Custom application development to interface a DCS Processor with STARLIMS™ and Empower 3 CDS

CASE STUDY

PROJECT AT A GLANCE

Business Sector:
- Chemical Manufacturing

Informatics Systems
- Empower 3 CDS
- STARLIMS 11.0
- STARLIMS SDMS

Service Offering
- Planning
- Development
- Implementation

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

An in-process testing system for the polymer manufacturing lines of a chemical company needed to be updated to reduce downtime and improve testing flexibility. CSols has a contractual agreement with the client that has developed due to our expertise with STARLIMS, Empower, and C# development. The work described here is part of a larger, ongoing project to which CSols has dedicated project management resources.

Objectives and Challenges

The goal of this project was to update and enhance the in-process testing workflow for polymer manufacturing, and to automate data storage.

To achieve these objectives, there were a few hurdles to overcome. The existing system would fail at inconvenient times and was not scalable or flexible. Manufacturing parameters had to be manually entered for each of the sampling processes. The client's ability to adjust polymer batches was limited to the three sampling points allowed in the current system, which had no interface to the Empower CDS.

Without the desired enhancements, the manufacturing line would continue to be interrupted with legacy software failures that required human intervention. A custom application needed to be written to send manufacturing parameters to the Empower CDS for in-line quality control samples

CSols's Role in the Solution

CSols has expertise in C# coding, with STARLIMS applications, and with Empower CDS. This expertise enabled our consultant to design a custom Windows Service application, written in C#, to work with the client's existing systems and deliver the desired functionality and scalability. The client is using STARLIMS organization wide, but for this work only a few specific features of STARLIMS were needed. The Data Lookup feature in STARLIMS QMS was used as the data repository for

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manufacturing parameters. A custom STARLIMS application was added to allow users to view and manage data in the STARLIMS SDMS. For this work, a CSols resource functioned as Developer and Business Analyst.

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- The Developer/Business Analyst learned the distributed control system (DCS) the client is using, to understand the key steps in the workflows of the polymer manufacturing process. This helped to identify the best path for developing the custom application. The CSols resource then wrote the design and requirements documents for the custom application to be created.

- The CSols resource wrote code for a Windows Service application to work with data from the DCS, the STARLIMS database, and the Empower CDS API. The custom application looks for text files generated in the DCS by monitoring a folder on the server. When one appears, the application reads in the data and takes the file to STARLIMS. The application reads the "generic" parameter values from STARLIMS data lookup, and transforms it into a set of concrete Empower CDS parameter values, in combination with data from the DCS. The Empower CDS starts the instrument run based on those parameters. At the end of the instrument run, a plot file is generated. The STARLIMS SDMS Grabber was configured to pick up the plot file, and a STARLIMS script was written to create a batch, sample, and result, and attach the plot file to the result. Plot files are stored in the STARLIMS SDMS.

- When development was complete, the CSols resource performed Operational Qualification testing for the application.

Benefits

- Automating the in-process sampling allowed manufacturing efficiency to increase, and the number of support tickets has decreased.

- Evaluation of the DCS allowed the CSols Consultant to identify what C# programming was required for the custom application. Upon completion of the customization, the custom application now lets users identify the key sampling and analysis points in the batch being manufactured so that any out-of-spec batches can be addressed.

- The client can now test samples at different steps of the process, depending on the batch being run.

- There are currently five possible testing steps, but this can scale up because the coding performed in the custom application will base the sampling parameters on batch data from the DCS and STARLIMS lookup data. Lookup data can be added easily, using a custom STARLIMS application.

- Users are now able to view the Empower CDS Plot files in the STARLIMS SDMS, which is web-based and accessible without having to be logged into STARLIMS. The extensive knowledge of STARLIMS and Empower CDS made it possible to write the custom application to improve the sampling process and streamline access to the results.

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