Taking web standards to the terminal point

Use of Web-based management for process control and automation is growing fast. We no longer need special software for each purpose, machine or a particular manufacturer's product. Web-based management simply requires a browser and a network connection via Ethernet and TCP/IP. Independent of operating systems, it offers supervision of machinery status and control anywhere within a corporate network or the wider world. Web technology is turning the world of process automation and control upside down. Christopher Ernestus

Serious application for HTML: controlling runway lights at Athens Airport

Imagine writing a graphical user interface with little knowledge other than that of using basic HTML, perhaps in producing a schematic representation of a machine or plant. The Web allows this to be done and the result can provide all the necessary information at a glance, reliably... and readable anywhere.

But the browser's Web interface is not the only internet technology that can help to improve Industrial plant management without recourse to special client software. E-mail via SMTP can send alarms in response to certain situations arising in the plant. Other options in the same context – though not especially related to the Internet – include network management by SNMP and OPC (OLE for Process Control). All these technologies can help to reduce the costs of developing and operating an automation solution.

Keeping budgets under control is best achieved when standard protocols are consistently used from the controlled process up to the central computer. This is particularly true if it can be done without recourse to special engineering software.

Web-based management provides control and display of functions and parameters using any standard browser via the HTML interface. The HTML page shows a summary of the inputs and outputs. The user can either use this page as is or replace it with a self-designed page, for example a graphic representation of the process or signals with their meaning. Ready-to-use Java applets for inserting in the HTML page are available for dynamic display of values without having to periodically refresh the entire page. This means that with just a basic knowledge of HTML, standard template pages can be easily adapted. The names of the I/O functions on the screen as well as the stored explanation texts for operating personnel may be adapted from a menu.
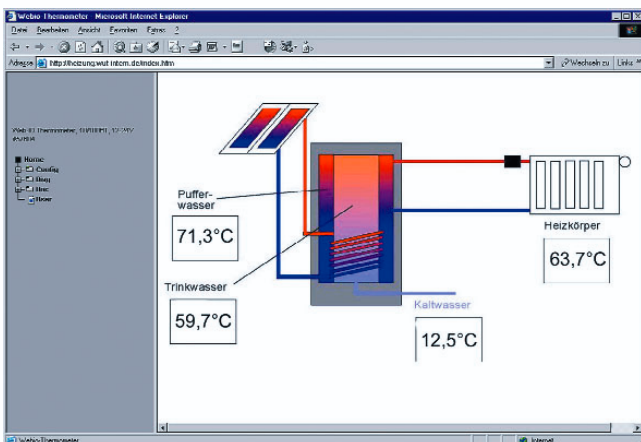
For security purposes operating functions can be protected by a tiered authorisation scheme with passwords.

Instead of using the browser, all the functions of the device as well as the I/O functions can be monitored via SNMP, including the generation of SNMP traps by the device. A digital signal, for example, which indicates a function fault within a production facility can also be monitored from within an existing systems management server.

Alternately, specified persons may be notified through programmable e-mail functions. This enables certain events to trigger pre-configurable texts which are sent by e-mail (and therefore, also by SMS or pager) to specified recipients such as an emergency response team or individual.

Alarm states can be defined as either a particular input signal condition or derived from a logical operation. This could mean, for example, that an alarm is sent to the cell phone only if the system sends Signal 1 and Signal 2, but not Signal 3 (event correlation).
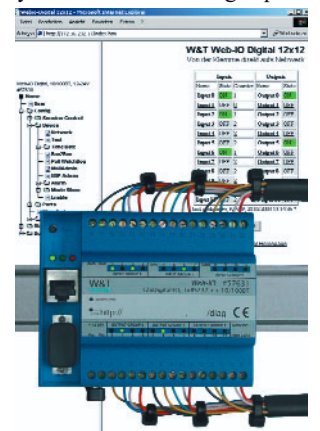
The same logic operations can be used to set automatically certain digital outputs depending on the status of certain inputs.

Specialised hardware fulfils classic process control functions but the device signals may be carried over the Web

Some other functions frequently required in automation tasks can also be handled by Web-based technology. For example the inputs may be configured as counters or the outputs set up so that they produce a pulse of a defined length – using time standards derived from the network clock.

An OPC software interface provides communication with process control or visualisation systems. Various communications paths can also be combined with each other.

Often there is a need to extend alarm or switch contact information from a distant part of a building or even from another city. Ethernet-LAN cabling or a TCP/IP-based WAN connection may be available but HTML-based software can "tunnel" such signals through the existing IP network often at less cost than a WAN solution. For example, if there is a cabling gap, part of the line could be a wireless LAN, or for remote connections cost-savings can be achieved by using an existing Virtual Private Network (VPN) in the Internet.

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Web-based technology can offer a high quality HMI interface with nothing other than a standard browser installed on the client machine

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