

Project Spotlight

Utilities Data Concentrator

The Utilities Group of a local pharmaceutical manufacturing firm utilized a data concentrator to organize data from 48 different remote PLCs that controlled the manufacturing facilities critical utilities. This information was accessed by a Wonderware HMI and data historian system. Setpoints entered into the HMI were routed to the remote PLCs by the data concentrator.

The system design permitted several single points of failure such as a single processor and several failures resulted in GMP deviations, an unacceptable situation. The existing PLC platform was also very limited in available memory limiting future expansion. Recognizing an opportunity to leverage advances in PLC design the customer issued a Request for Proposal specifying an Allen Bradley ControlLogix solution.

Our proposal was selected due in part to our inclusion within the proposal of the project management techniques and tools to be used during the project. Our proposal also specified the resource commitment and schedule milestones required to complete the project within the specified 5 month period.

The design of the system was performed with an eye on what could be improved upon, not just on recreating the existing program on a newer platform. Redundancy was incorporated from the beginning with the use of redundant PLC racks, processors, power supplies and Control Net communication channels to a gateway PLC rack that contains the Ethernet and DH+ communication modules. Although the gateway communication modules remained a single point of failure, they are hot swappable and do not require the system be halted for repairs. Additionally, the communication network was segmented into five isolated channels, meaning that a single module failure would not impact more than approximately 20% of the system. Where

available, Ethernet was used as the primary method of communication with DH+ set up as the failover communication path if an error was detected on the primary.

Of primary concern during deployment was the prevention of data loss as each remote system was transferred from the existing concentrator to the new system. Extensive simulation testing was performed in our office's simulation lab and on the customers PLC simulator system. Over two thousand pages of test cases were executed twice. First on the simulator before deployment and again after deployment to be absolutely certain the system was functioning as designed. This approach allowed the system to stay in a validated state throughout the deployment.

To provide scalability, the final program was designed and tested for almost twice the number of existing remote PLCs connected to it. This means the system was validated with more remote connections than the customer's expectation of future expansion. New system connections will require much less effort in design and validation, providing a significant reduction in cost of future expansion.

This project was a great success for the partnership between our customer and our firm. We completed our work within the original time constraint of 5 months with zero change requests issued. No data was lost nor were any deviations caused by the online conversion of the critical, continuous processes. The new system is faster, more robust, and is capable of monitoring twice as much data as the previous system. Our firm continues to provide both engineering and validation solutions to this customer and is proud of our affiliation with them.

