

# INTERNET ENABLES REMOTE CONTROL IN A FAMILIAR OPERATING ENVIRONMENT

**Today, it is possible to monitor and operate power systems with a web browser. This enables networks to be managed efficiently and cost effectively over the internet.**

Users are increasingly requesting distributed and remote monitoring and control capabilities in the SCADA system they have. They want to have a system that is easy to use and runs in a familiar environment. To allow this, some standard technology is needed. The answer is web browser and internet technology. This way existing communication media can be used efficiently and easily, and familiar user interface with remote and distributed capabilities can be created.

## The ABB solution

ABB's MicroSCADA control system, is developed and used within both SCADA (Supervision Control And Data Acquisition) systems of electrical distribution networks and automated substation systems. The system offers real-time information about the power process and includes automated functions for e.g. alarm indications and process events.

In ABB's MicroSCADA control system the above mentioned is implemented by using:

- Microsoft Windows NT Terminal Server + Citrix Metaframe package and the Citrix ICA client.
- Java API to transfer information from/to MicroSCADA.

The Microsoft Windows NT Terminal Server supplemented with a Citrix Metaframe package provides access to MicroSCADA pictures and dialogues through a standard Web browser. This means that the users can deal with, remote monitoring and



control issues through the standard MicroSCADA tools and also have access to station pictures displayed in the browser.

The response time for events and updating on the local screen is short, since only the data that has changed is sent to the browser. On slow phone lines this can be very important. Also, the browser/internet interface is familiar to the operator, minimising training needs. For security issues, an additional data encryption package is available and can be used in the Citrix Metaframe solution. The MetaFrame thin-client/server system software incorporates Citrix's Independent Computing Architecture (ICA) protocol. Installing MetaFrame will not interfere with the functions of a computer running

Terminal Server. This means that clients can connect and execute programs on the server regardless of whether they are running the Citrix ICA protocol, or the standard Terminal Server client using RDP (Remote Desktop Protocol). The main differences are in the features that each protocol and its respective clients support. The Java API technology enables the user to connect over the LAN and to use the web-based technology to provide different application types. This could be, for example, energy reports, event lists or similar. Typically, a system owner such as an electric utility having a MicroSCADA based network control solution would have their system connected through the elements described above. Security issues such as user login is obviously an important element. The owner of the system must know who connects and when. The security features provided by both operating systems and MicroSCADA support this particular issue. The above described solution means that the system could be connected over a LAN to a dial-up modem pool or similar WAN system. For security reasons it is recommended that the system is connected to the Intranet, rather than the public Internet. The features and functionality are however the same as when connecting to the Internet. If connecting over the public internet, either encryption or VPN (Virtual Private Network) solutions providing a more secure connection is recommended.

From the user point of view, the MicroSCADA system implemented this way provides the duty officer increased control over the system. The web browser based MicroSCADA system makes the duty officers are more mobile and allow them to do remote control, monitoring and even testing when they are on site.

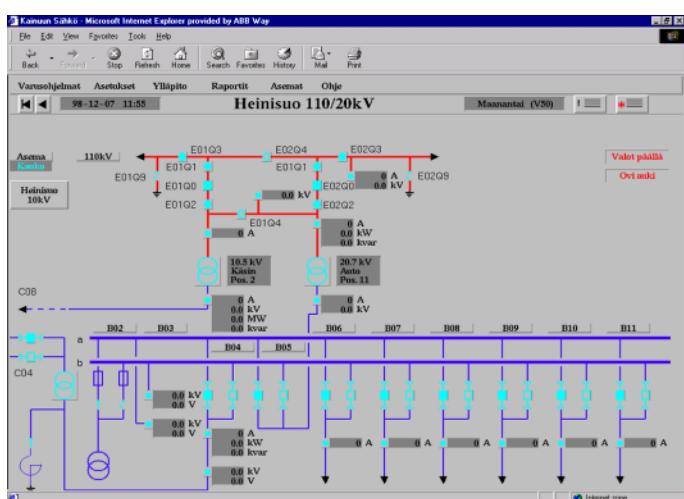
Innovative technologies such as GPRS (General Packet Radio Service) improve the transfer and connectivity speeds of the mobile connection. This leads to a greater connectivity even from places where a public phone line is not available. The hardware requirements for such a system would be a portable computer with either dial-up modem or a modem with the capability of using the mobile GSM technology. The utilisation of mobile technology is common in today's MicroSCADA control systems. The web browser functionality is complemented with, for example, web camera and SMS (Short Message Service) via GSM phones. When SMS is used, the duty officer receives an alarm to his GSM phone and can then log in to the utility's intranet (or via public internet) from his portable PC via web

browser to access the MicroSCADA system.

ABB's MicroSCADA is a scalable solution, that serves the information and control needs in the whole power process from substation monitoring with accessing substation information through serving as a gateway between the process and the upper level information system to enabling remote control of power networks and secondary substations. Thus MicroSCADA allows steady information flow between different levels of the power system. In the substation level MicroSCADA based system provides local and remote supervision, including event and alarm handling, reporting, disturbance record upload and analysis as well as parameter setting. In conjunction with intelligent electrical devices (eg. protection and control terminals) it provides a quick overview of the system, which is particularly valuable in a fault situation, reducing the time needed to locate the fault and restore the process.

## Finnish and Estonian applications based on internet technology

Finnish utility, Kainuun Sähkö Oyj, provides a good example of a utility that has successfully implemented a control system based on the web-enabled technology described above. "Our whole network can be supervised from the web browser while staying at home," says Vilho Hartikainen, the head of network automation at Kainuun Sähkö Oyj. He lives quite a distance from the office, and finds it very convenient to use the intranet connection to get information about the distribution network. Consequently, he has used the browser function frequently. Vilho Hartikainen finds that the conventional phone connection via modem is fast enough for his



routine activities, for example, checking the status of the network and reading the events and alarms. For the duty officer, however, ISDN connection is used to speed up the connection times and minimise delays in the data transmission.

In Estonia, where MicroSCADA is used for controlling the whole distribution network of Eesti Energia AS, the system is also built on the web browser technology. The benefits are quite similar to those experienced at Kainuun Sähkö Oyj. "Since our user interface has become web browser based, the distribution of information for needs other than just system control purposes is easy. Additionally, this feature enables the system to be operated no matter where you are, which again results in better customer service and reduced overall costs", says

Tõnis Tikk from Eesti Energia AS. The network control system in Eesti Energia AS consists of several levels: substation automation systems, local and regional control systems and the main control centre, which is located in Tallinn. Communication between the different levels is handled via TCP/IP connection in WAN network. This enables fast connections to the databases in different parts of Estonia eg. from Tallinn. Also, data mirroring is used so that it is possible to automatically transfer the required data about the changes in the process from the lowest level of the system to the database of the main control centre, which is located in Tallinn. Server based licence management and user authorisation assure security.

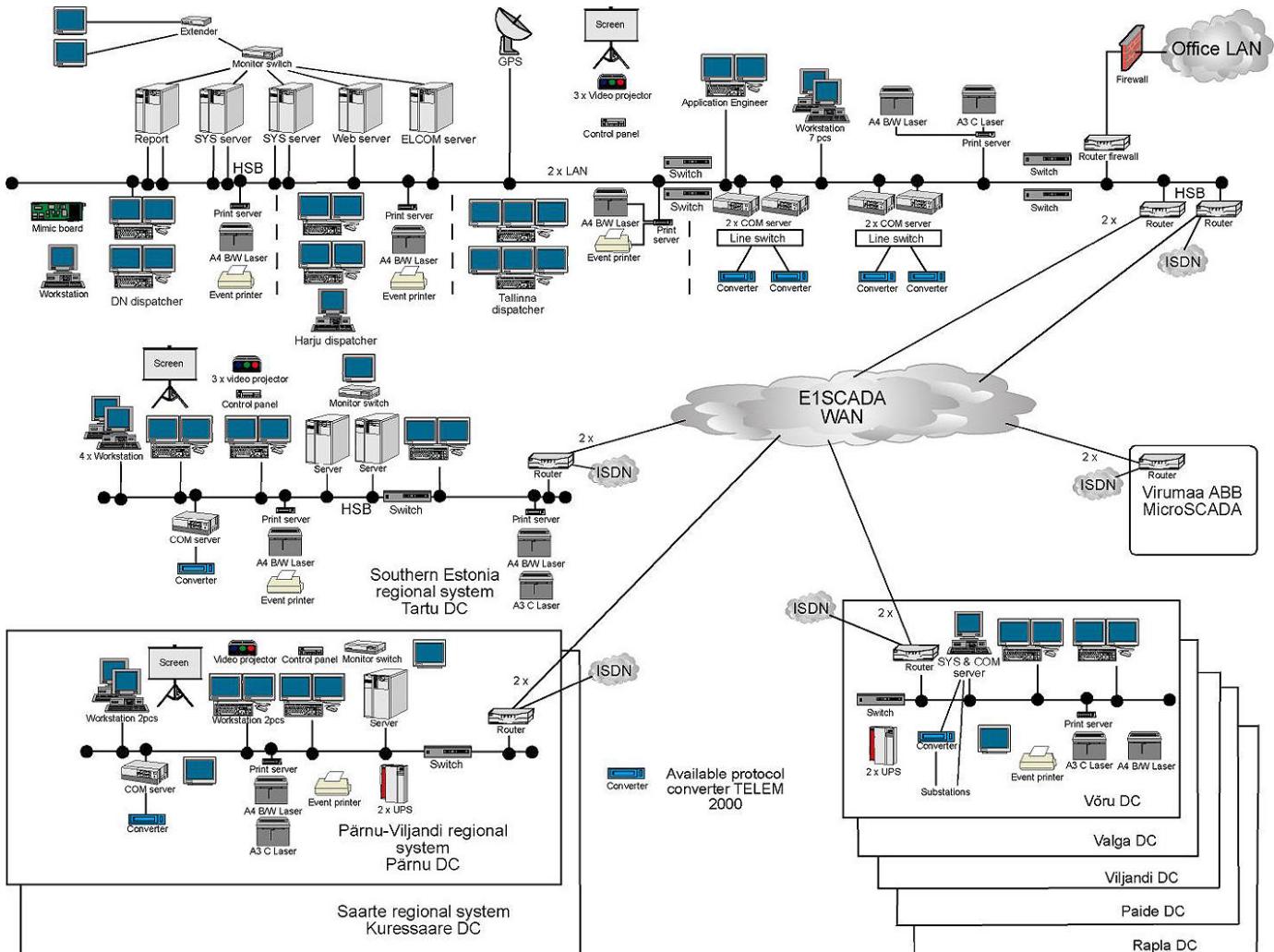




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