zenon manual

OPC Server

v.7.50
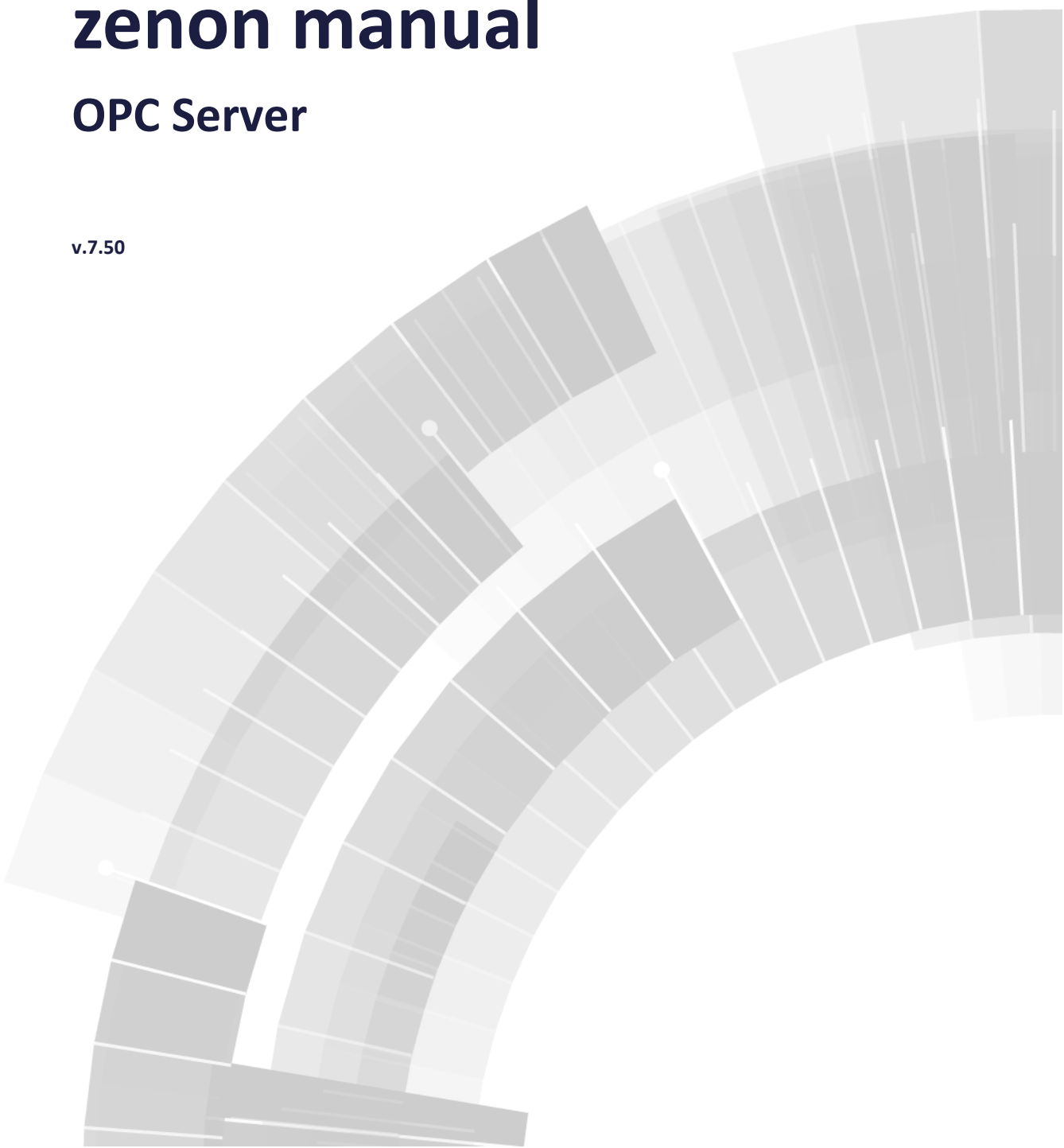
COPA·DATA
do it your way

Table of contents

1. Welcome to COPA-DATA help

GENERAL HELP

If you cannot find any information you require in this help chapter or can think of anything that you would like added, please send an email to documentation@copadata.com (mailto:documentation@copadata.com).

PROJECT SUPPORT

You can receive support for any real project you may have from our Support Team, who you can contact via email at support@copadata.com (mailto:support@copadata.com).

LICENSES AND MODULES

If you find that you need other modules or licenses, our staff will be happy to help you. Email sales@copadata.com (mailto:sales@copadata.com).

2. OPC server

The OPC server makes the variables of the project available for standard OPC client tools.

The use of the OPC UA Server is recommended for several operations. It is part of the COPA-DATA Process Gateway

> **License information**
>
> *Must be licensed in Editor and Runtime.*

3. Compare OPC Server and OPC UA Server

The OPC UA server system has superseded the OPC server. Use of an OPC UA server is recommended for most applications.

OPC SERVER

▶ OPC Task Force since 1995

▶ Uniform interface for automation systems

▶ Based on Microsoft's COM/DCOM technology

▶ OPC foundation since 1996

▶ several specifications for different applications
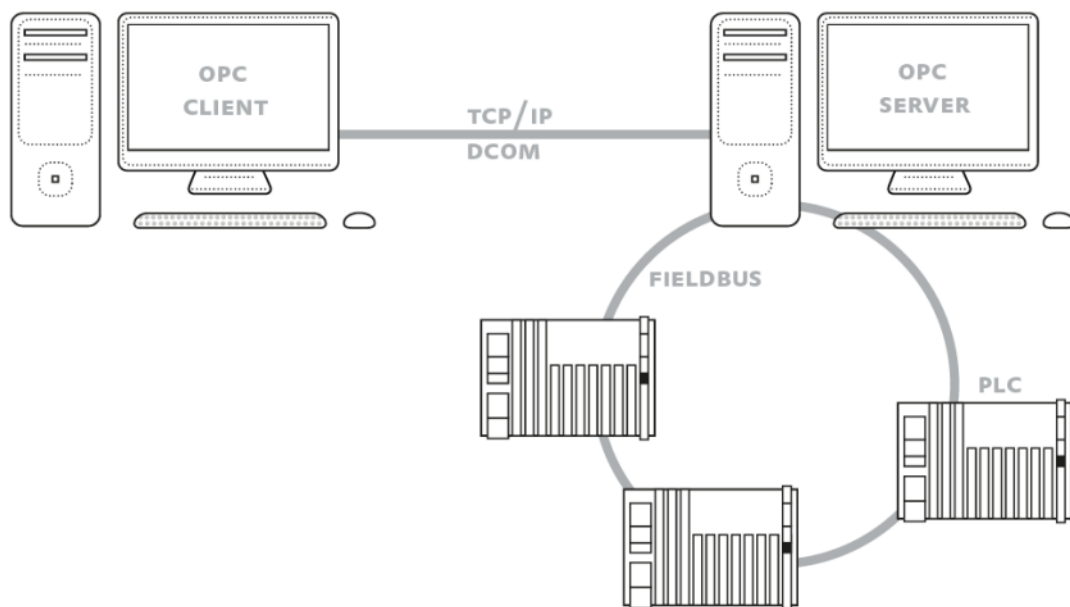
OPC UA SERVER

▶ First vision 2003

▶ Released in 2006, not yet all parts
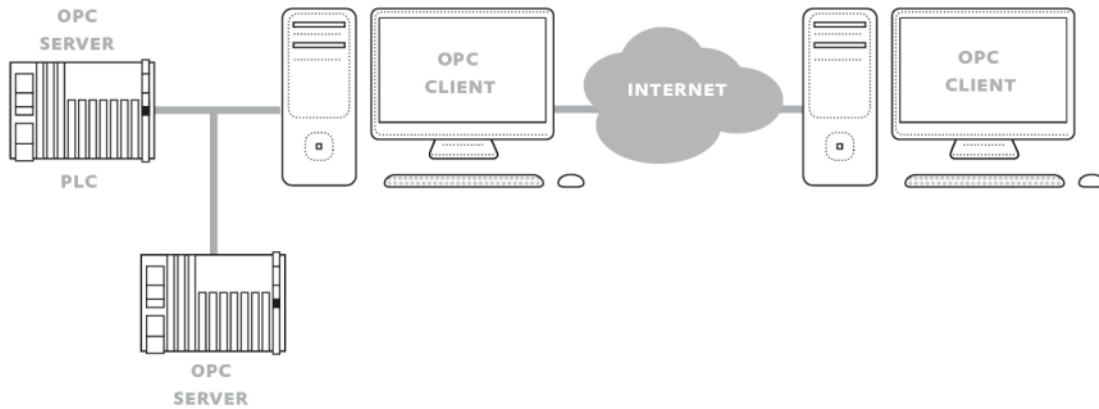
COMPARISON OF OPC SERVER TO OPC UA SERVER

Parameters	OPC Server	OPC UA Server
Data model	Limited	for all applications
Implementation	Manufacturer-dependent	Manufacturer-independent
Interoperability	no	yes
Configuration	laborious	simple
Network use	Not recommended (security); Windows CE cannot be used	yes
Network technology	DCOM (error-prone, unstable)	OPC UA TCP binary protocol
Performance	low	high
Platforms	Windows only	independent
Redundancy	no	yes
Resource requirements	high	lower
Service-orientated architecture	no	yes
Security	outdated	In accordance with current standards
Connection security	no	provided
Windows CE	no	yes

4. Technical background

The concept of OPC ist conceived for the application in the cell and management level. Here the OPC server offers data from the control level

OPC CLIENTS AND OPC SERVER

OPC SERVER
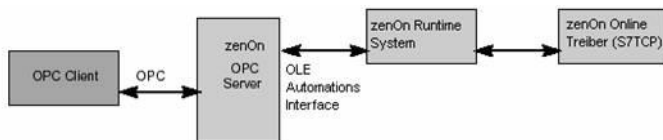
OPC defines objects that are described by object interfaces. In the OPC server there are two kinds of object interfaces, which can be addressed by an OPC client:

▶ The COM custom interface

▶ The OLE automation interface

OBJECT INTERFACE OF THE OPC SERVER
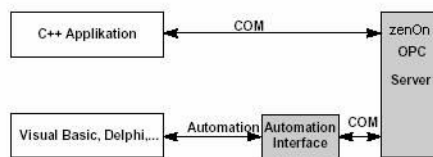
The COM interface is used by function-pointer-orientated languages, such as C++. It is possible to communicate with script languages, such as Visual Basic, using the Automation Interface.

OPC OBJECT HIERARCHY

An OPC server consists of three hierarchically-stepped objects:

▶ The server

▶ Groups and

▶ Items
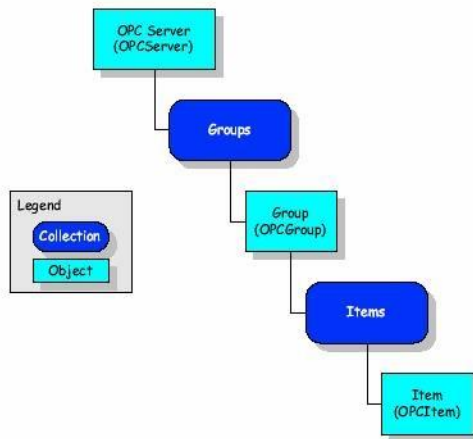
An OPC server projects the real objects to items (variables). These items are unique within the OPC server. The client organizes the items in one or more OPC groups.

4.1 General OPC Server Information

The OPC server:

▶ is an Out of Prozess server

▶ runs in a Single Thread Apartment (STA)

▶ Is registered as a MULTIPLEUSE COM server
  That means: The server runs only once as a process instance. Several OPC clients sign into the same server.

▶ only works locally

4.2 Item Addressing:

The OPC server has to be able to distinguish, from which projects the variables come, because serveral projects can be started in the Runtime. So the server uses the following nomenclature for the process variables: Projectname.Variablename

> **Example**
>
> **Project1.ActualValue**
>
> **Project1** = name of the project currently running in the Runtime
>
> **.** (Point) = Separator
>
> **Current value** = *Existing name of variable*

4.3 Group information

A group name can be freely defined. For example: **Test group 1**.

The update cycle in the group is not considered by the OPC Server as the OPC Server has an on-change data connection to the Runtime. Therefore every modification of value will be transmitted to the OPC Server without cyclically requesting the value.

> **Information**
>
> *OPC clients must create an own group for each zenon project.*

4.4 Supported OPC Specifications:

OPC Data Access Servers Version 1.0

OPC Data Access Servers Version 2.0

SUPPORTED OPC INTERFACES:

Interfaces	supported
IOPCServer	Yes
IOPCBrowseServerAddressSpace	Yes
IOPCServerPublicGroups	No
IPersistFile	Yes
IOPCCommon (from 2.0)	Yes
IOPCSyncIO	No
IOPCItemProperties (from 2.0)	Yes
IConnectionPointContainer (from 2.0)	Yes

5. Installation and registration of the OPC Server

The OPC core components from the OPC Foundation must be must be installed for use of the OPC server. On computers with a 64-bit operating system, it is necessary to install both the 32-bit version and the 64-bit version. You can find the setups on the installation medium with the additional programs. The computer may need to be restarted after installation.

The OPC server is not registered by default for security reasons. After installation, the OPC server can therefore not be discovered by an OPC client. The OPC Server has to be explicitly registered

Registering the OPC Server

1. Install the **OPC-DA Core Components** from the OPC Foundation.
   The setup is on the installation medium in the **AdditionalSoftware** folder.

2. Open the command line with administrator rights (Elevated Command Prompt).

3. Enter the login command with the desired parameters.
   Possible entries:

   - **zenopcsrv.exe /RegSrv**:
     Registers the OPC server. A message is given if this is not successful.

   - **zenopcsrv.exe /RegSrvD**:
     Registers the OPC server and also gives a message if this is successful.

   - **zenopcsrv.exe /UnregSrv**:
     Deregisters the OPC server. A message is given if this is not successful

   - **zenopcsrv.exe /UnregSrvD**:
     Deregisters the OPC server and also gives a message if this is successful

In the event of errors, check that you have sufficient authorizations.

Note: Changes made via the zenon **Startup Tool** or the installation of a new zenon version do not lead to any change to the registration of the OPC server.

6. Licensing the OPC Server

The OPC Server only runs, if it is correctly licenced. Otherwise you get the following error message:

Licencing is done with the standard licencing procedure. On ordering the OPC Server you have to state, on which computer the OPC Server should be installed, and the Runtime serial number you use there. From the licencing office you then get a new serial number and a new activation number for that computer. With these the OPC Server is licensed. These numbers have to be entered in the `zenon6.ini` with the tool licence order (Start – Programs – COPA-DATA – Licence order).

7. Settings in zenon

VBA has to be activated, so that the control system OPC Server can get data from the Runtime. Please check, if the following entries in the `zenon6.ini` are set correctly:

`[VBA]`

EVENT=1 (Switches on or off the event mechanism for the VBA – COM interface)

Default =0

This setting must be set to **EVENT=**1.

> ⚠ Attention
>
> *If the event mechanism in the Runtime is deactivated, the OPC Server can access the variables for writing, but the reading access does not work!*
> *The OPC Server then gets no change events from the Runtime. For the connection quality all OPC Clients will display "disturbed".*

No further settings in zenon are necessary.

The OPC Server reads out the running Runtime and offers all variables of all running projects for the connection.

> ⚙ **Information**
>
> *As soon as the Runtime is started, you can read out all variables from all projects that are available in the Runtime. This is independent from the fact, if the included projects are standalone, client or server projects.*

8. Browsing of the OPC Server

OPC Clients use two different methods to find and to browse the variable information of the OPC Server. Finding the OPC Servers installed on the PC can be done in two ways.

▶ Reading out the Registry

▶ Browsing with the additional program `OPCEnum.exe`

The additional program **OPCEnum** is not distributed. So it can happen that an OPC Client cannot find the control system OPC Server, because it uses this browsing method. Read the documentation of the OPC Client to find out whether the browsing method can be changed to reading out the registry. (For the Matrikon OPC Explorer you find that under Options.) If this is not the case, you must install the program **OPCEnum**.

Hint: If you install the freely available Matrikon OPC Simulator Server, OPCEnum is also installed.

> ⚙ **Information**
>
> *When browsing the control system OPC Server offers all variables that exist in the running control system Runtime. So you have to make sure, that the control system Runtime is running, before you start browsing the variables.*

9. Starting/stopping the OPC Server

The OPC Server is automatically started by the first client that connects to it and it is stopped by the last client that disconnects.

10. Logging

For monitoring and evaluating the activities of the <CD_PRODUCTNAM> OPC Server the Diagnose Viewer is used.

11. Asynchronous read request

The OPC interface IAsyncIO and the OPC interface IAsyncIO2 support multiple asynchronous read requests.

12. REMOTE access with DCOM

With DCOM technology, it is possible for an OPC client to have read/write access to the zenon OPC Server over the network.

> ⚠️ **Attention**
>
> *The OPC server is optimized for local use; use in a network is expressly not recommended!*
> *Background: OPC network communication works using DCOM technology from Microsoft, which has proven itself to be prone to errors and unstable. Particular disconnections, such as unplugging a network cable and very long timeout periods are problematic in industrial applications.*
>
> **Recommended solution:**
>
> ▸ Using an OPC_UA Servers
>   or
>
> ▸ zenon Runtime is installed and works as a client for the desired program on the computer on which the OPC client is running. zenon OPC Server is started for this client. In this way, zenon OPC Server can be connected to the OPC client.

> ⚠️ **Attention**
>
> *Make sure, that always the user of the OPC Client application logs in at the server. In certain cases, this does not have to be the user registered on the client PC.*
> *This is then the case if the application is started with another user. This happens e.g., if the Runtime (with an OPC Client driver, that connects to the remote OPC Server) is started with the Remote Transport. Then the OPC Client runs in the context of the SYSTEM user and in the context of the logged in user.*
> *In any case, you must enter the correct user on the OPC Server PC in Access authorizations (on page 17)!!*

12.1 Windows Firewall

The Windows firewall blocks all incoming connections. So also the connection attempts of the OPC Client to the OPC Server are blocked. So you have to completely deactivate the firewall or to configure it correctly.

As the correct configuration could not be found, when this tutorial was written, we recommend at the moment to deactivate the Windows firewall completely.

12.2 General authorization

The user – in whose context the OPC Client runs – must have administrator rights on the server PC, so that the OPC Client can log in at the OPC Server PC and gets the according rights there to start and configure the OPC Server.

Start the Control panel on the OPC Server and open the entry "User accounts". With 'Add…' add a new user, with which the OPC Client logs in, and configure this user as an administrator. See example 'user' in the screenshot.

> ### 💡 Information
>
> *The best is to use the same Windows user on the OPC Server and on the OPC Client and to add this user to the administrator group.*
> *Attention! It is not sufficient to have local users with the same name on both computers. It has to be the same domain user!*
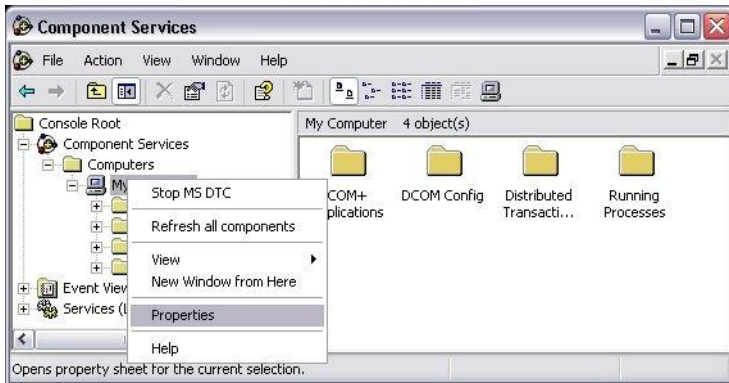
12.3   DCOM configuration

You only have to do this on the OPC Server PC. No settings are necessary on the Client PC.

12.3.1   PC wide settings

Start the program DCOMCNFG from the Windows\\System32 directory.

Open the console root and switch to the Component services - Computer - Workspace.

Select the **Properties** in the context menu of the workspace.

Usually you do not have to make changes in the property pages "General", "Options", "Standard protocols" and "MSDTC".

Open the property page "Standard settings". Here you have to make sure, that DCOM is activated for this computer. Do not care about the other settings.

The following settings have been tested:

▶   Activate COM internet service - not active

▶   Standard authentication level - connect

▶   Standard identity change level - identify

▶   Additional security for allocation logging - not active
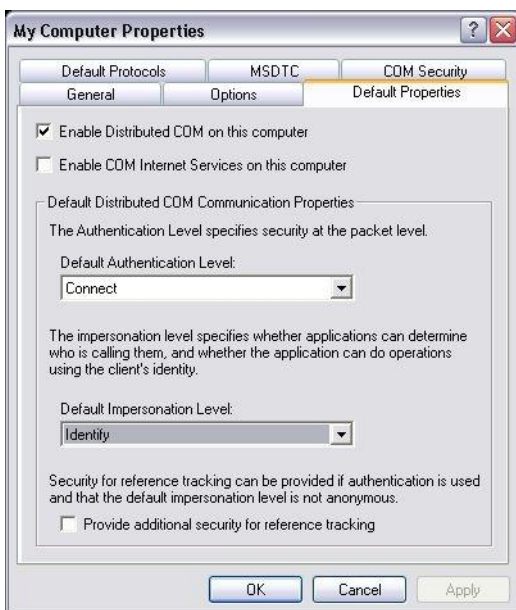
On the property page "COM standard security" you will find the settings for the access authorization.
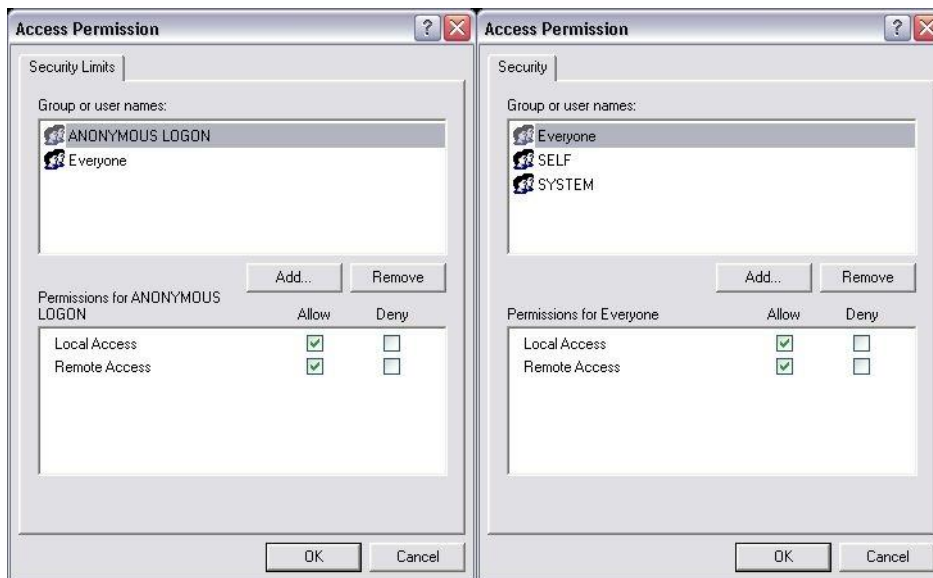
⚠ Attention

The limit settings for the access authorizations and the start and activation authorizations must be set, otherwise remote access is prevented by the operating system!

The limits to access authorizations and the start and activation authorizations must be edited.

Setting the access authorization

Click on "Edit limits…". In the dialog you can define the access authorizations. First add the needed users (in our example the Praktikant) and allow the remote access! You also have to allow the remote access for the user "ANONYMOUS-ANMELDUNG" necessarily.

⚠ **Attention**

Never remove the user "ANONYMOUS-ANMELDUNG" or refuse local access!
With this you would prevent any COM data traffic on your PC!

💡 **Information**

Never remove the user "ANONYMOUS-ANMELDUNG" or refuse local access!
With this you would prevent any COM data traffic on your PC! You now have to configure
the user "ANONYMOUS-ANMELDUNG" correctly. For all other settings the user with
which the OPC Client logs in is sufficient.

Setting the start authorization

Similar to the access authorization you have to add the OPC Client user/s and allow all authorizations.

12.3.2   Application specific settings

The security specific settings should be configured directly in the application and not in the standard settings of the workstation.

Start the program DCOMCNFG from the Windows\\System32 directory.

Open the console root and switch to the Component services – Computer – Workspace – DCOM – Configuration. It may occur, that not correctly registered programs are listed. Confirm the message boxes with "Yes". So the programs are added to the registry.

Search the OPC Server from the list and click on the OPC Server with the right mouse button. Select the properties in the context menu.


Information

The OPC Server is independent of the zenon version. So the name of the OPC Server can differ from the version number of your control system installation. Usually you will see the name OPC Server for Version 5.21. Don't get confused, it has no influence on the functionality. Important is the unique application ID (AppID). It has to be correct. The AppID of the OPC server is: {CA2AF1F9-C031-42B7-8BF3-6C6041B23EAC}
Check if the path leads to the correct OPC Server. You will find the path of the registered OPC Server under Local path.

You have to do the following settings in this dialog:

On the property page General: Authentification level: connect

On the property page Execution place: Execute application on this computer

On the property page Security:
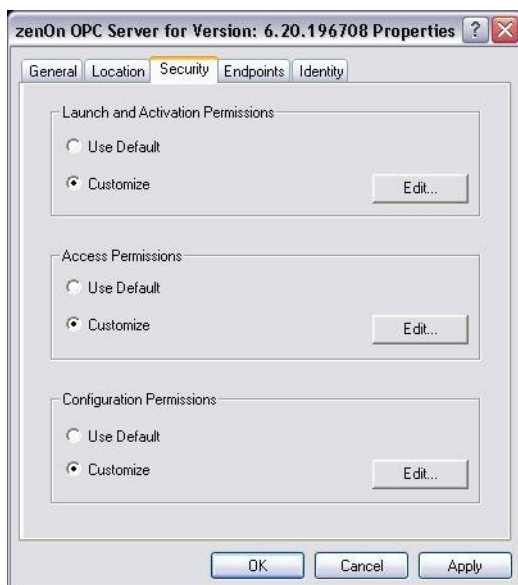
Start and activation authorization	Select adjust. With a click on "Edit…" you open the authorization dialog. Add the necessary users and activate all authorizations.
Access authorization	Select adjust. With a click on "Edit…" you open the authorization dialog. Add the necessary users and activate all access authorizations.
Configuration authorization	Select adjust. With a click on "Edit…" you open the authorization dialog. Add the necessary users and activate the configuration authorizations for full access and reading.

On the property page End points: Click on "Add…" and add connection oriented TCP/IP with the standard points.

On the property page Identity: Select "Interactive user"

12.4   Remote browsing the OPC Server

As already described in Browsing the OPC Server there are two methods, how an OPC Client can find and browse an OPC Server. Also for remote browsing the OPC Client can use both methods.

12.4.1   Browsing with Registry entry

The OPC Client has to support browsing per Registry and has to be configured accordingly. Additionally the access to the Registry of the remote server has to be possible.

12.4.2   Browsing with OPC Enum

The program OPCEnum.exe has to be installed on the OPC Server PC (it is not shipped). The OPC Enum program has to be correctly configured in the DCOM configuration like the OPC server. Grant access authorization for the remote OPC client. Configure the settings similar to the settings for the OPC Server). Otherwise the OPC Client cannot establish a DCOM connection to the OPC Enum program and thus browsing does not work.