



# PowerNet Designed for Success

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Martin Walton, CEO, PowerNet

## Results

- Open, standards-based SCADA system that is easily adaptable to the needs of the business
- Fully automated load management to optimize energy purchases and maximize energy sales
- Improved SCADA system reliability
- More efficient network management
- Data management capabilities that deliver a return on investment that would not be possible with conventional SCADA

# On demand power distribution

PowerNet Limited, based in Invercargill, New Zealand, is a joint venture company that manages the electricity reticulation networks of The Power Company Limited, Electricity Invercargill Limited, and OtagoNet Joint Venture. Established on July 1, 1994, the company's core business is to manage electricity network assets in a cost-effective way. This strong commercial focus means PowerNet is able to achieve efficiencies in a monopoly-controlled industry.

PowerNet is responsible for the distribution of electricity to 64,000 rural, residential, and industrial customers. The company adheres to a vision and value code to serve its customers through understanding their needs and expectations and responding accordingly.

One of the ways they do that is make the most of the technology available to them. This allows them to reward their stakeholders customers, employees, suppliers, and owners—by producing a sound financial performance and contributing to the wellbeing of the community and the environment.

The electricity network is monitored and controlled by PowerNet staff from a central control room. To be true to its commitments, PowerNet had to upgrade its obsolete SCADA master station, the most critical real-time system in the business, which serves as the central monitoring and control system used by the electric company to operate their electricity network. As SCADA systems age they can become unreliable, and are difficult to interface to the other computer systems in the business, making it difficult for the company to integrate business processes and access critical data.

PowerNet turned to Catapult Software, a software integrator that has been developing SCADA software products and installing SCADA systems for the electricity industry since 1991. The company developed iPower specifically for the electric utility SCADA operations based on GE Digital's iFIX, a robust HMI/SCADA solution that provides process visualization, data acquisition, and supervisory control of operations.

iPower delivers a modern, sophisticated, and “evergreen” SCADA software to electric utilities that includes all of the safety, performance, reliability, and management needs to efficiently operate an electric network.

# Defer hardware upgrade costs

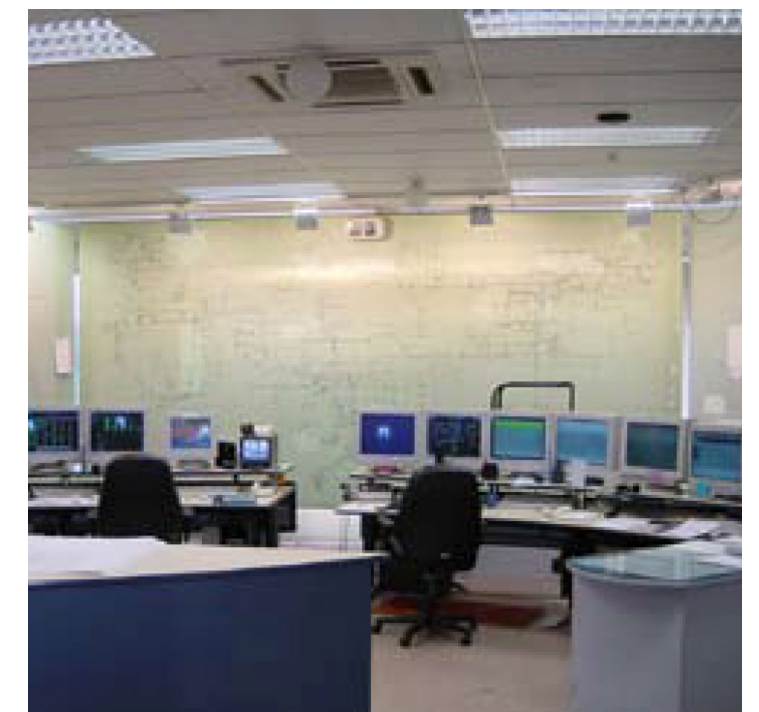
When one of Catapult Software's electric distribution customers asked them to look at the available SCADA systems, they found existing systems fell into two camps: those that were developed specifically for the electric industry, and control systems developed for larger factory automation markets. The first seemed overly expensive, yet typically lagged behind current industry standards and trends. The second was sold in high volumes, delivered considerably more sophistication, and was better priced. Its shortcoming was a lack of specific functionality required for electric distribution SCADA.

“iPower was developed to deliver the best of both worlds,” said Tony Haresnape, President of Catapult Software. “We started with a market-leading, sophisticated control system in iFIX from GE Digital. We added the software services needed to meet the requirements of electric distribution SCADA. The result is a sophisticated Windows-based SCADA system, affordable and perfect for the needs of rural electric cooperatives.”

When PowerNet began its upgrade project, they looked at different OS-based SCADA systems and decided that they were expensive to install and maintain. Microsoft Windows-based systems developed specifically for electric utilities are sold in relatively small numbers and therefore do not have the richness provided by the iFIX platform.

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# Data management: a competitive edge

A key difference between GE Digital's iFIX and other Windows-based SCADA products is that iFIX offers data management capabilities that enable users to easily extract information from SQL, Oracle, Access, and other databases. "PowerNet recognized that this capability could deliver a return on their investment that would never be possible with conventional SCADA," said Catapult Software's Haresnape.

The single largest cost when installing a new SCADA system is the time it takes to configure the system. Less obvious at purchase time is the cost of maintaining the integrity of the data, plus ongoing expansion of the system over the years of ownership. iPower tools make configuring and maintaining an electric utility SCADA system many times faster than in a conventional SCADA.

"The iFIX-iPower system has improved SCADA system reliability and delivered more efficiency to network management," said Martin Walton, CEO of PowerNet. "It was readily accepted by our operators and enabled us to retain our existing RTUs."

Each electricity substation has an RTU (Remote Terminal Unit)

an I/O device similar to a Programmable Logic Controller (PLC). The RTU is wired to analog and digital transducers, relaying their current value/state back to the iPower SCADA computers in the power company's control room. The control room is usually in the power company's headquarters, while the substations are spread across the power network. Communication to the RTUs from the control room is mostly accomplished by radio.

Human operators monitor the state of the electricity network at the iPower workstations by monitoring the system through the information from the RTUs: analog data includes voltages and currents at key locations, and digital data includes the state of the circuit breakers. Alarm and event processing are other important monitoring tools. In addition, operators perform controls such as remote opening and closing of circuit breakers.

The system assists with a clear, concise display of information. For example, operators navigate from a single picture over-viewing the whole power network. From this picture, they drill down to individual substation pictures to see detail supported by alarms and events lists. PowerNet's SCADA, which handles approximately 20,000 tags, is designed to present critical information in a clear and intuitive way so that operators are not swamped with flashing lights and alarms during a storm that causes outages.



# Automated load management

“OnDemand” is a distribution load management option for iPower that fully automates operation of the network to optimize the effectiveness and the profitability of electricity supply. At the same time, OnDemand ensures operation of the PowerNet system within the electrical constraints of the network.

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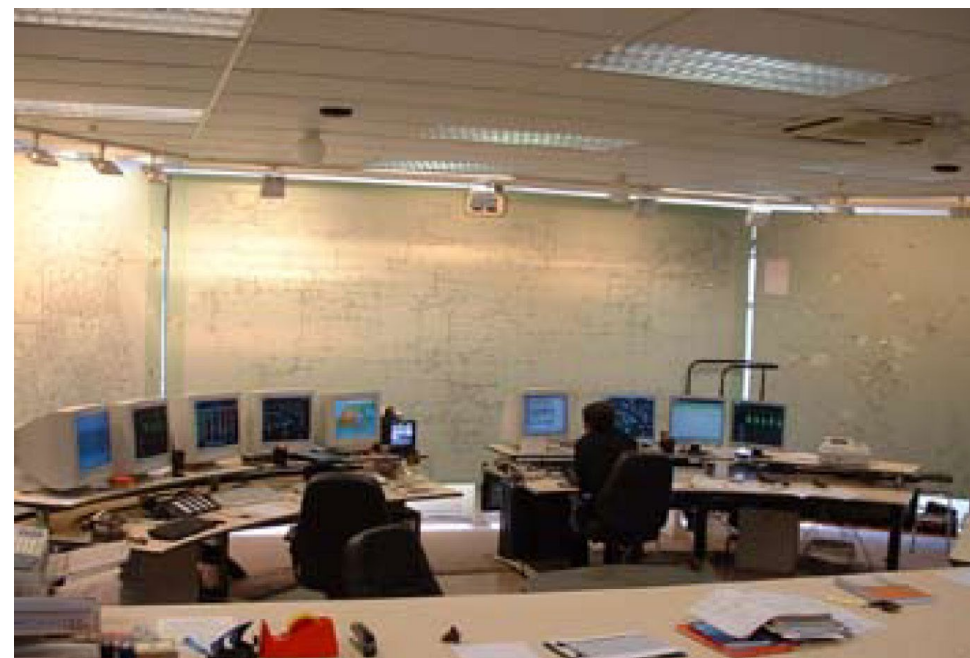
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# Enhancing operational effectiveness

From a reporting perspective, the company needed two different aspects addressed by iPower. First, after a major event like a storm, they wanted to review the sequence of events (SOEs) to learn the root cause of the outages, and also to understand how the network behaved. iPower adds a detailed events/SOE record to iFIX to make this possible. SOE information, time stamped down to 1 ms by the RTU, is integrated within the full events list. Events also give the company a precise and long-term record of everything every operator has done.

In addition, PowerNet needed historical information about how the demand for electricity has varied over the past day, week, and month. They use GE Digital’s Historian for this purpose. This information is critical to understand and improve the reliable and cost effective delivery of power to meet customer needs.

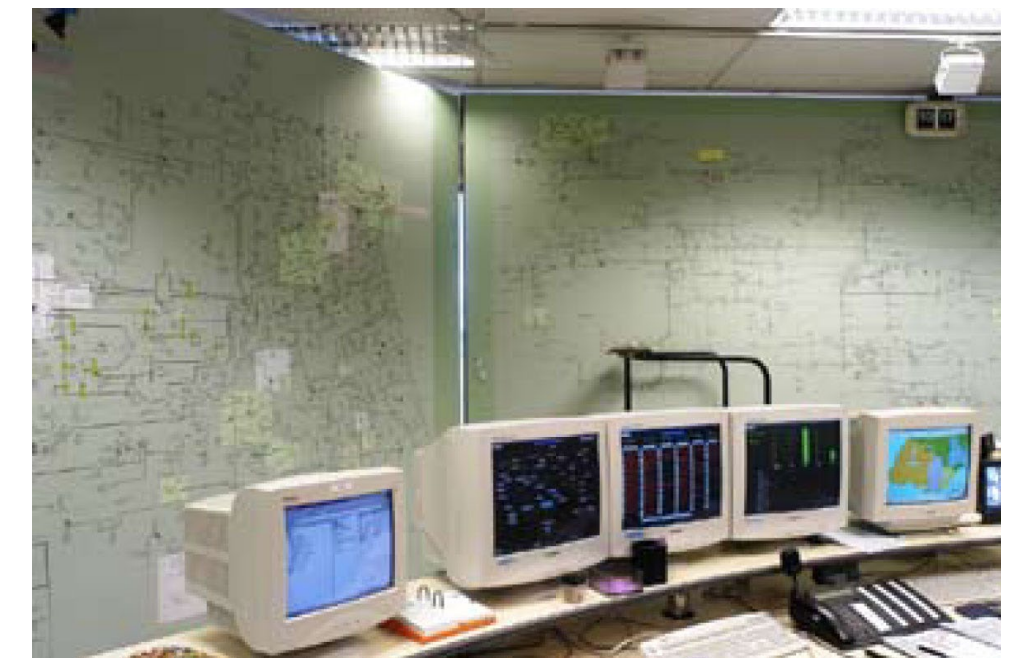


# Getting graphic

iFIX features Graphic Dynamos that are reusable, animated objects, or groups of objects that enable the creation of graphic elements quickly and easily. Graphic Dynamo sets provide a number of predefined objects, such as circuit breakers and transformers, which can be dropped into the graphics workspace to save development time.

iPower takes the Graphic Dynamo concept in iFIX to the next step, with complex objects that represent the real world. For example, a Transformer Dynamo becomes more than the transformer graphic; it also automatically links to the 20–30 analog and digital tags in the iFIX database that relate to the real-world transformer. This means that to configure a transformer on a picture is one drag and drop, not 20 or 30.

The iPower implementation has worked well for PowerNet. The company now has more ability to integrate SCADA data with other business data so that they are able to find and make efficiency gains, and accurately tune their business.





## About GE

GE (NYSE: GE) is the world's Digital Industrial Company, transforming industry with software-defined machines and solutions that are connected, responsive, and predictive. GE is organized around a global exchange of knowledge, the "GE Store," through which each business shares and accesses the same technology, markets, structure, and intellect. Each invention further fuels innovation and application across our industrial sectors. With people, services, technology, and scale, GE delivers better outcomes for customers by speaking the language of industry.

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