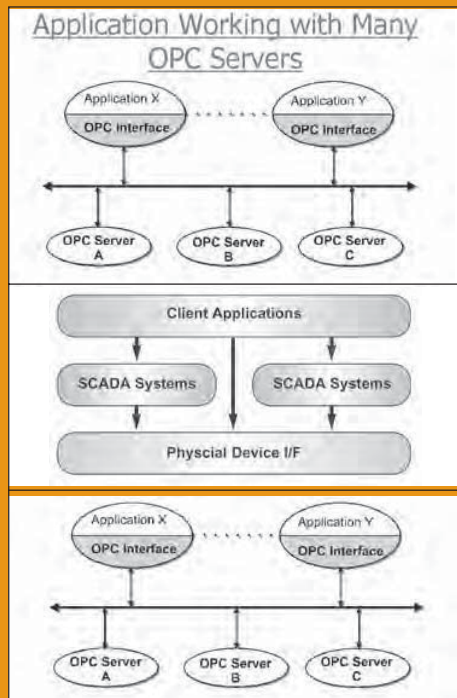


# PRACTICAL FUNDAMENTALS OF OPC (OLE FOR PROCESS CONTROL)



## YOU WILL LEARN HOW TO:

- Describe what OPC is and how to apply it to your applications
- Understand why OPC is such a robust solution
- Understand OPC Data Access 3.0
- Describe the key components of OPC
- Understand DCOM
- Describe the key features of OPC
- Configure a simple application to display data from the plant floor
- Build a simple SCADA system and supporting components using OPC
- Enhance your existing legacy control system networks to use OPC
- Learn why you need to demand OPC in your products
- Migrate your process data seamlessly into your MS Office applications

## WHO SHOULD ATTEND:

If you are using any form of automation or communication system or are applying PCs/PLCs/SCADA systems, this workshop will give you essential tools in working with OPC. This is not an advanced workshop – but a hands-on practical experience. Among those that will benefit by attending are:

- Process Control and Instrumentation Engineers
- Process Control and Instrumentation Technicians
- Design Engineers
- Network Engineers
- Electrical Engineers
- Engineering Managers
- Network System Administrators



## The Workshop

OPC has come a long way in making the engineers' dream of plug and play compatibility in automation engineering achievable. OPC is an industry-wide standard that breaks this proprietary lock by allowing open connectivity based on the principles adapted from widely accepted and applied Microsoft Windows integration standards. OPC capabilities have been demonstrated in many practical applications and it is now a well-established approach for different competing manufacturers. It is now easily considered to be the standard interface in the windows environment. If you are serious about reducing your costs of installing and maintaining your automation systems you need to use OPC.

If you have only briefly heard about OPC and want to get to grips with its tremendous power and apply this to your plant and application, then this workshop will give you the necessary tools. You will receive a valuable overview of OPC and understand why it is the standard of choice for data access in automation systems. You will be exposed to and understand the essential components of OPC based on typical applications. You will understand how OPC servers are installed and how they are then accessed by OPC clients (which could be SCADA systems). The exercises that you will work through in the class will allow you to apply the theory you gain in the class in a practical manner.

The OPC specification will be discussed in great detail and you will be exposed to the development of OPC servers and clients. The interaction between OPC and DCOM will be discussed in practical detail.

The latest trends and future developments with OPC in the USA and Europe will be detailed.

## The Program

### CONCEPTS AND DEFINITIONS

- Classes and objects
- Clients, servers and client/server interaction
- OLE
- DDE and NetDDE
- ActiveX
- .NET

### OPC OVERVIEW

- What is OPC?
- Problems addressed by OPC
- The OPC logical object model
- OPC data (sources, formats, etc)
- OPC client/server relationships
- Current OPC specifications

### COM AND DCOM

- What is COM?
- COM basics
  - Classes
  - Interfaces
  - Components (proxy/stub files, wrappers)
  - Globally Unique IDs (GUIDs)
  - OPC registry entries (ProgID, ClassID, AppID, CatID)
  - OPC client/server interaction (in-process, local, remote)
- Setting up DCOM (programmatically or declaratively)

### OPC DA SPECIFICATION (3.0)

- Functional description
- Logical object model (OPCServer, OPCGroup, OPCItem)
- Typical server and client structures
- Read/write methods (synchronous, asynchronous, refresh, subscription)
- Data source (cache, device)
- OPCServer interfaces and methods
- OPCGroup interfaces and methods
- Group and item properties
- Server configuration procedure

### OTHER OPC SPECIFICATIONS

- OPC common information
- OPC alarms and events
- OPC batch
- OPC data exchange (DX)
- OPC historical data access
- OPC security
- OPC XML-DA

### COMMUNICATIONS ISSUES

- Networking protocols
- LANs, WANs
- OSI Model
- Network infrastructure (Ethernet)
- 'Transports' (TCP/IP)

### TROUBLESHOOTING

- DCOM protocol stack
- Physical and data link layer problems
- Network and transport layer problems
- COM/DCOM-related problems
- Client/server-related problems
- Simulation and conformance testing
- Error codes

### PRACTICAL EXERCISES

- *Setting up network (IP addresses, subnet masks, default gateways)*
- *Connecting simple clients to a SCADA system*
- *Setting up an OPC server*
- *Data export to Excel*
- *Generating and importing tag lists in CSV format*
- *Graphical (drag and drop) clients*
- *AE client/server interaction*
- *Validating servers*
- *Setting up DCOM to enable OPC clients and servers to interact across a network*
- *Tunnelling (across local network and the Internet)*

### SUMMARY, OPEN FORUM AND CLOSING

## Practical Sessions

This is a practical, hands on workshop enabling you to work through practical exercises which reinforce the concepts discussed.

