

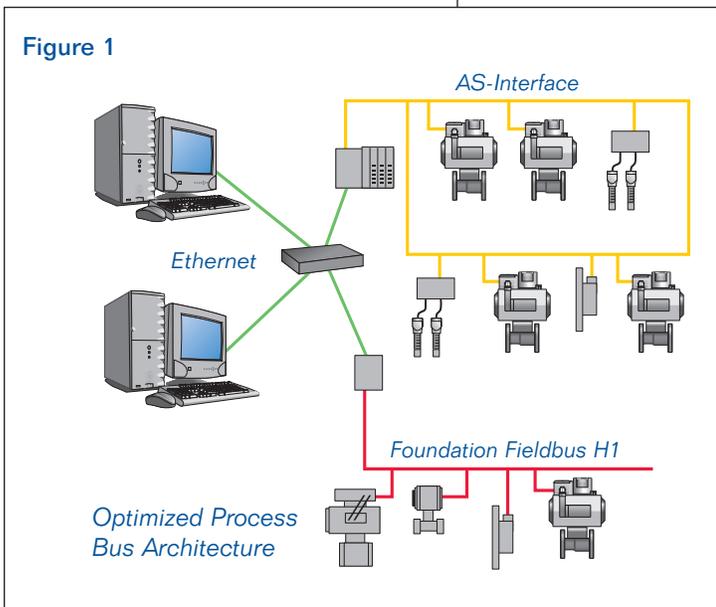
Process Networks and FieldLink

Standardized communication networks are linking intelligent field devices to enterprise systems to offer unparalleled benefits to the process industries. Benefits include dramatic reductions in installation costs, reduced maintenance and commissioning costs and improved process performance. FieldLink, StoneL's process networking products and support services program, facilitates the implementation of your field network. The following section describes how the FieldLink program can help you implement and optimize contemporary field communication networks for your specific application.

Optimized Process Control Architecture

An optimized network may consist of two or three communication protocols which seamlessly and economically link sophisticated process instruments and simple, discrete devices into the process control architecture. **Figure 1** illustrates a fieldbus and sensor bus being directly attached to the process control/enterprise system. Although one higher level protocol may be capable of directly connecting all of the field devices with the control architecture, area classifications, reliability, and economic considerations make the layered approach preferable.

Figure 1



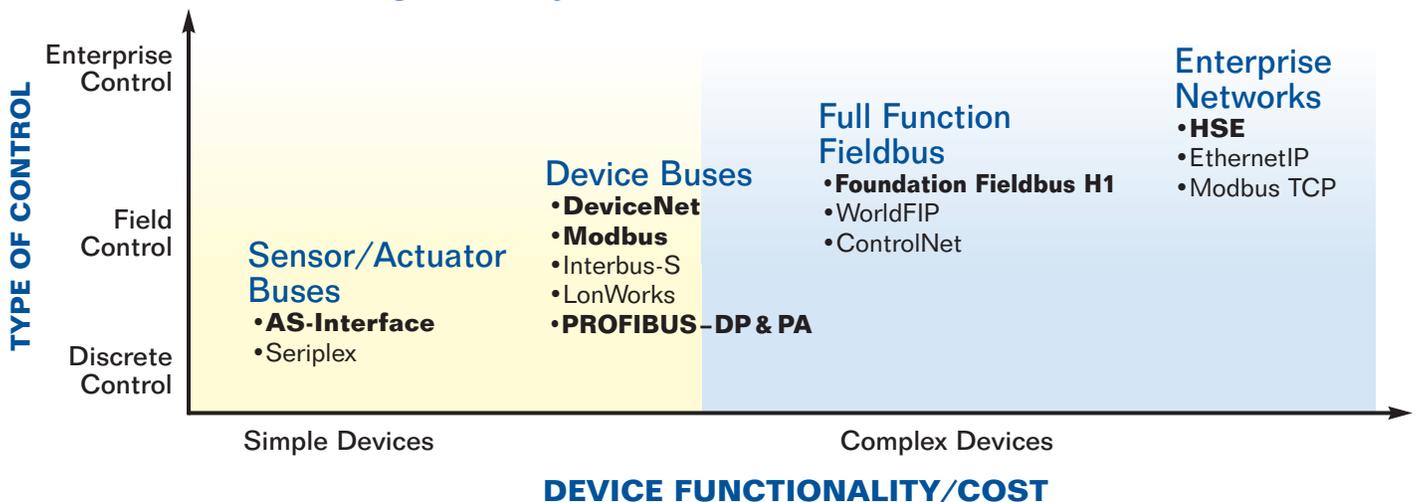
Enterprise Networks

Ethernet with TCP/IP is the de facto standard for linking computer control and business systems together. Field level protocols are now being plugged into the enterprise networks by sliding the application layers from the field protocol onto the Ethernet network. As a result, the following Ethernet based protocols have emerged at the control system level:

- Profinet - Ethernet with Profibus
- Ethernet IP - Ethernet with ControlNet/DeviceNet
- HSE - Ethernet with Foundation Fieldbus
- Modbus TCP - Ethernet with Modbus

Ethernet with OPC (OLE for Process Control) clients/servers promises to offer universal translation for each of the different protocols' application layers to seamlessly interact with windows-based software.

Process Bus Networking Hierarchy



Fieldbus Networks

Analog process control instrumentation, which requires unique interfacing for loop control algorithms and hazardous area compliance, is best networked using “full function fieldbus” protocols.

Foundation Fieldbus is supported widely by instrument manufacturers around the world and is the de facto standard for “analog” process control networks in North America. It features a number of process oriented attributes including object oriented function blocks, process variable time stamping, and field based PID control.

The most popular protocol at this level is Foundation Fieldbus (H1). This protocol uses the IEC 61158-2 physical layer which has been designed to replace 4 to 20mA control loops and may be used in intrinsically safe circuits.

Device Bus Networks

Device bus networks offer the functionality to connect both analog and discrete instruments into the process control architecture. Modbus, DeviceNet, and PROFIBUS are popular device bus protocols used in the process industries.

Modbus has been the traditional standard for tying remote I/O and PLCs into a plant’s DCS systems. Legacy control systems typically interface readily to Modbus networks, making this protocol ideal for retrofit applications.

DeviceNet is used in numerous applications where Allen Bradley PLCs and integration support are prevalent.

PROFIBUS-DP offers exceptional performance for high speed applications with its low bit stream overhead and fast baud rate. PROFIBUS is the dominant network in European markets and is also supported throughout North America. PROFIBUS-PA, which uses the IEC 61158-2 physical layer, interfaces directly into PROFIBUS-DP networks.

Interbus-S is a protocol used extensively in Europe over the past 15 years. Although quite popular in Europe, it has not been used significantly in North America so it is not supported well in this market. LonWorks, which uses the neuron chip, was developed by Echelon Corporation and has been primarily used in HVAC applications.

Sensor/Actuator Networks

Discrete process devices may be conveniently and economically interfaced into a plant’s control architecture using sensor actuator networks.

AS-Interface is the dominant protocol used for discrete applications throughout the world in the process industries. It offers dramatic installation savings, is simple to install, integrates conveniently into most other higher level protocols, and is easy to maintain.

They offer end-users a convenient, reliable method of taking advantage of the benefits of bus networking technology on nearly all

discrete applications. Seriplex, although an early contender in this market, has not been used extensively in the process industries.

