

White Paper

CUSI making advanced .net architecture available for utilities of all sizes

Prepared for:



By Warren B. Causey
Vice President
Sierra Energy Group
The R&A Division of
Energy Central



Table of Contents

Executive Summary	Page 3
Utility IT: Moving away from doing thing the “hard way”	Page 5
‘Soup to Nuts’ construction	Page 8
More than just CIS	Page 9
Conclusion	Page 12
About the Author	Page 13



Executive Summary

CIS is core to utility company's businesses. It also is one of the most complex things they do, ranking in importance with the operation and maintenance of the transmission and distribution grids. Because CIS is so core to their operations, it must be linked to many other computer systems including financials, work management, field services, automated and manual meter reading, supply chain, etc.

Because utilities are relatively slow adopters of technology, many of them now have a collection of software systems from several generations of technological development. Linking these together has been difficult and often involved literally hundreds of point-to-point interfaces. This process of integration has been very time-consuming and expensive.

Today, Internet-based services, object-oriented programming and service-oriented-architecture (SOA) are simplifying the massive task of integration. Several new architectures such as .NET from Microsoft, Netweaver from SAP, Java from Sun Microsystems use basically open SOA to enable the linking of systems. Now, major software vendors are adopting various versions of SOA to "de-couple" their different modules and enable integration. However, few CISs have been built from the ground up as SOA-architected.

An exception are the products offered by Continental Utility Systems Inc., (CUSI) a Jonesboro, AR.-based firm that has used .NET and SQL server as the foundation for its CIS and other products. Thus CUSI's CIS and other products are ready out-of-the-box to operate in the new computing environment.

With more than 900 implementations, CUSI, though not as widely known as some other firms, has begun to make waves, winning larger deals of late, including one of more than 500,000 customers in South Africa. With its advanced technology and architecture, the firm seems to be poised to become an important force in the utility software market.



CUSI's software includes a robust CIS as well as financials, work management and other tools essential to utilities. CUSI often has been overlooked as a serious vendor for large-scale CIS deployments. That likely will change as the utility industry continues to evolve to more recent, highly adaptable technology and software architecture.



Utility IT: Moving away from doing thing the “hard way”

Tracking customers and their electric, natural gas or water usage is one of the most difficult and complicated things utilities do, and one of the most vital. It is a complex undertaking since customers move often, there are large numbers of them, and usage can vary widely by time of the year, individual practices, etc. In addition, all these variables must be accurately accounted for to ensure correct billing. Horror stories of improper billing abound in the industry and the media usually covers these stories widely.

As information technology (IT) began to enter the utility world, first with large main-frame computers and software, it became obvious how important billing and customer information systems (CISs) are in utility operations. One of the most salient indications of this is the number of interfaces built to customer information systems over the years. In recent Sierra Energy Group (SEG) surveys, utility IT personnel report anywhere from dozens of CIS interfaces to, in many cases more than 100, occasionally up to 200.

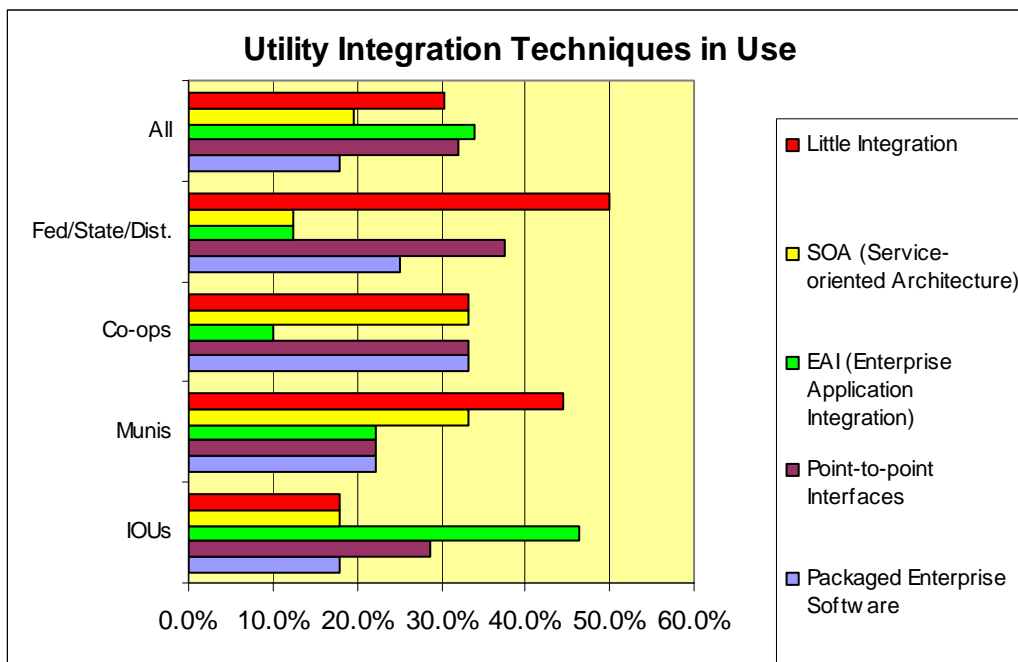
From the beginning, most of these interfaces were “hard-wired,” with complex application binary interfaces. Later APIs (application programming interfaces) moved the process up a step, to incorporate the interface rules into the programming language. This made interfaces a bit easier, but still complex, and individual APIs were required for each program linked. These generally are called point-to-point interfaces. Most of those dozens to 100 or more interfaces to CISs at utilities still are APIs.

Today, however, a new generation of IT architecture has led to moving away from direct connections from one program to another, to the idea of treating the information contained in programs as “data abstractions” that can be implemented and accessed across mixed networks. In this environment, the data contained in a CIS can be treated as “services” or “objects.” In this case, a “request for service” can be sent to a program, the program made to perform the service, and then the data as sent an object, or service, generally using the XML (Extensible Markup Language) Internet protocol. Once converted to an XML-based “service,” the information can be used by any other



program, even if the programs involved uses a different programming language or computer operating systems.

In this evolutionary process, first there was middleware. Enterprise Application Interfacing (EAI) was one of the earliest attempts at making data program-neutral. However, EAI tended to be proprietary and expensive to implement, though many utilities still rely upon it today. As shown in the following chart from a recent SEG survey, most large IOUs still use EAI, although point-to-point interfaces still are in use at many utilities.



As also can be see in the previous chart, however, service-oriented architecture (SOA) is beginning to make rapid inroads at utilities. SOA has several varieties, including some that is semi-proprietary and some that is “open-standard.” Examples of semi-proprietary SOA include SAP’s “Netweaver” and Microsoft’s .NET framework. Java, from Sun Microsystems, is another popular services-based language. All of them use “web services” as the means by which to transfer data. Web services were made possible by treating programs, such as CIS, as a “service” on an Internet-based set of protocols.

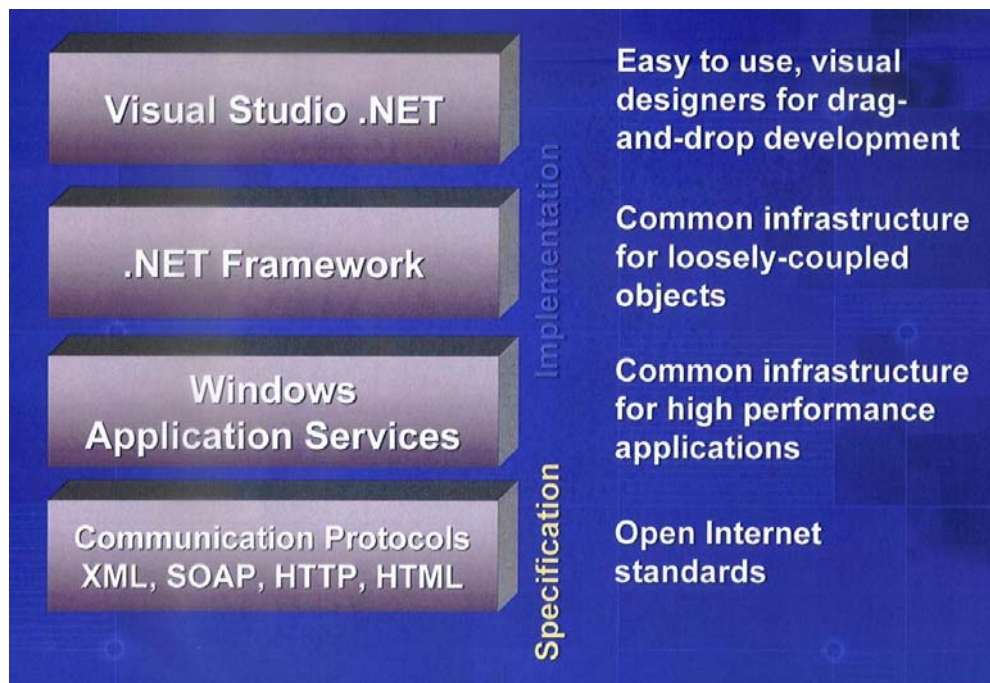


Microsoft's .Net is described as:

- Microsoft's platform for integrated solutions
- An application framework and design patterns for creating connected IT systems
- An architecture that models processes and data as abstractions that can be implemented and accessed across mixed networks
- An application framework for creating solutions across organization, legacy systems, devices and knowledge workers.

The .net architecture is integrated into Microsoft's Windows operating system, making it native to all Microsoft programs, including the Office products. Thus it can serve as an underlying "glue" to knit together all Microsoft products. The architecture also uses open standards for outward facing connections so that it can be integrate Microsoft products and others into mixed networks using Internet protocols.

The overall .NET programming architecture is shown in this chart:



“Soup to Nuts” construction

While most vendors serving the utility industry today are adapting their programs to be able to operate as services in an Internet “cloud,” there are only a few CISs that have been built from the ground up to operate in the new environment. One of the latest of these, which uses Microsoft’s .NET architecture, is UMS.net (Utility Management System.net) from Continental Utility Solutions, Inc. (CUSI), Jonesboro, Ark.

“UMS.net is the most recently constructed utility CIS software on the market today,” says Michael Guerriero, president & CEO of CUSI. “UMS.net is at the heart of today’s customer care and management and is easily and economically integrated within the .net environment. What historically took weeks to perform now can be accomplished in days due to the latest in protocol standards and object-oriented programming.”

CUSI is a privately owned and operated company founded in 1984. It has 55 employees and more than 850 CIS/Billing Application installations to date, a large proportion of them in the water industry, though the firm has been moving into electric and natural gas utilities. The firm also has installations at waste management, irrigation, property management and sub-metering companies. The firm’s software manages about 7 million bills monthly in North America, Central America, the Caribbean, Asia, Africa and Europe. With 850 implementations, although not widely recognized, is the fact that CUSI probably has the largest installed base of CISs of any software company.

One of CUSI’s most significant recent “wins” is in South Africa, where, in partnership with Fujitsu, it is installing its CIS, UMS.Net, at Nelson Mandela Bay, a Johannesburg utility with 500,000 residential water and electric customers. Under the terms of the agreement, Fujitsu is being licensed to offer UMS.Net, under the name PROMIS.Net to other utilities in South Africa. Go-live date for the Nelson Mandela Bay installation is scheduled for 2008.



SIERRA ENERGY GROUP

Market Intelligence and Research Solutions

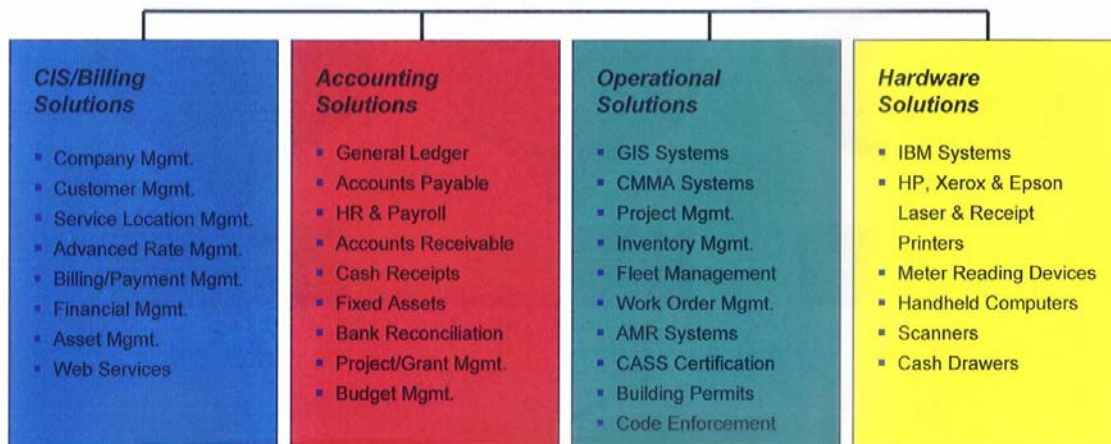
In addition to a CIS, CUSI, along with various partners, also offers accounting and materials management and many other types of software. The company's software development history includes:

- 1986—The Water Bill
- 1993—The Continental Accountant
- 1997—Continental Billing System for Windows
- 1998—Continental Material Management System for Windows
- 1998—Continental Irrigation Billing System for Windows
- 2004—Utility Management Solution.net
- 2005—Inventory Management Solution
- 2006—Resident and Property Manager ASP.net Web Services

More than just CIS

In addition to its flagship CIS, CUSI also offers a full suite of enterprise applications. The following chart shows the depth and breadth of solutions CUSI can implement in association with its partners:

CUSI Products



In addition to providing licensed software, CUSI offers full implementation services. These include software installation, implementation management, formal process management, dedicated staff, data extractions, data conversion and online and on-site training.

Guerriero describes CUSI as a “software development company,” meaning that although the company does its own implementations, its primary focus is the continual improvement of its software products. As such, the company has its own development staff, but also uses off-shore staff, as well. Some special adaptations of the basic UMS.Net product, for example, to accommodate some unique billing requirements in South Africa, is being done in Ireland.

CUSI uses a specific development methodology to ensure that its products are being continually improved. That methodology is shown graphically in this diagram:



CUSI Development Methodology



Being built from the ground up as an object- and service-oriented product, UMS.net includes some of the latest current technological thinking. Specific attributes of the technology include:

- .NET environment
- SQL Server database
- Object-oriented programming
- Advanced data exchange
- Fully web-enabled
- Advanced security
- Advanced database management
- Fully scalable to more than 1 million accounts
- Expandable technology



- Latest current development standards
- Extensive testing

Functionality of the product includes:

- Comprehensive security controls
- Expanded accounting functionality
- Expanded customer information
- E-mail functionality
- Location information
- Meter tracking
- Billing management
- Payment management
- Work order management
- Extensive reporting capability
- Inventory management module
- Credit card payment module
- GIS compatibility
- Web site compatibility.

Conclusion:

Increasingly utilities are moving toward service-oriented architecture (SOA) for their IT systems. The new architecture enables a mixing and matching of current technology with legacy systems. Utilities are traditionally relatively slow at adopting new technology, but are being forced by the rapidly changing regulatory and business environments in which they operate to upgrade as rapidly as possible. Having major systems, such as CIS, pre-enabled with SOA and other state-of-the-art capabilities is a requirement they increasingly are placing on their vendors.

The Microsoft .NET environment is one of the SOA approaches that is gaining increasing acceptance in the market. By embracing this technology, CUSI, though still a



SIERRA ENERGY GROUP

Market Intelligence and Research Solutions

relatively small company, has positioned itself well to win CIS and other product clients at larger utilities. The recent South African win, described above, with more than 600,000 customers to be billed, indicates this process has begun. With its small, rural setting in Jonesboro, Ark., CUSI has been frequently overlooked as a serious vendor for large-scale CIS deployments. That likely is about to change as the utility industry evolves to more recent, highly adaptable technology and software architecture.



Warren B. Causey

Vice President

Sierra Energy Group, the Research & Analysis Division of Energy Central

Warren B. Causey has been a researcher, writer and consultant working with technology and innovation for more than 30 years. He has specialized in the utility industry since the early 1990s. He was involved in several major computer systems installations in the 1970s and 1980s, and was working on the ARPANET, the military predecessor of the Internet, when it still was a closely guarded military secret. He is a prolific author of more than 25 books and hundreds of magazine articles including all of the leading utility industry publications. The full-length documents include "The New Utility Model," co-authorship of "IT Performance Management," and the widely read annual "CIS/CRM Report."

Causey also has worked as principle-in-charge for a wide variety of utility projects including IT Performance evaluation and gap analysis at Florida Power & Light, Nstar and Xcel Energy. His reports and analyses have been sold to utilities around the world and are in use by 84% of IOUS and Canadian provincials, 34% of municipal utilities and public power organizations, 14% of rural electric cooperatives, 25% of natural gas utilities (excluding combined service), plus all major and many minor vendors, analysts, consultants, etc. He has headed research/consulting projects for a host of utilities and vendors including Northwestern Energy, Lucent Technologies, SPL Worldgroup, SAP, Alliance Data Systems, and many others.

Causey is a frequent keynoter and speaker at virtually all of the major industry conferences, as well as being in demand for specific, contracted targeted advice sessions with utilities and vendors across the industry. He speaks frequently on leading-edge technology in information, distribution and business. He constantly tracks new technology including advanced power-line carrier, composite core transmission and distribution, emerging high-voltage low-heat technologies, business information and artificial intelligence systems, as well as new generation technologies, distributed generation and legislative/regulatory mandates.

Causey founded Warren B. Causey, Ltd. in 1996 and led it to become one of the most respected research/publishing/analysis firms in the industry, before merging it with Energy Central in 2005. He is retired from the U.S. Army Reserve, a decorated veteran of the first Persian Gulf War, and a part-time United Methodist pastor. He also is a private pilot.

