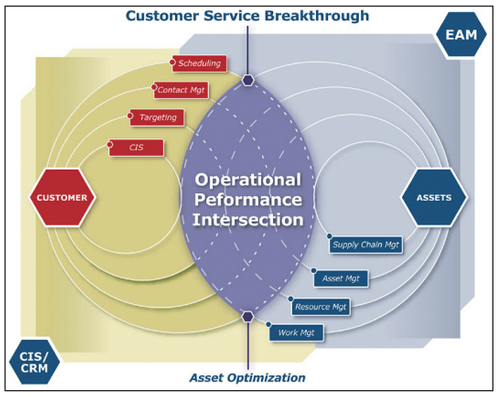
BY DAVID RAGER

Work/Asset Management Central To GCWW's Business Transformation

MORE THAN 140,000 AUTOMATED WORK ORDERS WERE PROCESSED, AND 600,000 ASSETS WERE TRACKED IN CINCINNATI'S NEW MANAGEMENT SYSTEM IN ITS FIRST YEAR.

A few years ago, we at Greater Cincinnati Water Works (GCWW) had to make some tough decisions about how best to evolve the utility to not only prosper, but to continue to offer the highest-quality water to our constituents. We faced significant hurdles. Containing costs in the face of rising supplier costs was a significant challenge. Customer service was hindered because employees did not have ready access to information that would allow them to effectively address customer concerns. As with most utilities, our infrastructure was distributed over 400 sq mi (1,000 km^2) and was difficult to track and maintain. The utility was literally at the point that it could not expand with the current processes in place.



Yet, because our customer base was shifting, expansion was an imperative. Cincinnati has had a large manufacturing base for more than a hundred years, which means significant water consumption. However, as with most Midwestern cities, the local economy has transitioned to more of a service industry with financial and corporate operations, which are not large consumers of water. Therefore, to generate new revenues we needed to take on new customers.

PUTTING A PREMIUM ON EFFICIENCY

Top management agreed to use technology to meet these challenges, and we began in 1985 to draft a technology migration master plan. From an architecture standpoint, we sought systems that included both Windows NT and Unix servers running on a Windows NT network and using an Oracle database so that as these systems were built they could be linked together using open standard, best-in-class applications. Specifically, we were looking for:

- distributed rather than centralized computing;
- intelligent workstations rather than "dumb" terminals;
- distributed rather than centralized databases;
- heterogeneity rather than homogeneity of operating environments;
- open rather than proprietary solutions; and
- interoperability rather than "islands of automation."

GCWW Snapshot

- GCWW is municipally owned and operated
- Purchased by the city from a private owner in 1839
- Provides wholesale and retail (metered) services
- 3,000 mi (5,000 km) of water mains
- 52 bil gal (200 GL) of water distributed annually to 235,000 customers
- Service area includes:
  City of Cincinnati
  Most of Hamilton County
  Adjacent counties—Butler, Warren, Clermont and N. Kentucky
- Maintains 24-hour operation at three treatment plants, one granular activated carbon facility, 17 pumping stations, and 26 storage tanks and reservoirs

But we didn't stop with technology upgrades. We also developed a strategic business plan that would allow us to function more like a business enterprise. After all, we are a business that just happens to be owned by a government. We sell products and services, receive payments from customers for the products and services we deliver, and cover our costs solely from the payments we receive. We simply needed to be more efficient. Still, everyone involved realized this would be a major, multiyear undertaking and a huge culture change for our employees.

Although the master plan would touch on all major business processes, the consensus was to focus on four main foundational areas and integrate them around this architecture. Those four areas were: (1) create a single point of customer contact, (2) automate our geographic information systems (GIS), (3) use a process control system to monitor assets and water quality, and (4) connect everything together through work order management.

CREATING A SINGLE POINT OF CUSTOMER CONTACT

Our 25-year-old mainframe-based billing system, using homegrown software, was dated and inflexible. Most processes were paper-based. We called it a "take-a-step-and-wait" system. Our staff was in an operating mode in which almost every customer-related action required human intervention in order to go to the next step. Two of the questions we asked were: "What is the value of that human intervention?" and "How can technology speed up the process?" Our vision was to have all the information available to the call center staff so they could address any customer question. Our goal was to develop best-in-call-business processes and then find the technology that would support our redesigned business processes.

We chose the Banner Advantage customer information system (CIS) from SCT, now owned by Indus International, to bring all the information and all our customer points of contact together in one place. With this system a single person can take a customer call and have access to the bill or any other information needed to help him or her solve the problem. Further, our CIS system would also be linked to enhancements within our call center so that customers could address many of their needs through technology without ever needing to talk to a person.

AUTOMATING YOUR GIS

We had done some work in GIS, but we didn't have all the information in the system to allow us to provide the level of service we wanted from maintenance, management, and customer service points of view. We were part of a consortium of local Cincinnati utilities and government entities that had developed a common GIS system. It started out with curbs, streets, and parcels, and for us it showed where the access holes were. From these locations we could guess where the water was. What wasn't in the system were data on location and types of valves, pipe sizes and construction details, where the branches were that feed off that water main, and where the valves were that went to each home. We had thousands of plant maps that contained that information for our entire service area, and our field service personnel were forced to copy and carry those maps with them into the field on service calls.

To automate and modernize these practices, we installed a suite of GIS applications using software from ESRI to track service requests and actions. More than 2,800 mi (4,500 km) of pipe were part of the digital GIS database. All existing water main system records were fully converted to the digital format, essentially eliminating all paper records.

USING A PROCESS CONTROL SYSTEM TO MONITOR ASSETS AND WATER QUALITY

Our supervisory control and data acquisition (SCADA) system allowed us to perform simple chores such as actuating control valves and motors and controlling water flow. However, it did not allow us to monitor water quality or the condition of our assets to determine whether they needed attention before a problem occurred. Modernizing this system allowed us to reallocate staff, reduce costs, and tie this performance data into our work order and asset management system.

CONNECTING EVERYTHING TOGETHER THROUGH WORK ORDER MANAGEMENT

All work management was paper-based, so getting a sense of the required volume of work and the resources needed to complete it was very difficult. We measured workload by how much paper was in the "in" basket. Our inventory operations were essentially based on experience and history. We could not track or apply costs to assets. It was impossible for us to say, for example, "We have fixed this asset six times over the past 15 years; maybe we ought to just replace it."

What we wanted out of work management was to be able to determine from one source the work facing the organization at any point in time and to set priorities. So, how do we reallocate resources to our priority issues and do it dynamically? We call the process the Total Enterprise Asset Management (TEAM) project and selected EMPAC from Indus International for this keystone role.

EMPAC is at the core of our operating environment because it connects asset management, work order management, inventory management, and fixed assets, while providing 17 point-to-point interfaces with other enterprise business applications such as

financials, purchasing, and human resources/payroll.

Following a design/analysis phase, EMPAC was implemented in a two-phased approach. We started bringing up the system in August 2001 and by February 2002 had integrated 450 users from our supply, engineering, commercial, distribution, water quality and treatment, and business services divisions that were running on the system. Now our field and maintenance forces get their day's work electronically and report electronically on conditions found and repairs made.

CHANGING THE EMPLOYEE MINDSET

Changing business processes means changing the way people work, and this takes time and effort. Employee training was a major undertaking, and for many employees it involved a culture shift. Computer skills were rudimentary for some. Without a strong commitment from top management, the implementation would not have succeeded. Not only did we have to put these new tools in front of employees, we had to teach them to use them efficiently and show them how to integrate them into their daily job functions. They were also encouraged to explore different ways to apply the wealth of information that was being generated from EMPAC.

The results have more than justified the effort. The system has been enthusiastically endorsed throughout the organization from top to bottom. Employees feel a renewed sense of pride in learning new job skills and participation in a forward-looking organization. In some cases, they have taken on completely new roles. Maintenance staff that used to do largely mechanical maintenance work now also perform electronic-circuit troubleshooting and are familiar with fiber-optic networks.

REAPING THE BENEFITS

Last year, we processed 140,000 work orders through the TEAM system, tracking close to 600,000 assets. All six of our business divisions are integrated in a wonderfully concerted effort. Some examples of the benefits we're realizing from the new systems include:

- **Integrated work and inventory management.** Now, a job isn't scheduled if parts aren't available. When the job is scheduled, the process is expedited. When the technician shows up at stores with a work order, the parts are ready, and the worker is off with no delay.
- **Optimized resource utilization.** The system helps us better match resources with the work required in order to determine what our requirements are for a given day. It helps us answer basic questions such as how many people are needed to complete a job. This preplanning greatly improves time utilization as well as productivity.
- **GIS/EAM integration.** By linking the GIS's graphical view and the enterprise asset management system's textual view, we obtain a consistent representation of assets to all users and the integration of work processes that require information from both systems. Now we look at the GIS and identify what assets are out there and, once they have been identified, tie this information back to the enterprise asset management to create a work order.

IMPROVING CUSTOMER SERVICE THROUGH CIS INTEGRATION

Another key area of improvement has been customer service, primarily because of the integration of our CIS and work/asset management systems. In this era of privatization and increased competition, nothing is more important than customer service. To gauge customer satisfaction, we survey customers every 24 months on a variety of issues. By far the number one thing they say they want is healthy, safe water.

The challenge is that consumers don't have the technology we have in our analytical labs to ascertain whether that water is safe or not. So, they evaluate our organization based on other parameters—namely customer service. If they get a bill for $10,000 instead of $100, their assessment is, "If GCWW can't get my bill right, is it treating my water correctly?"

The CIS system lets us address this issue. Customer service representatives now answer the phone promptly, and they have all the information at their fingertips to make sure the bill is correct and that customer communications are handled in a timely fashion. The work management system links directly to the CIS so that when a service call is made to the customer's premises, the technician is armed with customer knowledge via the work order. He knows how long a customer has been with us, his or her normal water consumption, what the problem is, and whether a service representative has been there before and for what. This level of customer intimacy not only facilitates efficient service and reduced costs, it also improves customer relations.

PREPARED FOR THE FUTURE

Technology has opened our eyes to many possibilities—and this is just the tip of the iceberg. In a few years, we expect to be Internet-based in terms of gathering information, purchasing, and interfacing with our customers. The technology we have installed today will be an increasing part of the metamorphosis of the organization. It's been a long road to get here, but we feel great about where we are.

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