

Case Study: Data Center



Jerry Zahora, consulting systems engineer, analyzes a waveform on his laptop.

LexisNexis Gets Powered Up for Non-Stop Business

This 45,000-square-foot data center serves 2.6 million subscribers with 3 billion online documents. To help eliminate their weekly eight-hour maintenance window and run non-stop 24 hours a day, Power Measurement installed an EEM system with ION® software and meters.

The system performs continuous status monitoring, alarm management, and root-cause analysis of power disturbances. It collects data from devices such as ATSS, transformers, UPSs, and PDUs, and provides centralized display of all metered sites.

Application:

Data Center

System:

Pegasys software
ION® 7700, ION® 7330 meters

Benefits:

- ◆ Reliable operations
- ◆ Fast troubleshooting
- ◆ Easy information access
- ◆ Simplified workflow
- ◆ Flexibility

Gathering Intelligence

The Data Center Services group installed over fifty ION 7700 and ION 7330 metering devices. The ION 7700s capture power quality events and energy data at 12.47kV-to-480V transformers, uninterruptible power supply (UPS) outputs, and the static switches that transfer loads between UPS systems. The ION 7330s gather load data from automatic transfer switches and twenty power distribution units. The meters are linked via Ethernet to a server in the data center running PEGASYS software.

Consulting systems engineer, Jerry Zahora, and his team display alarms, generate reports, and analyze waveforms at five PEGASYS workstations. "We're creating custom screens where we can 'walk' around our one-line electrical diagram and look at a batch of meters," describes Zahora. "We can see all meters in a substation at once instead of calling up each meter individually."

Easy Load Switching

One challenge was backup for the UPSs during maintenance work. If Zahora's group had to perform maintenance on the UPS system cabinet, the whole UPS system and the computer equipment fed from it would have to be shut down.

"We installed another large UPS system that could back up any of the five existing UPS systems," Zahora explains, "as well as the monitoring system that could track where the loads were. This gave us the flexibility to move loads around with the use of static switches."

Measuring Quality

The next goal was capturing more information about voltage spikes and other power quality events. Many alarms, for cases such as voltage imbalance and over-current, are reported by PEGASYS to the LexisNexis building automation system, which instantly notifies maintenance of any urgent problems.

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"We've configured the software to send messages describing the condition and location; for example, 'UPS 10 has a transient.' In the future, I'll also set up the software to call my pager and send text messages directly to me."

A Waveform is Worth a Thousand Words

Voltage and current waveforms convey a great deal about the causes of power quality events. "Every waveform has a signature. I compare suspicious waveforms recorded by the meters with the ones in my reference book. By checking vectors and degrees, I can identify two or three possibilities for the source of a problem. That's how I determined that one of our disturbances was caused by a shorted capacitor."

This irregular waveform was captured by an ION 7700 meter on every static switch. One night, all eight of the switches transferred power from the new UPS. At first, no one knew why. Then Zahora checked the waveforms and they all pointed to the source that was feeding the switches — the UPS itself. Capacitors on the output filter had shorted. "Without the meters," Zahora says, "we would have wasted a lot of time troubleshooting the problem and we may never have known the cause."

Another disturbance was reported every morning at 7:28 a.m. by an ION 7700 meter on an incoming substation feed. The waveform revealed an oscillatory transient, probably coming from a utility capacitor bank. Zahora phoned the utility and confirmed that a capacitor bank was indeed being switched on at that time.



Simplifying Tasks With Software

Zahora appreciated the ability to customize a meter's functions through software. "In training, I learned how to program an alarm on an emergency generator so the transient sensors weren't activated until after the generator started running. If I had set up a standard alarm, it would have been on all the time because, when the generator switches on, the voltage instantly changes from 0 V to 480 V, above the nominal 280 V."

"I made these changes on the meters remotely through software, without any hard-wiring. I just modified a few modules and linked them graphically on my workstation."

"I also set up PEGASYS to send reports automatically to a web page. One of them is a weekly UPS head chart that lists the UPSs, their capacities, and whether we've run them during the week. We used to do that manually, a hated drudge that the software has removed. Now we immediately receive information on how high an anomaly was, its duration, and more."

Another custom setup was to confirm whether the transient voltage surge suppressors (TVSSs) were working properly. The TVSSs prevent high voltages from passing into the data center if it's hit by lightning. On his workstation, Zahora can see the highest voltage and current actually allowed through.

Information Anytime, Anywhere

It's just as important to exclude unnecessary details as it is to gather data. That way, Zahora can decipher the important facts faster. "I learned some tricks about eliminating extra waveforms that I don't need. That's what I like about the system. You can do just about anything you want, and get meaningful data that gives you tremendous insight into every situation."

Zahora has PEGASYS on his laptop so he can dial into the data center from out of town and check the health of the electrical system at anytime. "I never check the meters in person. We don't even have displays on the meters. I get all my information over the network."

He's now analyzing the feasibility of incorporating LexisNexis remote "phone rooms" — 2,000-square-foot sites that route communications traffic back to Miamisburg headquarters — into the company's Ethernet network, so he can bring any site in the country onto his computer screen as easily as if it were right next door.

The right information, anytime, anywhere. That's what Zahora needs to keep the data center running, and leave everyone else thinking it's a piece of cake.



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