

White Paper: Industrial Ethernet... more than just another fieldbus system

As Ethernet continues to gain momentum in the industrial automation market, it's changing the way control engineers utilize their fieldbus systems. In the past, fieldbus networks were considered one-dimensional – they performed one task and did it very well – transferring process data between networked devices in a fast and deterministic manner. Usually these devices were on a local segment, isolated from higher-level networks. Nowadays, Ethernet-based fieldbus systems perform this basic task and so much more. With industrial protocols like Modbus/TCP, EtherNet/IP, and PROFINet process data is sent over standard, off-the-shelf Ethernet hardware. No longer are users forced to buy proprietary fieldbus components from a handful of vendors.

One of the core benefits of Ethernet is its ability to handle multiple protocols on the same network medium. A single field device can support many protocols at one time. Therefore, standard Information Technology (IT) protocols like HTTP, SMTP and FTP can be used in conjunction with an industrial protocol. This adds a whole new dimension to fieldbus systems, allowing connectivity options not available with legacy systems.

Hypertext Transfer Protocol (HTTP) was originally designed for transmitting web content across the Internet. It handles the commands and formatting of web data, so web browsers and servers can communicate with each other.

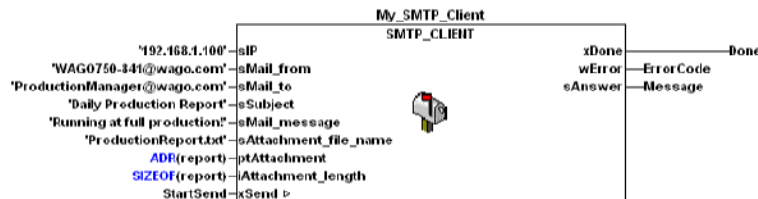
Many Ethernet-based field devices now support HTTP with the use of embedded web servers. It allows users to view and change parameters in a field device using a standard web browser like Internet Explorer. No additional custom software or custom hardware is required. Just enter the device's IP address in the browser's address bar and the built-in default page is displayed (see Figure 1 - Sample Web Page).



Like most IT-based protocols, HTTP can be used on a local area network (LAN) or wide area network (WAN) like the Internet. This means with the proper network infrastructure, these web pages can be access from anywhere in the world. This type of accessibility provides a powerful tool for remote troubleshooting and remote monitoring.

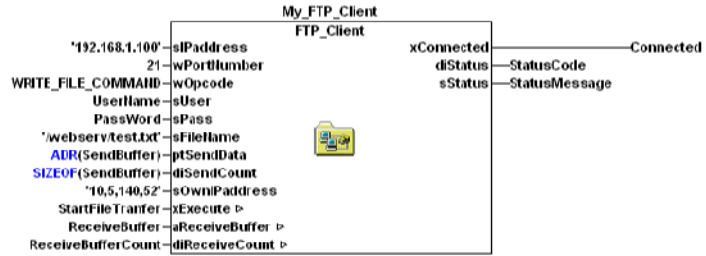
Simple Mail Transfer Protocol (SMTP) allows an Ethernet-based field device to send an e-mail message, similar to a personal computer. A function block is added to the control program specifying the details of the mail server and the e-mail message (see Figure 2 – Email Function Block). When the function block is triggered, the e-mail is sent to the appropriate personnel.

This feature has many innovative uses for communicating information directly from the field. For example, a field device can notify maintenance and operations personnel of an equipment failure or when preventive maintenance is required.



File Transfer Protocol (FTP) is used to transfer files between a client and a server. It gives Ethernet-enabled devices the ability to quickly store and retrieve large quantities of data from a remote file server.

Files are commonly used in field devices for recipe databases, material tracking, production records, and data logging. This function gives unlimited storage capacity to a field device (see Figure 3 – FTP Client Function Block).



Industrial Ethernet is changing the way Control Engineers view and utilize their fieldbus networks. It's providing new methods of communication between field devices and personnel to reduce downtime and improve process efficiencies.

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