. The CSols consultant had these skills and, therefore, helped the client meet their objectives for optimizing protocols and performance.

Benefits

A breakdown of benefits the client derived from the data visualization and analysis services are as follows:

- **Faster performance**—One optimized query went from 18 minutes to 50 seconds. The protocol optimizations significantly improved the user experience and eliminated the need to purchase additional hardware.

- **Direction**—The visualizations identified the areas where the application of resources would derive the maximum benefit.

- **Confirmation**—The ability to track improvements and quantify those benefits to justify to management the investment in time and effort.

- **Better use of existing resources**—With the help of a CSols developer, the client was able to use the data visualization tools they already owned to identify areas of improvement within their lab and business operations.

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