Matrikon®

CERTIFIED WORKSHOPS FOR INDUSTRIAL ENGINEERING

PRACTICAL TRAINING IN OPC AND OPC UA

Theoretical virtual Workshop with real practices

Organized by Vester Industrial Training Center

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OVERVIEW:

The OPC technology Workshop is geared towards:

- Solve common system connectivity issues using field-tested OPC technology
- Reduce integration time by learning to install, configure and test OPC
- Improve system reliability using standards-based technology
- Reduce long term ownership costs by building robust systems
- Quickly troubleshoot and diagnose Windows security problems

For engineers and integrators who are integrating new systems, expanding current operations, replacing legacy equipment and looking for ways to improve data communication; our OPC hands-on workshops provide a practical approach to learn and understand the methods of accessing data through OPC technology.

Unlike other OPC courses that only provide basic lectures, Matrikon provides interactive, hands-on workshops that enable participants to install, configure and test OPC servers and applications using a variety of OPC specifications including OPC Data Access, Historical Data Access and Alarms&Events.

LEARNING ENVIRONMENT

The Workshop will be held online, in a virtual classroom where students will be able to interact with the instructor and between their companions at any time. It will be composed of explanations, Power Point presentations and practical exercises. Attendees will expose their own connectivity problems to learn from the others.

MATERIALS INCLUDED

a. Manual and exercise guide in digital format
b. Power points with extra material
c. Annexes in digital format
d. Access to the virtual classroom and digital certificate
e. All the necessary material will be sent by mail before the first day of Workshop.

OBJECTIVES

Upon completion of OPC technology, graduates will have the following knowledge and skills:

- Understand the various OPC specifications including Data Access, Historical Data Access and Alarms&Events
- Understand the client/server architecture and how connections are made
- Learn how to use OPC on the old and new operating systems
- Install and configure OPC servers & clients and test OPC connections
- Integrate archives and analyze data using OPC HAD and Configure remote OPC connections. Recognize, identify and solve various networking problems through common symptoms
- Understand the inner workings of DCOM and learn how to set or restore an OPC system's DCOM configuration
- Use advanced troubleshoot techniques to diagnose and debug any OPC connection and system. Solve a series of simulated OPC issues. Identify problems related to interoperability

Day 1

1. **Introduction to OPC Technology (9:00-10:30)**

   a. Basic OPC technology concepts. Real case study.

   b. Introductory practice using OPC Explorer test client.

   c. OPC History and OPC Foundation role.

2. **Break (10:30-10:45)**

3. **OPC DA (10:45-13:30)**

   a. OPC DA fundamentals. What is it for and when to use it.

   b. Detailed explanation for Quality, timestamp, cache reads, device reads.

   c. Detailed explanation about data sources in the market and different hardware control types.

4. **Break (13:30-14:30)**

5. **OPC HDA (14:30-16:00)**

   a. OPC HDA fundamentals. What is it for and when to use it.

   b. OPC HDA Server and OPC HDA Client basic topology.

   c. Difference between relational databases and data historians.

   d. OPC HDA interaction with data historians.

   e. Practical exercises.

6. **DCOM and Tunnelling (16:00-18:00)**

   a. What is Windows DCOM and how works.

   b. DCOM limitations.

   c. What is OPC Tunnelling and works.

   d. Practice using local OPC Tunneller.

   e. Practice using AWS OPC Tunneller.

Day 2

1. **Introduction to OPC UA (9:00-10:30)**

   a. Classic OPC versus OPC UA.

   b. Main advantages for OPC UA compared to its predecessor.

   c. OPC UA road map, and midterm migration.

   d. OPC UA technical: Address Space, namespaces, nodes, etc.

   e. Space Browsing functionality.

   f. Practical exercises.

2. **Break (10:30-10:45)**

3. **Administration and advanced configuration (10:45–13:00)**

   a. Subscription management.

   b. Advanced subscription settings.

   c. Read and Write.

   d. Practice: Connection with an OPC UA

   e. Embedded Server in a PLC.

   f. Queue buffering and data recovery.

   g. Practice (Data Recovery).

   h. Attributes.

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4. **Discovery Process (13:00 – 13:30)**

   a. Local Discovery Server LDS

   b. Global Discover Server GDS

5. **Break (13:30-14:30)**

6. **Digital Certificates (14:30-16:00)**

   a. What is a digital certificate.

   b. Using digital certificates with OPC UA communications.

   c. Practical exercises.

7. **Administration and advanced configuration (16:00-17:00)**

   a. The OPC UA Stack explained.

   b. Telegram analysis using Wireshark.

   c. The connection process (Firewall, Certificates, user security).

   d. Embedded Systems: pros and cons.

   e. DMZ topology with OPC UA.

   f. Store&Forward with OPC UA.

8. **Mixed technologies (17:00-18:00)**

   a. OPC Classic and OPC UA compatibility.

   b. OPC Wrapper and UA proxy.

Day 3

1. **Redundancy (9:00-10:30)**

   a. Why is redundancy important in industry and how is it used.

   b. Case studies.

   c. Redundant architecture.

   d. PLC level redundancy, OPC level redundancy and Scada level redundancy.

   e. What is needed for a redundant architecture?

   f. Exercise architecture in detail.

2. **Break (10:30-10:45)**

3. **Client Server Architecture (10:45-13:30)**

   a. Why do control systems need to share data.

   b. Existing methods to share data between hardware control systems.

   c. Exercise architecture in detail.

   d. Practical exercises.

4. **Break (13:30-14:30)**

5. **OPC Security (16:00-17:00)**

   a. Why is a secure implementation Important for OPC?

   b. Security in real cases today.

   c. How to implement a secure topology for OPC.

   d. Exercise architecture in detail.

   e. Practical exercises.

6. **Troubleshooting (17:00-18:00)**

   a. How to identify issues in an OPC architecture.

   b. Handy tools to use in projects.

   > I. Telnet
   >
   > II. OPC Explorer.
   > III. OPC Simulation Server
   > IV. Wireshark.
   > V. OPC Tunneller.
   > VI. Netstat
   > VII. Logs.
   > VIII. Windows Event Viewer.