

## BIOGRAPHICAL INFORMATION

Jason Dettman  
System Consultant  
Intergraph Security, Government & Infrastructure

### Specific Responsibilities

Jason E. Dettman was formerly with Integrys Business Support, LLC, a subsidiary of Integrys Energy Group, Inc., for two-and-a-half years as a Lead Programmer Analyst on the DISCO (Distribution Operations) Application Development team, where he focused on GIS and Outage Management applications. During that time, Jason performed the role of Technical Lead on the implementation of the InService Outage Management Project.

Recently, Jason joined Intergraph Corporation, where he works with utility customers to implement the InService product suite.

### Educational Information

Bachelor of Science in Geography – Resource Management, University of Wisconsin – Eau Claire, December 1997

### Professional Memberships

GITA

Eric J. Charette, PE  
Sr. System Consultant  
Intergraph Security, Government & Infrastructure

### Specific Responsibilities

Eric J. Charette recently joined Intergraph as a Senior Systems Consultant for Mobile Workforce and Outage Management Solutions.

Previously, Eric worked for Wisconsin Public Service Corporation, where as a Senior Outage Management Engineer, he successfully led the client-side implementation of the InService Outage Management Project. Eric attended Michigan Technological University, in Houghton, Michigan, where he earned a Bachelor of Science degree in Electrical Engineering, with an emphasis in Power Systems. Eric is a registered professional engineer.

### Educational Information

Bachelor of Science in Electrical Engineering with an emphasis in Power Systems,  
Michigan Technological University in Houghton, Michigan

### Professional Memberships

IEEE  
PES

**AMR/OMS Integration: Improving Utility Operational Efficiencies and Enhancing  
Customer Value One Ping at a Time**

Jason Dettman  
System Consultant  
Security, Government & Infrastructure  
Intergraph Corporation  
P.O. Box 6695  
Huntsville, AL 35824-0695  
Telephone: (256) 724-0804  
Fax: (256) 730-8109  
E-mail: [jason.dettman@intergraph.com](mailto:jason.dettman@intergraph.com)

Eric J. Charette  
Sr. System Consultant  
Security, Government & Infrastructure  
Intergraph Corporation  
P.O. Box 6695  
Huntsville, AL 35824-0695  
Telephone: (256) 730-8295  
Fax: (256) 730-8109  
E-mail: [eric.charette@intergraph.com](mailto:eric.charette@intergraph.com)

ABSTRACT

Advances in Automated Meter Reading (AMR) have prompted utilities to integrate their network of smart meters with their Outage Management System (OMS). Wisconsin Public Service (WPS) is using this integration in the restoration verification process and has given dispatchers the ability to ping meters directly within the OMS from an interactive map. WPS also plans to leverage this integration for future endeavors. The integration has led to increased operational efficiencies and enhanced customer value.

## FULL PAPER

### Business Pain

In the world of electric distribution operations, long-standing practices and procedures have withstood the test of time. Many of these are widely accepted because they are in line with industry best practices and are proven to be the best approach to solve business problems with existing technology. At Wisconsin Public Service (WPS) in Green Bay, one of these standards was manually calling customers back after an outage to verify power restoration during major storm conditions. After WPS resolved each outage, it was common for them to call as many customers back as possible to verify that power had been restored. Quite often, these calls were made by the same operations personnel who were dispatching the orders, working with the line crews, and generally managing the storm. Though necessary to prevent return trips to an outage scene and to provide a better level of customer service, time spent on the phone took time away from dispatching the work and prolonged the restoration effort.

To staff a storm restoration effort properly, the solution was to nominate additional non-operational personnel to make these calls during a storm. This solution required more people in an already crowded operations center and a higher cost for WPS to restore power to the same amount of customers. In addition to the cost, it also was difficult to manually enter the information into the legacy Outage Management System (OMS). Frequently, before power restoration could be verified by phone, the line crews had left the site and were enroute to the next outage location before learning that work still remained at the previous site.

### Business Solution

In March 2005, WPS began a multi-million-dollar project to purchase and implement a commercial off-the-shelf OMS. The new system would replace the home-grown system used at WPS since 1999 and a paper system used at Upper Peninsula Power Company (UPPCO). Each of these systems had their value, but lacked interactive graphics, real-time network management, switch planning, and other features prevalent in outage systems today. The project was completed in the second quarter of 2006, enabling central dispatch for both WPS and UPPCO from one central control center in Green Bay.

Along with interfaces to the Customer Information System, the Geographic Information System, and other internal systems, the project team had a vision to build an interface to the recently implemented Automated Meter Reading (AMR) system. More than 425,000 automated smart meters had been installed in the previous five years as part of another project at WPS. Recent advances in AMR had prompted a handful of utilities to integrate their network of smart meters with their OMS, but at the time, this type of interface was relatively new to the industry. The team's goal was to automate the long-standing process of manual call backs and make the personnel and systems as efficient as possible during the storm restoration process.

In April 2006, WPS went live with their new OMS after a yearlong implementation project. Once the system was in production, the team incorporated the use of the smart meter into the power restoration verification process. In doing so, additional tangible benefits were realized that were thought possible but not included when the AMR system was first budgeted and approved many years prior.

### The Process Today

Nearly 18 months after the initial go live of the project, WPS is taking advantage of the AMR/OMS integration in everyday distribution operations. Upon closure of an outage within the OMS, the interface pings meters of the customers who called in to report a power outage. For each successful meter ping, the order is automatically closed in the CIS system. For failed pings, manual intervention is taken by a dispatcher, which may include a phone call back to the customer or reissuing the call in the OMS for further analysis. The dispatchers are now able to perform critical parts of their job while the meters are automatically pinged. Previously using the manual callback process, a typical customer call lasted anywhere from 30 to 60 seconds by the time the dispatcher located the call back number, waited for the customer to answer, and interacted with the customer. With the new automated process, anywhere from 10 to 15 meters can be pinged and processed per minute.

WPS also has leveraged this interface by giving operations personnel the ability to ping meters directly within the OMS from the interactive map. For this process, the dispatcher simply locates a device on the map and generates a list of customers to be pinged that are downstream of this device. The dispatcher can select a transformer, a fuse, a breaker, or even a conductor and automatically send the list of downstream customers to AMR. These predictive pings help determine the extent of an outage, especially when customer call volume is low, as well as confirm what the OMS outage predication engine already has determined. For each case where the utility supply voltage is present, the dispatcher is able to cancel the order before a line electrician is required to investigate the situation. This is accompanied by a call to the customer to inform them that WPS has verified the system is in proper working order and advise them of additional steps to take.

The management of this entire process is handled through a combination of the OMS and a custom-built application called "CB Man," short for *Call Back Manager*. This tool manages all of the pings automatically created as part of closing orders and those manually created through the map interface. It also stores a historical view that contains records of all transactions. This application was envisioned, designed and constructed by the technical and client project leads. CB Man is now a critical part of the outage management process, and no order is complete without first interacting with it. The dispatcher needs something that is easy to work with and does not take away from the dispatching process. The simple user interface of the CB Man is appealing to the everyday user as well as the occasional user in storm situations.

With all of this automation, it was important to WPS that the customer service levels remain constant. The dispatchers are still making customer call backs during a storm, but instead of calling all the customers back, they can now focus their attention on just the customers who requested a call back. The manual call back process would often leave the customer with a negative impression of WPS when they called to verify the restoration when the customer did not request a call back, but this call was important to the operation of the system. Many times these calls would need to be made after hours. The dispatcher determined whether or not to disturb a customer or move on without the information and possibly leave customers without power. With the OMS/AMR integration, an anonymous meter ping has taken the place of the manual call and provides near real-time information, which is key to the process.

### Benefits of Integration

The AMR-OMS integration at WPS has led to a number of benefits. The primary benefit has been increased operational efficiencies.

WPS has eliminated an average of about 20 trips per week to locations where internal problems or other issues are present. They ping meters before dispatching a line crew when power outages are reported meeting the following conditions:

- Single customer call during normal weather conditions and reported through IVR
- Single customer call from an apartment or mobile home park with no other related calls
- Single customer call from a customer served on a transformer that also serves other customers
- Single customer call originating from a remote location (such as work) or other location that is not the same as the outage
- Single customer call based on an alarm system notification

The chart below represents an annual cost savings of nearly \$108,000 (using a conservative duration of two hours per emergency dispatch avoided for a single-person trouble crew and associated vehicle and fuel costs).

Cost Savings Calculations	Normal Business Hours	Outside of Normal Business Hours	Totals
Avoided Trips / Year	364	676	1040
Hours / Year	728	1352	2080
Sub Totals	\$25,480	\$82,472	\$107,952

WPS has eliminated the need to make customer call backs to ensure power has been restored. This adds up to more than 320 hours per year of labor and a cost savings of \$8,000.

Cost Savings Calculations	Totals
Calls Formerly Made / Year	20,000
Hours / Year	320
Totals	\$8,000

The numbers above assume that not all customers could be contacted to verify power restoration due to various reasons. In reality, WPS is saving nearly five times this amount yearly, as AMR is able to ping *all* meters of customers who reported outages.

WPS is also recognizing benefits of this integration in storm situations as well. In a recent storm event which disrupted power to thousands of customers, the use of Call Back Manager proved even more valuable when dispatchers, from sites not affected by the storm, were assigned to do analyst work, assisting the storm site. Through the use of the OMS map and CB Man, these dispatchers who possessed little knowledge of the storm site's electrical network and who were physically located hundreds of miles away, were able to ping meters to confirm outage locations. According to Dale Klimek, Supervisor of Dispatch Operations at WPS, "The work of these remote dispatchers helped to eliminate unnecessary trips and allowed our crews to focus on the actual outage locations. This enabled us to complete our restoration efforts in less time than storms of the past where we didn't have the AMR-to-OMS integration."

In addition to the quantifiable benefits of this integration, there were numerous intangible benefits as well. WPS has eliminated the dispatch of crews to homes that have been disconnected for non-payment and still have managed to report their power out, attempting to circumvent the system and have their power reconnected. They also have improved customer service by informing customers that they are aware when they have power supplied to their meter.

In northern Wisconsin and Upper Michigan, the opening of hunting and fishing seasons means returning to the cabin, camp, or cottage for the first time since the end of the prior season. If an outage had affected these remote areas and was never reported, hunters and fishermen arrive to a cottage without power. This would result in an after-hours call to the utility, cost incurred to repair the problem on overtime for WPS, and a general inconvenience to the customer. WPS began a process in which they track misreads for several days leading into a season opening weekend and then dispatch crews to these locations during normal working hours. WPS also uses this technique after storm

activity. They will ping all of the meters in affected areas to ensure that the power has been restored to all meters before their customers arrive at their recreational property. By restoring power under these conditions, WPS is able to save cost and provide better, yet hidden, customer service.

Since the new OMS and the AMR interface have been in production, customer satisfaction scores for Outage Management at WPS have risen steadily each quarter. In the latest customer satisfaction survey, they scored a stellar 8.7 on a scale to 10 in the area of overall satisfaction with outage management. It is clear that the customer is finding more value than in recent years with the service that WPS provides during outages.

In summary, the integration at WPS has led to faster outage analysis, higher levels of reliability, accurate reporting to the Wisconsin Public Service Commission, increased operational efficiencies, and enhanced levels of customer satisfaction.

### The Process Tomorrow

WPS is already beginning to look beyond their present day functionality with the AMR/OMS integration for additional ways to leverage this technology. Within months after the go-live of the outage system, they started developing plans for the next phase of the project.

With any new advancement there are areas for refinement. The predictive ping process to verify power before dispatching an outage has become such an important part of the process that it takes place before every single customer outage call. Customers often have internal wiring problems, such as their breaker has tripped, they have experienced a momentary outage, or they inadvertently report their power out through the IVR system. More than half of the customers report their power out using the IVR system at WPS, and while this results in more data for the OMS to analyze and predict the outage location and requires fewer personnel to staff the customer communication center for call taking, it also means some outages will be created for non-outage situations. The dispatchers at WPS are manually pinging these meters before sending out a line crew. WPS is planning to automate this process by automatically pinging a customer's meter when creating the order in the CIS. This may only reduce the effort by less than a minute, but when processing 3,000 single customer power outages a year, the time will add up to annual savings of \$10,000.

Beyond this initial enhancement, WPS is also looking at ways to empower the customer. One way to do this is to allow customers to verify power status by pinging their own meter through a secured Web portal. Just a few years ago, this would have seemed like a ridiculous proposal, with questions about how customers could access their computer or the Internet without power. Today, the answer is in the smart handheld devices and the availability of wireless Internet almost anywhere. Customers are asking utilities for more tools to access real-time information about their service. Having the Internet and instant access to information on a wireless device, such as a smart phone, has prompted utility

customers to want even more. In the past, they were happy with the ability to report their outage and have their power restored in a timely fashion. Then, they wanted to know how long it was going to be, what the cause was, and what the utility was doing to resolve it. Now they want to report an outage online, check the real-time status, and receive notification when updates are available. A real-time interface between a secured Web portal and the OMS is now an attainable solution.

Ultimately, customers want to know when their power has been restored so they can return home or make other decisions dependent upon the availability of electricity. To meet this need, WPS is pursuing an option to integrate with an outbound dialer to call customers back after AMR verifies the power has been restored. In some cases, customers will be notified that their power has been restored before they even knew there was an outage.

### Conclusion

WPS has proven to be a leader in this area of technology and has generated interest from other utilities in the industry looking to integrate their smart meters with their outage system.

It is this progressive attitude that has helped WPS be on the leading edge of technology. The success of the process today is clearly paving the way for the enhancements of the future. Through the AMR to OMS integration, WPS is not waiting for others to determine their future, but instead is creating it on their own, one ping at a time.