

Mining for Gold Deep Within the Customer Information System

by Bill Barnett
Development Manager
Innoprise Software, Inc.

In the utility industry, it's not possible to discuss improving the effectiveness of either customer or revenue management without considering the critical nature of the customer information system (CIS). Pivotal to effective customer and revenue management, the CIS typically contains the vast majority of the information needed to achieve the best possible levels of customer satisfaction. It also houses much data critical to a utility's operational efficiency. It's the CIS that is the system of record for both customer and meter data. In combination with asset databases, these information repositories comprise the lifeblood of every utility.

Although CIS modules for billing, account management, meter readings, credit and collection, work orders, rate management and customer contact are typically integrated, they are usually not tuned for analysis or for easy reporting, and while almost all of the utility's customer interaction, revenue and work order functions are handled through the CIS, a single view of the customer and the business processes surrounding the customer does not exist in most of the systems in use today.

Most utilities, as a result, are data rich, but information poor, with repositories consisting of gigabytes or terabytes of data about their customers but no ability to turn this raw data into significant insights concerning their customers and markets that can help guide management, marketing and investment strategies.

Considering that a terabyte is equivalent to roughly two million books, that's a lot of information that, in theory, could be viewed in many different contexts relevant to a wide variety of business processes and strategic decisions that must be made. Unfortunately, this valuable information typically goes largely untapped beyond the realm of the singular process for which it was initially captured.

It is a classic case of "data rich, information poor." This is particularly true when the CIS is running on a legacy platform, of which there are many still in use. The convoluted nature of the legacy software and the monolithic architectures upon which old solutions were built are not conducive to flexibility of data access and manipulation. Fortunately, the ROI of replacing legacy software with new technology based on open, Web-based architectures is increasingly attractive, and as more and more legacy data is migrated to new CIS software platforms, it becomes increasingly easier to access and manipulate this data.

Ponder the power of being able to view and analyze the millions of pieces of CIS in relation to other pieces as a means to identify, visualize and extract critical trends and patterns -- to drill deep into the data and analyze the root causes of key issues like delinquency, slow payments, potential for collection, etc.

Enter the Data Warehouse

Utilities seeking to improve both strategic and tactical decision-making and achieve greater efficiencies are benefiting through efforts to create "one-stop" repositories for the retrieval of information, with an emphasis on more fully leveraging the information that's already been created and is stored in existing data archives. Here, the focus is not so much on what's taking place but rather on understanding why specific events happen by transforming data into knowledge that can then be analyzed.

The emphasis is on combining archived customer and operational data with emerging analytic functionality, and the first step is to consolidate data stored in disparate databases into a data warehouse. A data warehouse stores large quantities of data by specific categories so it can be more easily retrieved, interpreted and sorted by users, enabling executives and managers to anticipate and respond faster to market situations and make better-informed business decisions.

It has been predicted that every business will have a data warehouse within ten years. But merely storing data in a data warehouse does a company little good. This is where data mining and customer analytics come in. Based on a robust data warehousing framework that provides a single view of the customer by combining customer information, account management data and information on installed services, meter reading, billing, payment and collection, data mining tools then enable user-defined analysis of this data.

What is Data Mining?

Data mining provides tools and techniques that add intelligence to the data warehouse. It derives its name from the similarities between digging through and extracting meaning from information in a large database and mining a mountain for a vein of valuable ore. Both processes require either sifting through mountains of material, or intelligently probing it to find its hidden value.

Data mining tools use pattern recognition technologies, along with statistical and mathematical techniques, to sift through warehoused information and unearth significant facts, hidden patterns, relationships, trends, exceptions, anomalies and predictive information that might otherwise go unnoticed. These new analytical tools can answer important business questions that, until the advent of these tools, were too complex and time-consuming to consider, much less resolve.

Currently, data mining and the associated use of customer analytics and business intelligence software are more prevalent within the European utility industry than in North America because of the higher level of competition underway (and thus the more pressing need to fully understand customer buying and usage patterns). For example, in order to survive a price war, German power company Hamburgische Electricitats-Werke AG (HEW), implemented a data warehousing project followed by a data mining project to analyze customer acquisitions and better position itself to compete. At Electricite' de France, the French national electric power company is using data mining to better understand and predict electric power load curves of individual customers, to predict missing data in customer databases and to detect and characterize records which fail consistency-checking of the data warehouse. This makes it easier to produce accurate reports even when data is missing, through the use of statistical adjustment.

As North American utilities progress further down the road to an open marketing, data mining is an important technology trend as utilities seek to better understand their customers, their behaviors and how this impacts their desire for products and services.

A better understanding of customer behavior and consumption patterns lead to better decisions

Using data mining tools, utilities can analyze many years of historic information to gain fuller insights into the correlations between customer profiles and payment histories. Analysis capabilities can enable users to query CIS data in an ad hoc manner to identify patterns and analyze root causes for key issues like delinquency and slow payments, thereby increasing the potential for collection. Similarly, a variety of data mining techniques have been used to develop fraud systems that can detect fraudulent credit card transactions in near-real time.

Predictive models can take the uncertainty out of projecting timing and magnitude of utility consumption and thus facilitate and lower the risks of load forecasting, and more accurate load information can be used to negotiate better rates. Many utilities that collect and maintain meter data reflecting actual energy usage for individual consumers to support accurate customer billing are installing advanced metering technology to enable time-of-use and real-time pricing rate

programs. This data can be mined as a means to improve geographic load forecasting and subsequent targeting of energy efficiency and demand reduction programs. The data can also be mined by utilities and/or state regulators to target specific regions or major customers (by class or individually). Data analysis could identify promising trade-off opportunities to mitigate price and supply volatility in commodity markets, and provide unprecedented capabilities to more precisely target public energy management programs. They could help competitive energy service providers in emerging retail markets on a non-discriminatory basis to support more effective marketing and business development efforts that would open retail markets faster.

Furthermore, data building management and metering systems can be aggregated and analyzed to spot trends, issues or problem areas and to identify energy-saving opportunities, which can be posted on secure Web sites for 24/7 access from any Internet connection so that everyone from executives to maintenance personnel can leverage the data based upon their unique job functions.

Data mining also enables utilities to better meet operational and regulatory reporting needs. Utilities are increasingly required to constantly monitor their information and practices and benchmark their performance against competition. They are expected to analyze existing customer information and apply measurement criteria to improve the scope of the services provided to the customer, improve the cash collection process, streamline work flow practices, carry out change management processes and improve customer communication. Data mining can provide quick answers to key questions such as those asked by Sarbanes Oxley.

Using data mining, those responsible for customer relationship management can quickly access customer information, meter data, payment history and operational data to analyze customer consumption, revenue, cost, load provides and service disruptions. As a result, they can gain greater insights into what customer segments are most profitable, the demand profile by each segment, what services and products are being bought by various segments and the associations between these services/products and consumption patterns. This, in turn, can enable the utility to more effectively market existing offerings and to create new targeted products and service offerings to meet specific customer needs. Utilities can reduce the likelihood of customers going to their competitors by building churn models to identify high-risk customers and take the action necessary to retain them.

Summary

This article focused on the mining of CIS data. Data mining tools, however, can also provide large benefits used in other domains, for example, power plant maintenance, network operation and human resource management. Today, modern business intelligence tools are empowering utilities to combine data that already exists within the company in previously unprecedented ways to support better, more profitable decision-making and achieve new strategic advantages. As the utility market continues to evolve and progress, this trend can only continue to grow.

About the author. Bill Barnett is a Development Manager for Innoprise Software, Inc. He has more than 21 years of experience with Customer Information, Utility Billing systems, Financial and Public Safety applications. Barnett's experience started with programming and analyst roles evolving to VP of Integrated Systems. He holds a degree from the University of Florida and enjoys the leisure pursuits of golf and fishing.