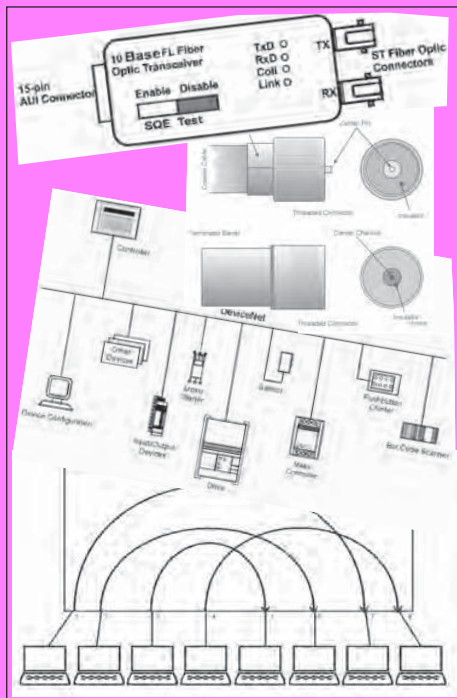


# SETTING UP, UNDERSTANDING AND TROUBLESHOOTING OF INDUSTRIAL ETHERNET AND AUTOMATION NETWORKS



## WHAT YOU WILL GAIN:

- A practical toolkit of know-how on latest data communications technologies
- A grasp of the latest updates for OPC
- An understanding in the operation of industrial wireless systems
- Practical experience in troubleshooting cable and wireless systems
- Design tips and tricks for your own operational industrial data communications systems
- Ability to integrate the different industrial communications protocols and standards
- Skills to be the local guru in industrial data communications

## WHO SHOULD ATTEND:

Anyone who wants to get the latest up-to-date practical information on industrial data communications systems and challenges ranging from fieldbus and Ethernet systems to OPC and security, including:

- Instrumentation and Control Engineers and Technicians
- Process Control Engineers
- Network Planners
- Electrical Engineers
- Test Engineers
- System Integrators
- Designers
- Electronic Technicians
- Consulting Engineers
- Design Engineers
- Plant Managers
- Systems Engineers

## The Workshop

Ethernet is becoming the obvious choice for automation networks. It is a rugged, versatile technology. While its basic frame structure has not changed, technologies such as fast and gigabit Ethernet, industrial Ethernet, VLANs, redundant rings and real-time Ethernet have increased the complexity and choices available. Consequently some misconceptions have arisen as to how Ethernet functions and how the system should be optimally configured.

This workshop addresses these issues in a clear and practical manner. Ethernet can be augmented with wireless technologies and the workshop takes a brief look at current and emerging industrial wireless technologies such as IEEE802.11, wireless mesh and wireless sensor networks. Due to its rugged design, all major automation system vendors are adopting TCP/IP (and of course, Ethernet). This complex topic will be covered in an easily understandable and coherent manner. OPC has made vast inroads into the process automation arena and has been adopted by all SCADA vendors. We look at current standards and also at new developments such as the 'Unified Architecture', highlighting some implementation issues and ways around them. In the automation arena there is a strong move to Ethernet. We cover offerings from the HART communication foundation, the ODVA, the PROFIBUS/PROFINET user organisations and the fieldbus foundation, as well as the latest. Ethernet fieldbuses. Real-time Ethernet can now operate at sub-millisecond access times and less than one microsecond jitter.

The workshop covers various offerings by the abovementioned vendors and the two basic methods through which this incredible performance is being achieved. Finally we look at every system manager's nightmare; security, and suggest some simple commonsense and internationally accepted measures to keep the hackers at bay.

## The Program

### INTRODUCTION

- The OSI model and client/server paradigm
- The overall picture: Where do all these technologies fit in?
- Current trends

### INDUSTRIAL ETHERNET

- Background: IEEE 802.3 CSMA/CD
- Fast, gigabit and ten gigabit Ethernet
- Switched Ethernet networks, redundant rings and VLANs
- Industrial Ethernet components
- Real-time (deterministic) Ethernet and IEEE 1588
- Implementation and troubleshooting

### INDUSTRIAL WIRELESS

- Wi-Fi (IEEE802.11a/b/g/n)
- Wireless Mesh Networks (IEEE 802.15.4)
- Wireless Sensor Networks (IEEE 1451) TCP/IP
- The TCP/IP protocol suite
- Network layer protocols (IPv4, ICMP, ARP)
- Host-to-Host layer protocols (TCP, UDP)
- Application layer protocols (FTP, HTTP, Telnet)
- Configuration and troubleshooting

### OPC

- The OPC concept
- OPC specifications and unified architecture
- DCOM and registry issues
- OPD DA (Data Access)
- Redundancy, tunnelling and bridging
- Implementation and troubleshooting issues (especially Windows XP SP2)

### AUTOMATION NETWORK DEVELOPMENTS

- Fieldbus definition and standards
- HART Communication Foundation: HART and WirelessHART
- ODVA: DeviceNet, Ethernet/IP and CIPSync
- PNO: PROFIBUS DP/PA, PROFINET v1, v2 (SRT), v3 (IRT)
- Fieldbus Foundation: FOUNDATION Fieldbus H1 and HSE
- Real-time Ethernet field buses:
- EtherCAT
- Ethernet PowerLink (EPL)
- Sercos III

### SECURITY FOR INDUSTRIAL NETWORKS

- Authentication
- Encryption
- Firewalls
- Wireless LAN issues
- Practical steps to safeguard

## Practical Sessions

14 Useful Practical Sessions include:

- Install and configure an industrial wireless access point as part of Ethernet network
- Interconnect industrial wireless and Ethernet networks
- Control access with MAC address filtering
- Perform path loss calculations on radio link
- Use protocol analyser to solve Ethernet problems
- Connect up simple analog and digital I/O system to network
- Troubleshoot a HART instrument
- Analyse protocols for ProfiNet and Ethernet/IP
- Configure IP addresses and subnet masks
- Analyse ARP/ICMP/IP/UDP/TCP using protocol analyser
- Connect up different packages using OPC
- Troubleshoot a simple OPC problem
- Set up a simple firewall
- Demonstrate network security using encryption and authentication