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WasteHarmonics

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Case Study

Waste Harmonics uses Siemens 3G cellular routers to monitor hundreds of trash compactors across North America, saving more than \$100,000 annually

For companies with many sites that span wide geographic territories, managing local waste and recycling can be challenging. They have to deal with different haulers, each with their own contracts, expirations, service levels, plus terms and conditions. They have to verify and process different invoices each month. If a compactor breaks, they have to call its provider and arrange for repair, all while trash, garbage and recyclables pile up.

Waste Harmonics, based in Rochester, N.Y., brokers local hauling services for its customers and provides a single point of contact for those services, regardless of location. This effectively consolidates their waste management services no matter where their operations are, simplifies the payment process and lowers their total cost of managing their waste and recycling.

The company currently serves a large number of national, international, and regional companies in the retail, property management, grocery, utility and furniture industries. For example, one major supermarket chain with more than 100 locations enlists Waste Harmonics to coordinate hauler coverage across all their stores. It rents compactors and balers from Waste Harmonics and pays just one monthly service fee. If and wherever a problem arises, it has just one number to call for service.



Customer: Waste Harmonics, LLC is waste services broker that rents compactors and balers to customers across North America.

Challenge: Needed dependable, secure wireless communications to monitor the operating condition of hundreds of hydraulic compactors across North America.

Solution: Combined a Siemens SCALANCE M875 3G cellular router to a Siemens SIMATIC S7-1200 PLC control system to gain access to AT&T's Jasper Wireless network.

Results: Gained new visibility to compactor operations, enabling remote status, diagnostic and troubleshooting capabilities; avoided \$760,000 in capital costs, \$62,000 in annual communication costs and up to \$40,000 in yearly service calls; sharpened its competitive edge thanks to improved service levels.

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Challenge: Needed dependable, secure wireless communications to monitor around-the-clock operating conditions of hundreds of hydraulic compactors across North America.



Unlike most of its competitors, Waste Harmonics owns the compactors, balers and other equipment its customers use to dispose of their waste and recycled materials. According to President Mike Hess, his competitors would rather leave ownership of that equipment to the local haulers, who then have the responsibility for its proper operation, maintenance and repair. "Our competitors simply don't want to deal with it all," he says, "but we do because it ties us closer to our customers and gives us much more control over the services we provide."

Data not available. While those additional responsibilities help clearly differentiate Waste Harmonics in its market, they also create a need to monitor that equipment from afar. Hess explains that most legacy equipment has proprietary timer/relay control systems with little or no communication capabilities. "If anything, they can generate a single data point about how full a unit is, but we wanted visibility into the control units themselves," he says. "For that we needed a continuous flow of 24/7 data about operational conditions, predictive maintenance, troubleshooting and so forth."



Waste Harmonics saves its customers with many distant sites the time, effort and money of managing their waste and recyclables on their own.

Hess realized Waste Harmonics had to take an entirely different approach. When researching solutions, he learned that if he stuck with legacy equipment, getting the kind of data visibility he sought would require third-party provisioning and cost about a million dollars – not counting 15 percent ongoing license and support fees. Even then, he wouldn't get all the data capabilities he needed.

"Crunch time." Meanwhile Waste Harmonics' single-point-of-contact value proposition was drawing lots of new business –making a much more economically viable solution an urgent imperative. The turning point came when the company won a major contract to manage 350 trash compactors across the U.S. and Canada. "It was crunch time," Hess recalls. "We had just 60 days to get the equipment built, shipped, installed and operating."

Solution: A Siemens SCALANCE M875 3G cellular router combined with a SIMATIC S7-1200 PLC control system to gain 24/7/365 access to AT&T's Jasper Wireless network.

Standardization was a key part of Waste Harmonics' strategy with this customer, so much so that Hess wrote it into the service agreement between the two companies. "We wanted to deploy the exact same equipment, each with the exact same setup, in every single location," he says. "This way, if there are any operational issues with the equipment, we can diagnose and fix it very quickly."

To meet his requirements, Hess turned to a leading equipment manufacturer for the waste and recycling industries. "They suggested using the Siemens SIMATIC S7-1200 PLC, which has a proven track record and has given us tremendous control functionality" he says. "But we also wanted to pair it somehow with a communications module that would give us not only operational visibility but also the ability to do remote troubleshooting, diagnostics and even upgrades, as needed."

At first, Hess considered using Wi-Fi access at each of his new customer's locations, which could then communicate its compactor's operating data back to Waste Harmonics' Rochester headquarters via the Internet. "But we quickly realized that wasn't going to work," he says. "A lot of it had to do with security, not being on a private network and dealing with their various Wi-Fi configurations at each location. And we'd also need to deploy costly industrial-grade, VPN-capable routers for each location, too."

With the Siemens solution, Waste Harmonics can now remotely monitor the following parameters 24x7 and in near real-time for its compactors across North America:

- Oil temperature
- Number of cycles
- Motor running time
- Hydraulic pressure
- Electrical overload
- Interlock failure
- High temp warning
- Equipment disconnect
- Equipment reconnect
- Mode of operation

Beware of hackers. Hess then realized how his security concern might also become both a safety concern and a risk management issue when he visited the compactor manufacturing plant. He was on the plant floor when a staff engineer powered up his smart phone and then told him to watch what happened. “The machine next to us starts running, triggered by the engineer’s phone,” he says. “On the face of it, I thought that was a cool feature. But then I realized that someone using a smartphone could hack into a compactor’s control system. Obviously because I’d be owning the compactor, it’s my risk, and I just couldn’t take the chance with such a liability.”

Hess also considered hard-wired communications solutions, but finally settled on using cellular routers. After evaluating a number of candidates, he chose the AT&T-certified Siemens SCALANCE M875 3G cellular router for several reasons. The most obvious was its easy integration with the Siemens SIMATIC S7-1200 PLCs, which are mounted alongside each other in the compactors’ control panel. “We only had 60 days to get 350 compactors built, delivered and commissioned,” Hess says. “The M875’s quick and easy integration with the S7 PLC was critical to meeting that schedule.”



Open architecture, lower cost. The open architecture of the Siemens SCALANCE M875 3G cellular router also resonated with Hess’s aversion to closed, proprietary components. Compared to the other solutions he researched, it cost much less, too. Finally, if service was needed, the nationwide service and support coverage of Siemens and its partners would provide a backstop.

“Our ability to call Siemens and always be able to reach someone no matter where we are has been invaluable, especially during our rollout,” says Hess. “In Nevada, for example, we had some technical issues that needed onsite troubleshooting, and Siemens was ready to send someone right out. Turns out we solved the problem, but it’s great to know that Siemens service and support are always there, if we need them.”

For secure, around-the-clock 3G network services, Hess chose AT&T’s machine-to-machine (M2M) network, a nationwide platform in the U.S. In Canada, AT&T subcontracted to one of its Canadian network partners.

In effect, given the Siemens SCALANCE M875 3G cellular router’s built-in security features, plus its AT&T-certification and the network’s own security measures, Hess created an “in-house” private network that connects each trash compactor securely with Waste Harmonics’ master database aboard a control server hosted in a local data center.

Results: New visibility to compactor operations, enabling remote status, diagnostic and troubleshooting capabilities; avoided huge capital, communication and service costs; sharpened its competitive edge thanks to improved service levels.



Hess reports that the Siemens solution saved Waste Harmonics “a ton of money.” For starters, he figures that the company avoided \$760,000 in upfront capital costs had it opted for third-party setups and the legacy equipment approach. “Compared to those, the Siemens solution was just a quarter of the cost,” he says. “What’s more, these alternatives wouldn’t have given us anywhere near the data we wanted, nor would we have had any control over that data.”

Waste Harmonics also avoids more than \$100,000 a year in operating costs, Hess adds. First, the Siemens SCALANCE M875 3G cellular router is configured to use AT&T's M2M network as cost-efficiently as possible. Hess says his company pays just a small fraction of a cell phone data plan monthly; and, because it has deployed so many of the Siemens 3G routers, AT&T considers Waste Harmonics a dealer, which provides even more price breaks. "Our alternatives would have cost us about \$62,000 a year in communication costs over what we're paying now," he says.

The rest of Waste Harmonics' annual operating cost-avoidance – more than \$40,000 a year, Hess says – comes from being able to pre-empt service calls by conducting remote diagnostics via the network and addressing problems with a phone call. "Compactors are built for extreme weather and use, so with proper maintenance and the kind of operational monitoring we can now do, not a lot can go wrong," he explains. "But what often happens, is that e-stops get pushed inadvertently, gates get left open and key switches get turned to manual. When these things happen, we're aware of them and can just call the customer's site and let them know. It's a lot cheaper than sending out a service technician that can cost up to \$500 a call."

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