

Application Case Study

SCADA Amalgamation at Hydro Ottawa



The consolidation of Ottawa's five local municipal electric utilities into a single Local Distribution Company, Hydro Ottawa, created a requirement for all SCADA system functions to be amalgamated into one. As a result of the consolidation, Hydro Ottawa came to own four independent SCADA systems, each of them monitoring and controlling a number of RTUs (Remote Terminal Units):

- Hydro Ottawa's OaSys,
- Gloucester Hydro's Quindar,
- Nepean Hydro's Quindar, and
- Kanata Hydro's ABB Spider.

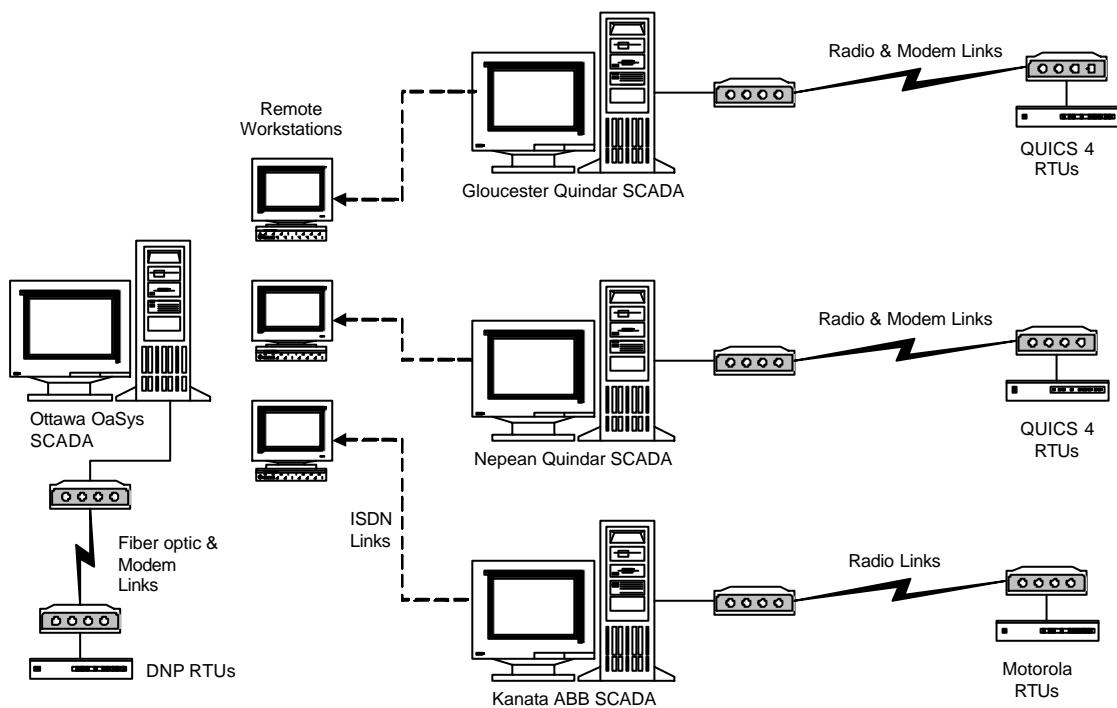


Figure 1: Existing SCADA Systems Architecture

Hydro Ottawa's primary objective was to amalgamate the four existing systems into one system using their OaSys SCADA as the master. Secondary objectives were to achieve this

amalgamation process as unobtrusively (to operations) as possible, and to use the existing RTUs and communication links.

eLAN™ SOLUTION

BOW Software's *eLAN* Router and Gateway products are ideally suited to amalgamating disparate SCADA systems, while retaining investment in legacy RTUs and communications infrastructure. *eLAN* is a family of communication and networking products that provide SCADA front-end data acquisition, protocol translation, data routing, and network interfaces for systems where the RTU protocol differs from the host protocol. In the case of Hydro Ottawa, the QUICS IV serial protocol used by the Quindar RTUs was translated to DNP 3.0 and communicated to the OaSys master over an IP network interface.

eLAN gateways facilitate communications between Hydro Ottawa's OaSys SCADA system and the existing Quindar RTUs at Nepean and Gloucester. Acting as an autonomous data acquisition system, with serial to Wide Area Network (WAN) interfaces and routers, *eLAN* created a virtual path from the Quindar RTUs to the OaSys master scan tasks.

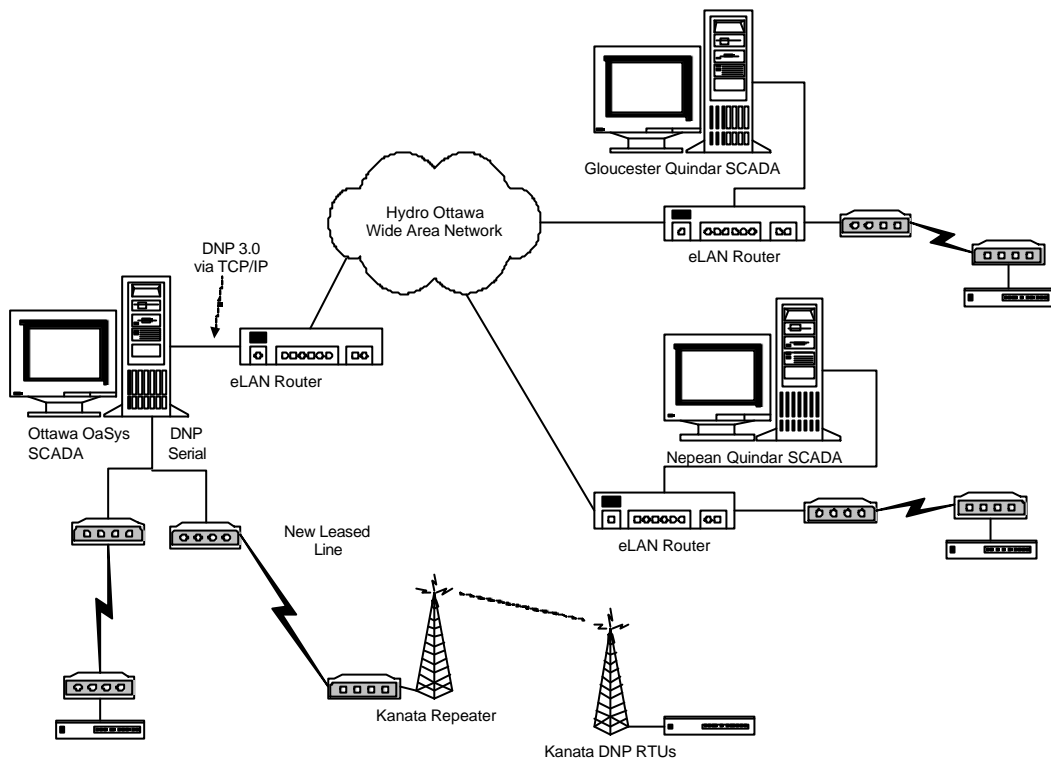


Figure 2: SCADA System Architecture With *e*LAN Gateways

Redundant *e*LAN equipment was installed to provide hot standby with automatic fail-over functionality. This redundancy also enabled the benefits of Hydro Ottawa’s dual IP network architecture: *e*LAN units work together to overcome failures in equipment or communication paths, and provide continuously updated communication channel and RTU status information.

With *e*LAN linking Hydro Ottawa’s OaSys SCADA system with the RTUs at Nepean and Gloucester, neither the RTUs nor the existing communications devices (modems) needed to be modified.

The situation at Kanata was different: the Kanata radio system was connected directly to OaSys, via a new leased line.

SCADA Amalgamation Project Plan

To minimize operational impact, the implementation phase of the SCADA Amalgamation Project had two steps. This staged approach allowed a gradual transfer of communication and control from existing SCADA systems to the new amalgamated system, and ensured system availability during the transition period.

Step 1 - Equipment Installation & OaSys Configuration

The first step involved the installation of the *e*LAN equipment to 'listen' in on the data traffic between the Gloucester and Nepean Quindar SCADA systems and their respective RTUs. Data obtained from listening to the Quindar systems was converted to the DNP 3.0 protocol and made available to the OaSys system, on a read-only basis. The existing Quindar systems stayed fully functional with no impact on their operations.

Hydro Ottawa used this 'listening' period to modify the OaSys data base to accept the 'new' Gloucester and Nepean RTUs. The DNP 3.0 data presented by *e*LAN allowed new operator screens and database records to be validated using actual real-time field data. This minimized the requirements for commissioning 'new' RTUs on the OaSys system.

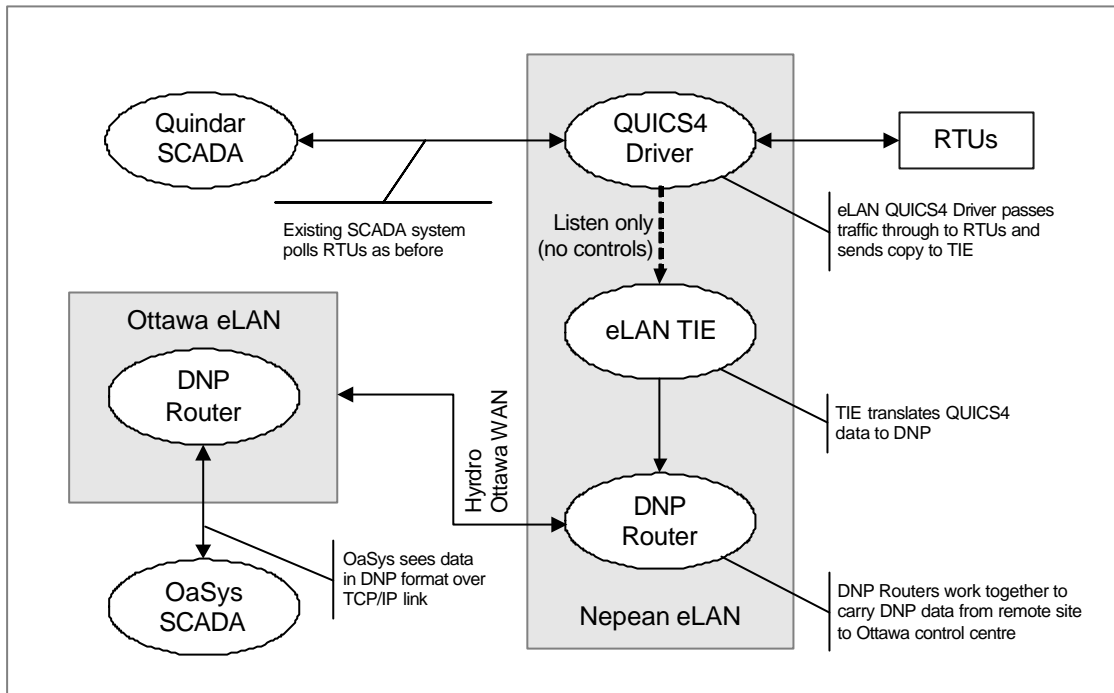


Figure 3: SCADA Data Flow in 'Listen Mode'

Step 2 – Cut Over to OaSys

Once the OaSys databases are modified to accept 'new' RTUs, ownership of communication channels are cut over from the Quindar systems. On a channel-by-channel basis, eLAN gateways are switched from Listen to Normal mode. This has the effect of disconnecting the original SCADA master from the RTUs and passing full control over to the OaSys system.

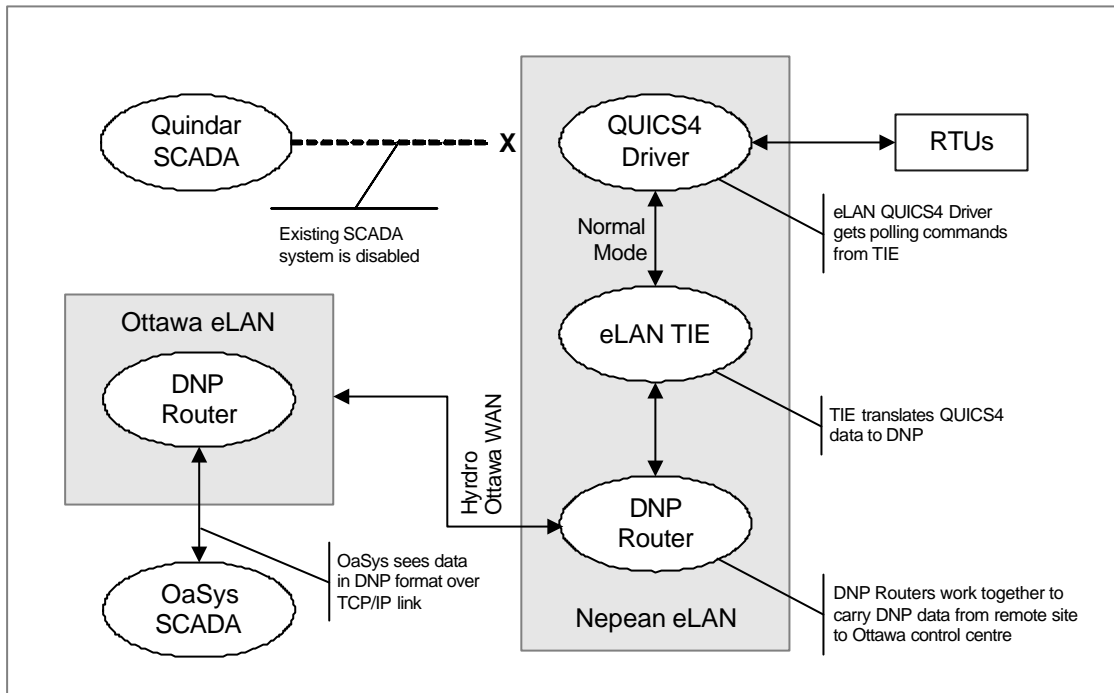


Figure 4: SCADA Data Flow in 'Normal Mode'

Active control over RTUs can be switched back and forth between the Quindar and OaSys masters on a per channel basis at any time. This has the benefit of allowing whole channels of RTUs to be temporarily moved for testing purposes.

At the end of this second phase, all RTU channels will be in Normal mode on the OaSys system, and the original Quindar SCADA systems will be decommissioned altogether.

Summary

BOW's eLAN™ routers and gateways allowed Hydro Ottawa to preserve their investment in legacy systems while moving to an integrated networking technology. A number of specific eLAN features, as well as BOW's experience in the utility communications sector, gave Hydro Ottawa a transition strategy that was virtually seamless.