Benefits

- Low cost, easy laboratory setup

- Teaching of industrial systems integration and remote data access

- Sharing laboratory infrastructure with other institutions

- Cost effective use of bandwidth

- Easy network management

Solutions:
Remote Access + Remote Data

University: McMaster University
Country: Canada

McMaster University was sponsored by eWON in the scope of the educational program 'eWON on Campus'.

Many engineering programs minimize the laboratories because of time, cost and space limitations. In W. Booth School of Engineering Practice and Technology of the Faculty of Engineering at McMaster University, we are addressing this issue by developing a series of industrial automation laboratories that are accessible onsite and online through the Internet. We call these labs 'McMaster Internet Labs', or 'MiLabs'.

PLC laboratory set up

The laboratory setup has a PLC that controls a three-phase motor through a Variable Frequency Drive (VFD). In addition, the PLC's analog inputs are connected to a vibration sensor and a temperature sensor through signal conditioners; and one of its outputs controls a lamp through a high voltage relay.

Remote access to PLC laboratory equipment based on VPN

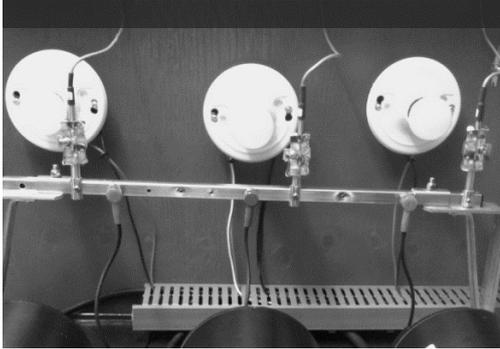The graphic below shows a generic architecture of MiLabs.
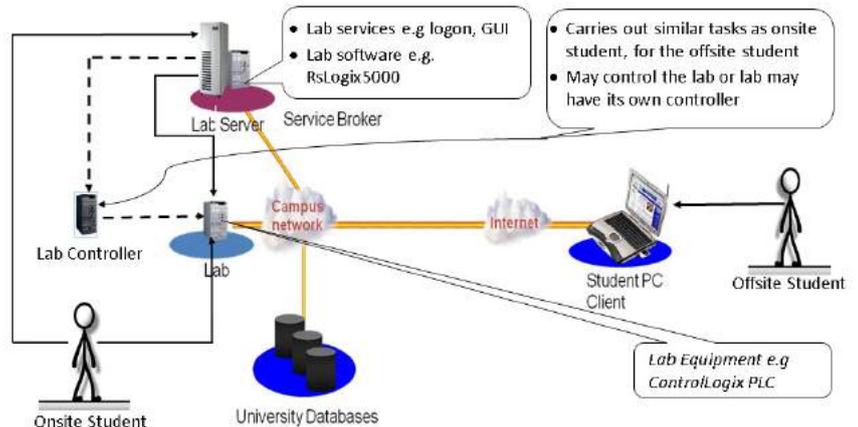
The first version of these labs is based on Virtual Private Network (VPN). Therefore, users need to be authenticated using the university databases. The VPN sets up a virtual LAN, which is separate from the lab LAN and indeed the other university LANs. Since most PLC programming applications either do not have data routing capabilities or use serial connection, we use a virtualization lab server to provide Graphic User Interfaces (GUIs) for the lab controllers; host lab software such as Rslogix5000, Cx-Programmer, and RsWorx; and provide other services such as logon and service brokerage.

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HMS Connecting Devices™

Input-output devices connected to the MiLabs PLC

The eWON Cosy 131 router offers easy remote access to McMaster PLC laboratory

Remote access to PLC laboratory equipment based on eWON

McMaster University was sponsored with two eWON routers (eWON Flexy and eWON Cosy) in the scope of the educational program 'eWON on Campus'. The routers simplified our lab setup, and most importantly removed the need for users to be authenticated using the university databases. In fact using the VPN met that only McMaster students could use our labs, yet we have plans to share the labs with other institutions.

The other challenge we face with the lab VPN is that all equipment (PLCs, VFDs, Remote IOs, energy meters, and motor protection relays) have to be connected to the LAN that is managed by the university IT department. Since, at the lab level, we do not have administrative rights to create subnetworks, it is impossible to isolate the networks of individual lab setups. Using eWON solves this problem easily since each eWON creates its own LAN which you can configure to communicate or not communicate with other LANs in the laboratory.

" eWON technologies are very important in remote data log, in machine condition and health monitoring. "

Dr. Tom Wanyama - P. Eng Alberta & Ontario

Finally, I would like to mention that since we teach industrial automation and integration, we do not only use eWON routers to access our labs remotely, but we also use them to demonstrate the use of remote access technologies in industrial automation. Such technologies are very important in remote data log, and in machine condition and health monitoring.

Benefits of using eWON

In short, using eWON has brought the following benefits to our endeavor to provide remote access to laboratory equipment:

* Low cost, easy laboratory setup.

* Endless educational benefits, including: teaching of industrial systems integration and remote data access; and sharing laboratory infrastructure with other institutions.

* Cost effective use of bandwidth, since users can host PLC programming IDEs on their computers, and access the lab equipment only when they are ready to test their configuration and programming.

* Easy network management since eWON creates a LAN to which a specific lab setup can be connected.