



Fieldbus
Foundation

Front End Engineering and Design (FEED)

Freedom to
Choose. Power to
Integrate.

Muller Huang 黃茂龍
ABB

On behalf of
Fieldbus Foundation™



FEED Benefits

- Instruments choice
- Cable routing
- Where to have the control
- Flexible assignment to controller
- Direct alarming
- Excellent Diagnostics



Rigorous Interoperability Testing

- Device
 - Physical Test
 - Conformance Test Kit (CTK)
 - Protocol
 - Interoperability Test Kit (ITK)
 - Blocks, Enhanced EDDL, Capability File (CF)
- Host (Software, Handheld)
 - Host Registration Process (HRP)
 - System test
- Power Supplies (Conditioner, Barrier, Limiter)
 - Physical
- Coupler [wiring block]
- Cable



No surprises



Interoperability - Host Registration Process

FOUNDATION™
HOST PROFILE REGISTRATION

Manufacturer:	Emerson Process Management
Model:	DeltaV & AMS Device Manager
Type:	Host
Revision:	DeltaV 10.3 & AMS 10.5
Host Profile Test Version: 2.1	
Host Profile Test Campaign: HP061300	
Host Test Report: FF-528-(HP061300)-1.1	
Host Test Kit Version: 1.1.0	
H1 Stack Manufacturer / Revision: Emerson Process Management / 4.86	
H1 Stack Test Campaign Number: CT0056FF	
HSE Stack Manufacturer / Revision: N/A / N/A	
HSE Stack Test Campaign Number: N/A	
Host Profile Class: Class 61a - Integrated Host	

Profile Features

H1 Device Address Assignment	Use Views for Block Detail Reads
Configuration of Link Master Device	Device Alert Management Configuration
H1 Physical Device Tag Assignment	Device Alert Handling and Confirmation
Convert Link Master to Basic Device	DD Blocks and Parameters
H1 Software Download	DD v4 Method Execution
Block Tag Configuration	DD v4 Menus
Resource and Transducer Blocks	DD v5 Visualizations, Methods
Standard Function Blocks	DD v5 Persistent Data Storage
Configuration of Scheduled Control Function Blocks	Capability File Support
Function Block Linking and Publication Scheduling	Data Quality Display in Default Block Detail Displays
Function Block Execution Scheduling	Data Quality Display in Default Face-Plate Displays
	Data Quality Display in Trending
	Data Quality Support Through Host Controller Connections
	Data Quality Recording in Historian
	Data Quality Display in Custom Process Graphics

24-April-2009
Registration Date


 Richard J. Timoney
 President and CEO

- Test process ensures Fieldbus is implemented correctly
 - Device commissioning
 - Function block configuration
 - EDDL
 - Alert management
 - Status handling



FOUNDATION



Interoperability

- Selection of device based on function

Same Supplier
Different process
measurement



Same Supplier
Different process
measurement



Same Communication
Different Features

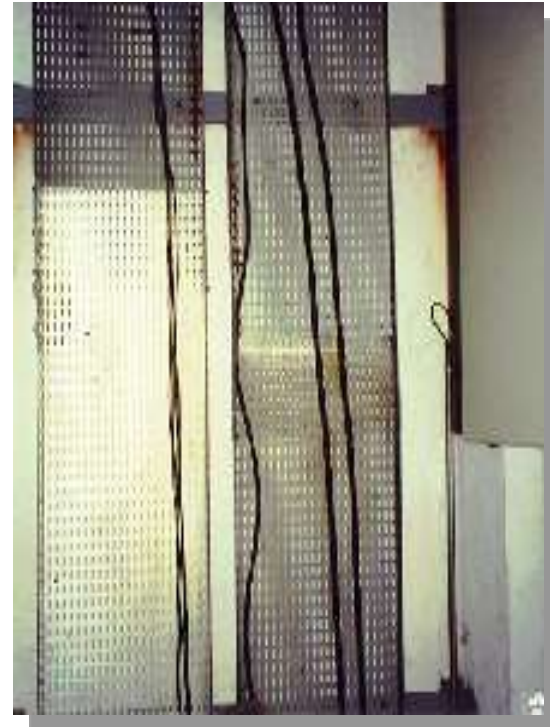


Same communication
Different Features



Easy cable

- Hardwired I/O
- FOUNDATION fieldbus
 - Reduced wires
 - Reduced pulling & connection
 - Reduced cable trays & conduit
 - Fewer safety barriers
 - Fewer I/O cards



Architecture Benefits

Access the same H1 link from different controllers

Flexibility during engineering

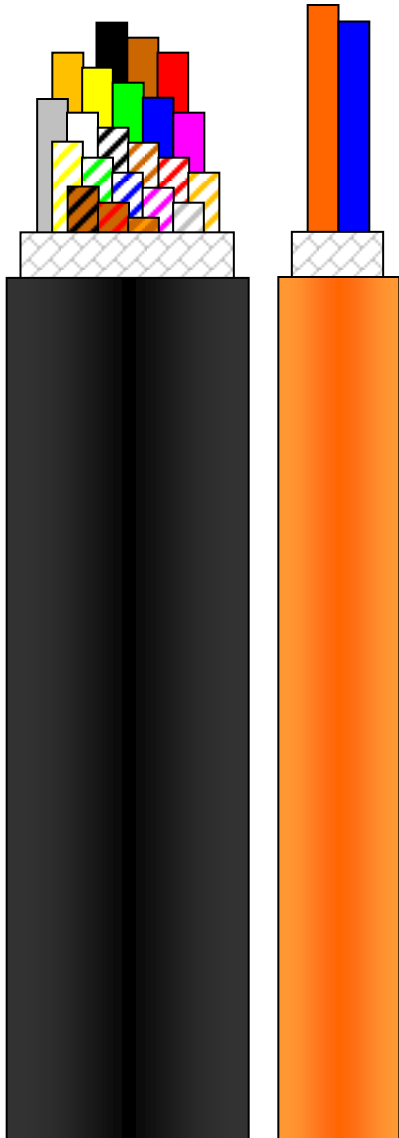
- Focus on field installation needs and segment layout considerations for the H1 part.
- Focus on process design (grouping, minimizing cross controller communication, balanced controller load, redundancy requirements) in the controller.
- Assign FF application independent of location of H1 link on the HSE subnet.

Easier Late Changes: Fieldbus 'Soft Marshalling'

- Late changes:
 - Add a device
 - Change device type
 - On/off valve > control valve > electric actuator
 - Add signals (in devices)
 - Auxiliary measurement, position feedback, limit switches etc.
- Easy
 - No additional wiring
 - No additional I/O cards
 - No I/O card change
 - No safety barrier change

Bus Saves More Wiring on Complex Devices

- Bus technology reduces wiring for electric actuators



Cores	I/O	Description
4	3 DO	Open/stop/close control
2	1 AO	Desired valve position control
2	1 DO	Emergency shut down
3	2 DI	Valve position status (limit switches)
2	1 AI	Percentage open
1	1 DI	Available for control
1	1 DI	Local/remote switch
1	1 DI	Motor running open direction
1	1 DI	Motor running closed direction
1	1 DI	Torque switch tripped
2	1 AI	Percentage torque
1	1 DI	Motor thermostat tripped
1	1 DI	Battery condition low
22	16 ch	TOTAL



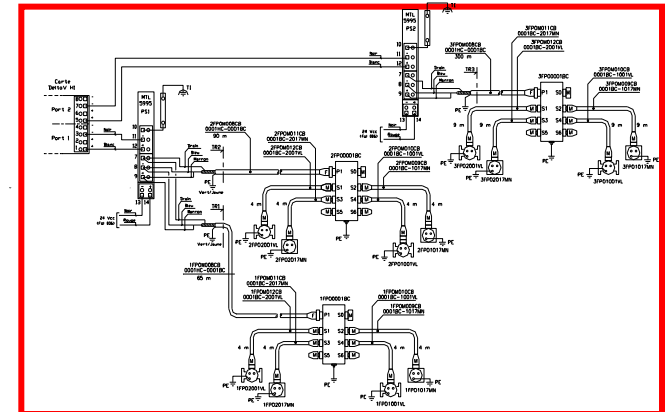
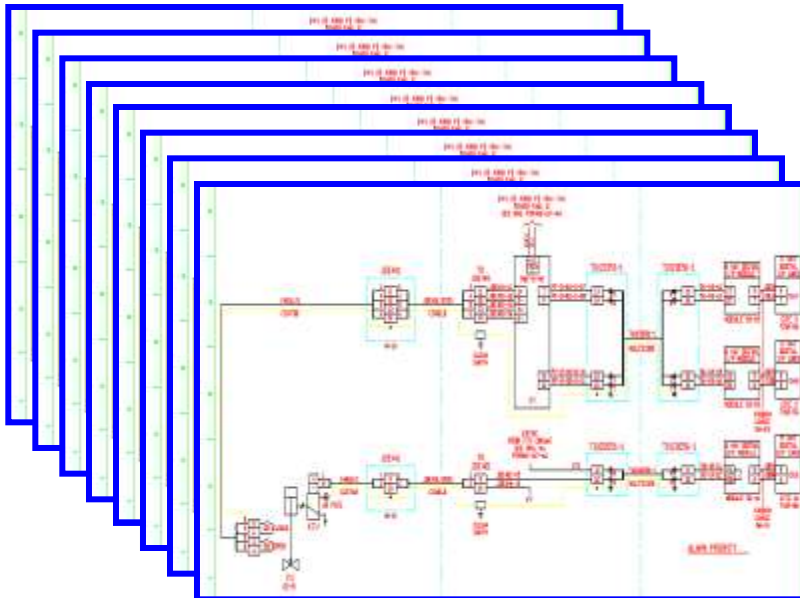
Hardwire:
Multiple wires
per MOV

Fieldbus:
Multiple MOVs
per cable

Lower Cost Fewer Engineering Drawings

- One segment drawing replaces up to 8 loop drawings
 - Fewer engineering hours

Use EPC and system supplier with Fieldbus experience



Obsolescence Protection Platform for the Future



Multi-Channel Temperature Transmitter
• 8 channel, universal input



8 Point Remote Indicator



Digitally integrated
On/Off Valve

Fully integrated
Gas Chromatograph

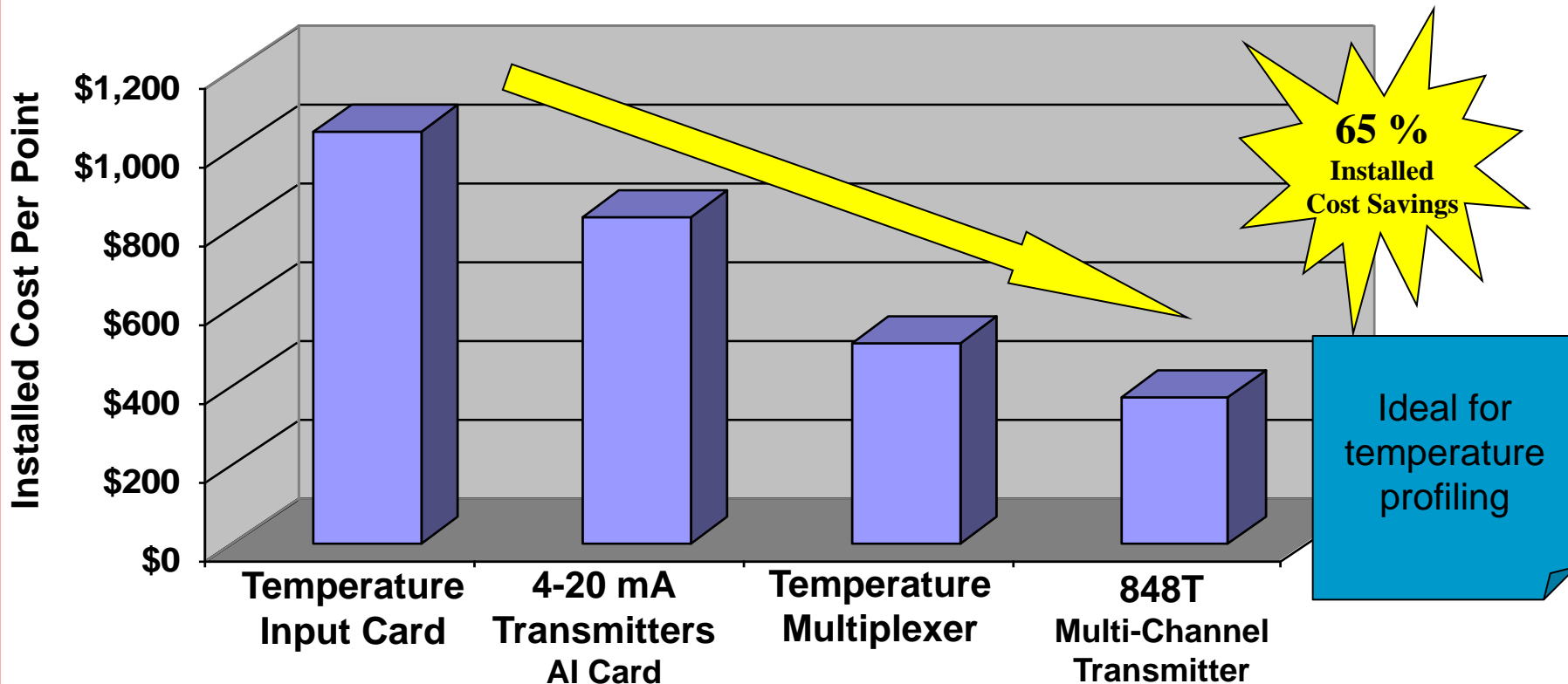


Dual Temperature Transmitter
- 2 channels can be used for control

Without
fieldbus you
cannot benefit
from new
innovations



Multi-Channel Transmitter Lower Cost: Fewer Transmitters, Less Wire



- Shorter sensor wires
 - Less noise pickup
- Fewer transmitters and cables
 - Lower cost



All Devices Digitally Integrated

Traditional Smart Devices	Fieldbus Additions
<ul style="list-style-type: none"> • Transmitter • Flow meter • Liquid analyzer • Valve positioner (pneumatic) 	<ul style="list-style-type: none"> • On/Off valve coupler (pneumatic) • On/Off valve actuator (pneumatic) • Electric actuator • Gas analyzer

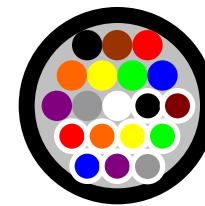


- “Complex” devices (many signals)
- Many more devices around the plant can benefit from device management: diagnostics
- No device left as an "isolated island"

Simplify Complex Device Wiring

- Hardwired
 - One device, twelve wires
 - Electric actuator (MOV)
 - Open, stop, close, ESD, overload...
 - Valve positioner
 - Setpoint, feedback, limit switches...
 - On/Off actuator
 - Solenoid, limit switches...
 - Mass flow transmitter
 - Mass, volume, density, temperature...

- Fieldbus
 - One cable, twelve devices
 - Many DI/DO cards eliminated



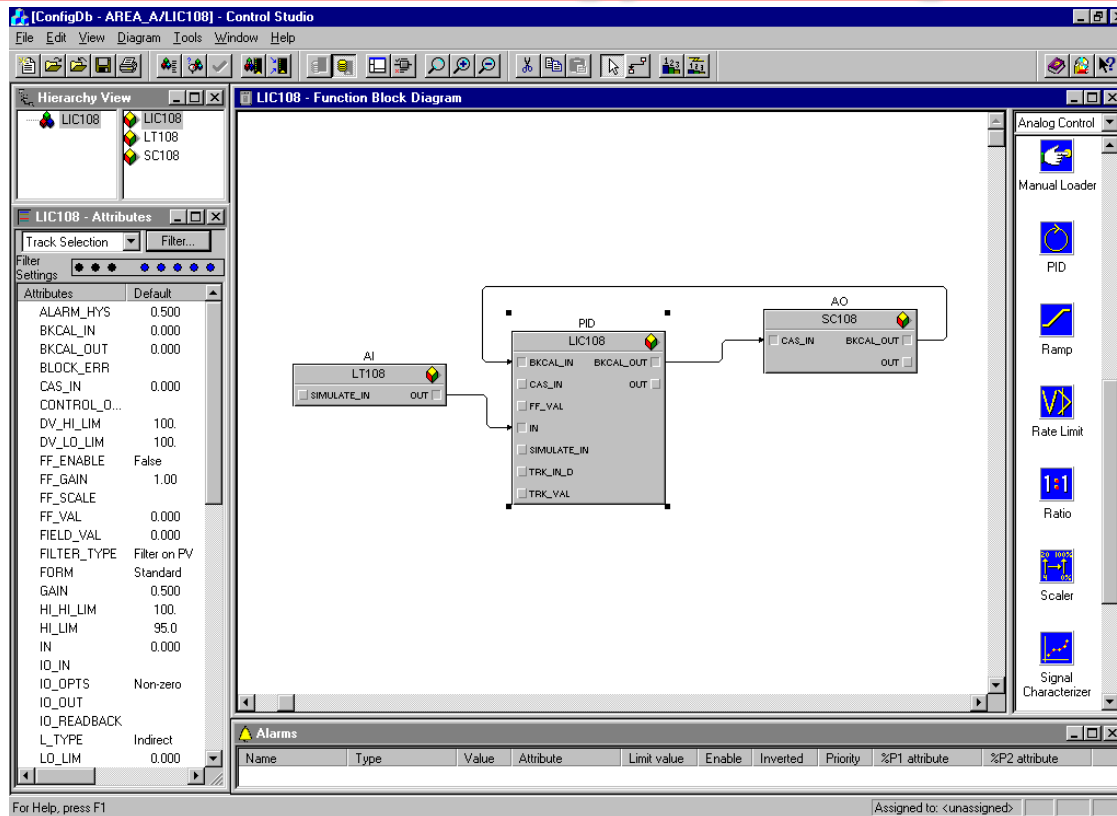
hardwired:
Multiple pairs
Per device



Bus:
Single pair
Many devices



Easy Engineering Control Strategy Configuration

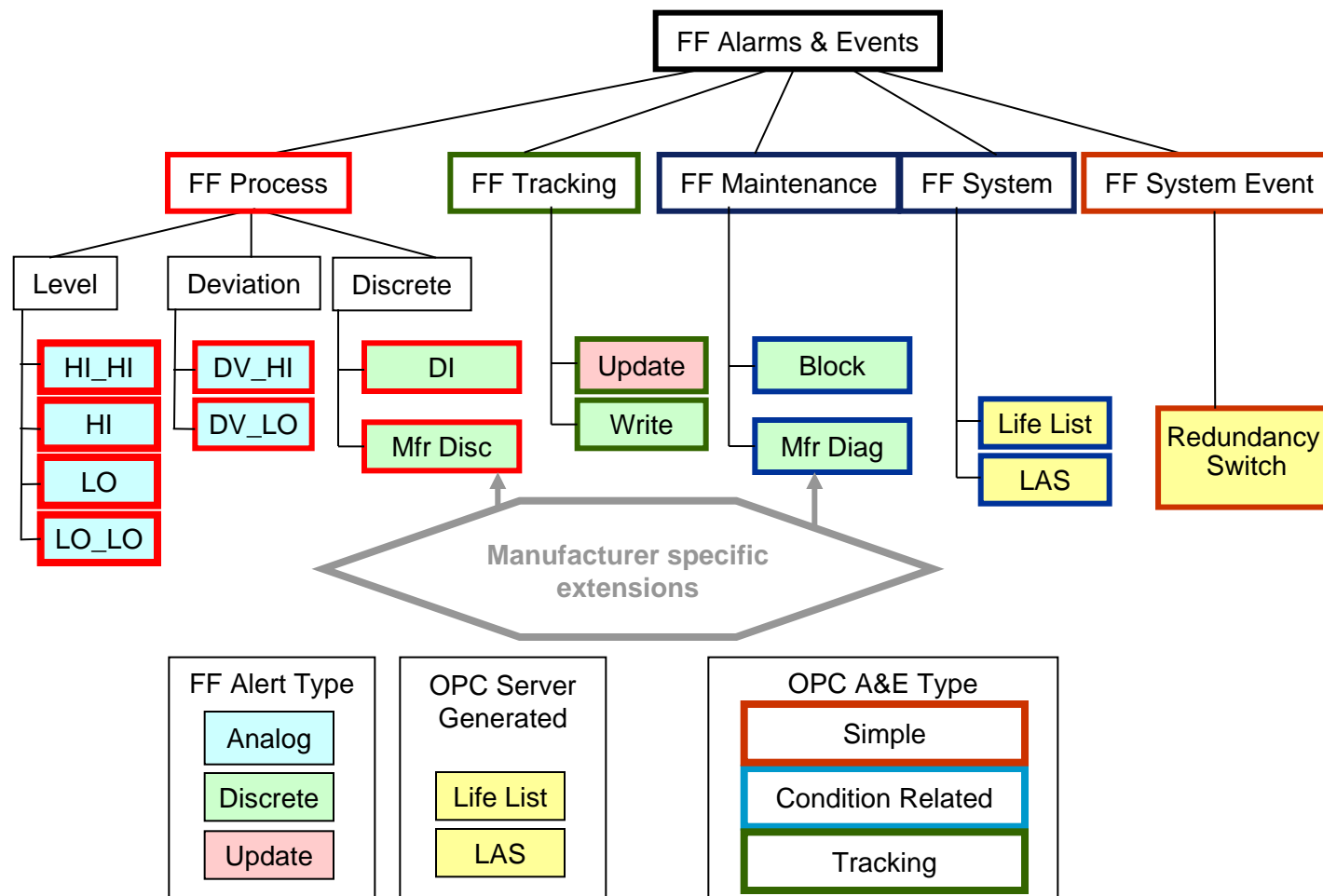


IEC 61804-2
function block
programming
language

- Central or field control from the same software
- Mode and status propagation works the same in central controller and field devices
- Universal templates

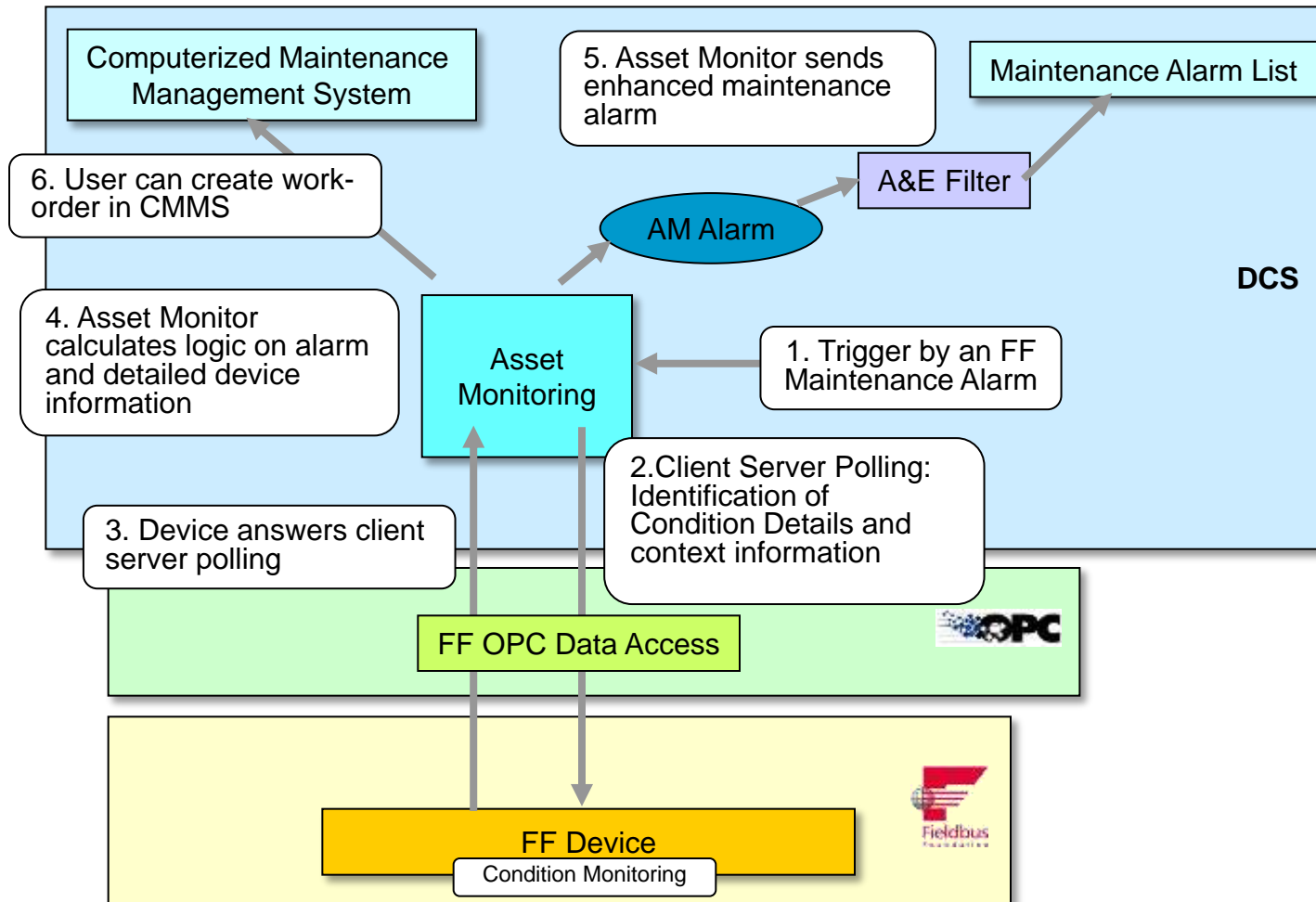
Device Management

Direct FF Alarms & Events

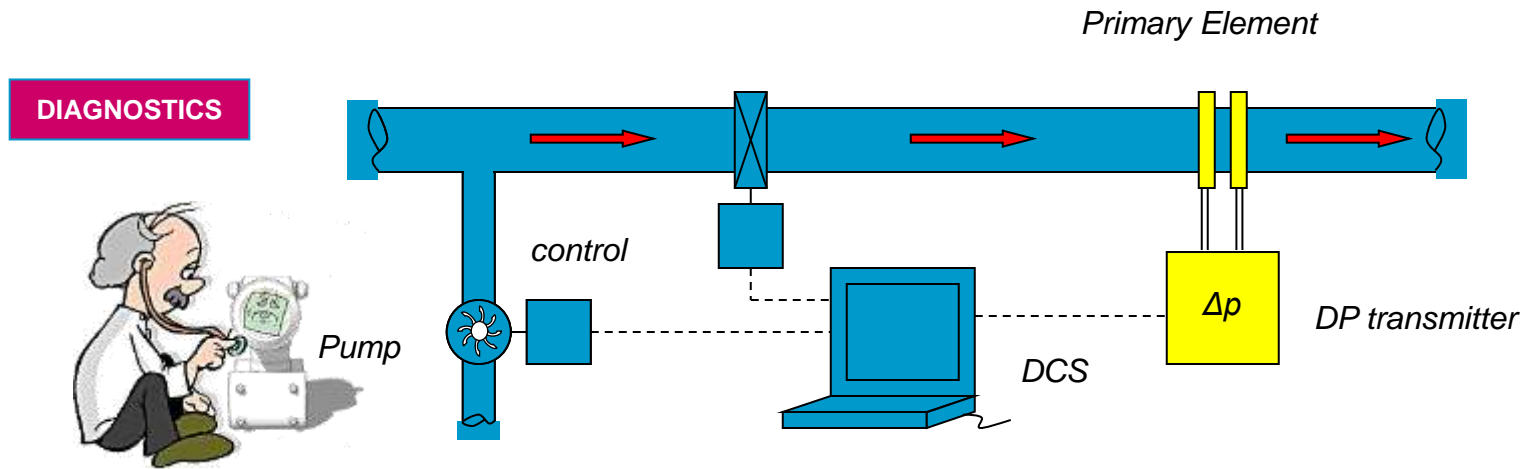


Device Management

Direct FF Alarms & Events

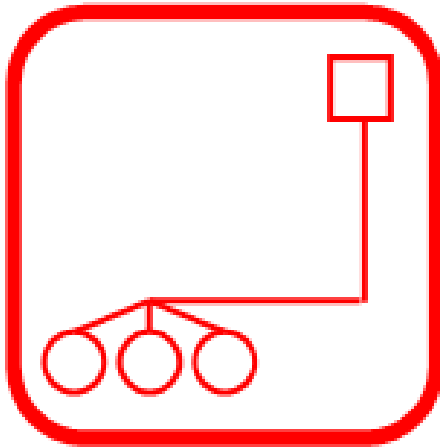


Device Management Example why AM Plugged Impulse Line Diagnostics

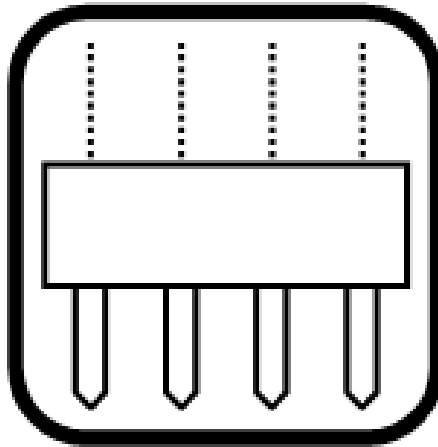


Based on the analysis of the variation of the natural and unique pressure noise signal of the plant

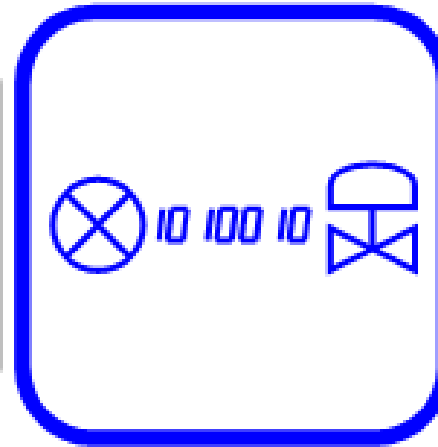
Summary: The Digital Difference



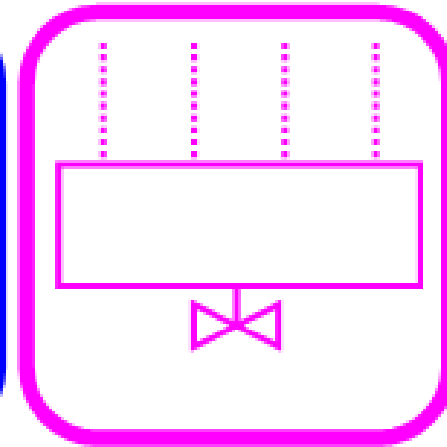
Multidrop



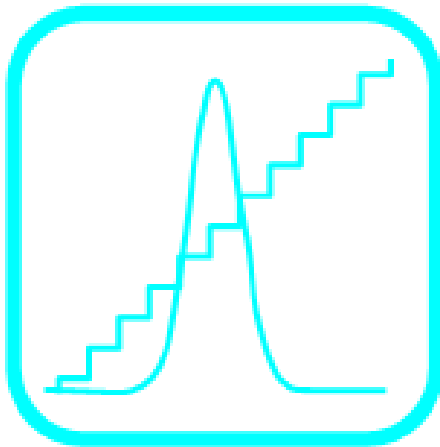
Multi-Channel



Closed Loop Digital



Complex Devices



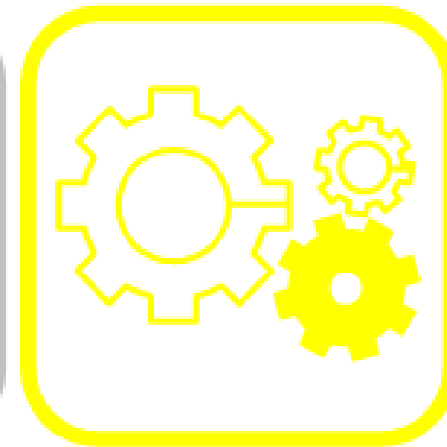
Fidelity



Diagnostics



Real Number



Firmware Download