Newell Automation

What the heck is SQL?

A customer on the East Coast wanted to understand more about the down-time in their process. What was causing the downtime? What equipment was involved? How much time was actual down-time? Like many manufacturers, they were hoping to improve their process time and get more production out the door. They turned to Andy Baughman, M.G. Newell Control Systems Engineer.

Andy upgraded their controls and programmed their system to collect all of the relevant data about their process. He then developed a solution based on SQL programming that allowed them to data-mine the collected process information. The end result:

- The customer was able to see trends about the equipment and process that had not been detected previously
- They were able to tailor their Preventive Maintenance using these trends
- With the entire system being web-based, it allowed the users to integrate web features such as talk-to-text
- Their West Coast office was able to monitor the process in "real time"
- The SQL program gives them the versatility to add other options such as bar-coding in the future
- With improved monitoring and data collection, the customer realized that their process was actually running over 50 units per minute instead of the 30 units per minute previously thought

Benefits Gained from Updating your Controls

1. Live production monitoring
2. Live "Lean Manufacturing" analytics
3. SQL data archiving
4. Alarms and notifications
5. Reduced infrastructure cost

Why SQL?

Sequential Query Language (SQL) is a programming language for storing, manipulating and retrieving data from databases. Database tables collect and store process and product data in a way that can be retrieved and used later. SQL allows users to describe, define and manipulate that data and even allows the user to embed it within other programming languages. "Flat Files" describe data that is stored in columns and rows (like an Excel® spreadsheet).

It is preferable to collect data in database tables rather than flat files. Why? Let's use our example above to explain.

Downtime doesn't fit the Flat File model. For any given production run, the number of downtime events can vary from 0 to infinity. A flat file would need enough columns to store the maximum number of downtime events. This would not be efficient or practical because any production run that concluded with no downtime would have zeros or "null" values in every column assigned for downtime events. The file itself would be huge and contain very little to no information. Likewise, retrieving any information would be tedious.

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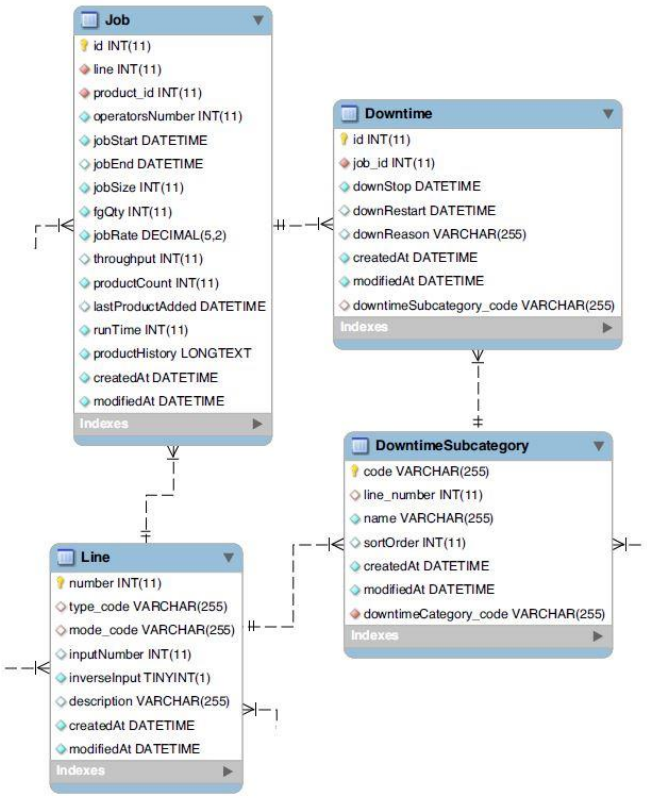
A better solution is to store the data in multiple "tables". A "Job" table could store all the information regarding a unique production run. A Job marries a specific product to a specific production line. It documents details about that job such as start/stop times, product information, production rate, etc. A "Downtime" table could store all the information regarding each downtime occurrence. The two tables could then be linked to each other in a database. A new field could be added to the Job data to represent the number of downtime events that occurred during each production run.



Additionally, database tables can be added or deleted at any time. For example, our customer plans to add bar-coding functionality in the future. One never knows today what data might be important five years from now. By collecting as much data as possible now, the collected information can be "data mined" in the future.

Data mining is an analytic process designed to explore large amounts of data in search of consistent patterns or systematic relationships between variables. That information is then validated by applying the patterns to new subsets of data. The ultimate goal of data mining is prediction. For example, data mining is now common in the insurance industry as they gather more and more sophisticated information about car accidents. It is also commonly used by retailers to gather consumer buying trends.

Want to know more?

M.G. Newell has a team of Control and Automation Specialists on staff to help with PLC design and programing, control panel design and fabrication and software programming. As a UL Certified facility, our staff averages 20+ years of experience with backgrounds in electrical engineering, systems controls and automation design. Need an impartial assessment of your control systems? Do you wish your controls were more flexible? Contact us at sales@mgnewell.com and we can schedule an audit or just come in to answer any questions you may have.