CyBro OPC Server
User Manual

rev. 31

(applies to CyBro OPC Server v3.0.4 and later)

Index

General

OPC stands for "OLE for Process Control" - it is a specification standardized by OPC foundation, which enables OPC clients to access hardware data via OPC servers in a common, well defined way.

CyBro OPC Server enables OPC clients access to CyBro controllers, and attached IEX-2 modules. Clients may read and write whole memory space.

Installation

To install CyBro OPC Server, start the installation and follow instructions. Recommended install directory is "C:\Program Files\Cybrotech\CyBro OPC Server".

Installation does the following:

- unpack CyBro OPC files into specified directory
- create start menu group and icons
- register OPC server to be visible for clients
- install redistributable OPC core components

Note: administrator rights are required.

To upgrade server, install new version into the same directory, without uninstalling previous one. User settings will be preserved. Before upgrading, close SCADA window and shut down OPC server.

To uninstall server, start Control Panel, Add or Remove Programs, select CyBro OPC Server and press Remove button. OPC core components must be uninstalled separetely.

Activation code

To use CyBro OPC Server, valid activation code is required. To buy activation code, contact Cybrotech support. Regarding the application size, activation code may be:

- small   up to 100 tags
- medium   up to 1000 tags
- large   unlimited number of tags

Using the OPC server with 10 or less tags is free, no activation code is needed.

Without activation code, server may be used for development and testing. After 2 hours, warning message will pop up and server will stop. Restarting server provides another 2 hours. Number of restarts is not limited.

Configuration

OPC server configuration consist of creating a controller list and setting options.

Controllers

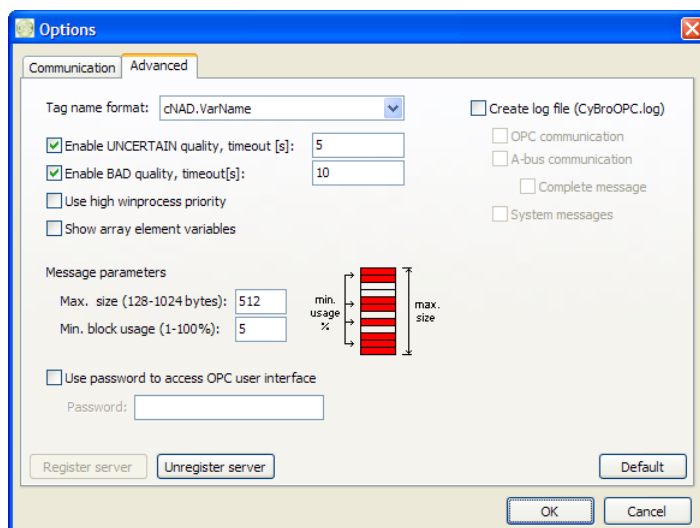To create list of controllers, use Scan option or enter controllers manually.
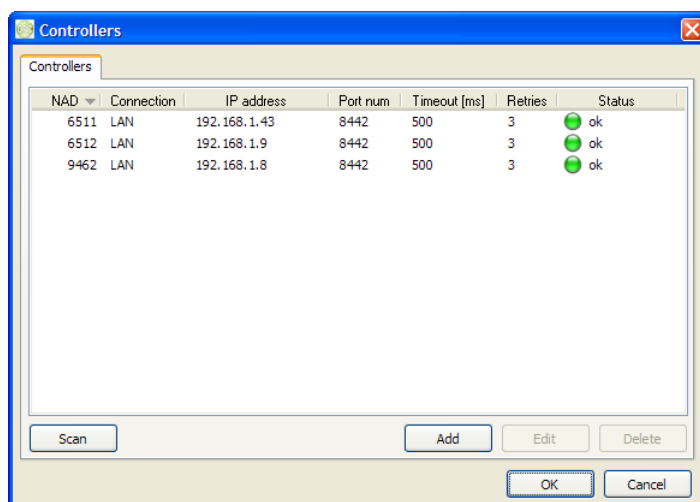
Status column reflect actions from Controllers dialog (scan), not regular communication.

Sort order (NAD, IP address...) directly affect order of controllers displayed in project tree.

Options

Use Options dialog to set communication options and advanced details.

Default tag format is cNAD.VarName, other formats are legacy and should not be used for new projects.

High process priority may slightly improve performance if server is heavy loaded.

Log file is used only for debuging, it may significantly affect server performance. File size is not limited.

Toolbar

Start/stop (Ctrl-D)   Open TCP/IP port and start communication.

Refresh tag (F9)   Refresh selected (one or multiple) tags. Refresh is performed by setting a read request (▪) to selected tags. Tags will be read in next communication cycle.

Refresh all (F10)   Read all tags from curent PLC/all monitor tags. Refresh is performed by setting a read request (▪) to all controller tags.

Set value (Enter)   Set value of selected (one or multiple) tags. Refresh is performed by setting a write request (▪) to selected tags. Value will be written in next communication cycle.

Add to Mon (Ins)   Add selected (one or multiple) tags to monitor. Monitor is basically a small OPC client. Monitor may hold variables from multiple controllers, and also system variables. Unlike background refresh process, monitor does affect tag status and communication statistics.

Controllers (F5)   Open list of available controllers.

Options (F4)   Open program settings dialog.

Status panel

Network status

Disconnected   Communication port closed, press Start to open port and begin communication.

Idle   No communication - either no controllers are configured, or no communication requests are given.

OK   Communication between OPC server and controllers is up and running.

Error   Error, socket binding problem or controllers not responding.

Network status is contained in Sys.Status tag. To get more details, check Sys.OpcStatus tag.

OPC status

Idle   OPC interface is idle, no clients are connected.

OK   OPC interface is active, at least one client is connected.

Network monitor

Controller status

Idle   CyBro is idle, no active read/write requests (background refresh doesn't count).

Ok   CyBro is active, communication is up and running, no errors detected.

Error   Communication or configuration error.

Controller status is contained in cXXXX.Sys.Status tag. To get more details, check cXXXX.Sys.PlcStatus.

Reading   A value is currently reading from the controller.

Writing   A value is currently written to controller.

OPC request   OPC client (SCADA) put a request to read/write one or more PLC tags.

Tag status

Reading   Read request pending. Tag will be updated in next available communication
                        cycle.

Writing   Write request pending. Tag will be written in first available communication cycle.
                        Tag quality becomes LOCAL_OVERRIDE until next read cycle is performed.

Idle   No requests are pending, tag will be refreshed in next background refresh cycle.
                        If communication is busy because of SCADA requests, background refresh is not
   available, and idle tags are not updated (tag quality drops to LAST_KNOWN).

Process priority

OPC server execute three separate processes, write, read and background refresh. Write process has top priority, read process is below, and background refresh has lowest priority.
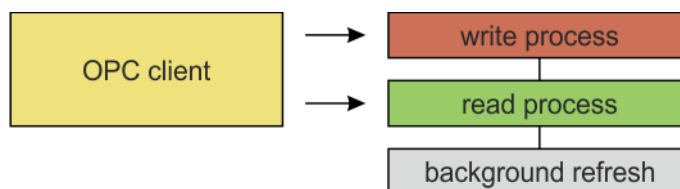
Read and write processes are initiated by OPC client requests. If no read/write requests are pending, background refresh is processed. Heavy traffic may slow down or even stop background refresh.

OPC data monitor is in essentially an OPC client. Monitor activity does affect system tags.
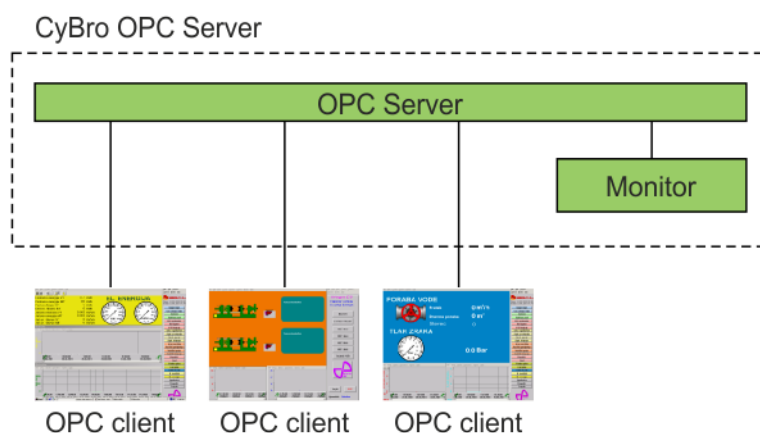
Tag quality

According to OPC specification, each tag has value and quality.

Value is an actual tag value, quantity. Range of possible values depends on tag type (bit, integer, long, real).

Quality is a property independent of value, and specifies how reliable the actual value is. Quality depends on how and when the value is obtained. When communication is uninterrupted, quality is always "Good". If communication channel is broken, quality first become "Uncertain", then "Bad".

A range of possible qualities is defined by OPC specification. There are three main categories, "Good", "Uncertain" and "Bad. Each category can contain additional info field, which may give a more detailed explanation about the problem cause.

CyBro OPC server implements the following qualities:

Good .... Value is updated regularly.

Good, local override .... Value is locally overridden using function "Set value". Tag status is red (write pending). After the write command is completed, status becomes green (reading) or gray (idle). When tag value is read next time, quality changes back to "Good".

Uncertain, last usable..................... First timeout, last updated value is more than 5 seconds old. Possible reason may be a slower network update time, or communication errors. This is a warning, not error.

Bad.. Value is unusable, no successful read was performed since OPC server started.

Bad, last known.............................. Second timeout, last updated value is more that 10 seconds old. Communication is broken, value is not reliable any more.

Bad, out of service .... Activation code expired. More tags than allowed by license is used, development timeout (2 hours) expired.

To adjust "Uncertain" and "Bad" timeouts, open Options/Advanced.

System tags

System tags are virtual tags created by OPC server, used to show information about OPC server and network. Two kinds of tags are available - those belonging to server, and those belonging to a PLC.

Some system tags are resettable (counter, timestamp, etc) - writing zero (or reset) will clear accumulated data and start from the begining.

To get more details about system tags, open tag list and check description for each tag.

Click column name to sort tags. To restore default tag order, click Status column.

DCOM setup

OPC 2.0 technology uses Microsoft's COM/DCOM model to exchange data between a client and a server, so DCOM permissions must be set to allow communication between DCOM objects on different computers.

As a prerequisite, latest version of OPC Core Components Redistributables must be installed (included in CyBroOpcServer instalation).

Setup mutual user accounts

To ensure a successful communication between OPC client and server computers, it is necessary to setup same user accounts on both computers. There are two things to note:

- user account must have a password.
- user account must have the same name/password on both computers.

On Windows XP and later it is also necessary to set the local security policies. Go to Control Panel / Administrative Tools / Local Security Policy or press Windows-R, type "secpol.msc" and press Enter. Next, navigate to Security Settings / Local Policies / Security Options and find the "Network access: Sharing and security model for local accounts" option and set it to "Classic - local users authenticate as themselves".

Configure system-wide DCOM settings

Press Windows-R, type "dcomcnfg" and press Enter to open Component Services. Navigate to Component Services / Computers, right-click on My Computer and select Properties.

On the Default Properties tab:

1. Check "Enable Distributed COM on this computer"
2. Set Default Authentication Level to Connect
3. Set Default Impersonation Level to Identify
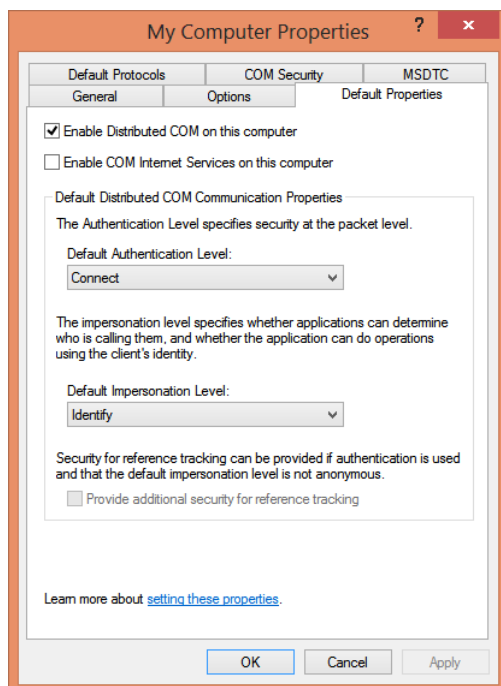
On the COM Security tab:

1. Under Access Permissions, click Edit Default button and add the following Group or user names:

Anonymous Logon
Everyone
Interactive
Network
System

2. Ensure that both Local and Remote Access are allowed for all groups/users above.

3. Do the same for Edit Limits option (if the button is not disabled).
4. Repeat the above three steps for Launch and Activation Permissions.
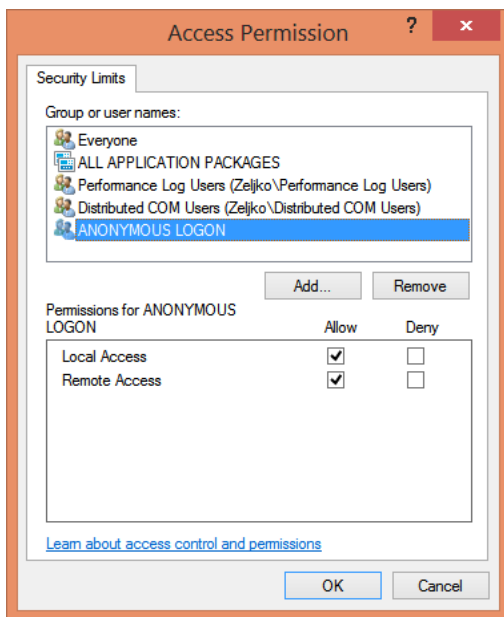
Configure specific DCOM settings

Press Windows-R, type "dcomcnfg" and press Enter to open Component Services. Navigate to Component Services / Computers / My Computer / DCOM Config. Find OPCEnum or OPC server in the list, right-click and select Properties.

1. On the General tab, set Authentication Level to "Connect".

2. On the Security tab, under "Launch and Activation Permissions", select Customize, Edit. Add the following users and ensure that all permissions are allowed for them:

Everyone
Interactive
Network
System

3. Repeat the procedure for "Access Permissions".

4. On the Identity tab, select the user under which your OPC server will run (in case of OPCEnum, set it to "The system account"). Since CyBroOPCServer wasn't developed to run as a service, it should be set to Interactive user or This user. If Interactive user is selected, it is necessary to remain logged on at the computer in order for the OPC server to run.
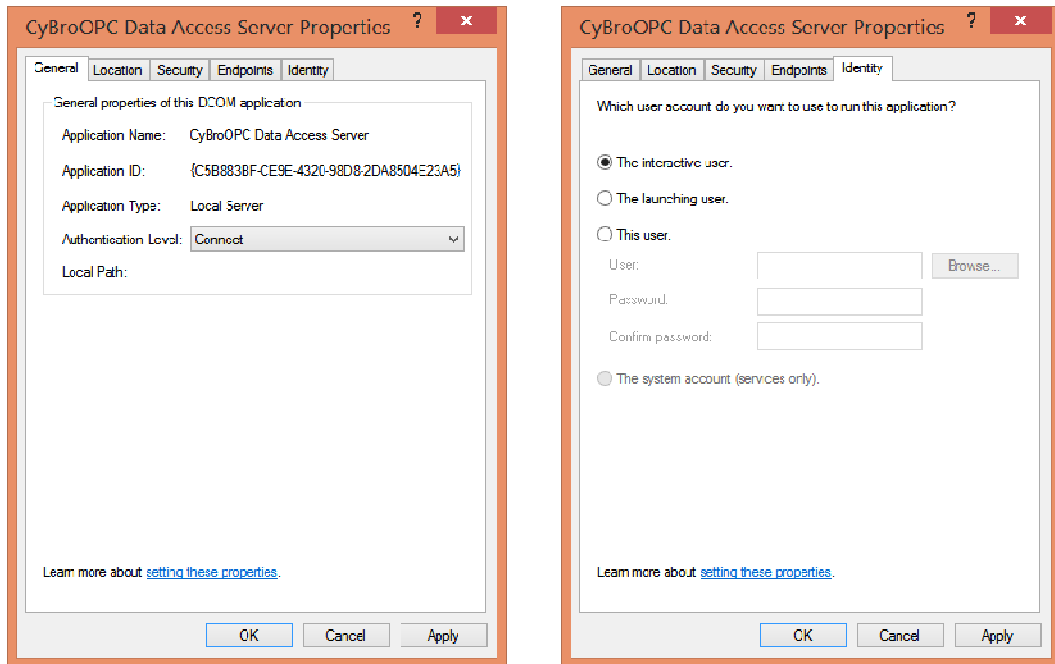
Add exception rules to a firewall

To enable successful communication with the OPCEnum and OPC Server from the remote computer, they should be added to the firewall's exception list. This task is specific to the firewall used, so it will not be covered here, but it should be easy and straightforward.

Troubleshooting

If you does not succeed in connecting to the remote OPC server, even after you have setup DCOM permissions, there is a troubleshooting guide available at OPC Training Institute website (http://www.opcti.com/ResourceDetails.aspx?id=2). Also on their website you can find a small utility, OPC Rescue, which will help in identifying the cause of the error.

Keyboard shortcuts

Ctrl-A .... Select all tags

Insert .... Add selected tag(s) to monitor (controller only)

Delete .... Remove selected tag(s) from monitor (monitor only)

Enter.................................... Set tag(s) value

Space .... Toggle tag(s) value (bit only)

Ctrl-Up/Down .... Move selected tag(s) up/down (monitor only)

F4 .... Options dialog

F5 .... Controllers setup dialog

F9 .... Refresh selected tag(s)

F10 .... Refresh all PLC tags / all monitor tags

Alt-F4 .... Close OPC window

Ctrl-Alt-F4 .... Shutdown OPC server

Technical specifications

Server ID CyProOPC.DA2

OPC version .... 1.0, 1.0a and 2.0

OPC interface .... synchronous and asynchronous

Supported OS .... WinXP, Win7, Win8

Program executable x86 32-bit

Supported PLC kernel .... CyPro v2.6.4 and later

Communication .... Ethernet/LAN

Communication protocol .... A-bus/symbolic (alc file read from PLC)