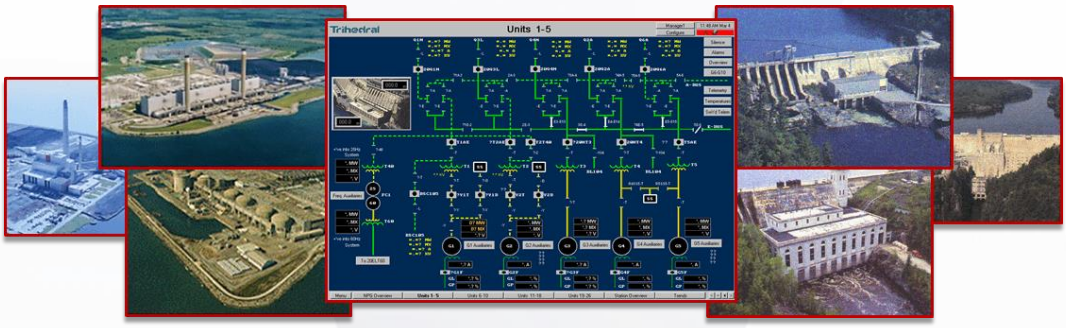
VTScada by Trihedral

Power Generation Reporting

One of North America's largest utilities underwent a large re-organization as part of a legislated deregulation of the energy industry in Ontario, Canada. To be responsive in a competitive energy marketplace, the utility split the power generation function from the power transmission and distribution functions to form two separate principle companies.



In the past, resources were shared across functions; however, the utility's reorganization led to the need for separate systems. One of the new utilities turned to Trihedral to develop a SCADA system for their newly formed Resource Management Division (RMD). The resulting VTScada-based system monitors the status of over 14,000 real time inputs every five seconds, representing the current operational status of 442 transmission lines, 223 generators, 164 revenue metering sites, and numerous miscellaneous signals including natural gas flow rates and river levels.

This information is gathered from 60 nuclear, fossil and hydroelectric power generating stations, and 56 switchyard sites across the province. The physical arrangement of hardware includes two servers configured in a hot standby configuration located in their Resource Management centre, with a number of connected clients used by operations staff as well as scheduling and business systems users. The interface to the field devices (meters, RTU's, other SCADA systems, etc.) is performed over their WAN systems, implemented as VPN (Virtual Private Network) links over public switched telecommunication links.

In this system VTScada acts as data concentrator gathering real time information from a diverse range of sources and presenting it to the users in a logical and consistent format, regardless of the source. To perform this task the system makes use of a number of standard VTScada I/O drivers combined with custom drivers developed to the customer's specifications. Interfaces include Modicon Modbus RTU protocolover both serial and TCP/IP LAN connections, DNP3 protocol over serial and TCP/IP LAN (via terminal servers), Quindar SCADA master systems using DECNet and TCP/IP based Qnet protocol, a Varian DCC interface, a proprietary ECOS database using an interface to an OLE/ActiveX object gathering data from a VAX computer, a PI database interface to an HP9000, and multiple SQL databases.

The information is displayed through more than 100 operating diagram display screens, including a scrolling overview screen of all major transmission lines in the province. In addition to these drivers, Trihedral developed several other customized objects. These include a VTScada tag used to gather information about a generator unit from a number of discrete analog and digital inputs. This tag determines the status of the unit, sets the tag value to reflect this status, and has a standard set of display methods for on-screen representation of the generator status.

Another VTScada tag monitors pairs of revenue meters to accurately determine the "best" set of meter data to present to system users based upon a customer specified meter validation and verification process. Custom "grouping" tags are used to sum generator unit data from a number of units, or to sum the total output from a number of metering installations to provide total power generation and/or consumption rates for plants, groups of plants, and for the utility as a whole, all updated in real time.

VTScada provides near real-time data into the utility's Energy and Resources Information System database. The data is then available to a wide range of users within the organization for Internet-style browsing of current and historical power generation statistics.

As a regulated utility, the utility operates under stringent security, dispatch and supply guidelines; the Trihedral system met those guidelines on time and under budget.

Since then, the system has expanded to include the following:

- The addition of a hot standby ICCP interface to OHN and IMO (Independent Market Operator) using Cycle Software's LiveData server product.
- Redundant communications paths to critical remote sites.
- TIBCO real time message publishing of selected SCADA system quantities for interface to business systems.
- The addition of up to 60 field RTU's using DNP3 over TCP/IP networks.
- A third level of server redundancy in their Business Continuity Environment site (BCE). This acts as a "disaster recovery" site in the event that system operation is not possible from the main control centre (due to fire, power outages, etc.), and is a fully functional SCADA site that will automatically assume communications with remote field devices in the event of a failure in the main control centre.

The original project was brought online in 1998 with a major expansion of scope in 2000.

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