

Making the PLC Internet-Ready

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Is there any truth to the idea of Web-enabled automation? Is it possible to connect production and processing machinery by their PLCs to the Internet? More relevant, is it practical or profitable? The short answers:

First, Internet access can provide compelling competitive advantages for linking manufacturers with service technicians, customers, suppliers and subcontractors. Second, proven affordable technologies are readily available to connect any PLC, machine control or I/O to the Internet and intranets.

Third, machine-to-Internet access has the potential to become a standard utility, a make/break for doing business.

Following is a short course on the what, why and how of becoming Web-enabled.

What it is

Web-enabling gives real-time access to data and control virtually any time from anywhere it's required. It uses communication with any manufacturer's PLC or I/O to send information via the Internet to anywhere in the world. Unlike the "horizontal" integration of standard B2B and B2C implementations, Web-enabled automation drives real-time accessibility "vertically" down to the level where things are actually produced, ordered, tested and stocked.

This access to individual machines gives producers, their customers and suppliers shared, front-line, real-time intelligence to optimize production control and coordination, while enhancing flexibility and response time.

What it does

Such accessibility and connectivity can do many good things regarding improved production control. For example, it can:

- • Check production data on a critical process, machine or order in real time, without waiting on batch reports
- • Track run time through the machine control and automatically request tool replacement, machine maintenance or other function
- • Have the system notify a technician via e-mail when it needs help or communicate directly with the machine maker to avoid delay and cost for a service-rep visit
- • Collect data on part parameters and production (from machine controller or independent sensor I/O) and send it to a server PC to do statistical process control (SPC) using standard PC-based software
- • Access HTML help files with graphics and instructions
- • Collect data from many distributed machines or processes and adjust

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Published on Industrial Maintenance & Plant Operation (<http://www.impomag.com>)

activity to achieve adaptive, closed-loop, optimized production

- Monitor and control remote operations (such as a pumping station or power-distribution system) to reduce field staffing and travel

- Link a system in real time to customers and suppliers, and adjust production flow, restocking, shipping, etc., to customer demand data.

Outside factors might also drive the need to become Web-enabled. First, customers are increasingly coming to expect "real-time" deliveries of product and information. In the world of consumer shopping, online ordering, status checking, and next- or same-day deliveries of merchandise are becoming commonplace. These same options are accessible to your business.

Second, if your business can't meet such expectations, the competition will. And, once they have implemented Web-enabled automation successfully, they'll be able to satisfy the customer more quickly and at lower cost than non-Web-enabled companies.

What's needed

The basic parts required for real-time, Web-based data access and control include:

- An interface to the machine, process or building to be monitored and controlled via the Web (network) connection. This Internet connection can be made by a standard hard-wired Ethernet line, a modem/phone line (dial-up) or a wireless modem.

- A Web server (or "thin server" data service) to make the desired displays and /or Web pages available to the remote browser.

- A data service or interface to handle data exchange between the local server and the remote system (client). A common language is required. XML (Extensible Markup Language), the standard defined by the World Wide Web Consortium, exchanges data along with a "tag" that defines the data. This makes XML independent of the sender's and receiver's hardware platforms, OS and application. This is a powerful and critical advantage when implementing open systems within a company or between different companies, as in B2B applications.

- A browser interface for remote viewing of data and/or Web pages. This can be a desktop, laptop, PDA or "thin client"). Applications requiring exchange of real-time data (SPC, optimization, or enterprise software) need a remote server PC and a compatible data-exchange service.

Think thin

Web-enabling doesn't mean that you need to replace your present machine or process controller, nor invest in an industrial PC for your browser interface. A new breed of "thin" Web devices can fill the role in many applications. They combine ruggedness with low cost by providing only the functionality required.

A thin server, such as WebLink from Advantech, is a complete "intelligent embedded server" solution. Providing all hardware and runtime software needed to Web-enable a system, it connects to the machine/process controller or other control device (I/O, sensor, etc.) using a standard RS-232/485 serial port or a fieldbus adapter. A network connection is then made through the unit's standard Ethernet

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10/100Base T port, or by way of optional modem, or wireless network/Internet connections. Development software enables Web pages to be easily created and data connections made to remote application software, then maintained from anywhere via the network connection. Security is provided by WebLink through password-protected user login.

A thin client serves the role of browser PC to access a Web page/data display resident in the thin server. If only required to view Web pages, the thin server can be a dedicated design and very simple device requiring only an LCD, CPU and a small amount of memory. No software is required other than Internet Explorer or Netscape, because the Web page is resident in the thin server. In the same way, the thin client can view Web pages from any source accessible via the network.

Control makers may also provide other elements designed specifically for Web integration, such as operator interface terminals and HMI software. All of these technologies are readily available for creation of robust, cost-effective, open solutions to Web-enabled automation.

In reality, Web-enabled automation provides benefits and competitive advantages for business enterprises. It closes the loop with customers and suppliers to optimize production flexibility and cost competitiveness.

Source URL (retrieved on 12/24/2014 - 11:52pm):

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