Cyberlogic OPC Server Help

OPC Server for MBX, DHX and OPC DA Server Devices

Version 9

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Version 9

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INTRODUCTION

The Cyberlogic OPC Server provides OPC Data Access, Alarms & Events and XML Data Access functions for various networks, controllers and compatible devices. It supports major industrial brands, such as Allen-Bradley and Modicon.

The server has a modular structure that supports a variety of industrial devices and communication networks. The various communication subsystems, which we call driver agents, are plug-ins that you can easily add as required. As a result, the server maintains a set of common features, but has the flexibility to allow additional features as required by the specific driver agent.

This document describes only the common features of the Cyberlogic OPC Server. For information related to a particular driver agent, refer to the help file specific for that agent.

The Cyberlogic OPC Server is part of these products:

- DHX OPC Server Suite
- DHX OPC Premier Suite
- DHX OPC Enterprise Suite
- MBX OPC Server Suite
- MBX OPC Premier Suite
- MBX OPC Enterprise Suite
- OPC Crosslink Suite
- OPC Crosslink Premier Suite
- OPC Crosslink Enterprise Suite
- OPC Datacenter Suite
- OPC Datacenter Premier Suite

Compatibility and Compliance

The Cyberlogic OPC Server is compatible with all local and remote OPC Data Access and Alarms & Events clients, including HMI, SCADA, ActiveX Controls and custom VB and C/C++ applications. It provides full compliance with the OPC Foundation specifications for:

- Data Access 3.0, 2.05a and 1.0a
- Alarms & Events 1.1
- XML Data Access 1.0
- Data Access Automation 2.02

These products are tested for compliance to the OPC specifications using the latest test software from the OPC Foundation. All Cyberlogic OPC products are certified for compliance by the OPC Foundation's Independent Testing Laboratory. In addition, they are tested annually for interoperability with other OPC products at the OPC Foundation's Interoperability Workshops.

WHAT SHOULD I DO NEXT?

The links below will take you directly to the section of this manual that contains the information you need to configure, use and troubleshoot the Cyberlogic OPC Server.

This document describes only the common features of the Cyberlogic OPC Server. For information related to a particular driver agent, refer to the help file specific for that Agent.

Learn How the OPC Server Works

If you are not familiar with the way that OPC Servers provide data, you should begin by reading the Theory of Operation.

Read a Quick-Start Guide

First-time users of the Cyberlogic OPC Server will want to read the Quick-Start Guide, which walks through a typical configuration session, step-by-step.

Get Detailed Information on the Configuration Editors

Experienced users who want specific information on features of the configuration editors will find it in the Configuration Editor Reference section.

Verify That It's Working or Troubleshoot a Problem

If you have already configured the server, you should verify that it operates as expected. Refer to the Validation & Troubleshooting section for assistance. In case of communication problems, this section also provides problem-solving hints.

Print a Copy of This Document

The content of this document is also provided in PDF format. PDF files can be viewed using the Adobe® Reader program, and can also be used to print the entire document.

Contact Technical Support

To obtain support information, open the Windows ***Start*** menu and go to ***Cyberlogic Suites***, and then select ***Product Information***.

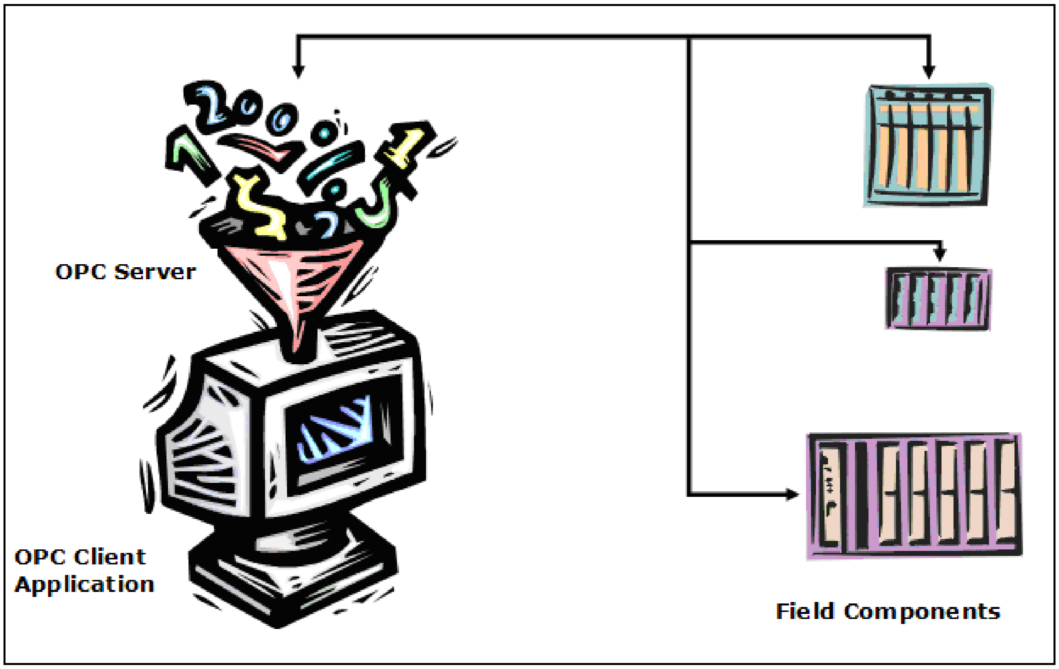
THEORY OF OPERATION

In this section, you will learn the details about all major architectural features of the Cyberlogic OPC Server. If you are new to OPC or the Cyberlogic OPC Server, you should first read the OPC Tutorial. You will find it in the Help section of your product installation.

Let's start with a brief review of what you have already read in the tutorial.

OPC Server Basics

The server is the "hidden" part of an OPC-based system. It sits behind the scenes, passing data between your PLCs or other field components, and the operator interface software you see on the screen. Although its operation is critical to the functioning of the system, it is typically the least understood component. Let's take a look at what the Cyberlogic OPC Server does and some of its key features.



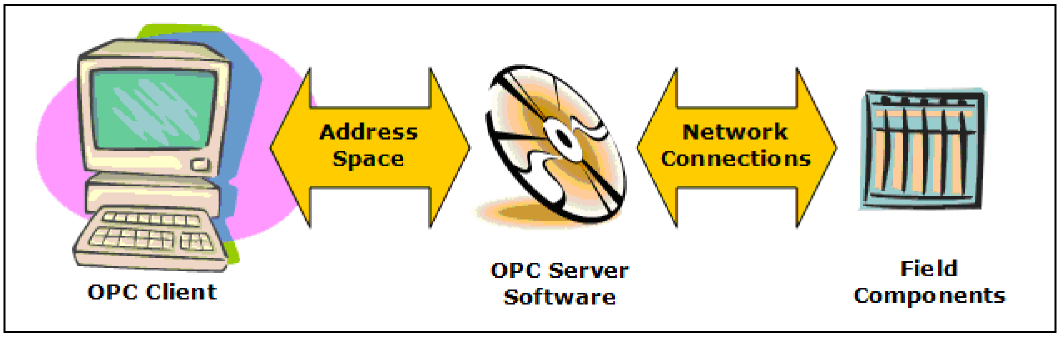
A basic OPC-based system consists of three major components:

- The field components, such as PLCs, instruments or other intelligent devices, that provide information you need to use.
- The OPC client applications. Typically, these are HMI or SCADA applications that the user interacts with to view, save or manipulate the data from the field components.
- The OPC server. This is a software application that handles communications, passing the data between the field devices and the client applications.

The purpose of the OPC server is to obtain data from the field devices and present it, in a standard way, to the OPC client applications. This relieves the client applications of having to deal with the myriad of devices, networks, protocols, formats and so on that exist among the various control device vendors. The client software need only concern itself with the graphics, logic, storage and other operations that it provides to the user.

In short, the server deals with acquiring the data, while the client deals with manipulating and displaying the data. Critically important are the OPC specifications, which describe how the clients and servers exchange data. Compliance with the OPC specifications means that any server will work with any client, even if they are from different suppliers.

New users must be careful to learn the terminology of OPC systems to avoid being confused by the difference between network connections and access paths or devices and network nodes. It is also important to understand the relationship and distinctions between the Network Connections tree and the Address Space tree.



To help keep this straight, remember that the OPC server provides the connection between the field components and the OPC clients. This means that the server interfaces in two directions, and both of these must be configured for the server to work properly.

When you open the Cyberlogic OPC Server Configuration editor, there will be five main trees in the configuration. However, two of them—the Address Space tree and the Network Connections tree—are critical when it comes to understanding the link between the OPC clients and the physical field components.

On one side, the Network Connections tree describes the interfaces to the field components. The server must use connections to physical networks (network connections) to talk to physical field components on those networks (network nodes).

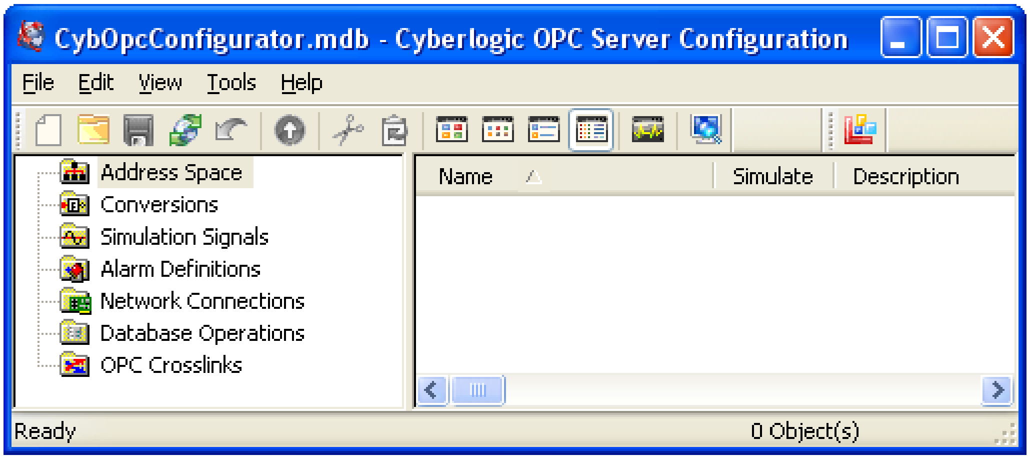
On the other side, the Address Space tree sets up the interface to the client. The server must present the information that the client needs (data items) in a way that is meaningful to the client. To do this, the information must be presented in a standard manner that conforms to the OPC specifications.

The two sides come together by defining routes (access paths) that connect data items through a network to a specific field component. This is done by creating devices in the address space, which contain one or more access paths to the network nodes (field components) in the Network Connections tree.

Since each device can be associated with several network nodes, an address space device does not necessarily represent a single physical device. Throughout the remainder of this document, the term "device" will refer to a device in the Address Space tree rather than a physical device, unless specifically stated otherwise.

If you are still unclear about some of the terms mentioned here, go back and re-read the OPC Tutorial.

Main Server Features



When you open the Cyberlogic OPC Server Configuration editor, you will find several main trees. These trees represent the main areas that you will configure. Note that some are for premium features that may not be part of the product you have installed, so they will not appear in your configuration. The trees are:

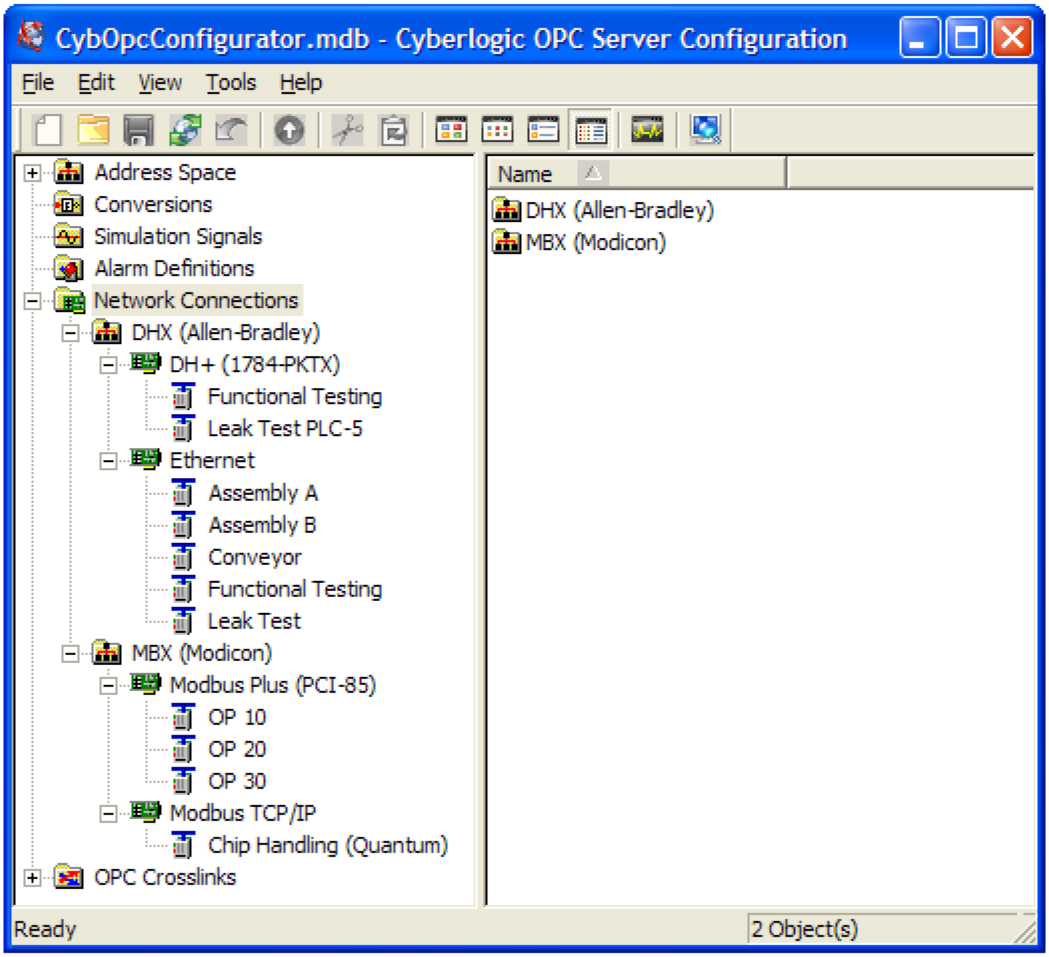
- The Address Space Tree is required for most configurations. Here you will create and organize the data items that will be available to the client application, and you will define how they are updated with new information.
- The Conversions Tree is optional. In it, you can define formulas that can be used to convert raw data values obtained from the field equipment into a form that is more useful to the client. For example, you can change a transducer’s voltage value into a pressure value in psi.
- The Simulation Signals Tree is optional. If you want to be able to use simulated data item values instead of real values, you can create various types of simulated data functions in this tree. Simulations are often useful for troubleshooting client applications.
- The Alarm Definitions Tree is another optional tree. It is used when you will interface to Alarms & Events clients. This tree allows you to define the desired alarm conditions and specify what information should be passed as they occur and clear.
- The Network Connections Tree is required for all configurations. This is where you select the networks and interface devices you will use, and configure each of the field components as nodes on those networks.
- The Database Operations Tree is part of the logging feature, which is a premium feature. If this tree is in your product, you can use it to configure databases and data logging operations.
- The OPC Crosslinks Tree is part of OPC Crosslink, which is a premium feature. If this tree is in your product, you can use it to configure data transfers between PLCs, between OPC servers and between PLCs and OPC servers.

The following sections describe these operational features of the server. Because the Network Connections Tree is normally configured first, we will start there.

Network Connections Tree

The Network Connections tree is used to describe the physical connections to the field components. This is where you select the communication driver agents, networks and interface devices you will use, and configure each of the field components as nodes on those networks. The following describes each branch in this tree.

Driver agents, the modular plug-ins that support different communication subsystems, use various means for connecting to their devices or networks. In some cases a serial COM port serves that purpose. In other cases, a network card is used. The Cyberlogic OPC Server refers to all of these using the generic term "network connection".



For example, in the Cyberlogic DHX architecture, the network connections will be DHX devices. In some cases a DHX device corresponds to a physical network card, such as a 1784-PKTX. In other cases, it is an abstract object, such as an Ethernet DHX device, that behaves like a network card. Network connections are grouped by their driver agents, such as MBX (Modicon) or DHX (Allen-Bradley).

Each network connection allows access to a network of one or more physical devices. The server refers to each of these physical devices on the network as a network node. A typical network node might be a PLC-5 on a Data Highway Plus network or a Quantum controller on a Modbus TCP/IP network. The server accesses the network nodes through their corresponding network connection. The network node configuration contains the communication parameters for the physical node device.

A user can define many network connections, each having many network nodes. These network connections and network nodes will be used in defining access paths for devices in the address space. This greatly simplifies the configuration process, because multiple access paths can refer to the same network node, and the network parameters for each node need to be entered only once. Any changes subsequently made to a network node are automatically reflected in all the access paths that reference that node.

Notice also, that each network connection and network node can be given any name that best describes its function. For example, rather than calling a node "PLC-5", you could call it "Assembly A" or "OP10" instead.

Refer to the Configuration Editor section for information on how to configure Network Connections.

Network Auto-Configuration

For most driver agents, the Cyberlogic OPC Server Configuration Editor can automatically detect the physical devices attached to the network connections and create corresponding network nodes in the server configuration file.

Health Watchdog

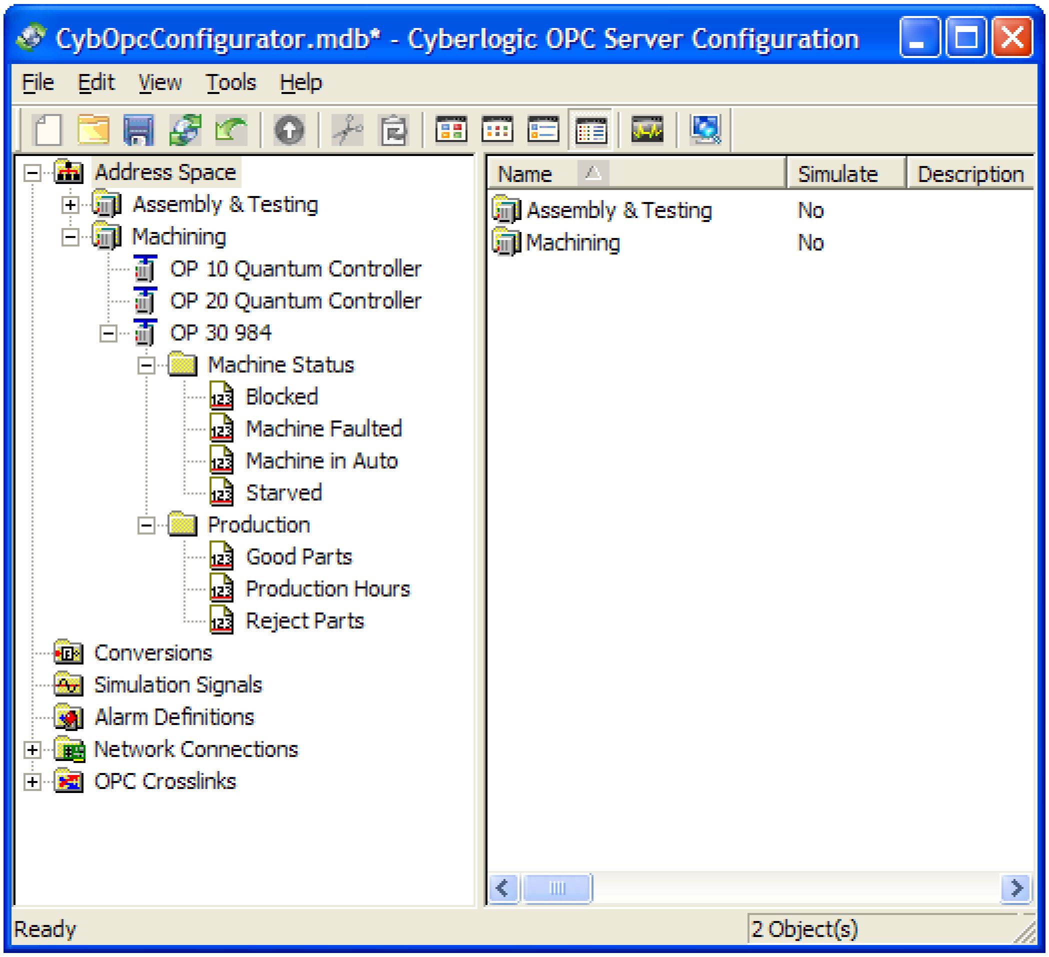
This feature allows you to configure redundant networks with automatic failover and recovery. The server monitors the health of the connection to each physical device. If there is no network activity for a specified amount of time, the server sends a communication request to the device to verify that it can still communicate. If the device becomes inaccessible, the server rechecks it at a specified polling rate to see if it becomes accessible again.

Once a failed network connection is reestablished, the server continues to exercise the connection for a specified time to ensure that the connection is reliable. After these tests complete successfully, the node is marked as healthy again.

When the health watchdog identifies that a network node has failed, you can configure the server to switch to a backup network node. When communication to the failed network node is restored, the server can then switch communication back to the primary network node. For more information on this capability, refer to the Address Space Tree section.

Address Space Tree

The Address Space tree allows you to organize the data items in a way that makes sense for your project. You can group and name related data items regardless of where they exist in the physical devices.



Name	Simulate	Description
Assembly & Testing	No	
Machining	No	

Ready

2 Object(s)

The branches of the tree are called "device folders", "devices" and "folders". These establish how the data items are organized. The data items themselves are the "leaves" of the tree. You will begin construction of the tree at the Address Space root folder, which may contain device folders and devices.

Device Folders and Devices

A device folder groups devices and other device folders. You can place a device folder directly in the Address Space root folder or in another device folder, up to four levels deep.

A device in the address space represents a logical data source, which is associated with one or more network nodes to which the server communicates. Each device maintains a list of access paths and a list of unsolicited message filters, which establish its relationship with the configured network nodes and network connections.

Note A device in the address space is not the same thing as a network node. Each network node represents a single physical device, while an address space device may be associated with many physical devices.

The main function of a device is to define valid sources of data for all of its data items. Multiple devices can use the same network node as a data source, allowing greater flexibility in the logical grouping of data items.

You may place a device directly in the Address Space root folder or in a device folder. In addition to its device-specific functionality, a device operates as a folder. It can contain folders and data items.

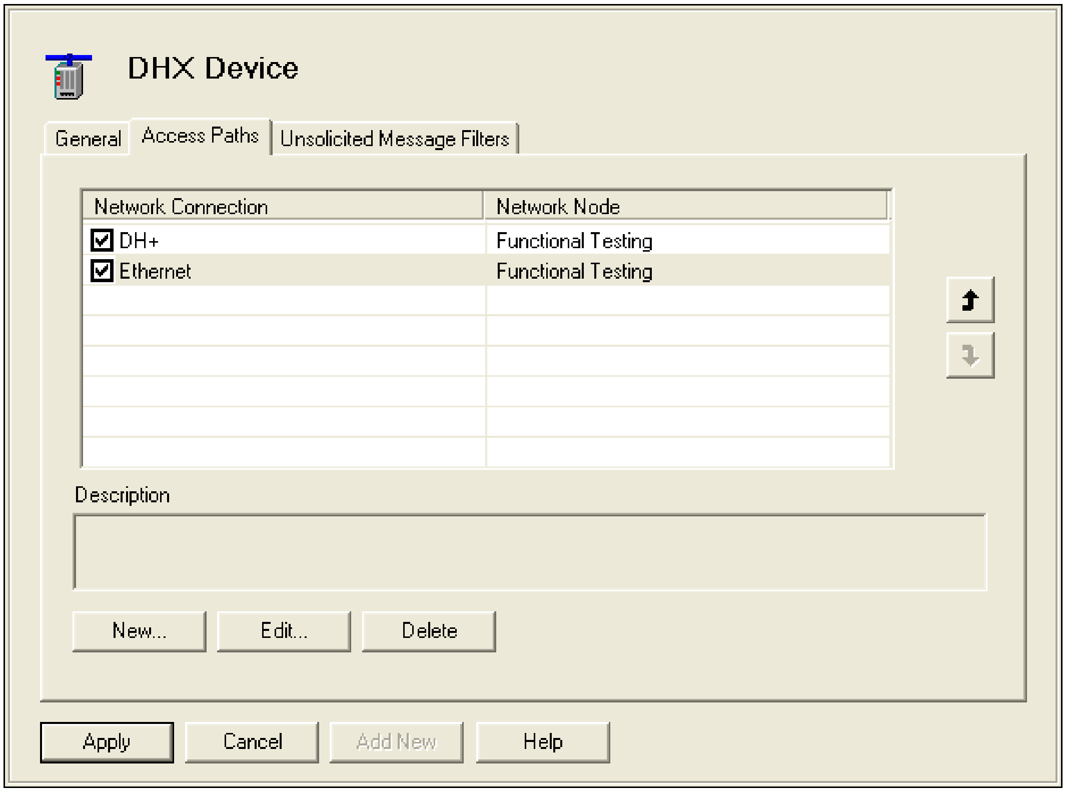
Math & Logic Devices

Math & Logic devices don’t get data from a network node, but instead contain data items with C-Logic programs that perform mathematical and logical functions on data. For more information, refer to the Math & Logic Help.

Access Paths

An access path is a logical connection to a network node. These connections link the data items in an address space device with their values in a physical device. They tell the server where and how to obtain these values during solicited data reads and writes.

Note Access paths are required only for solicited communications. If you plan to use unsolicited data updates instead, you do not have to configure any access paths. Refer to the Unsolicited Message Filters section for more information.



Network Connection	Network Node
☑ DH+	Functional Testing
☑ Ethernet	Functional Testing

Each device in the server's address space can have a list of associated access paths. If there are more than one, the access path at the top of the list is the primary access path, and the rest are backups.

The Health Watchdog monitors the access paths to determine which are available and which have failed. If the current access path fails, the server switches to the highest available backup. When a higher-priority access path becomes available again, the server switches back to it. This feature allows you to set up redundant networks for greater communication reliability. If your controls design uses a backup controller, you can set up access paths to both the primary controller and its backup.

You may specify an unlimited number of alternative access paths. For example, if you have two network connections for each PLC, perhaps Data Highway Plus and Ethernet, you can create four access paths: Data Highway Plus and Ethernet access paths for the primary PLC, and Data Highway Plus and Ethernet access paths for the backup PLC. Again, the order of these access paths specifies the order in which the server will switch to the backup connections.

You can also specify a data item that will control the enable state of the access path. At run time, the value of that data item will determine whether the access path is enabled or disabled. For more information on Dynamic Enable, refer to the help file for the OPC Driver Agent you are using.

Unsolicited Message Filters

In addition to the more common solicited updates, the Cyberlogic OPC Server supports unsolicited data updates. In a solicited update, the server sends a request to a device

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asking it for data, and the device replies. In an unsolicited update, the device decides when to send data to the server. This helps to minimize the amount of traffic on the network. For example, instead of having the server poll a device every 500 milliseconds to see if some data has changed, you can configure the device to update the server only when the data changes.

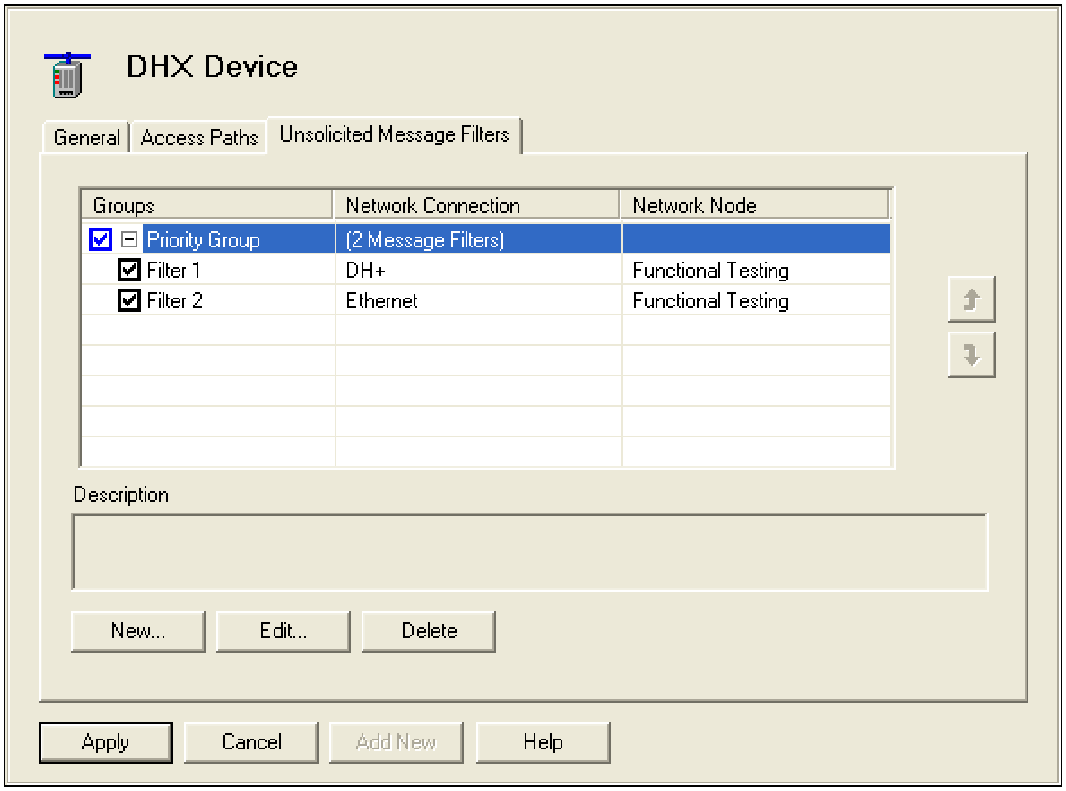
The disadvantage of unsolicited updates is the fact that the server has no control over who may attempt to send data to it. Data written from unintended sources could corrupt the server-maintained data, resulting in potentially catastrophic events.

Although unrestricted unsolicited updates are possible, the Cyberlogic OPC Server supports a mechanism of unsolicited message filters to prevent data corruption. Unsolicited messages must first pass through the user-defined filters before the server accepts them. These filters guarantee that unsolicited messages are accepted only from trusted sources.

Note Unsolicited message filters are used only for unsolicited communications. Only the driver agents that support unsolicited communications will support the use of unsolicited message filters.

Unsolicited Message Filter Groups

The unsolicited message filters are organized into groups. Each group is a list of trusted network nodes and trusted network connections. A message may pass through any one of these groups to be accepted by the server. In addition, the Configuration Editor allows you to disable and enable entire groups of filters. This can be very convenient during startup and debugging.



Groups	Network Connection	Network Node
☑ ⊟ Priority Group	(2 Message Filters)	
☑ Filter 1	DH+	Functional Testing
☑ Filter 2	Ethernet	Functional Testing

While the filter groups are of equal priority, the filters within a group can operate in either of two modes. In the default non-priority mode, the server treats all of the filters in the group equally. Any unsolicited message that passes any of the filters in the group will be accepted.

In the alternative priority-unsolicited mode, the server treats the filters in each group as a ranked list of preferred and backup data sources. It monitors the connections to each unsolicited message source and accepts messages only from the highest-ranked node that has a healthy connection.

You can configure as many groups of filters as you wish. Each group can be marked as priority unsolicited or not, as your application may require.

Caution!

Always keep in mind that the priority property applies only to the filters within a group. There is no priority implied between the groups themselves.

Folders and Data Items

Folders logically group data items and other folders. A folder can be placed directly under a device or under another folder, up to four levels deep.

A data item represents a register in the physical device, a range of registers, a bit inside a register or a range of bits. The user can individually configure each data item for solicited updates, unsolicited updates or both.

The Cyberlogic OPC Server supports a number of integer, floating point and string data types. It also supports single-dimensional arrays of these types. The following table shows all supported simple data types.

Type	Size in bits	Default Canonical Data Type	.NET Data Type	Description
Default				Default type based on the data item address
BIT	1	VT_BOOL	bool	1-bit boolean
SINT8	8	VT_I1	sbyte	Signed 8-bit integer
UINT8	8	VT_UI1	byte	Unsigned 8-bit integer
SINT16	16	VT_I2	short	Signed 16-bit integer
UINT16	16	VT_UI2	ushort	Unsigned 16-bit integer
SINT32	32	VT_I4	int	Signed 32-bit integer
UINT32	32	VT_UI4	uint	Unsigned 32-bit integer
SINT64	64	VT_I8	long	Signed 64-bit integer
UINT64	64	VT_UI8	ulong	Unsigned 64-bit integer
FLOAT32	32	VT_R4	float	IEEE 32-bit floating point number
FLOAT64	64	VT_R8	double	IEEE 64-bit floating point number
BCD16	16	VT_UI2	ushort	BCD value in the range 0 - 9999
BCD32	32	VT_UI4	uint	BCD value in the range 0 - 99999999
STRING	String size * 8	VT_BSTR	string	Zero terminated ASCII string of 8-bit characters
WSTRING	String size * 16	VT_BSTR	string	Zero terminated UNICODE string of 16-bit characters
FIELD	Field size	Best fitting VT_UIx or array of VT_UI1 if size > 64	Best fitting unsigned type or byte[ ] if size > 64	Multiple bit field

For each simple data type, a user can specify a canonical data type (a variant data type in the form of VT_XXX) or choose the default type. When the default is selected, the server selects the canonical data type that can best store the selected data type.

Data Write Protection

In general, the Cyberlogic OPC Server supports both read and write operations to its data items. However, writing to some data items may create a safety hazard. Some registers, such as PLC-5 inputs, are read-only and require no additional protection. For read/write registers, you can disable the write capability at any level. That is, you can disable writes for a:

- Data item
- Folder
- Device
- Device folder
- Network node
- Network connection
- Driver agent

You can also disable DirectAccess writes at each network node, network connection or driver agent.

DirectAccess

At run time, in addition to the user-configured address space branches, the Cyberlogic OPC Server dynamically creates a branch called DirectAccess at the root of the address space. OPC clients can use this branch to access any register in any configured network node or device by directly specifying the register address.

The DirectAccess branch acts like a device folder that contains all configured driver agents. Each driver agent branch contains its configured network connections, and each network connection branch contains its configured network nodes. However, only driver agents, network connections and network nodes that enable DirectAccess are present.

DirectAccess can benefit users in two ways. First, you can quickly deploy minimally-configured servers, giving clients access to data in the shortest possible time. By configuring just the network connection and network nodes, a user would have access to all the registers in each network node.

Second, DirectAccess can help you to work around configuration errors. Suppose a user forgets to configure a needed data register in the server. DirectAccess allows an OPC client to access the forgotten register until the server configuration can be modified.

Note DirectAccess is available for OPC DA servers, if the OPC DA Driver Agent is installed. It is also available for crosslinks, if OPC Crosslink is installed.

Conversions Tree

The raw data associated with a data item may represent a signal value from some instrument. Typically, this value is not expressed in the engineering units of the measured signal. To simplify working with the data from these instruments, the Cyberlogic OPC Server can associate a conversion with each data item.

A user can define a number of different types of conversions, and the server can then apply each conversion to a number of data items. As a result, each conversion type needs to be defined only once, regardless of how many data items will use it.

The server supports both linear and square root conversions. Each has a range of engineering units that corresponds to the specified instrument range. The conversions then keep a linear or square root relation between the engineering units range and the instrument range.

In addition, the server supports data range clamping, which prevents the server from reporting a value that is outside of a specified range. The clamping can be based on either the engineering units range or a custom range.

Refer to the Configuration Editor section for information on how to configure Conversions.

Simulation Signals Tree

To facilitate client-side testing without the need for a physical device, a predefined formula can simulate the data for each data item. A user can define several different types of simulation signals. Each signal can then simulate a number of data items. As a result, each simulation signal type needs to be defined only once, regardless of how many data items will use it.

The simulation signals available are: read count, write count, random, ramp, sine, square, triangle and step. The signals other than read count and write count have parameters that define properties such as amplitude, signal phase and number of steps.

Data can be simulated at any level in the server's address space. Enabling data simulation at one level automatically enables it at all levels below. For example, if you enable simulation on a device folder, all of the data items in all of the devices in that device folder will be simulated. This allows you to switch quickly between simulated and real data for a large number of data items.

Refer to the Configuration Editor section for information on how to configure Simulation Signals.

Alarm Definitions Tree

The Cyberlogic OPC Server supports the OPC Alarms & Events specification. It allows a user to define a number of alarm conditions, each of which can then be used by a number of data items. As a result, each alarm condition needs to be defined only once, regardless of how many data items will use it.

Note To receive the alarms and events reported by the server, the client application must also support the OPC Alarms and Events specification.

Alarms cannot be used with string data items, arrays or bit fields greater than 64 bits. There are two categories of alarms: digital and limit (analog).

Digital Alarms

Digital alarms are normally used with Boolean data. A user can request an alarm when the item's value equals either TRUE or FALSE.

Each alarm has an associated alarm message and a severity level. The alarm message describes the alarm condition. The severity value indicates the importance of the alarm on a scale of 1 to 1000, where 1000 is the most severe. Optionally, an alarm can be generated when the item's data returns to its normal value. A user can also specify that each alarm condition requires an acknowledgment from the client.

Limit Alarms

Limit alarms are normally used with numeric data. These alarm definitions divide the data item range into five alarm states: LoLo, Lo, Normal, Hi and HiHi.

Every alarm state includes an alarm message and a severity level. In addition, you may indicate whether the alarm requires an acknowledgment from the client. An optional deadband value prevents the server from generating a large number of alarm messages when the signal oscillates around one of the limits. When the deadband value is set properly, the server will send only one alarm even if the signal oscillates.

Refer to the Configuration Editor section for information on how to configure Alarm Definitions.

Database Operations Tree

In addition to providing data to OPC clients in real time, the Cyberlogic OPC Server can store it in a database. The feature that does this is called Data Logger. Once the data is logged, it is available to any application that can access that database. It need not be an OPC client application.

Refer to the Data Logger Help for a full discussion.

OPC Crosslinks Tree

This is where you can set up data transfers between PLCs and OPC servers. Before you can configure crosslinks, you must first configure the network connections to the desired PLCs or OPC servers. You must also configure address space data items to serve as the crosslink inputs and outputs.

Refer to the OPC Crosslink Help for a full discussion.

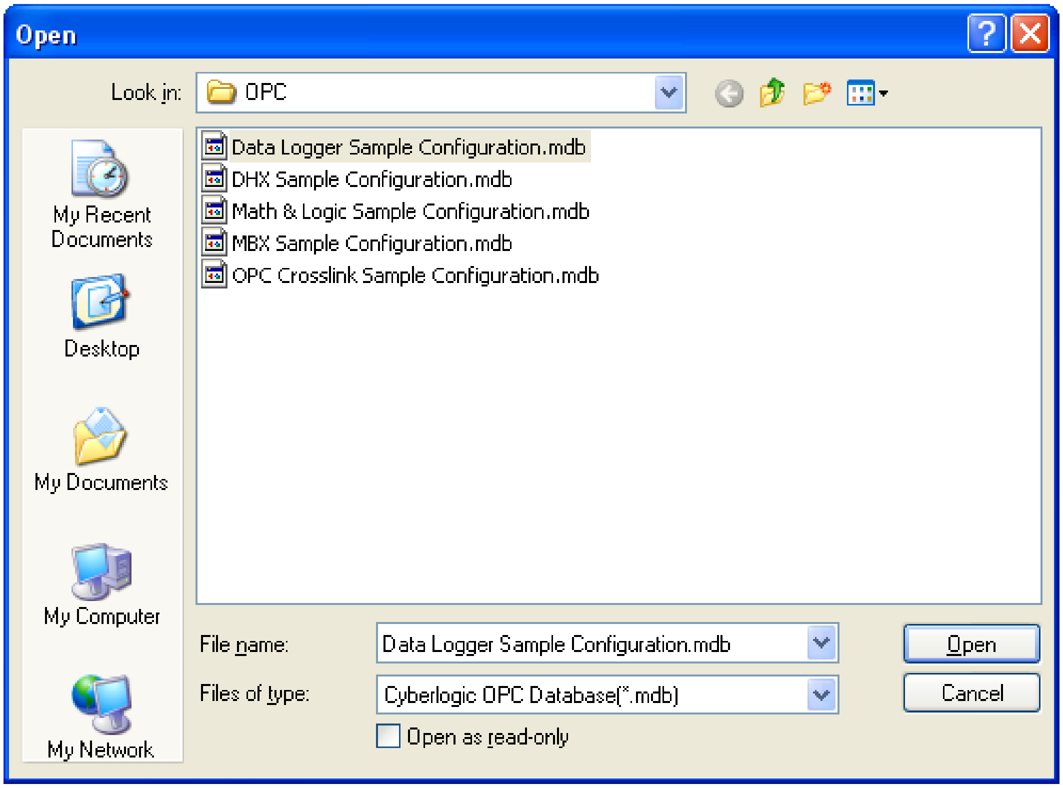
QUICK-START GUIDE

Before you can use the OPC server, you must configure it by using the OPC Server Configuration Editor. Every server requires configuration of the Network Connections branch, and most users will want to configure the Address Space branch. The remaining branches (Conversions, Simulation Signals, Alarm Definitions, Database Operations and OPC Crosslinks) are optional features used by some systems.

Sample Configuration Files

The default installation of all Cyberlogic OPC Server Suites includes a set of sample configuration files. These samples will help you to understand how to configure the OPC server for your project. In addition, the OPC Math & Logic sample provides you with numerous sample programs that you can modify and use in your system.

To open a sample configuration file from the OPC Server Configuration Editor, open the ***File*** menu and then select ***Open Sample...*** .



Look in: OPC

Data Logger Sample Configuration.mdb
DHX Sample Configuration.mdb
Math & Logic Sample Configuration.mdb
MBX Sample Configuration.mdb
OPC Crosslink Sample Configuration.mdb

File name: Data Logger Sample Configuration.mdb

Files of type: Cyberlogic OPC Database(*.mdb)

□ Open as read-only

A browse window will open to allow you to select the configuration file you want. The available choices will depend on which OPC products you have installed.

The default location of the files is:

C:\Program Files\Common Files\Cyberlogic Shared\OPC.

Step-By-Step Example

The following steps show a typical configuration session using the DHX OPC Enterprise Suite. This allows us to illustrate the configuration of all of the major features: communication to Allen-Bradley controllers and OPC DA servers, use of auto-configuration and DirectImport, and the configuration of unsolicited messaging. Configurations using the other driver agents, such as MBX, would be very similar.

Not all of the features shown are available on all of Cyberlogic's OPC suites, so some sections my not apply to your software. You should use this description only as a guideline of how to configure the most common features. For detailed information on all of the server's features, refer to the Configuration Editor Reference and to the help file for the driver agent you are using.

This example assumes that you have a single 1784-KTX card connected to the Data Highway Plus (DH+) network, so this example requires the DHX Driver. Because the 1784-KTX is not Plug-and-Play, you must create the device manually. If you had used a Plug-and-Play PCI card, such as the 1784-PKTX/A, a DHX device would have been created when you booted up the system. If you use a different adapter card or different network, refer to the driver-specific help file for more information on configuring the DHX devices.

Another assumption is that you have two Allen-Bradley PLC-5/20s connected to the Data Highway Plus network. One is the primary PLC at node address 2 while the other is the backup PLC at node address 50.

Finally, we assume that you are connected over Ethernet to another OPC server.

The procedure is divided into several sections:

- Configuring the Driver
- Configuring the Network Connections Tree Automatically
- Configuring the Network Connections Tree Manually
- Selecting a Computer in the Network Connections Tree
- Selecting an OPC Server
- Creating Address Space Device Folders and Devices
- Configuring the Access Paths
- Configuring Unsolicited Message Filters
- Using DirectImport
- Configuring Folders and Data Items Manually
- Using the Data Item Duplication Wizard
- Saving the Configuration and Updating the Server
- Verifying Your Configuration

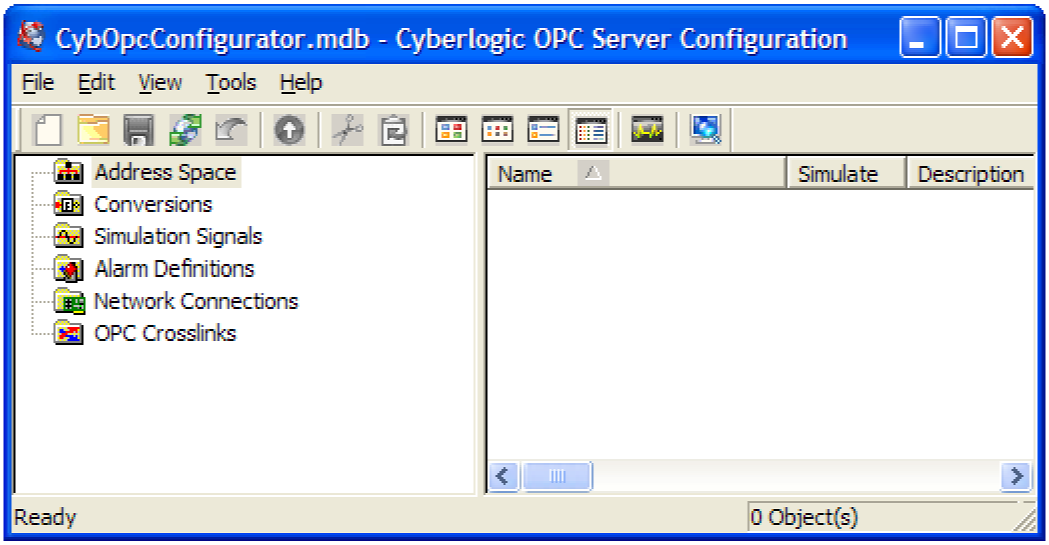
We will start with Configuring the Driver.

Configuring the Driver

Manual driver configuration is needed only if you want to communicate to a PLC through a legacy non-Plug-and-Play adapter card, such as 1784-KTX. For Plug-and-Play (PnP) adapters, such as 1784-PKTX, Windows will automatically detect and configure the adapter card. If you are using a PnP adapter, or you are interested only in communicating with OPC DA servers, you can skip this part of the configuration and start with Selecting a Computer in the Network Connections Tree.

The first step is to use the DHX Driver Configuration Editor to create a DHX device.

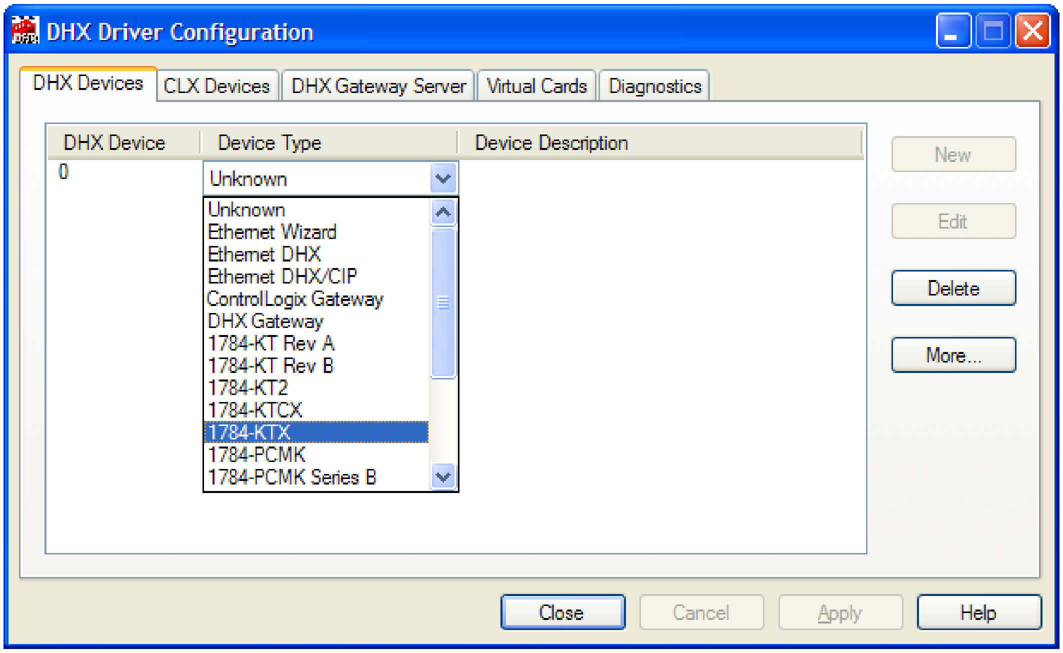
1. To start the editor, open the Windows ***Start*** menu, go to ***Cyberlogic Suites***, then open the ***Configuration*** sub-menu, and then select ***OPC Server***.



You will see the above screen.

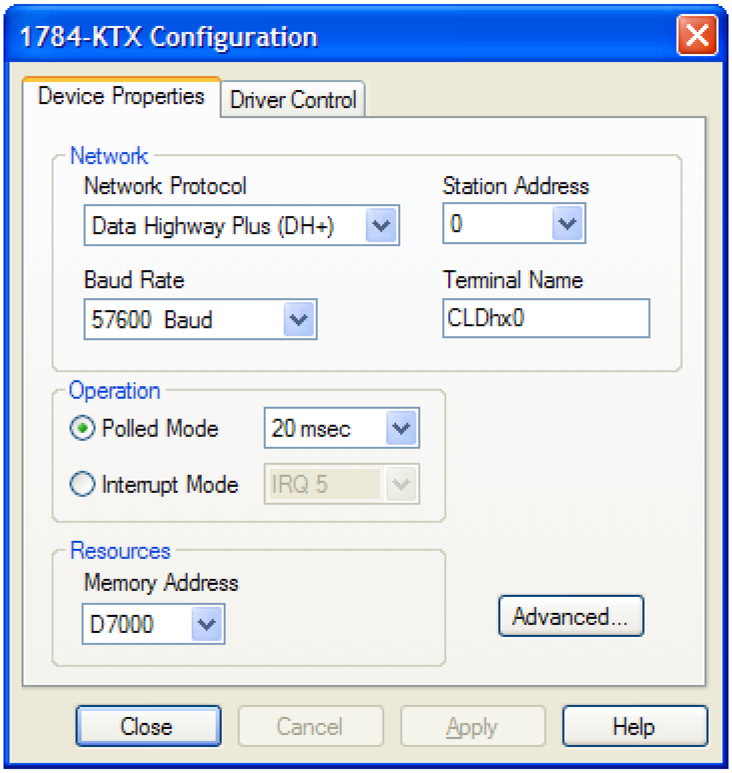
Since you are running the Cyberlogic OPC Server Configuration Editor for the first time, the editor will prompt you for a configuration file. Click the dialog box's ***Create New...*** button to start with an empty configuration. The first step is to configure the driver for the KTX adapter card.

2. From the ***Tools*** menu select ***DHX Connections for Allen-Bradley,*** and then select ***DHX Driver Configuration....***



DHX Device	Device Type	Device Description
0	Unknown	

3. Click the ***New*** button and select ***1784-KTX*** from the drop-down box.



Network Protocol: Data Highway Plus (DH+)
Station Address: 0
Baud Rate: 57600 Baud
Terminal Name: CLDhx0
● Polled Mode: 20 msec
○ Interrupt Mode: IRQ 5
Memory Address: D7000

The configuration window shown above pops up.

4. Select the correct ***Station Address***.

5. Click ***OK*** to return to the DHX Driver Configuration editor main screen.

6. Click ***Close***.

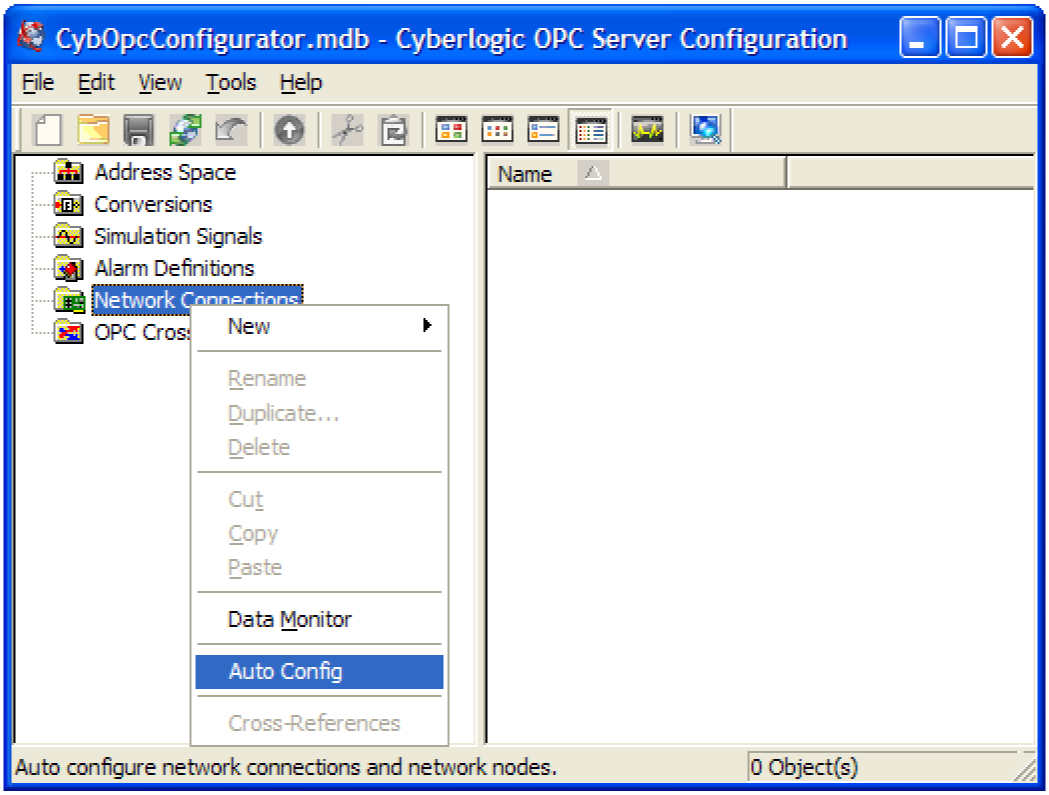
You have now created the DHX device that the server will use to connect to the DHX network. To continue, go to Configuring the Network Connections Tree Automatically.

Configuring the Network Connections Tree Automatically

There are two ways to configure the Network Connections Tree. The simplest method is to use automatic configuration, which is described in this section. Automatic configuration is available for some driver agents, including DHX and MBX, but is not available for others, including ControlLogix. Furthermore, the server system and the PLCs must be connected to the network for automatic configuration to be possible.

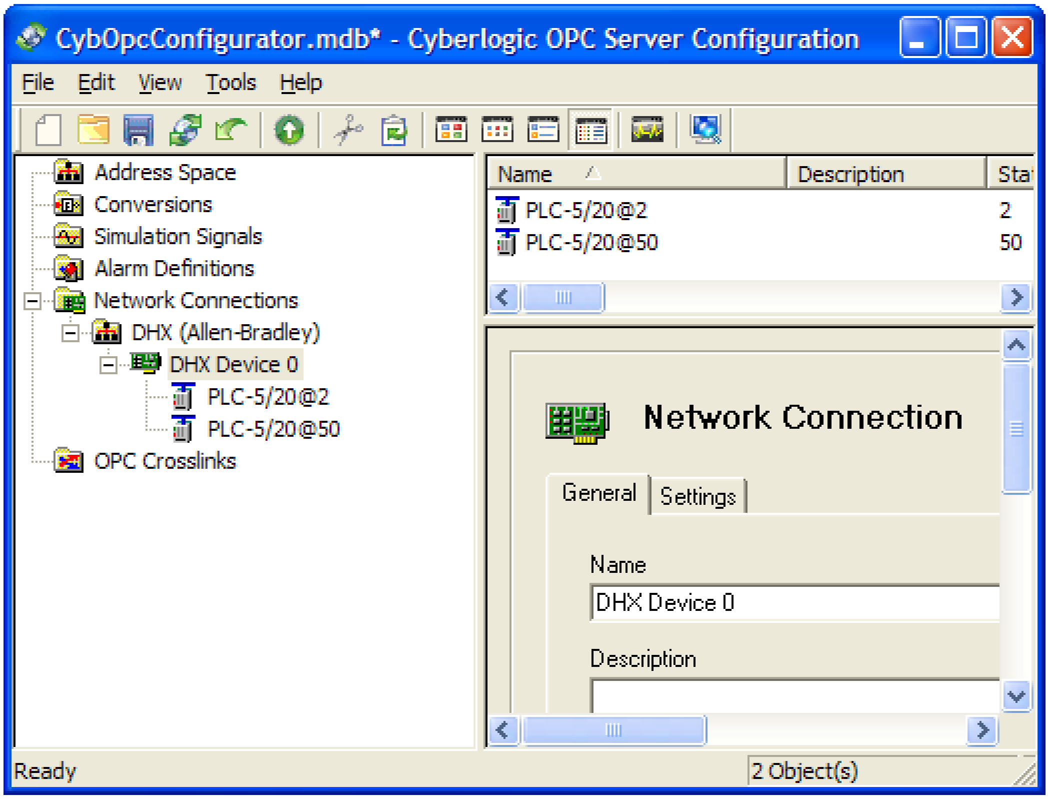
Note In complex systems, it is possible that part of your networks or devices will support automatic configuration and part will not. It may also be the case that some of the PLCs which support automatic configuration are not yet connected. In those kinds of cases, you should use the automatic procedure first, to get part of the configuration, and then complete it manually.

If you cannot use automatic configuration, skip this section and go to Configuring the Network Connections Tree Manually.



Auto configure network connections and network nodes.

1. Select the ***Network Connections*** root folder and select ***Auto Config*** from the Edit menu (or right-click on the ***Network Connections*** root folder and select ***Auto Config*** from the context menu).



Name	Description	Sta
PLC-5/20@2		2
PLC-5/20@50		50

Name: DHX Device 0

Description:

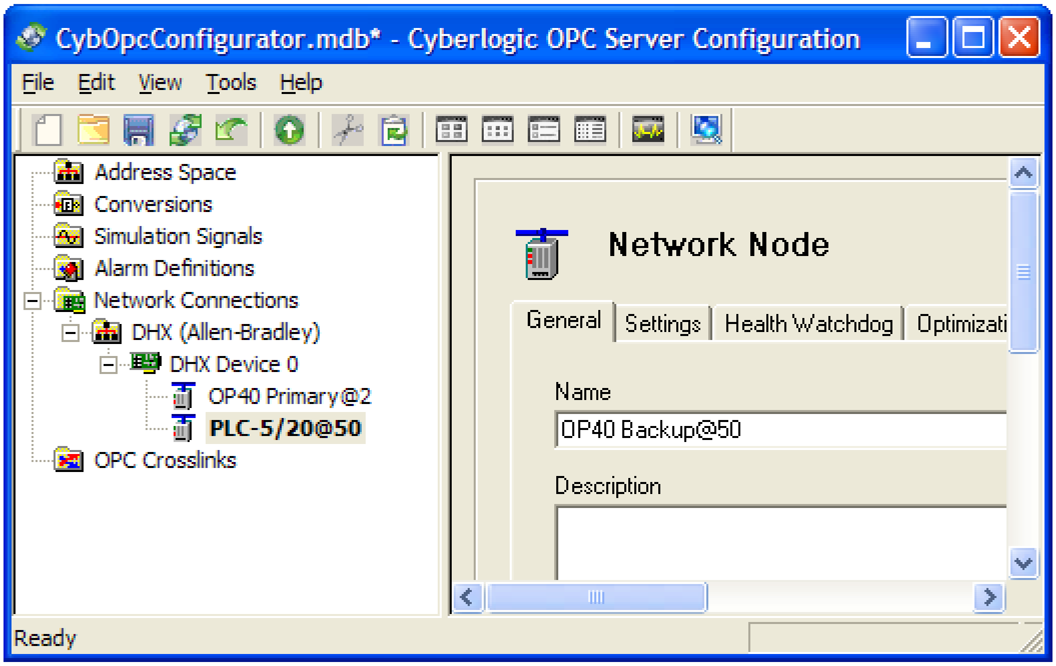
The editor will try to find all network connections and automatically detect and configure all network nodes. This screen shows that the editor has detected two PLC-5/20 programmable controllers, one at node address 2 (PLC-5/20@2) and the other one at the node address 50 (PLC-5/20@50).

Note ControlLogix nodes do not report enough information to permit automatic configuration to identify them. They will be detected, but will be reported simply as DHX nodes of unknown type.

You can accept the names that were assigned automatically, but it is usually better to give them names that are more descriptive.

2. Select the ***PLC-5/20@2*** network node.

3. In the ***Name*** field of the ***General*** tab, change the name to ***OP40 Primary@2***.



Name: OP40 Backup@50

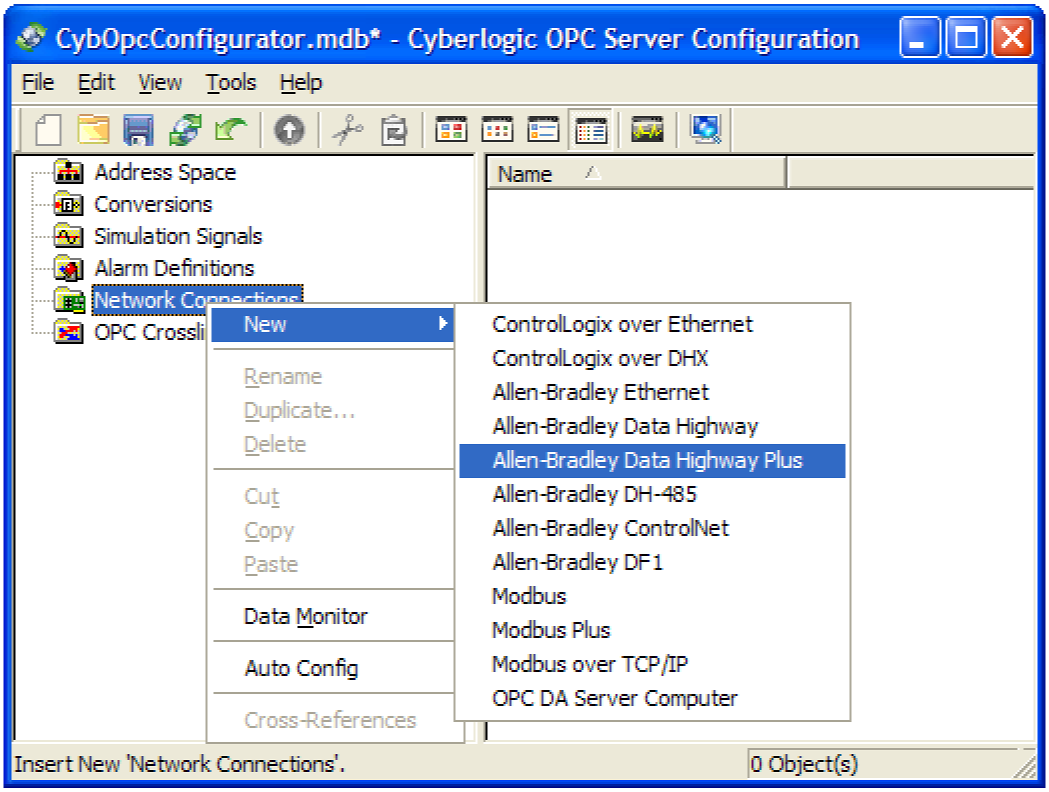
4. Repeat this for the ***PLC-5/20@50*** network node, changing the name to ***OP40 Backup@50***.

The next step is Configuring the Network Connections Tree Manually.

Configuring the Network Connections Tree Manually

When you use networks and devices that cannot be configured automatically or if they are not connected to the server system when you are doing the editing, you must configure them manually.

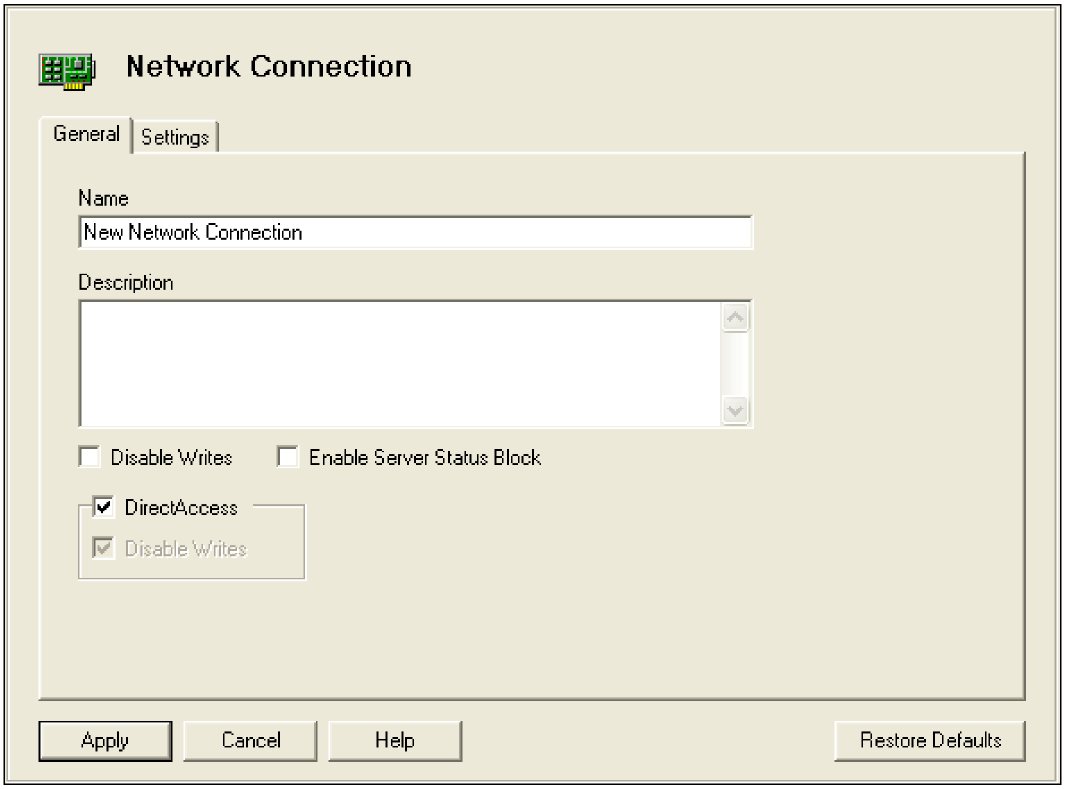
If automatic configuration was able to configure all of your network connections and nodes, then you can skip this section and go to Selecting a Computer in the Network Connections Tree.



Insert New 'Network Connections'.

0 Object(s)

1. Right-click on the ***Network Connections*** branch and select ***New***, then ***Allen-Bradley Data Highway Plus*** from the context menu.



Name

New Network Connection

Description

☐ Disable Writes ☐ Enable Server Status Block

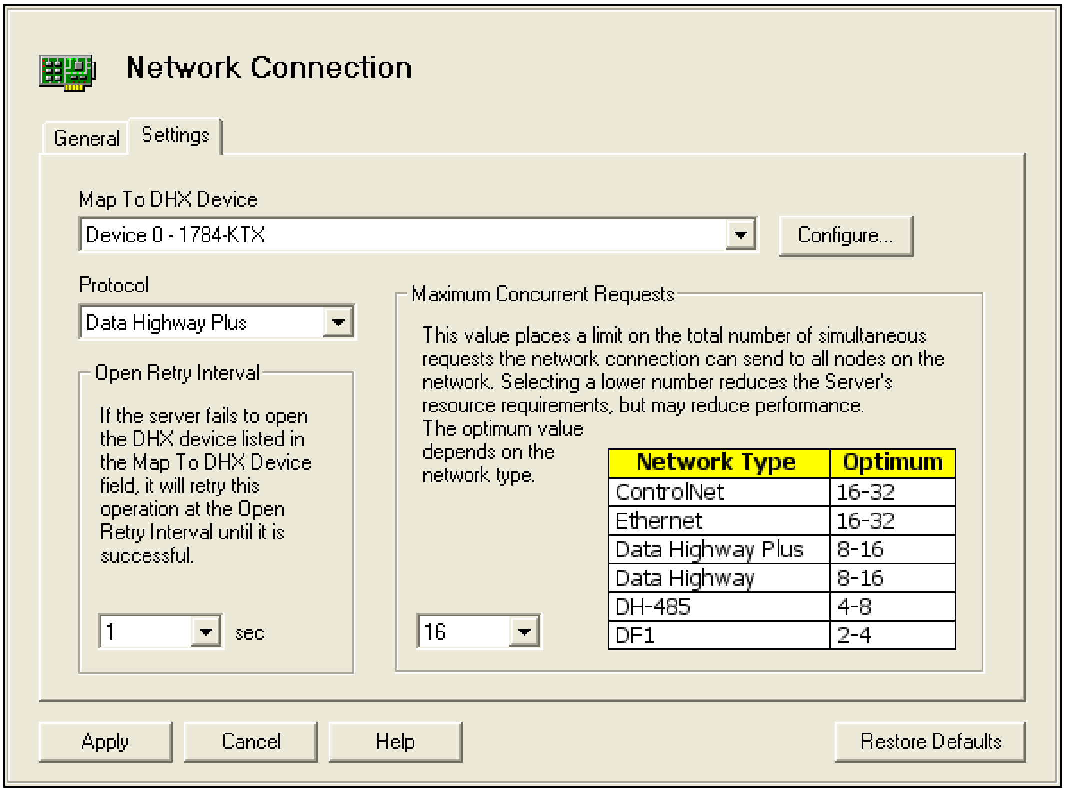
☑ DirectAccess

☑ Disable Writes

2. Click on the newly-created network connection and select its ***General*** tab.

3. Enter a descriptive name in the ***Name*** field.

4. Select the ***Settings*** tab.



Map To DHX Device: Device 0 - 1784-KTX

Protocol: Data Highway Plus

Open Retry Interval

If the server fails to open the DHX device listed in the Map To DHX Device field, it will retry this operation at the Open Retry Interval until it is successful.

1 sec

Maximum Concurrent Requests

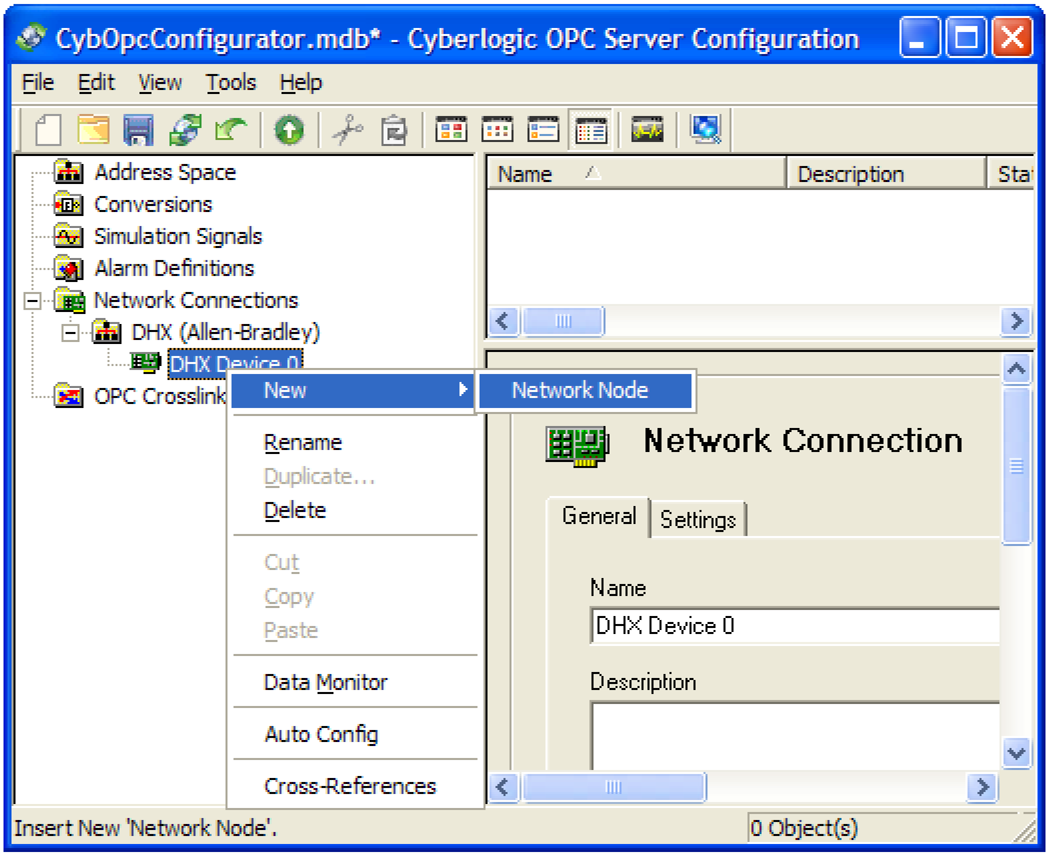
This value places a limit on the total number of simultaneous requests the network connection can send to all nodes on the network. Selecting a lower number reduces the Server's resource requirements, but may reduce performance. The optimum value depends on the network type.

Network Type	Optimum
ControlNet	16-32
Ethernet	16-32
Data Highway Plus	8-16
Data Highway	8-16
DH-485	4-8
DF1	2-4

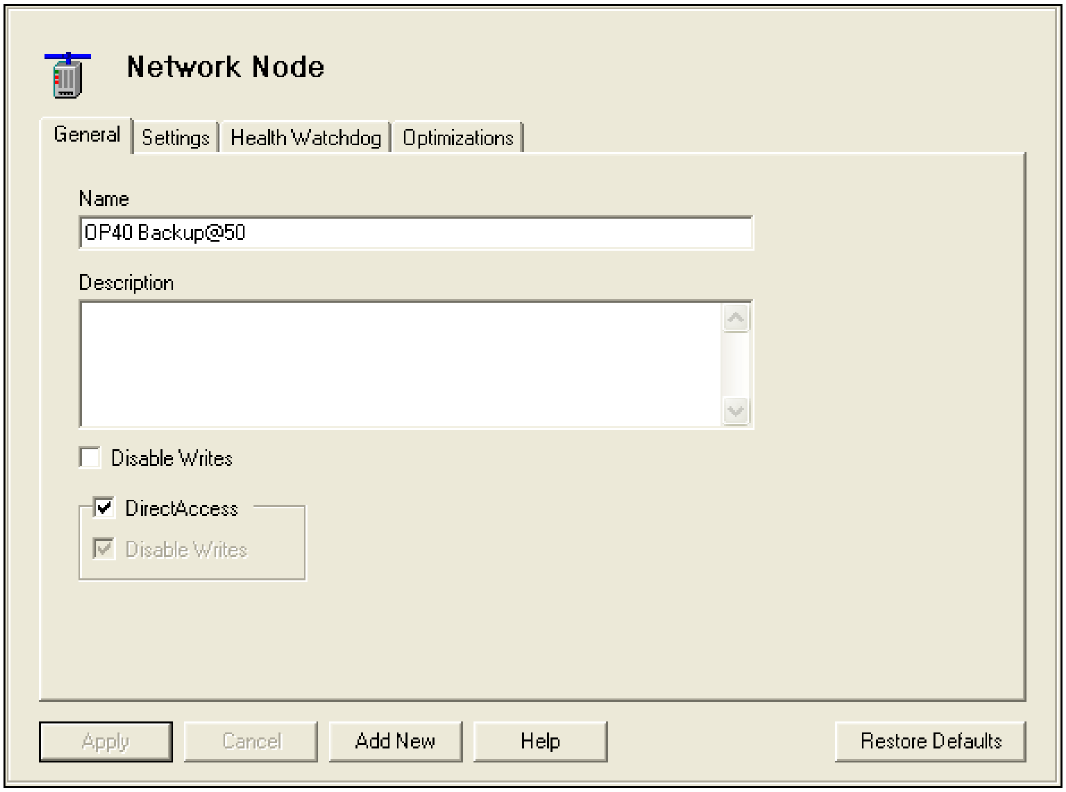
16

5. Select the desired DHX device from the ***Map To DHX Device*** field.

6. Click ***Apply*** to complete the creation of the network connection.



7. Right-click on the network connection you just created and select ***New***, then ***Network Node*** from the context menu.



Name
OP40 Backup@50

Description

□ Disable Writes

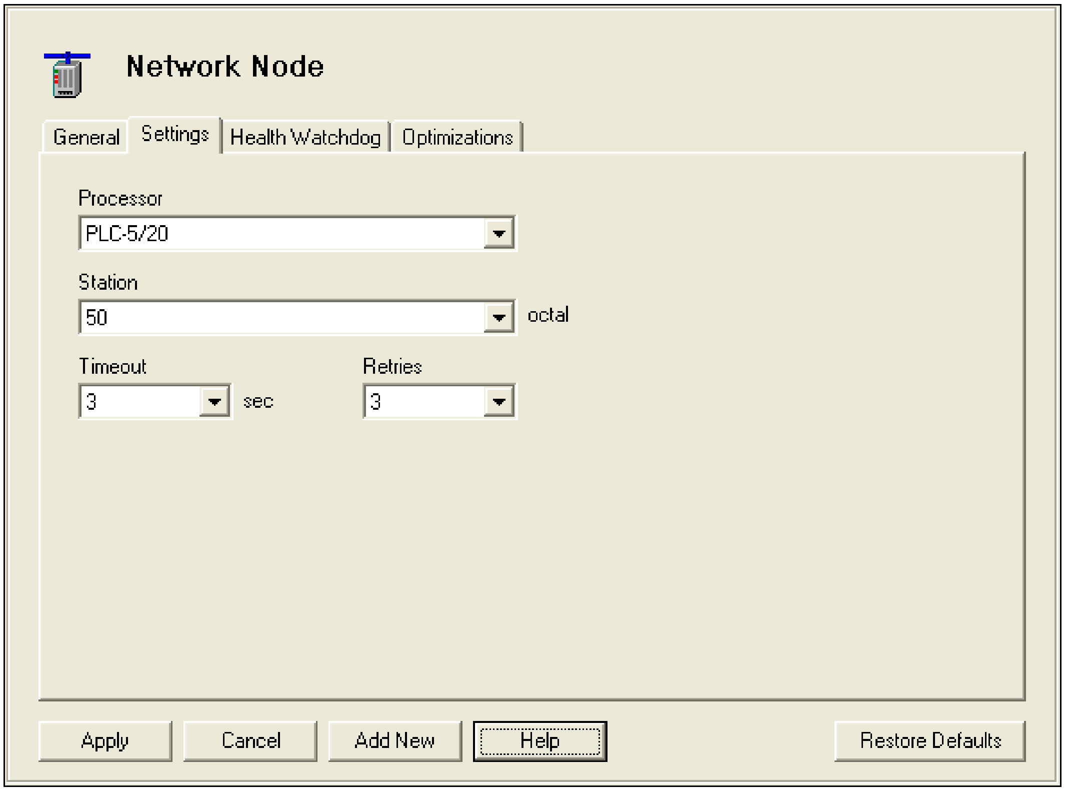
☑ DirectAccess

☑ Disable Writes

8. Click on the newly-created network node and select its ***General*** tab.

9. Enter a descriptive name in the ***Name*** field.

10. Select the ***Settings*** tab.



Processor: PLC-5/20

Station: 50 octal

Timeout: 3 sec

Retries: 3

11. Select the ***Processor*** type.

12. Select the ***Station*** node address.

Note The specific fields available on the Settings tab will vary, depending on the type of network connection you are using. For example, instead of a DH+ station address, you may need to enter an Ethernet IP address.

13. Click ***Apply*** to complete the creation of the network node.

You must repeat the above procedures to create all of the needed network connections and network nodes.

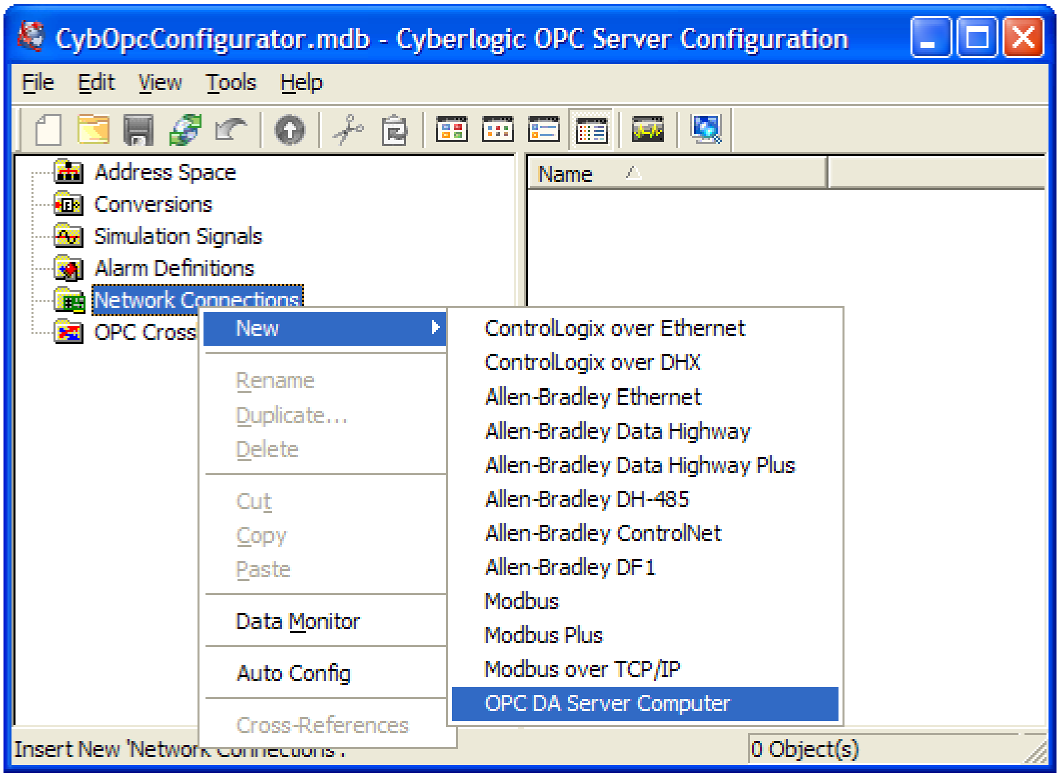
When you have finished, you will have completed the PLC communication portion of the Network Connections Tree. The next step is the OPC DA server portion, which begins with Selecting a Computer in the Network Connections Tree.

Selecting a Computer in the Network Connections Tree

To connect to an OPC server on another computer, you must first identify the computer on which it resides.

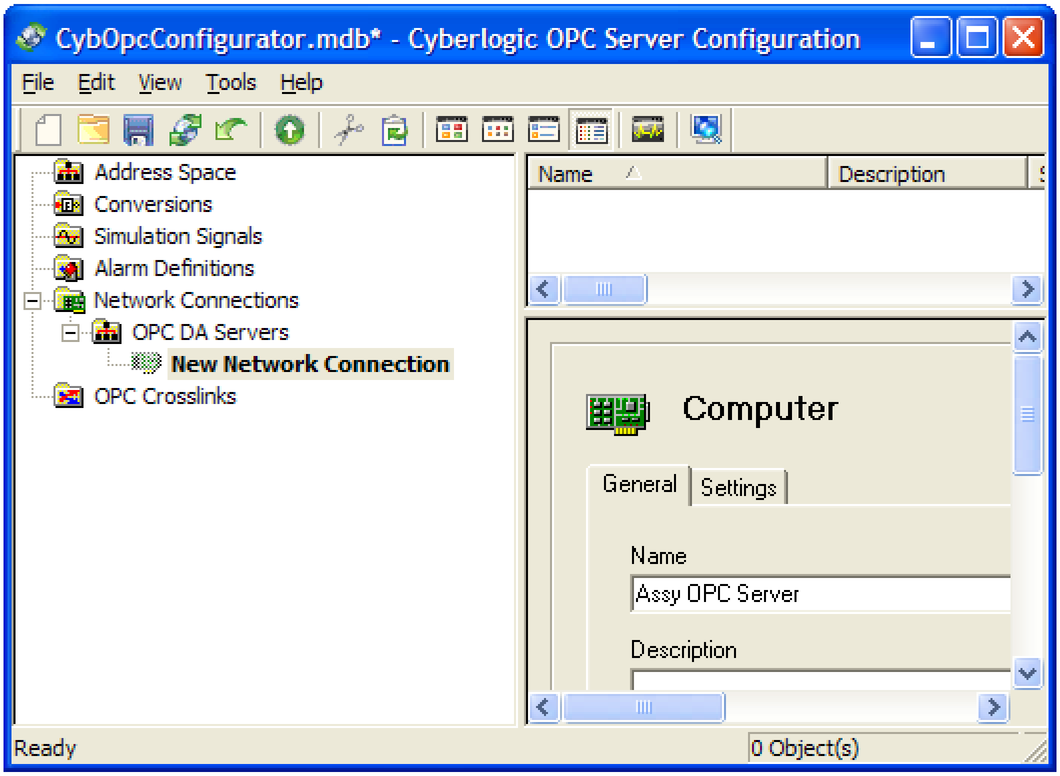
Connecting to other OPC servers is available only with products that include the OPC DA Server Driver Agent. Those products are the OPC Crosslink and OPC Crosslink Premier

Suites and the OPC Enterprise Suites. If you do not have the OPC DA Server Driver Agent or do not want to connect to other OPC servers, you can skip to Creating Address Space Device Folders and Devices.



1. Right-click on ***Network Connections*** and select ***New*** from the context menu.

2. Select ***OPC DA Server Computer***.



Name: Assy OPC Server

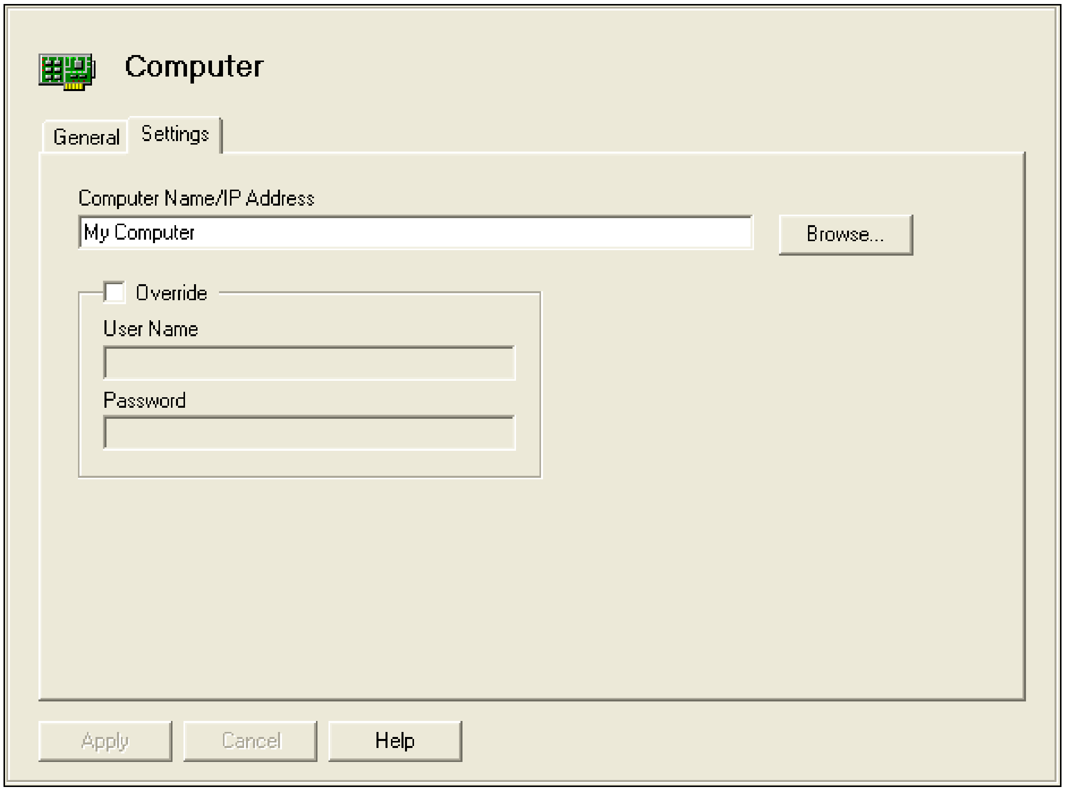
Description:

The editor will create a new folder called OPC DA Servers, containing a computer called New OPC DA Server Computer

3. Enter ***Assy OPC Server*** in the ***Name*** field.

   You may, of course, use any name you wish for the computer.

4. Select the ***Settings*** tab.



Computer Name/IP Address: My Computer

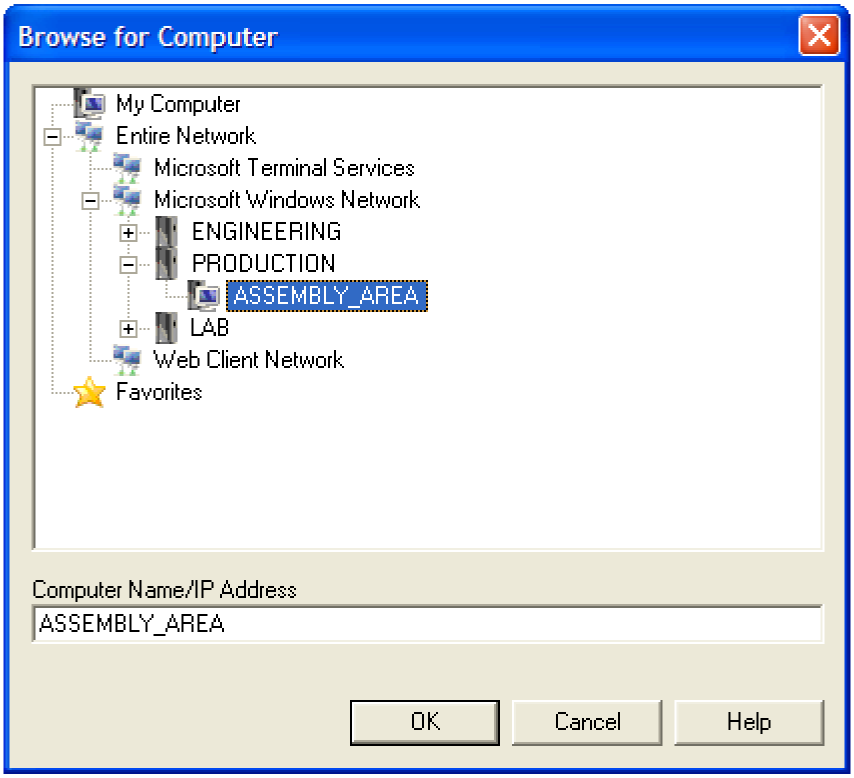
□ Override

User Name:

Password:

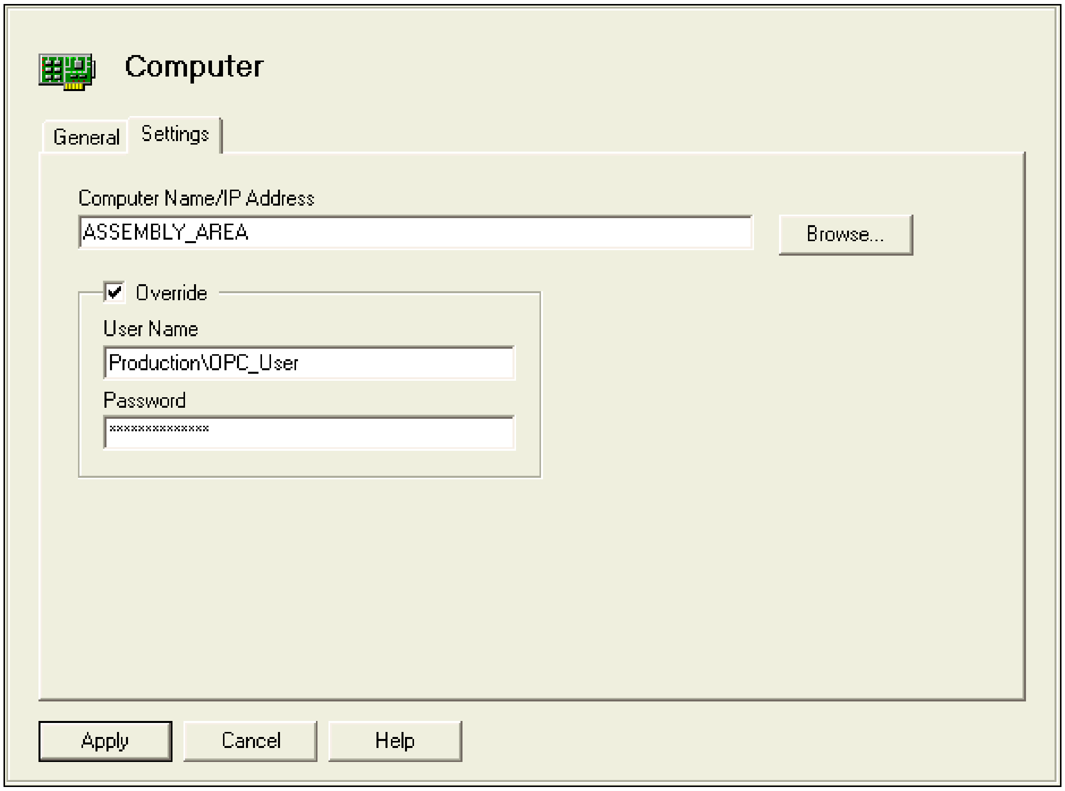
The editor defaults to My Computer for the Computer/IP Address setting, which represents your local computer.

5. If you want to select another computer instead, click ***Browse...***.



Computer Name/IP Address: ASSEMBLY_AREA

6. Browse for the computer you wish to use, and click ***OK***.



Computer Name/IP Address: ASSEMBLY_AREA

☑ Override

User Name: Production\OPC_User

Password: **************

Caution!

> If the selected computer is not your local computer, you may need to provide a computer or domain name, user name, and password, so the OPC server can access that computer.
>
> To simplify configuration, you should enter this information on the Settings Tab of the OPC DA Servers folder. This becomes the default computer/domain, user name and password for all computers and OPC servers. However, you can override this default setting by selecting Override and entering the computer or domain name, user name, and password information for this computer only.

7. If you want to override the default User Name and Password, check the ***Override*** box, and then enter the ***User Name*** and ***Password*** that you wish to use when accessing this computer.

   The User Name field entry must be in the form:

   [<DomainNameOrWorkgroupComputerName>\]<UserName>

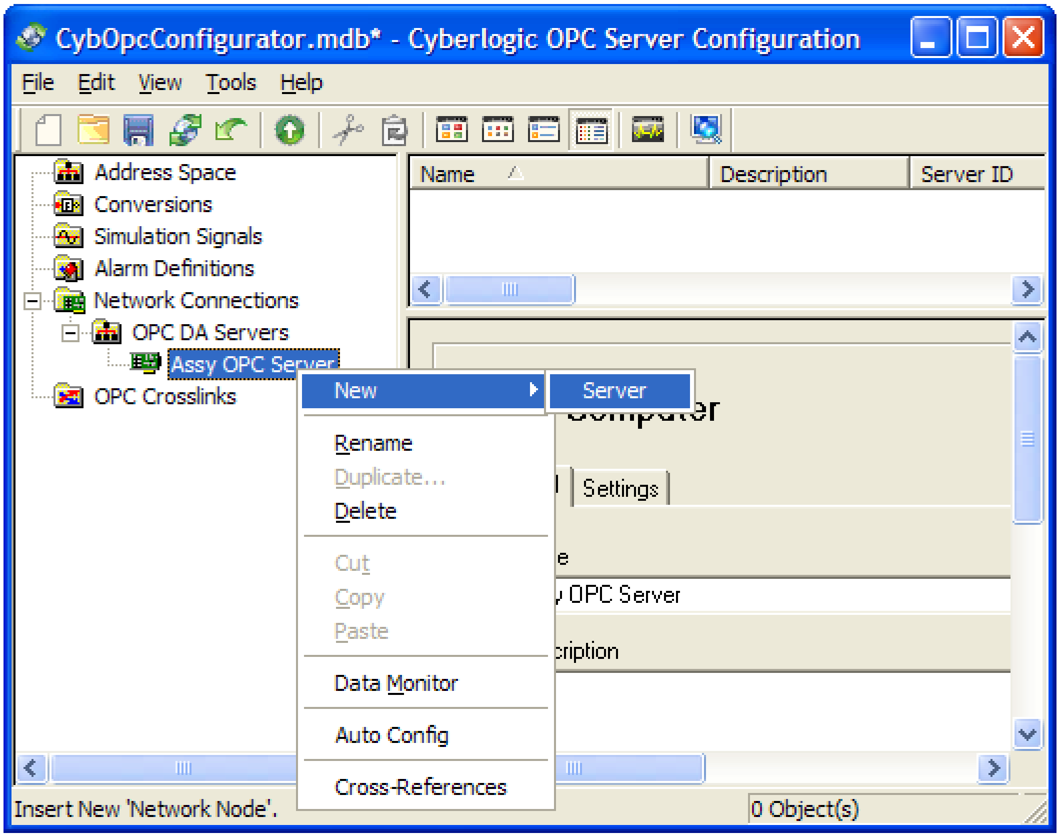
   If the computer you wish to connect to is the local computer or is in the same domain as the local computer, the domain name or workgroup computer name specification is optional.

8. Click ***Apply***.

Go to the Selecting an OPC Server section to continue.

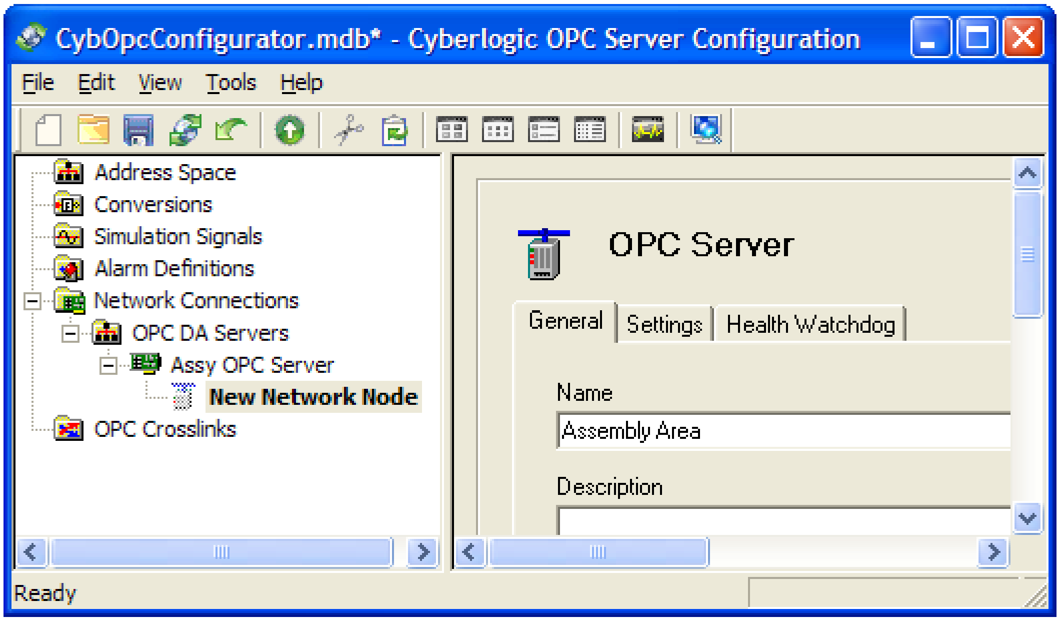
Selecting an OPC Server

You must now select the specific OPC DA server you will connect to. Once connected, you can read data from it, write to it, or use it as the source or destination for an OPC Crosslink data transfer.



1. Right-click on the ***Assy OPC Server*** computer branch you just created and select ***New*** from the context menu.

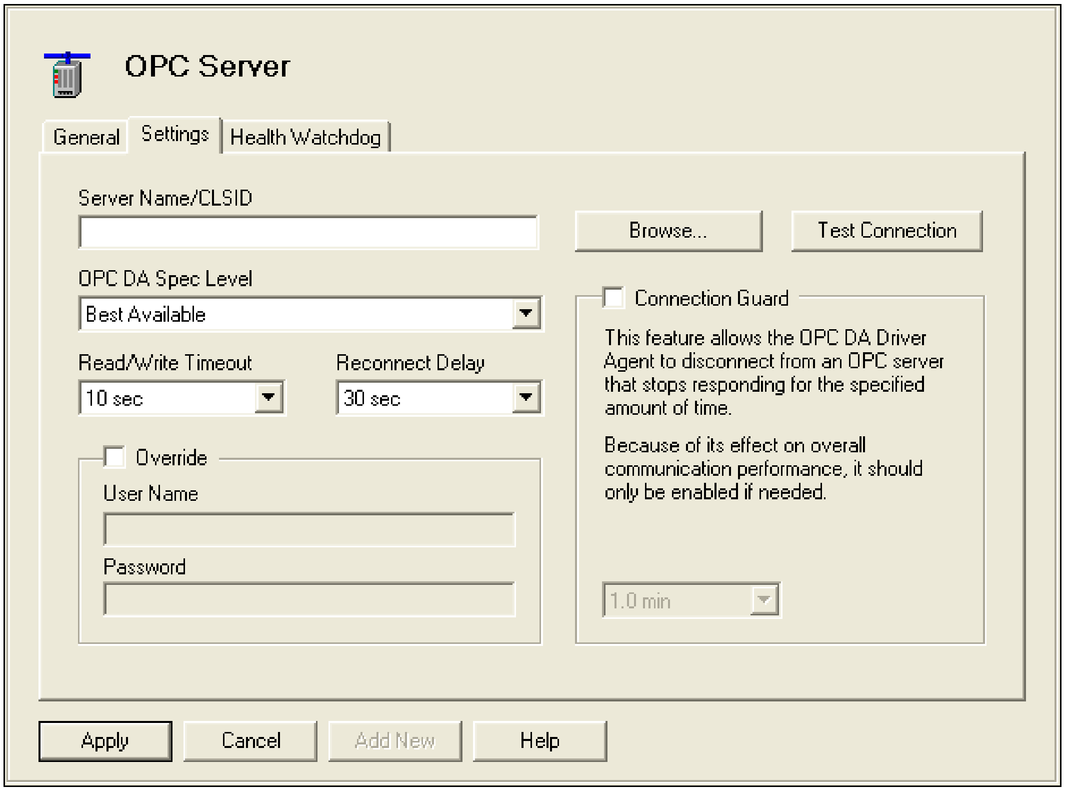
2. Select ***Server***.



The editor will create a new OPC server branch called New OPC DA Server

3. In the ***Name*** field, enter ***Assembly Area***, or any other name you would like to use for the OPC server.

4. Select the ***Settings*** tab.



Server Name/CLSID

OPC DA Spec Level: Best Available

Read/Write Timeout: 10 sec

Reconnect Delay: 30 sec

□ Override

User Name

Password

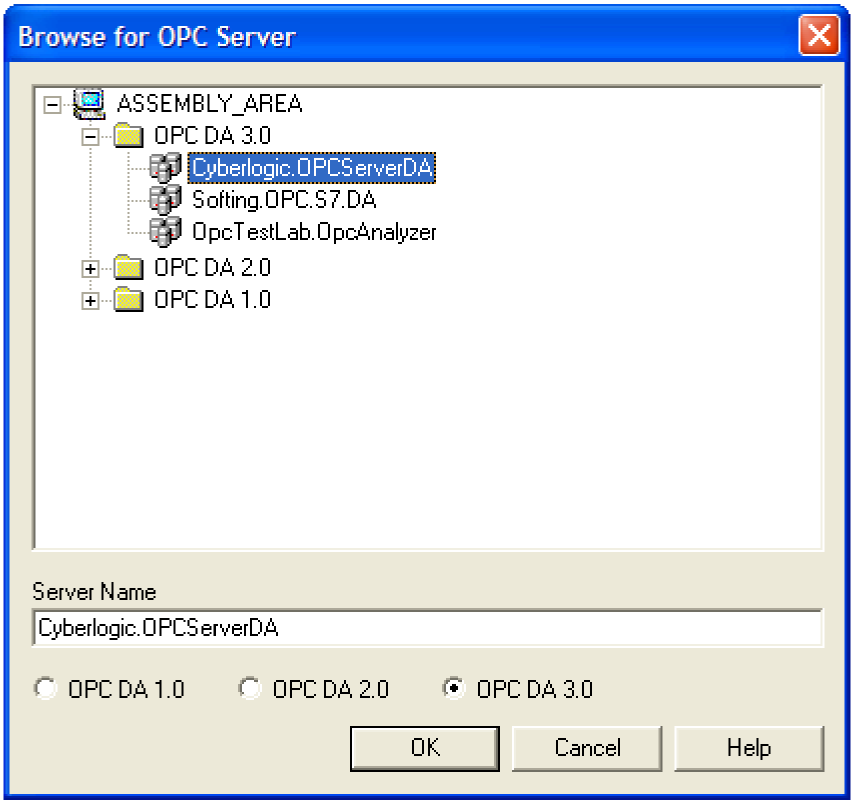
□ Connection Guard

This feature allows the OPC DA Driver Agent to disconnect from an OPC server that stops responding for the specified amount of time.

Because of its effect on overall communication performance, it should only be enabled if needed.

1.0 min

5. Click the ***Browse...*** button.



Server Name: Cyberlogic.OPCServerDA

○ OPC DA 1.0 ○ OPC DA 2.0 ● OPC DA 3.0

6. Browse to the desired OPC DA server.

7. When you have selected the desired server, click ***OK***.

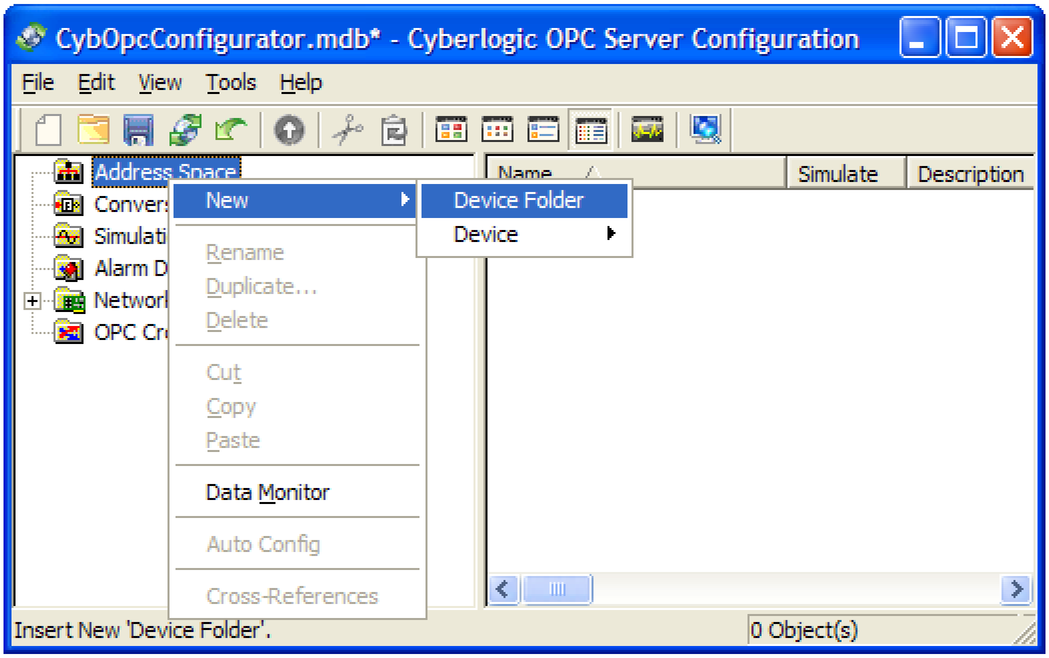
8. Click ***Apply***.

Go on to Creating Address Space Device Folders and Devices to continue.

Creating Address Space Device Folders and Devices

In the Address Space Tree, you will create devices that will obtain data from physical network nodes, and the data items that will receive the data. If you have many devices, you may also create device folders to organize these devices in a logical way.

Note If you are willing to limit yourself to using DirectAccess to obtain data from PLCs and OPC servers, it is not necessary to configure the Address Space Tree at all. However, you will not be able to take advantage of many of the features of the Cyberlogic OPC Server, including redundant networks and PLCs, unsolicited communication, and data simulation. Most users will want to configure the Address Space.



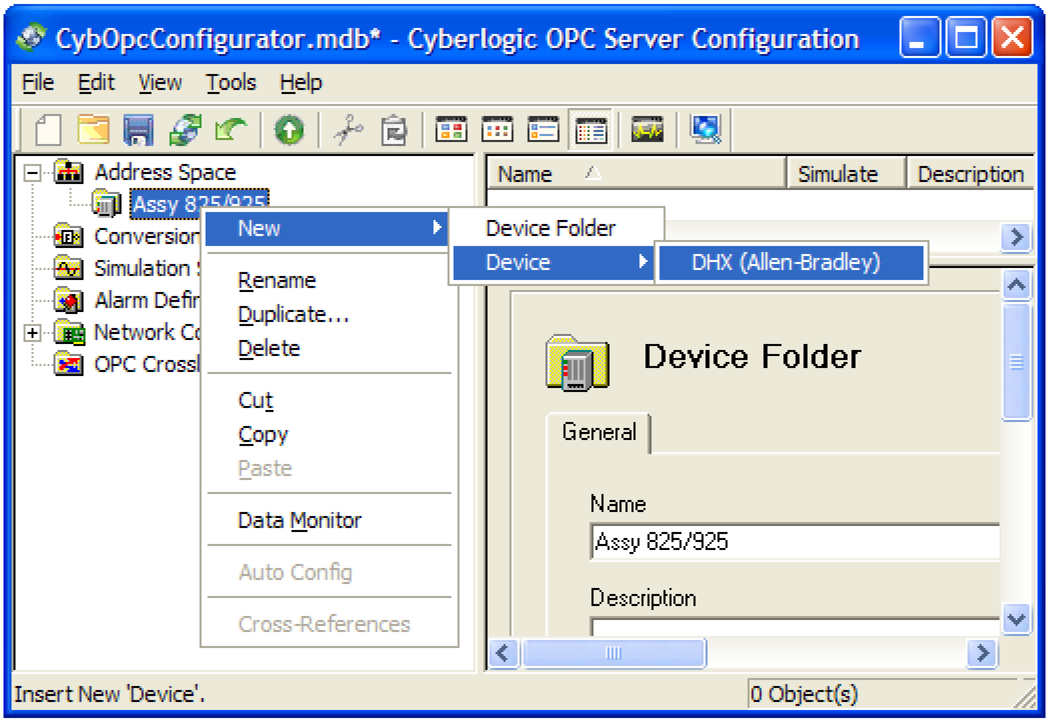
1. Right-click on the ***Address Space*** root folder and select ***New***, then ***Device Folder*** from the context menu.

2. Click on the folder and go to its ***General*** tab.

3. Enter a descriptive name in the ***Name*** field. For this exercise, use the name ***Assy 825/925***.

4. Click the ***Apply*** button.

5. Select the newly created ***Assy 825/925*** device folder.



Device Folder

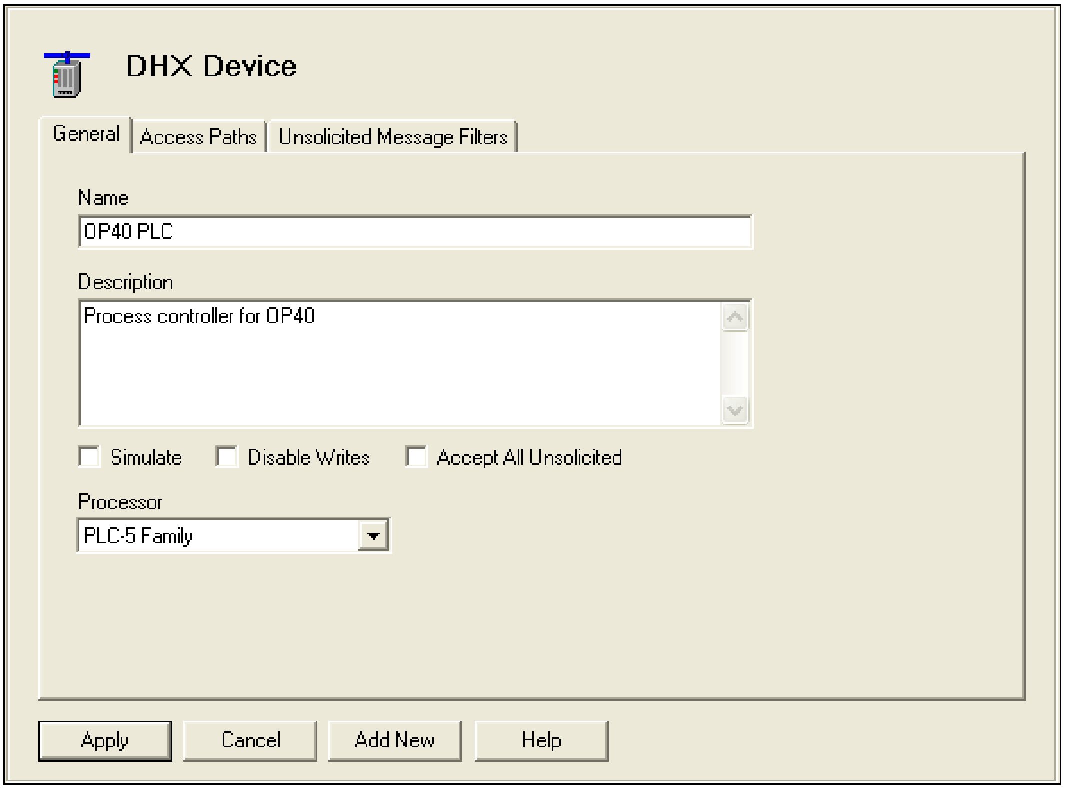
Name: Assy 825/925

Description:

Insert New 'Device'.

0 Object(s)

6. Right-click on ***Assy 825/925*** and select ***New***, then ***Device***, then ***DHX (Allen-Bradley)*** from the context menu.



DHX Device

Name: OP40 PLC

Description: Process controller for OP40

☐ Simulate ☐ Disable Writes ☐ Accept All Unsolicited

Processor: PLC-5 Family

7. Click on the newly-created device and go to the ***General*** tab.

8. Enter a descriptive name in the ***Name*** field. For this exercise, use the name ***OP40 PLC***.

9. Enter an optional description, in this example, use ***Process controller for OP40***.

10. From the ***Processor*** drop-down box, select ***PLC-5 Family***.

11. Click ***Apply***.

You have just created a device for the OP40 PLC, and you can repeat this process to create devices to be associated with the other controllers you will communicate with. If you also want to obtain data from OPC servers, you can create devices for them as well, in a similar manner.

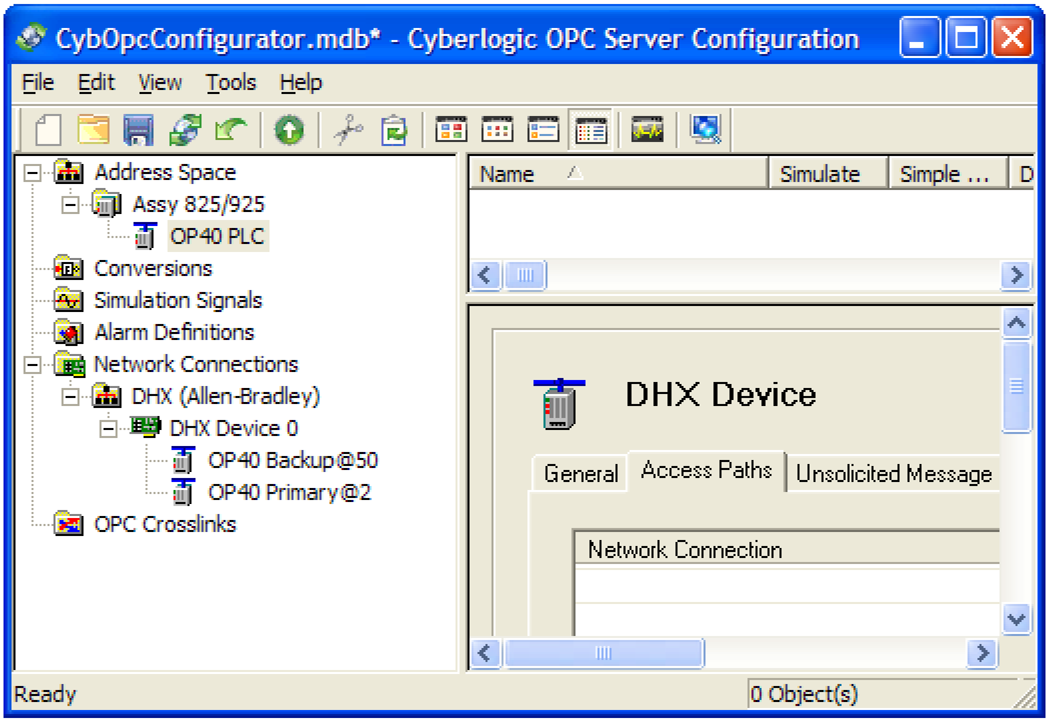
An address space device represents a logical data source associated with one or more physical devices to which the server communicates. In the next section, Configuring the Access Paths, you will make this association.

Configuring the Access Paths

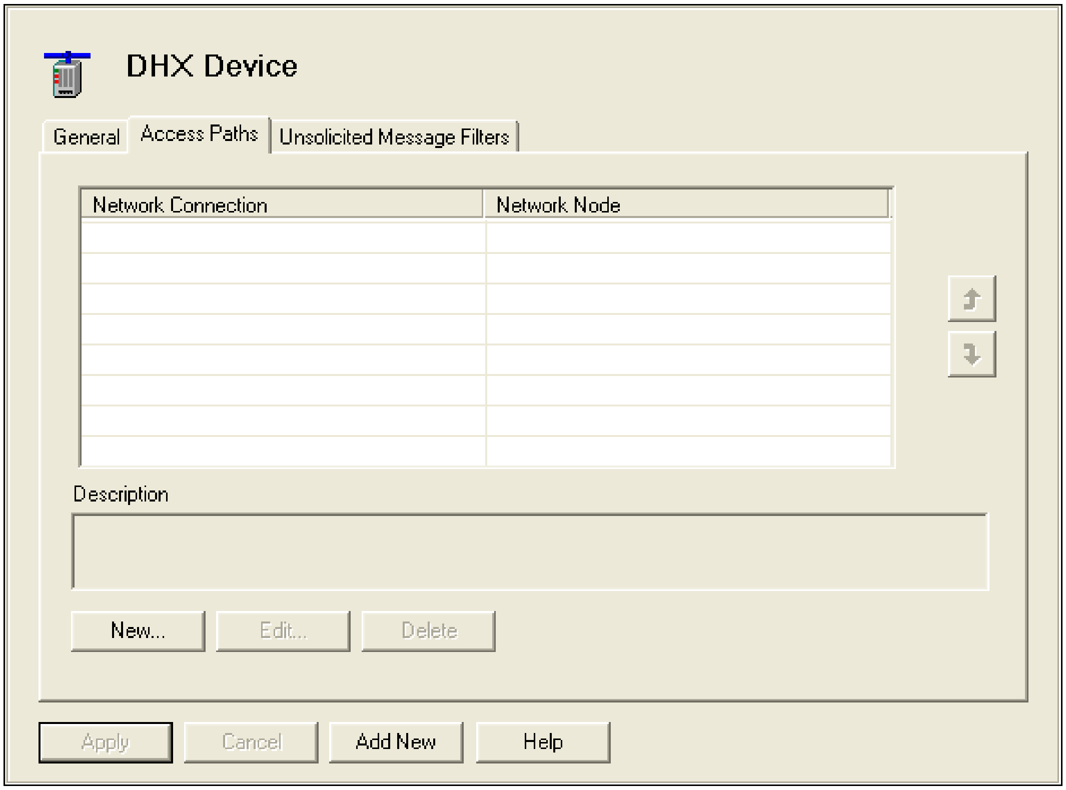
Access paths specify the network and PLC you want the device to use for obtaining its data. In the case of OPC server devices, access paths specify the computer and OPC DA server. If you want to use backup networks, controllers or OPC servers, you can specify more than one access path for a device to create the desired redundancy.

Note Access paths are needed only for solicited communication. If your driver agent supports unsolicited communication and you want to use only that type, you can skip this section and go to Configuring Unsolicited Message Filters.

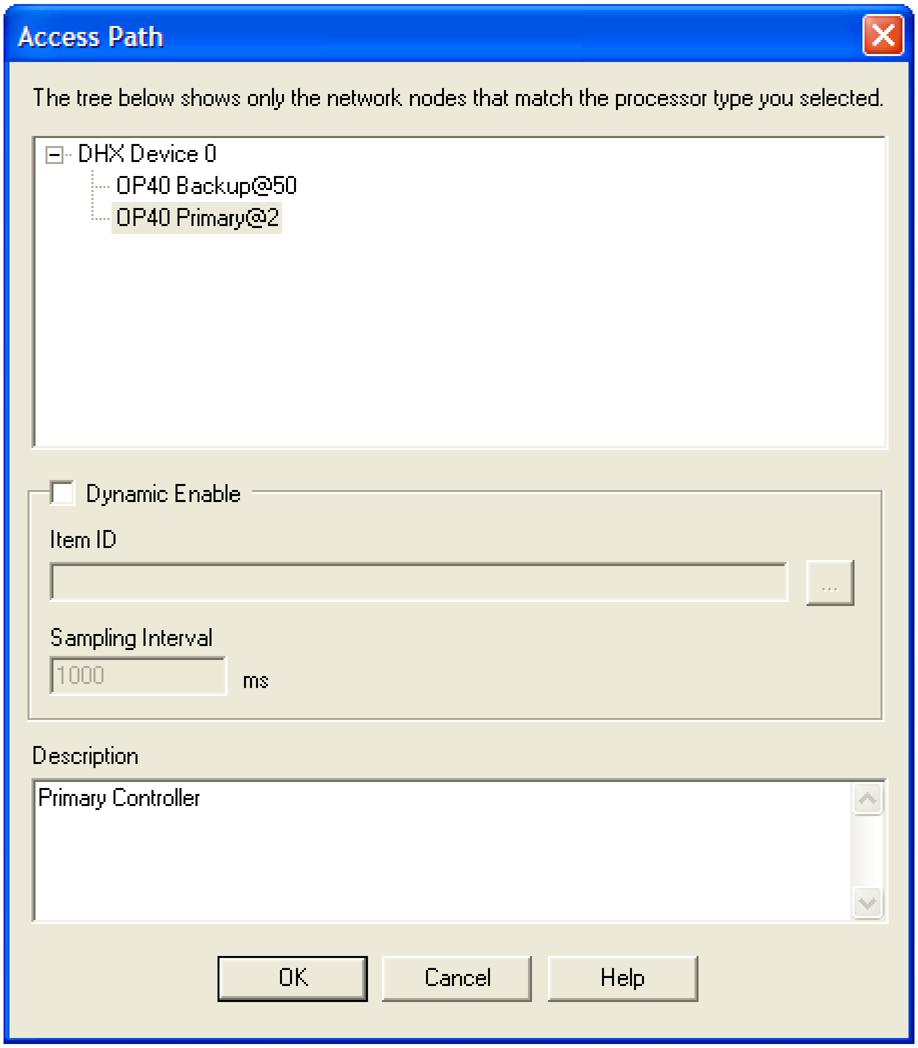
The newly-created OP40 PLC device has not been associated with the physical network nodes yet. In this section, you will set OP40 Primary@2 as the primary controller and OP40 Backup@50 as the secondary controller.



1. Click on the ***OP40 PLC*** device and select the ***Access Paths*** tab.



2. Click the ***New...*** button.



Access Path

The tree below shows only the network nodes that match the processor type you selected.

- DHX Device 0
  - OP40 Backup@50
  - OP40 Primary@2

□ Dynamic Enable

Item ID

Sampling Interval: 1000 ms

Description: Primary Controller

3. In the Access Path dialog, select the ***OP40 Primary@2*** node under DHX Device 0.

4. Leave ***Dynamic Enable*** unchecked.

   Dynamic Enable is not used in this sample configuration. It allows you to control the enable of the access path at run time by changing the value of a specified Item ID. For more information on Dynamic Enable, refer to the help files for the OPC driver agent you are using.

5. Type ***Primary Controller*** in the optional Description field.

6. Click ***OK***.

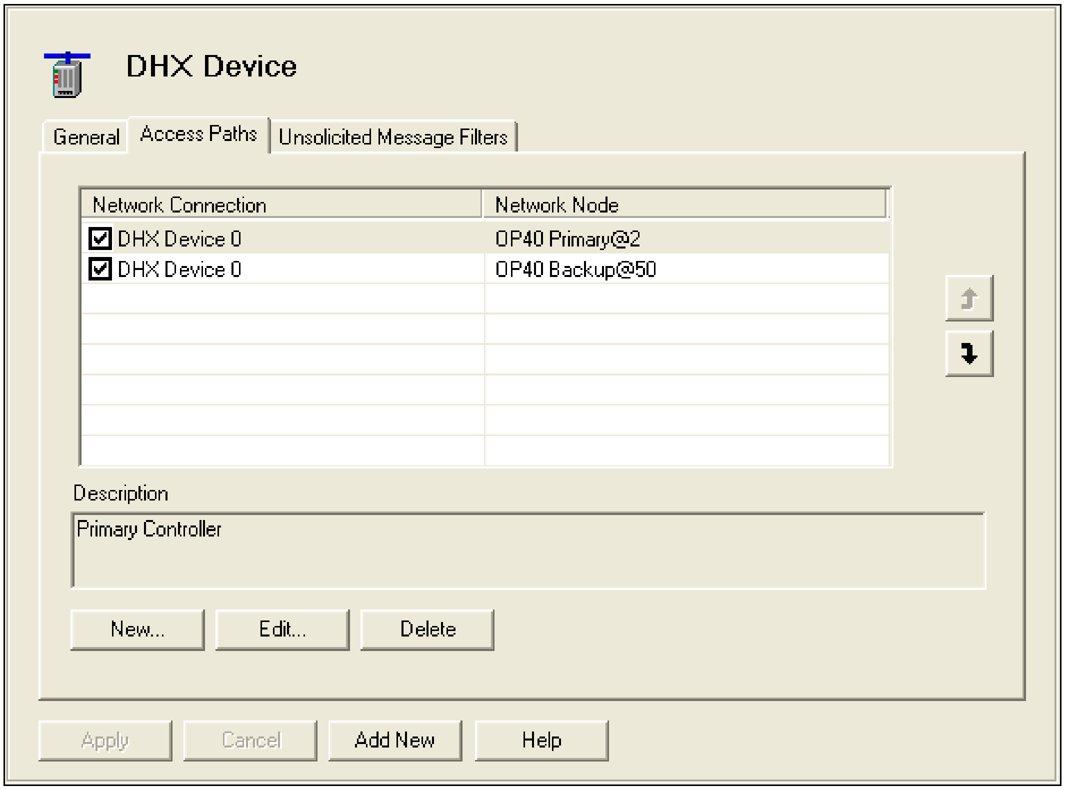
   You have just created the primary access path. Now you will add a backup access path that will be used in case the primary connection fails.

7. Click the ***New...*** button.

8. In the Access Path dialog, select the ***OP40 Backup@50*** node under DHX Device 0.

9. Type ***Backup Controller*** in the optional description field.

10. Click ***OK***.



Network Connection	Network Node
☑ DHX Device 0	OP40 Primary@2
☑ DHX Device 0	OP40 Backup@50

Description

Primary Controller

You have now created two alternative access paths, one to the primary PLC and one to the backup PLC. For details of how the server will use these access paths, refer to the Access Paths discussion in the Theory of Operation.

To continue, go to Configuring Unsolicited Message Filters.

Configuring Unsolicited Message Filters

Unsolicited messages must pass through user-defined filters before they are accepted. These Unsolicited Message Filters help to ensure that the server accepts unsolicited messages only from trusted sources.

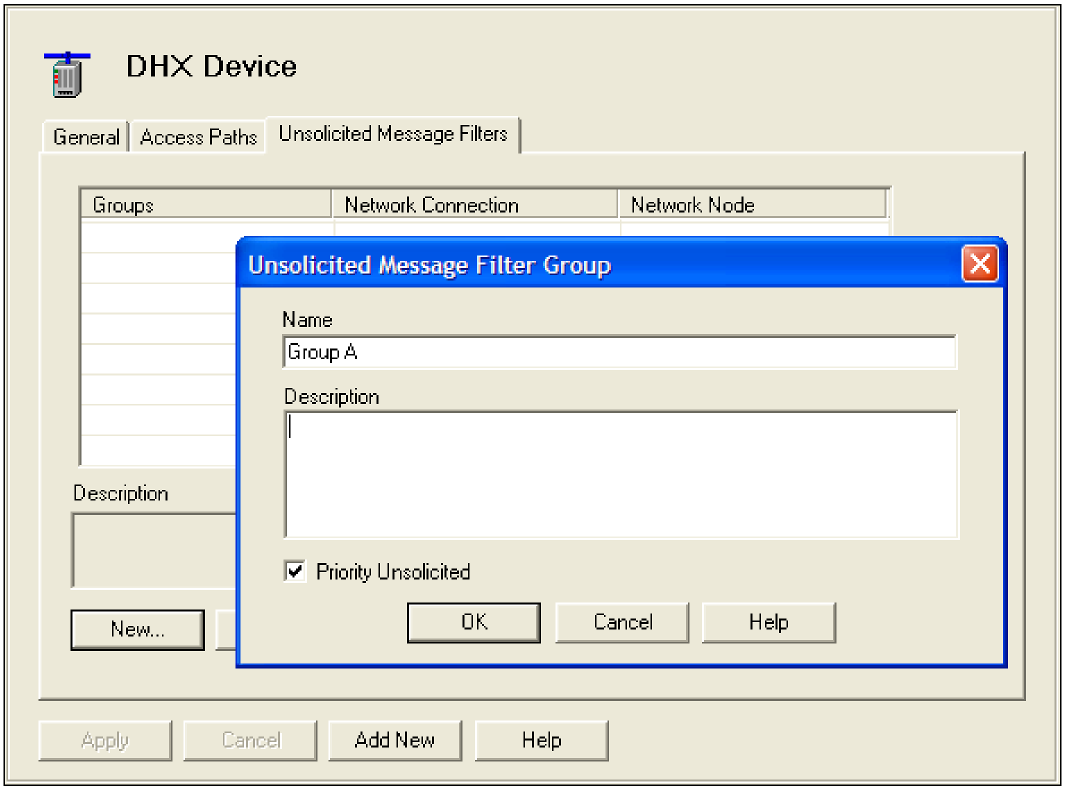
Note

Not all driver agents support unsolicited communication. If the driver agent you are using does not have unsolicited support, the Unsolicited Message Filters tab will not be available.

If your driver agent does not support unsolicited communication, or if you do not plan to use it, you can skip this section and go to Using DirectImport.

1. Select the ***Unsolicited Message Filters*** tab.

2. Click the ***New...*** button and select ***Group...*** from the context menu.



Name: Group A

☑ Priority Unsolicited

3. In the Unsolicited Message Filter Group dialog, enter ***Group A*** in the ***Name*** field.

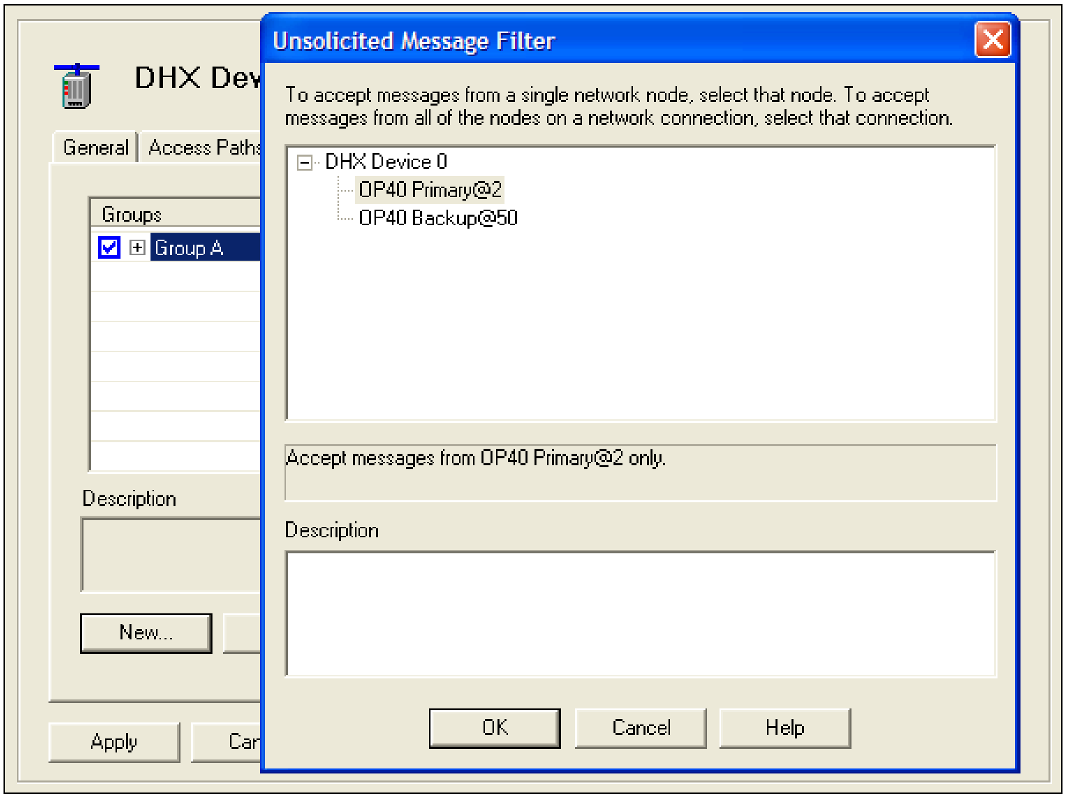
4. Enter an optional ***Description***, if you wish.

5. Check the ***Priority Unsolicited*** box.

6. Click the ***OK*** button.

   This creates the filter group. Now you must create the filters that the group will contain.

7. Click the ***New...*** button and select ***Filter...*** from the context menu.



Unsolicited Message Filter

To accept messages from a single network node, select that node. To accept messages from all of the nodes on a network connection, select that connection.

⊟ DHX Device 0
- OP40 Primary@2
- OP40 Backup@50

Accept messages from OP40 Primary@2 only.

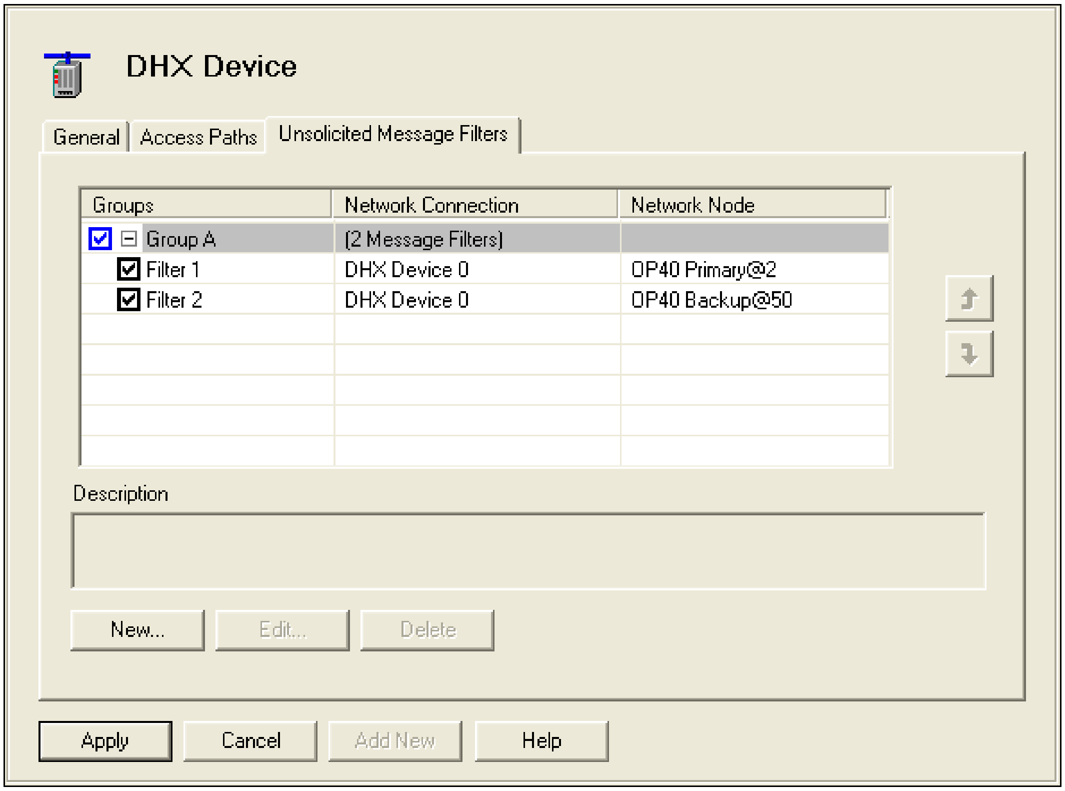
Description

8. In the Unsolicited Message Filter dialog, select ***OP40 Primary@2***.

   This creates a filter that will accept unsolicited messages from the primary PLC.

9. Click ***OK***.

10. Repeat this procedure, this time selecting ***OP40 Backup@50*** to create a filter to accept unsolicited messages from the backup PLC.



DHX Device

Groups	Network Connection	Network Node
☑ ⊟ Group A	(2 Message Filters)	
☑ Filter 1	DHX Device 0	OP40 Primary@2
☑ Filter 2	DHX Device 0	OP40 Backup@50

Description

If you then click the + sign beside Group A, your filter configuration will look like the above picture.

You have now created two unsolicited message filters, one to accept message from the primary and one to accept them from the backup PLC. Because you marked the group priority unsolicited, the server treats the filters within the group as a ranked list of data sources. In this example, if the connection to the primary PLC is healthy, only messages from this PLC will be accepted. However, if the primary connection fails, only messages from the backup PLC will be accepted. Other network nodes will not be allowed to send messages to this device.

Now that the device communication is configured, the next step is to configure the data items and organize them into folders. To begin this process, go to Using DirectImport.

Using DirectImport

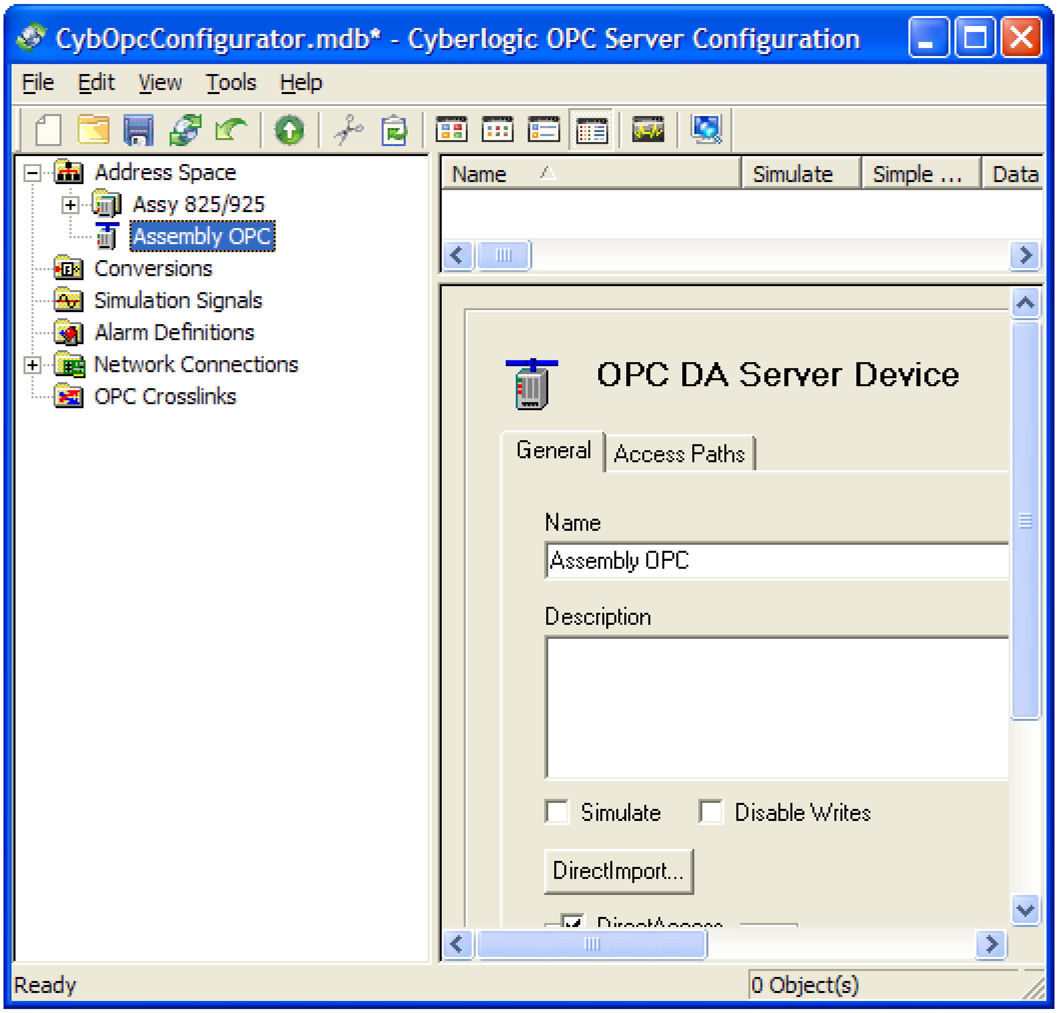
DirectImport allows you to import data items and the folders that contain them directly from the programmable controller or OPC server. If you have only a few folders or data items to configure, they can be configured individually, as will be explained in the next section. However, for PLCs and OPC servers with large or complex configurations, the use of the DirectImport feature can dramatically speed up this configuration.

Note

DirectImport is available only for the ControlLogix and OPC Server DA Driver Agents, and requires communication with the controller or server you are importing from.

If the driver agent you are using does not have DirectImport or if communication is not available, you can skip this section and go to Configuring Folders and Data Items Manually.

To illustrate the use of DirectImport, we will configure the data items and folders for an OPC DA server device that we have created.



Name: Assembly OPC

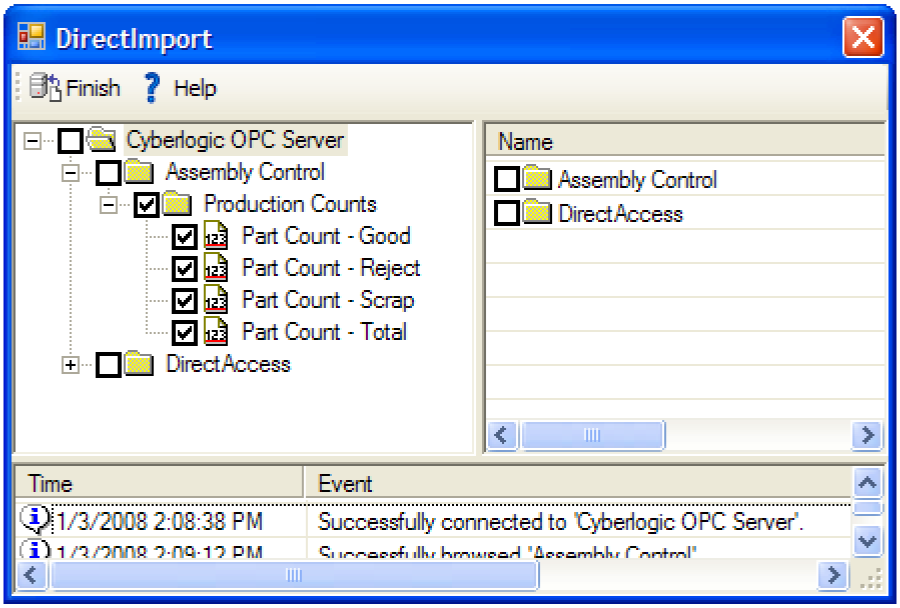
Description:

□ Simulate □ Disable Writes

1. Select the ***AssemblyOPC*** device.

   This is the OPC DA server device, which was created in the same manner as the Assy 825/925 device.

2. Select its ***General*** tab and click ***DirectImport***.



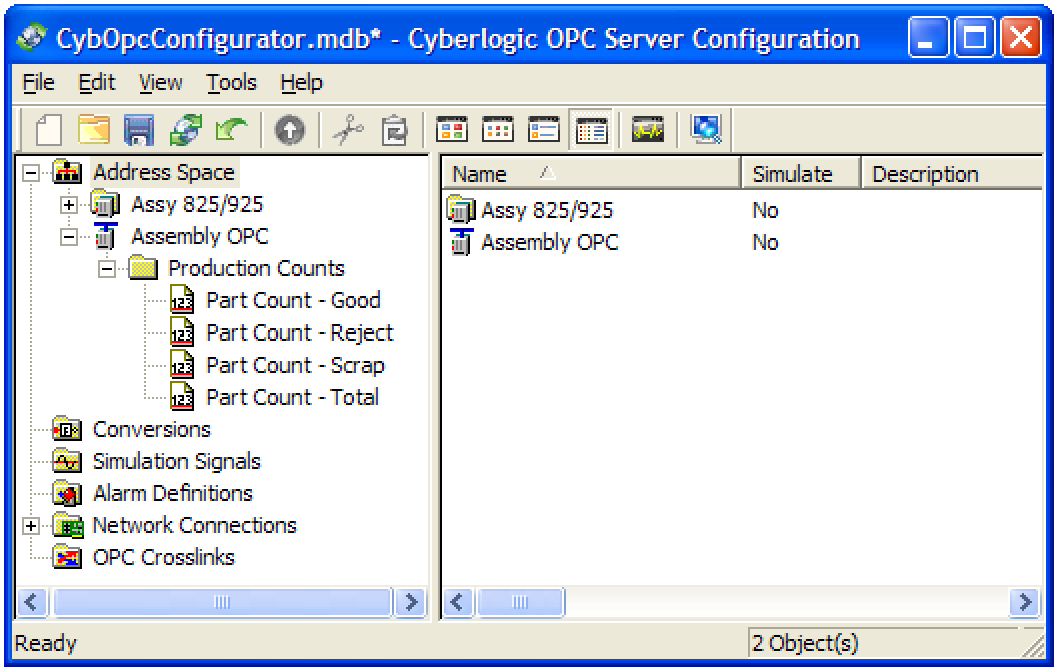
```
1/3/2008 2:08:38 PM   Successfully connected to 'Cyberlogic OPC Server'.
1/3/2008 2:09:12 PM   Successfully browsed 'Assembly Control'
```

The DirectImport window will open and will show all of the data items in the OPC server you are importing from.

3. Expand the branches and select the desired folders and data items by checking them in the left pane.

   Checking or unchecking a folder will check or uncheck everything it contains. You may then modify these selections as desired.

4. When you have checked all of the items you wish to import, click ***Finish***.



Name	Simulate	Description
Assy 825/925	No	
Assembly OPC	No	

The selected items will be imported into the address space tree.

5. You may then edit these folders and data items, if you wish to use different names or arrange them differently.

To learn how to edit the items you've imported or to create folders and data items that you could not import, go to Configuring Folders and Data Items Manually.

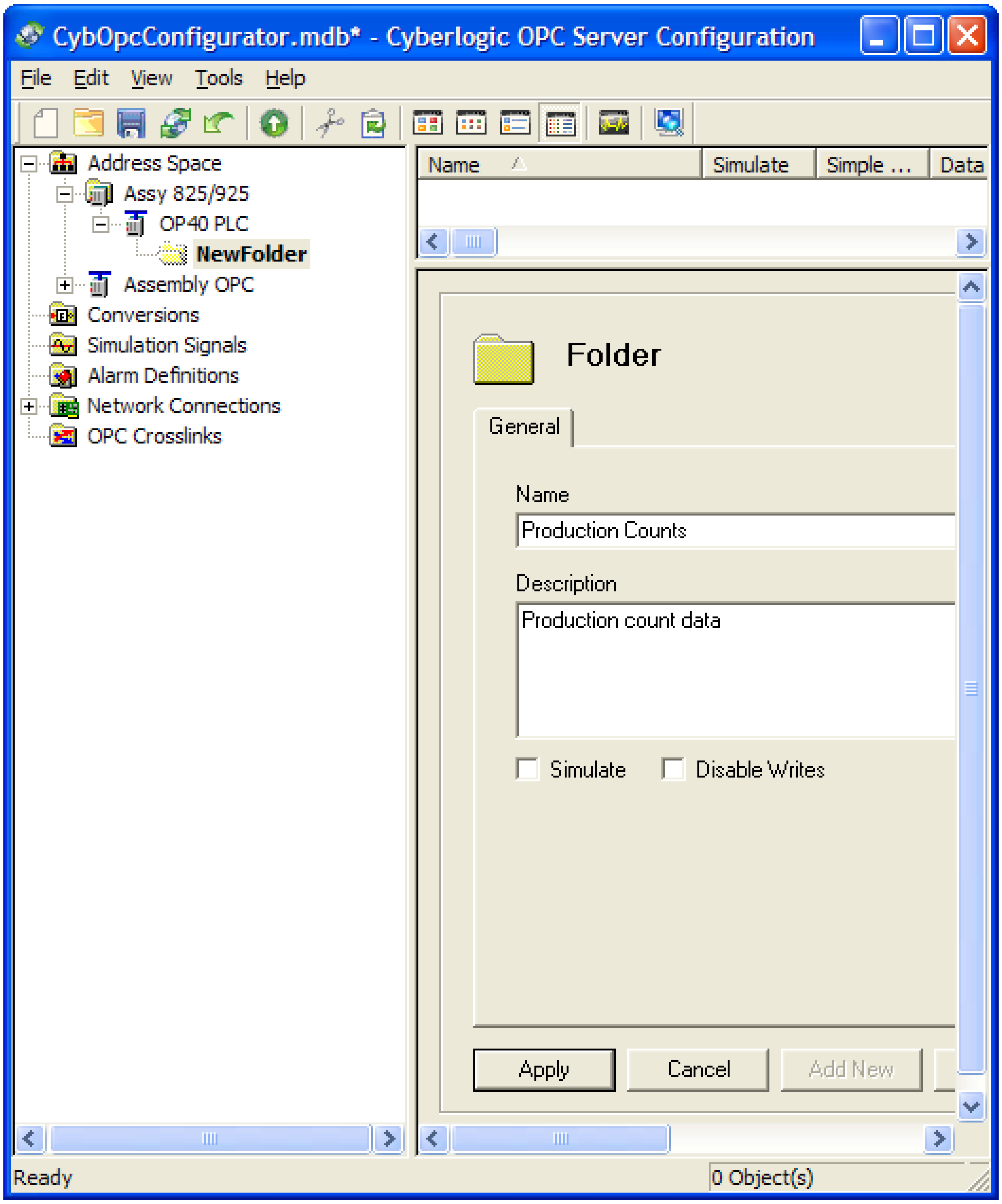
Configuring Folders and Data Items Manually

In the Address Space Tree, data items are used to receive data from the network nodes through the device's access paths or unsolicited filters. The OPC client software will access these data items to obtain the values they hold. Folders may be used to organize the data items into logical groups.

Note If you are willing to limit yourself to using DirectAccess at the device level to obtain data from PLCs and OPC servers, it is not necessary to configure the data items at all. However, you will not be able to take advantage of many of the features of the Cyberlogic OPC Server, including logical organization of data, and data simulation. Most users will want to configure the data items.

If DirectImport was able to import all of the folders and data items you need, and you do not want to make any changes to them, you can skip to Saving the Configuration and Updating the Server.

1. Right-click on the ***OP40 PLC*** device and select ***New***, then ***Folder*** from the context menu.



Name: Production Counts

Description: Production count data

□ Simulate □ Disable Writes

2. Click on the folder and go to its ***General*** tab.

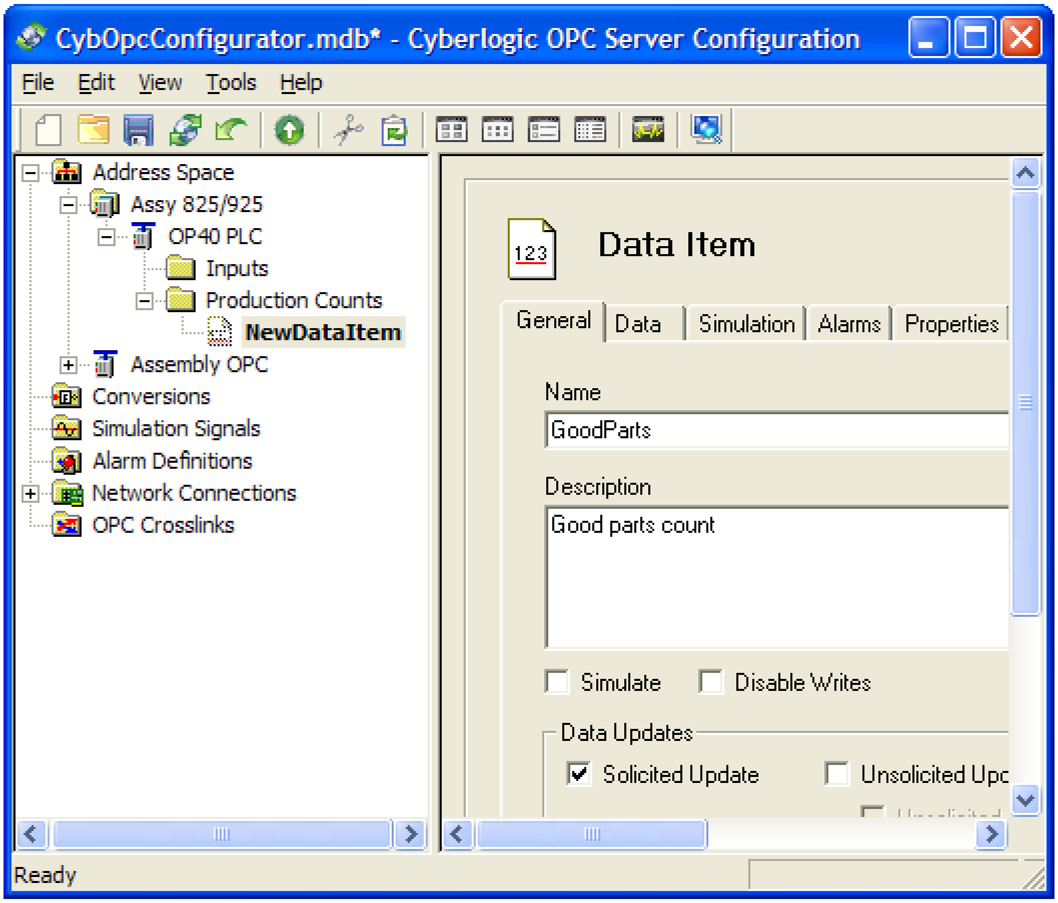
3. Enter a descriptive name in the ***Name*** field. For this exercise, use ***Production Counts***.

4. If you wish, enter an optional ***Description***.

5. Click ***Apply***.

6. Repeat the process to create another folder called ***Inputs*** with the description ***Discrete inputs***.

7. Right-click on the ***Production Counts*** folder and select ***New***, then ***Data Item*** from the context menu.



Name: GoodParts

Description: Good parts count

☐ Simulate ☐ Disable Writes

Data Updates

☑ Solicited Update ☐ Unsolicited Upc

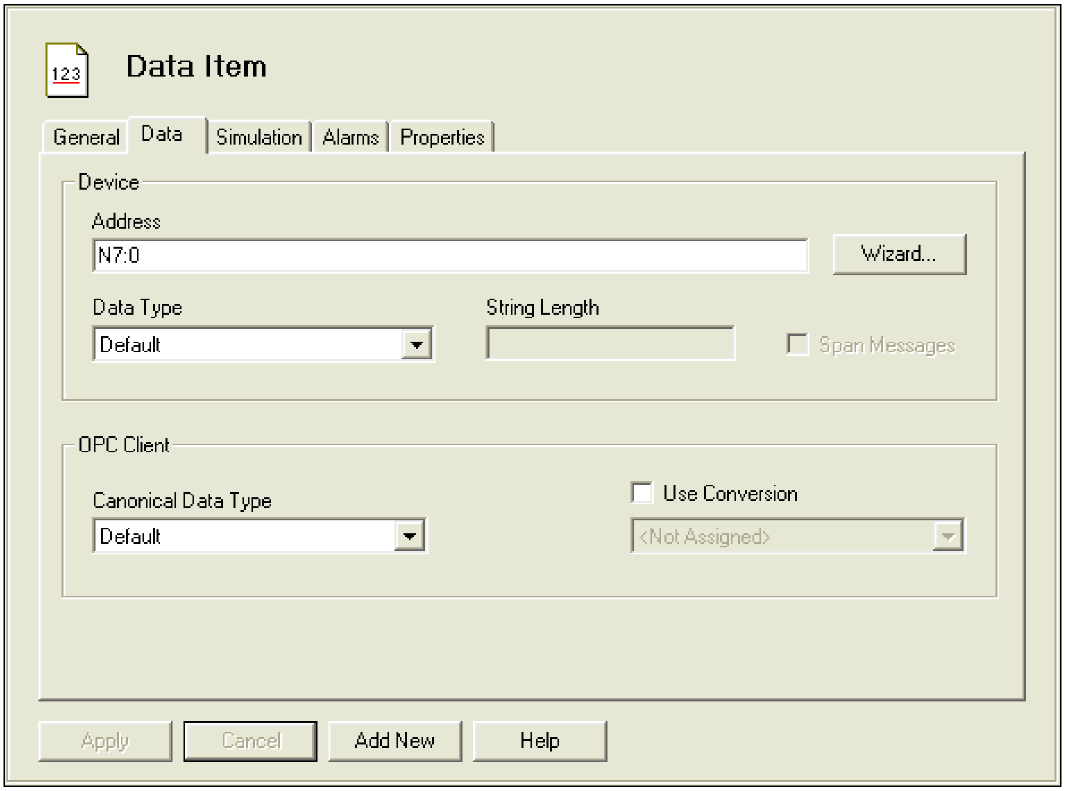
8. Click on the data item and select its ***General*** tab.

9. Enter a descriptive name in the ***Name*** field. For this exercise, use ***GoodParts***.

10. If you wish, enter an optional ***Description***.

11. Verify that the ***Solicited Update*** box is checked.

12. Select the ***Data*** tab.



Address: N7:0

Data Type: Default

String Length:

□ Span Messages

Canonical Data Type: Default

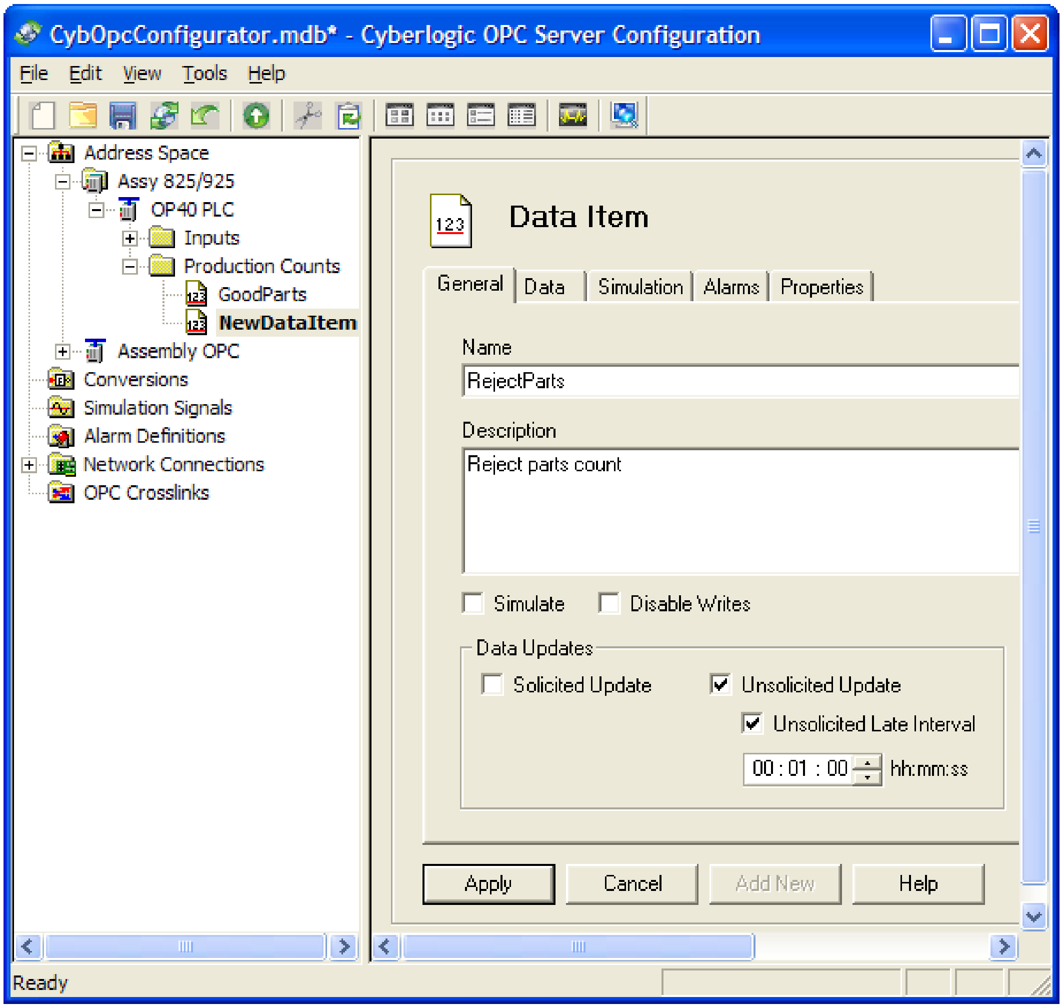
□ Use Conversion

<Not Assigned>

13. Keep the default address of ***N7:0***.

14. Click ***Apply***.

15. Repeat the process to create another Data Item called ***RejectParts*** at the register address ***N7:1***.



Name: RejectParts

Description: Reject parts count

□ Simulate □ Disable Writes

Data Updates

□ Solicited Update ☑ Unsolicited Update

☑ Unsolicited Late Interval

00 : 01 : 00 hh:mm:ss

16. Uncheck ***Solicited Update***.

17. Check ***Unsolicited Update***.

18. Check ***Unsolicited Late Interval***.

19. Set the ***Unsolicited Late Interval*** to one minute (***00:01:00***).

20. Click ***Apply***.

You have manually created two data items that represent some production-related counts. The GoodParts count will be updated using solicited communications, while the RejectParts count will be updated using unsolicited communications. In addition, if the server does not receive unsolicited updates within one minute, it will downgrade the RejectParts quality from Good to Uncertain.

For another way of creating data items, go to Using the Data Item Duplication Wizard.

Using the Data Item Duplication Wizard

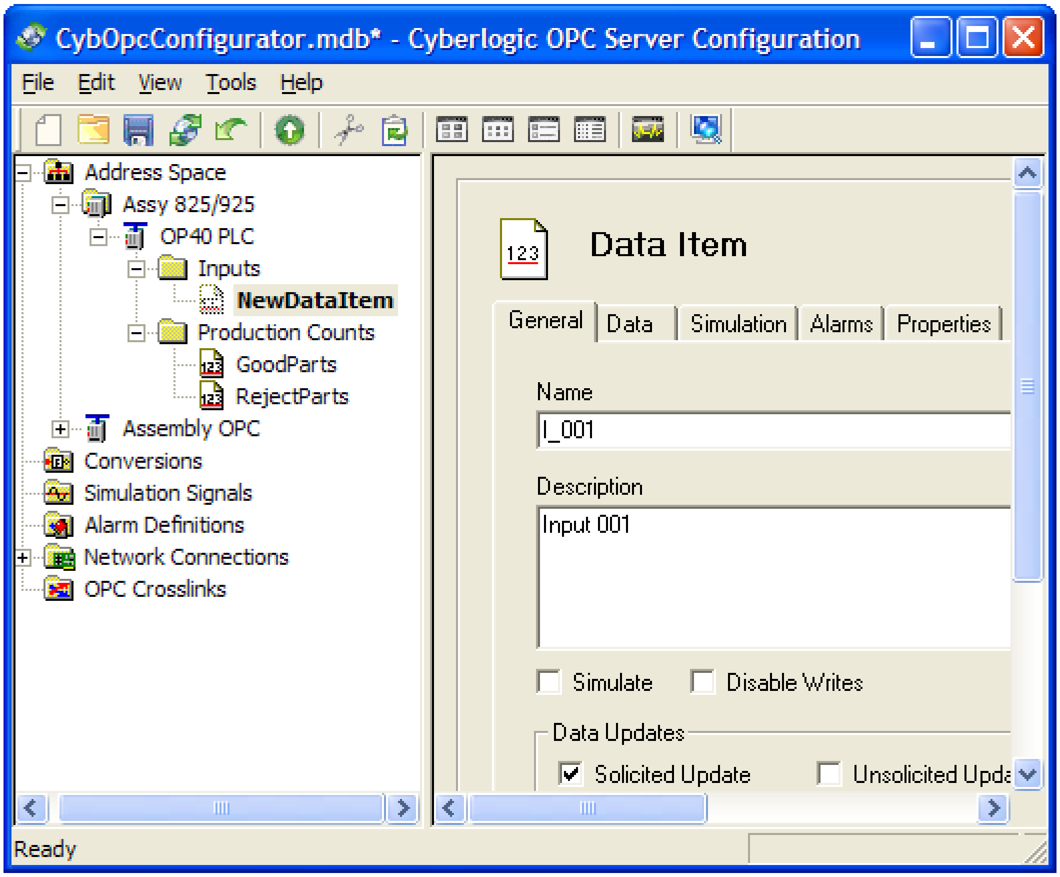
In this section, you will configure the data items for the Inputs folder. You could do this using the same procedure as in the previous section, but here we will use a much faster method.

Note

The Data Item Duplication Wizard is available only for the DHX and MBX Driver Agents.

If the Wizard is not supported by the driver agent you are using, or you do not need to use it, you can skip this section and proceed to Saving the Configuration and Updating the Server.

1. Right-click on the ***Inputs*** folder and select ***New***, then ***Data Item*** from the context menu.



Name: I_001

Description: Input 001

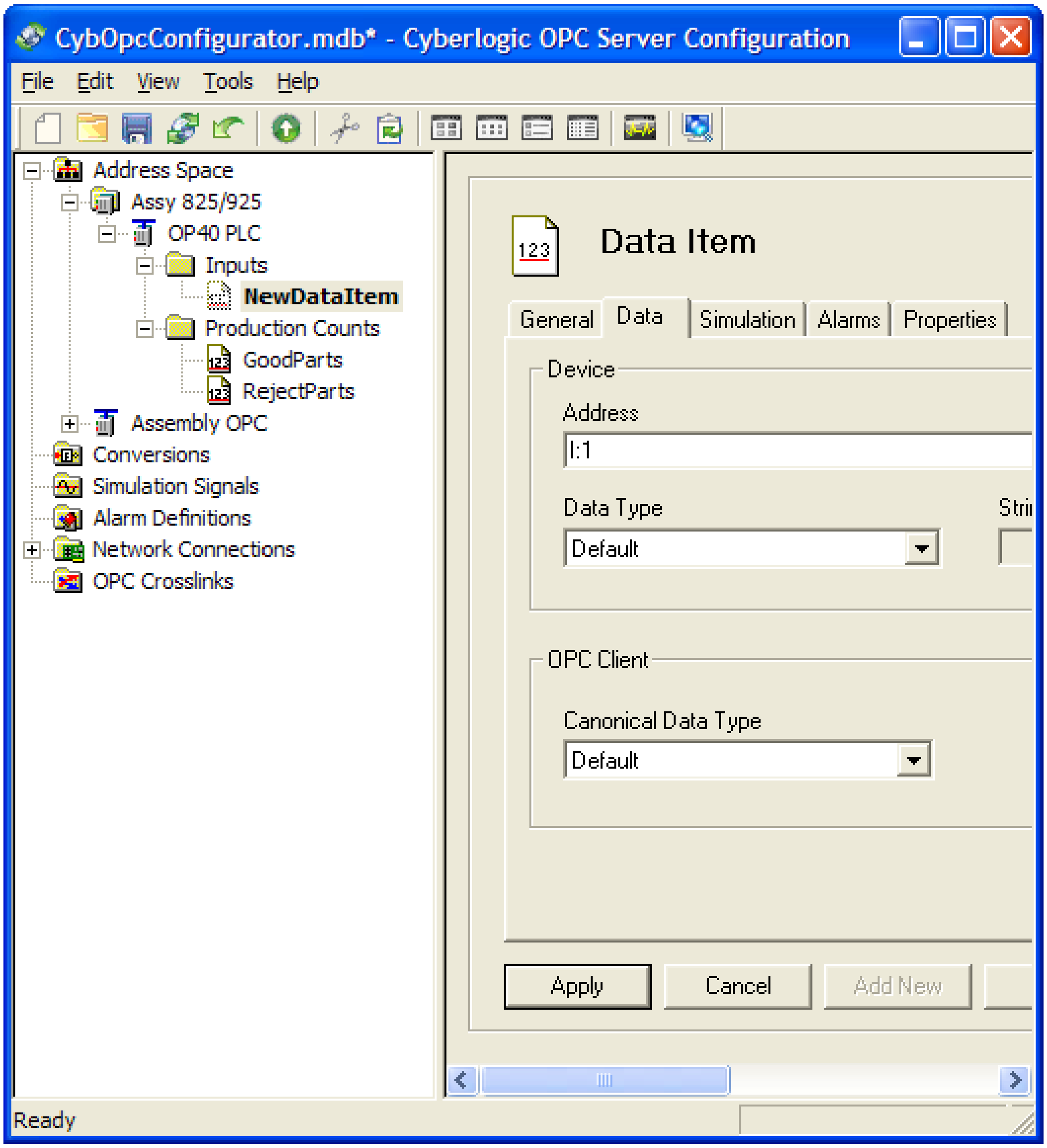
□ Simulate □ Disable Writes

☑ Solicited Update □ Unsolicited Upda

2. Enter a descriptive name in the ***Name*** field. For this exercise, use ***I_001***.

3. If you wish, enter an optional ***Description***.

4. Select the ***Data*** tab.



Address: I:1

Data Type: Default

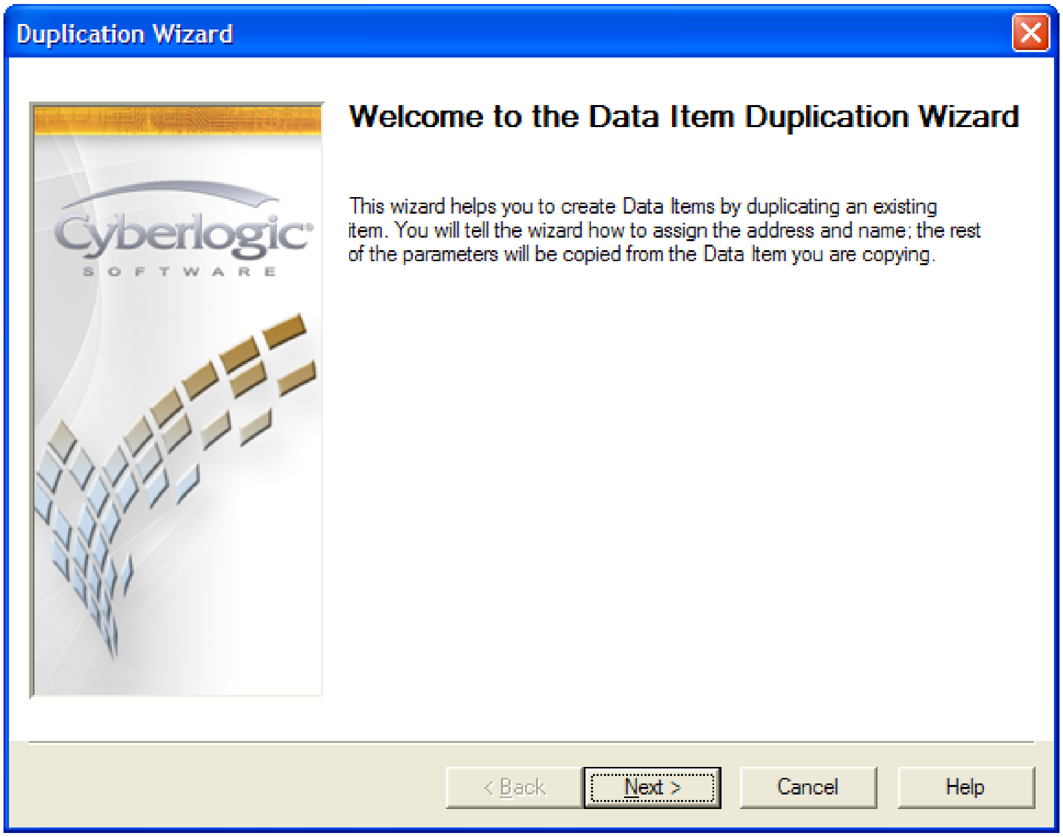
Canonical Data Type: Default

5. Enter ***I:1*** in the ***Address*** field.

6. Click ***Apply***.

   This creates a single input. You will now use the Duplication Wizard to create four more input data items in a single operation.

7. Right-click on data item ***I_001*** and select ***Duplicate*** from the context menu.

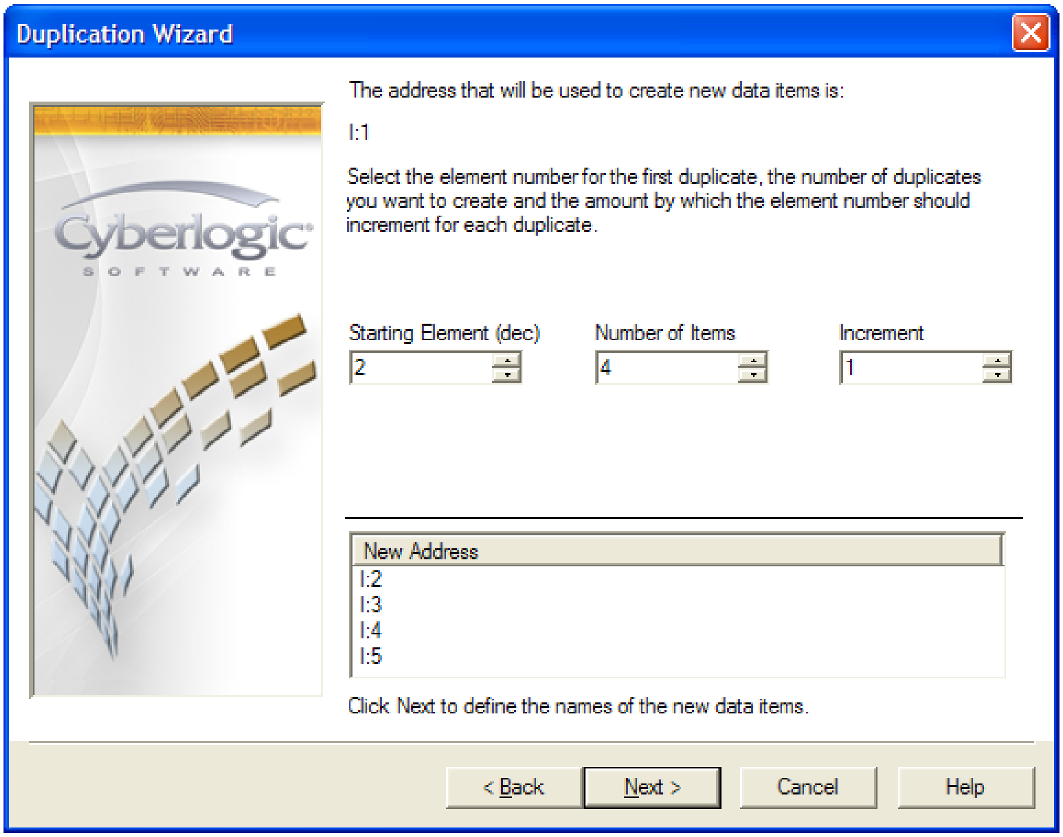


Welcome to the Data Item Duplication Wizard

This wizard helps you to create Data Items by duplicating an existing item. You will tell the wizard how to assign the address and name; the rest of the parameters will be copied from the Data Item you are copying.

The Duplication Wizard will open.

8. Click ***Next*** to move to the next screen.



Duplication Wizard

The address that will be used to create new data items is:

I:1

Select the element number for the first duplicate, the number of duplicates you want to create and the amount by which the element number should increment for each duplicate.

Starting Element (dec): 2

Number of Items: 4

Increment: 1

New Address
I:2
I:3
I:4
I:5

Click Next to define the names of the new data items.

On this screen, you will specify the duplicate data items you want to create. Notice that the screen tells you the address of the data item you are duplicating.

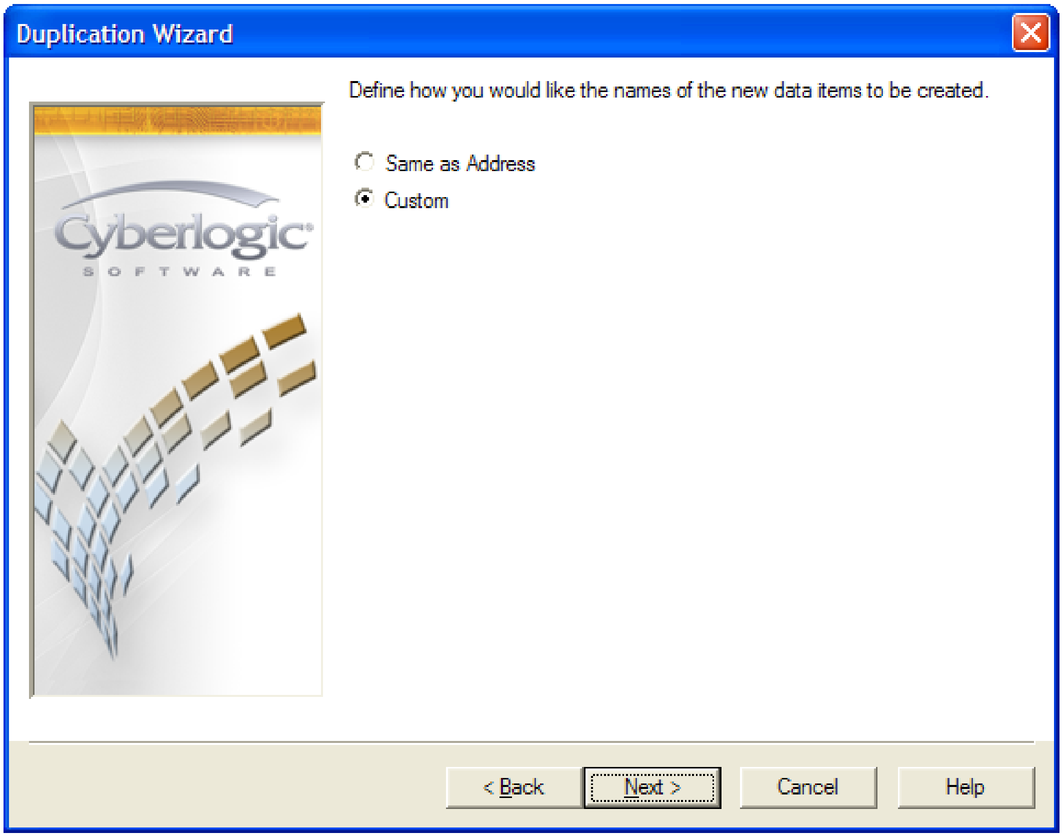
9. Enter ***2*** for the ***Starting Element***.

10. Enter ***4*** for the ***Number of Items***.

11. Enter ***1*** for the ***Increment***.

    The New Address box shows you the addresses of the data items that the wizard will create.

12. Click ***Next*** to continue.



Define how you would like the names of the new data items to be created.

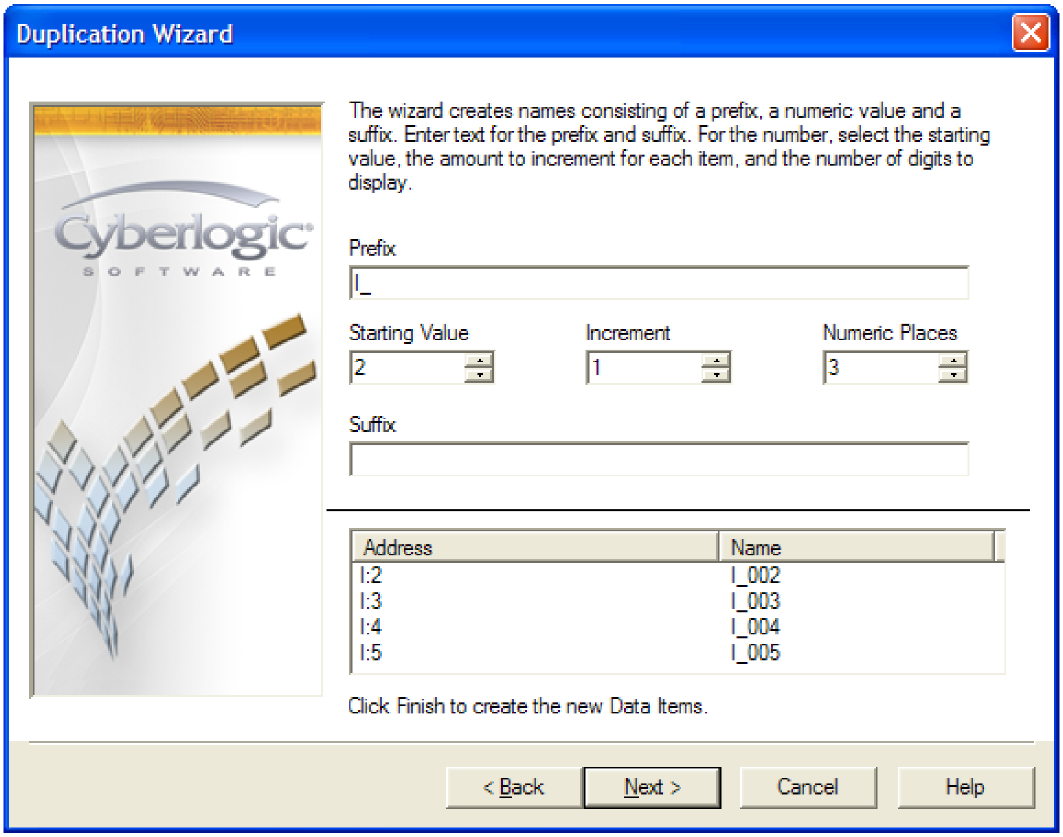
○ Same as Address

● Custom

You must now decide how you wish to name the data items you will create. You may simply use the address as the name or you may create a custom naming scheme.

13. Select ***Custom***.

14. Click ***Next*** to continue.



The wizard creates names consisting of a prefix, a numeric value and a suffix. Enter text for the prefix and suffix. For the number, select the starting value, the amount to increment for each item, and the number of digits to display.

Prefix: I_

Starting Value: 2

Increment: 1

Numeric Places: 3

Suffix:

Address	Name
I:2	I_002
I:3	I_003
I:4	I_004
I:5	I_005

Click Finish to create the new Data Items.

The wizard will create names for the data items for you. These names will consist of a prefix, a numeric value and a suffix. The first data item we created was named I_001 and we want the duplicates to have names of the same style.

15. Enter ***I_*** in the ***Prefix*** field.

    The next three fields define the numeric values to be used.

16. Enter ***2*** as the ***Starting Value***.

17. Enter ***1*** for the ***Increment***.

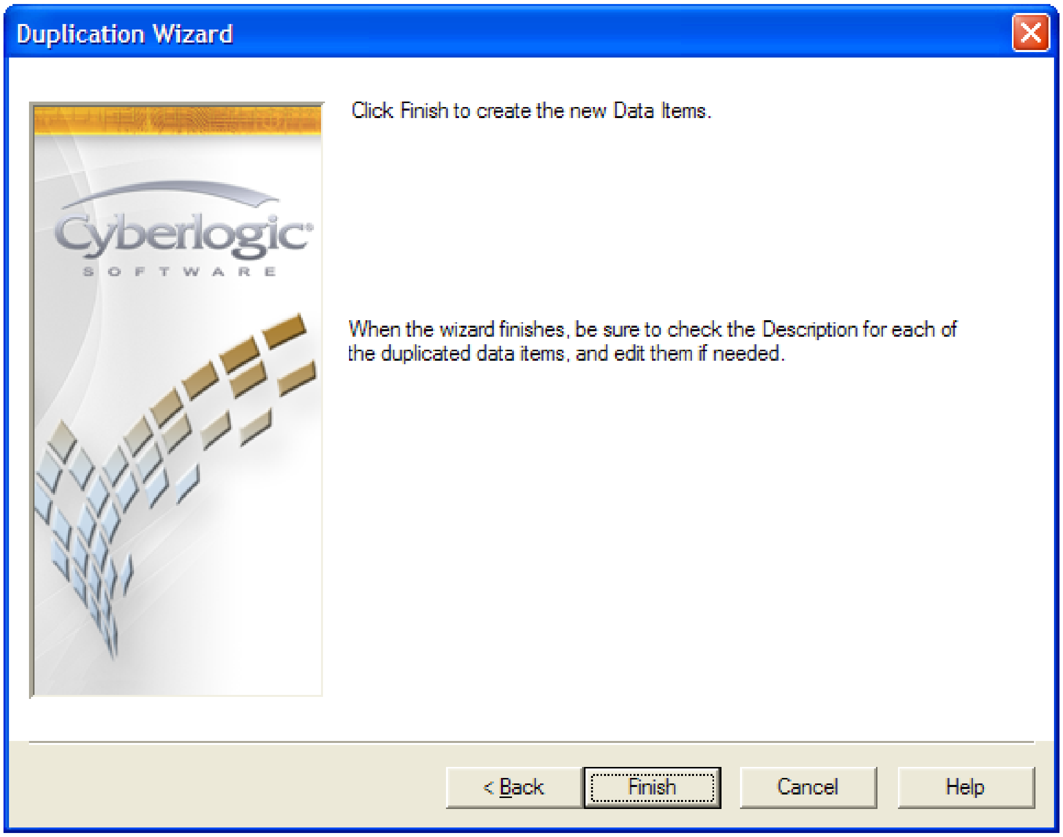
18. Enter ***3*** for ***Numeric Places***.

    This causes the duplicates to be consecutively numbered, beginning at 2. It also forces the names to use three digits, inserting leading zeros as needed.

19. Leave the ***Suffix*** field blank, because no suffix is necessary for this naming scheme.

    The lower pane will show you the names that will be used for each data item.

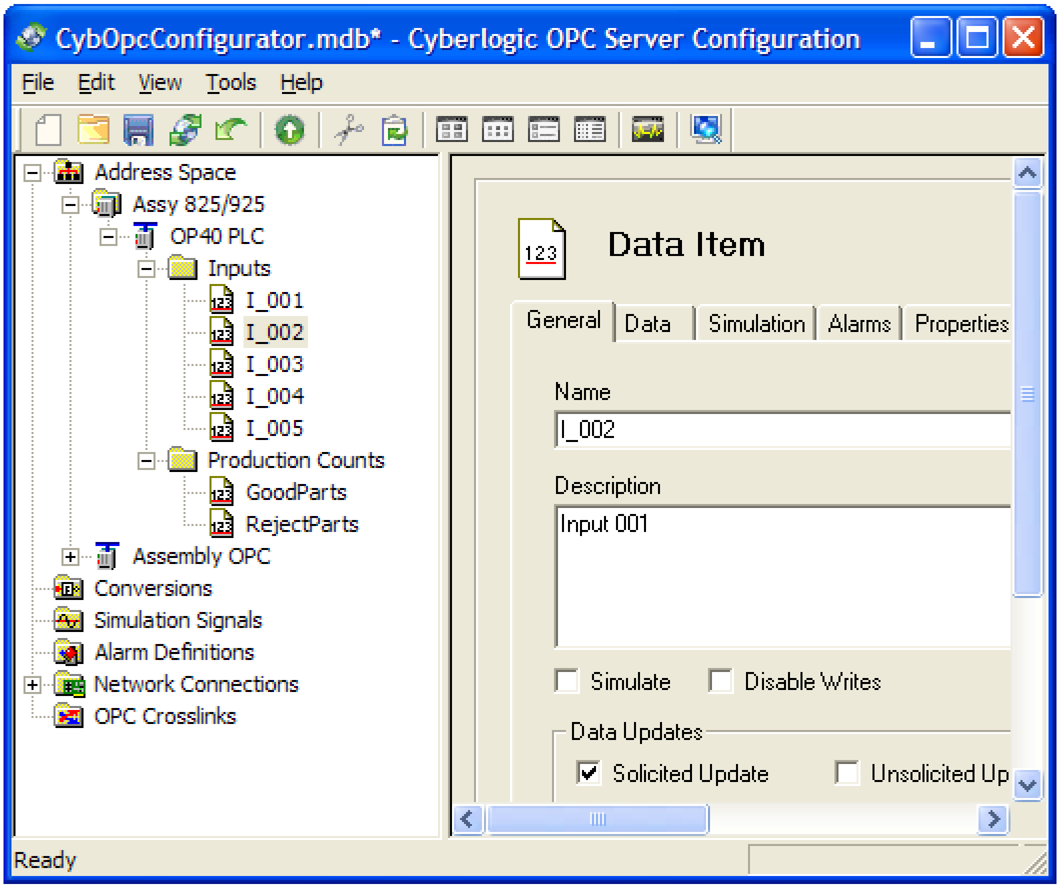
20. Click ***Next***.



Click Finish to create the new Data Items.

When the wizard finishes, be sure to check the Description for each of the duplicated data items, and edit them if needed.

21. Click ***Finish*** to create the data items and exit the wizard.



Name: I_002

Description: Input 001

☐ Simulate ☐ Disable Writes

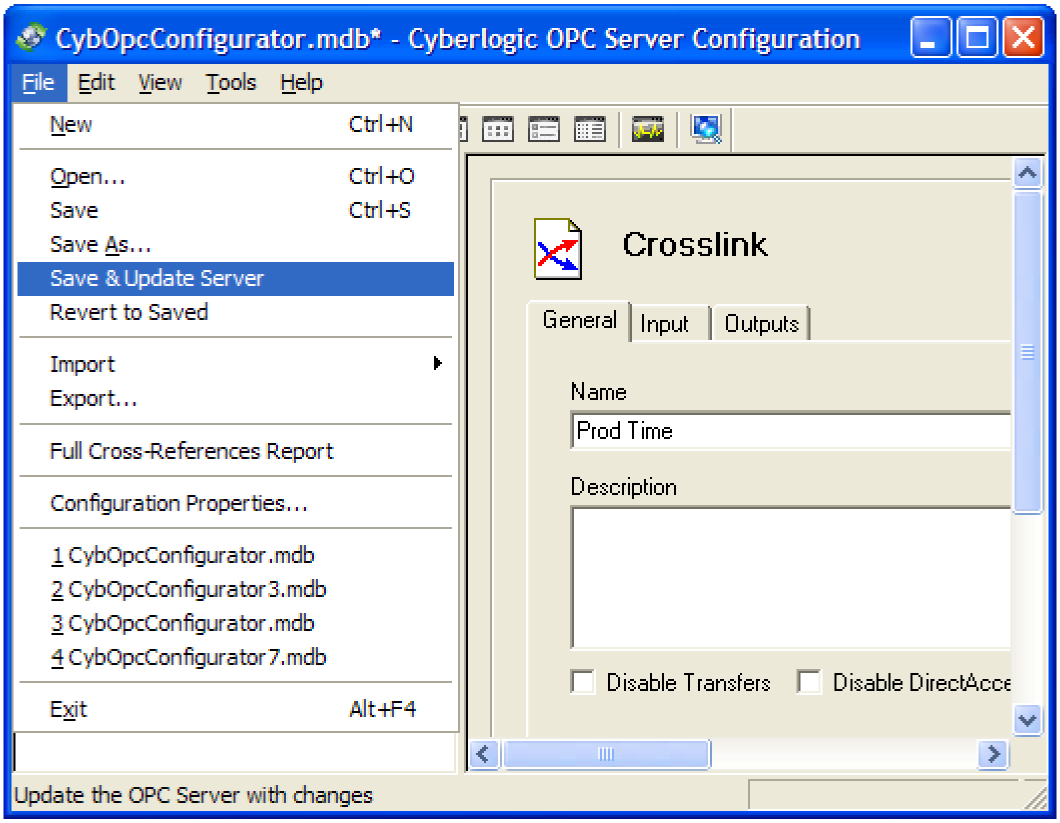
☑ Solicited Update ☐ Unsolicited Up

Caution! The Description field for each duplicate is the same as the original. You may wish to edit these descriptions.

After you have finished configuring all of the needed data items, go to Saving the Configuration and Updating the Server.

Saving the Configuration and Updating the Server

Caution! After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.



Name: Prod Time

Description:

Update the OPC Server with changes

1. Open the ***File*** menu and select ***Save & Update Server***.

2. Be sure to repeat this step every time you change the configuration.

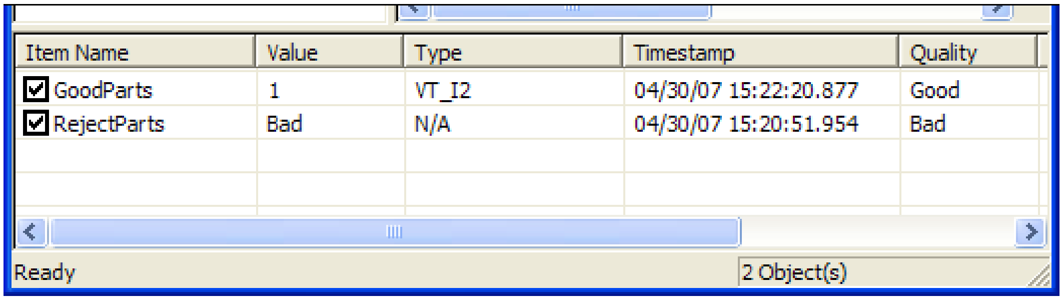
Your Cyberlogic OPC Server configuration is complete.

The next step, Verifying Your Configuration, will introduce you to the diagnostic features of the product.

Verifying Your Configuration

The Cyberlogic OPC Server Configuration Editor includes a built-in utility called the Data Monitor. This diagnostic tool allows you to view the status and values for data items in the currently selected folder.

1. Right-click on the ***Production Counts*** folder and select ***Data Monitor*** from the context menu.

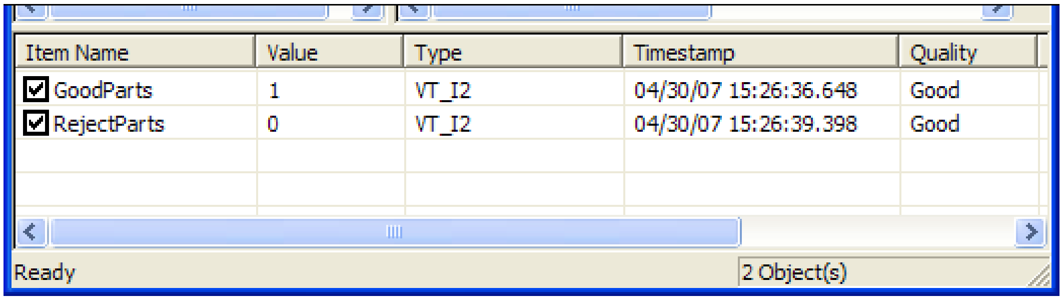


Item Name	Value	Type	Timestamp	Quality
☑ GoodParts	1	VT_I2	04/30/07 15:22:20.877	Good
☑ RejectParts	Bad	N/A	04/30/07 15:20:51.954	Bad

Ready | 2 Object(s)

2. Check the ***Enable boxes*** to the left of each data item in the Data Monitor view window.

   Because the GoodParts data item was configured for solicited update, the Server quickly retrieved new values with good quality. However, the RejectParts data item will show bad quality until the primary PLC sends an update.



Item Name	Value	Type	Timestamp	Quality
☑ GoodParts	1	VT_I2	04/30/07 15:26:36.648	Good
☑ RejectParts	0	VT_I2	04/30/07 15:26:39.398	Good

Ready | 2 Object(s)

3. Program the primary PLC to send data to the N7:1 register address in the server.

   Now, RejectParts shows data with good quality.

4. Disconnect the Data Highway Plus cable from the primary PLC and wait for one minute.

   Because the PLC will not be able to send additional unsolicited updates, the quality of RejectParts will change from good to uncertain.

5. With the primary PLC unable to communicate, the server will automatically switch to the backup PLC. Notice that the quality of the GoodParts item still shows good quality.

This concludes the Quick-Start Guide. To learn more about the features of the server, refer to the Theory of Operation section. To learn more about configuration, refer to the Configuration Editor Reference.

Configuration Editor Reference

Before you can use the OPC server, you must configure it by using the OPC Server Configuration Editor. Every server requires configuration of the Network Connections tree, and most users will want to configure the Address Space tree. The remaining trees (Conversions, Simulation Signals, Alarm Definitions, Database Operations and OPC Crosslinks) are optional features used by some systems.

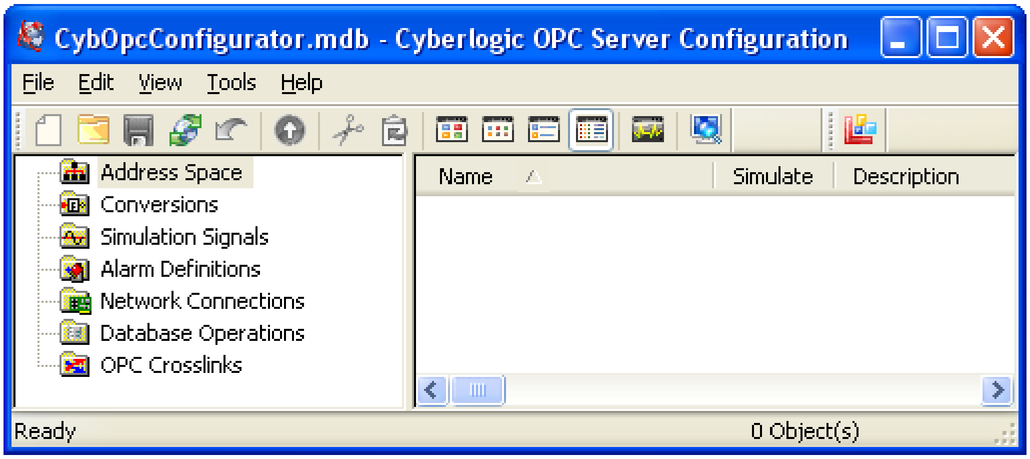
This section provides a detailed description of each of the configuration editor features. If you are a new user and want a procedure to guide you through a typical configuration session, refer to the Quick-Start Guide.

The Cyberlogic OPC Server Configuration Editor allows the user to create and modify the configuration file used by the runtime module. It is needed only to generate configuration files and is not otherwise required for the operation of the runtime module.

Caution!

After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

To launch the editor from the Windows ***Start*** menu, go to ***Cyberlogic Suites***, then open the ***Configuration*** sub-menu, and then select ***OPC Server***.



The left pane of the main workspace window includes the seven main configuration trees:

- Address Space
- Conversions
- Simulation Signals
- Alarm Definitions
- Network Connections
- Database Operations
- OPC Crosslinks

The following sections provide descriptions of the configuration of these trees. They are followed by a discussion of other important configuration features including:

- Saving and Undoing Configuration Changes
- Configuration Import/Export
- Editor Options
- Server Status Block
- Connecting OPC Client Software

Network Connections

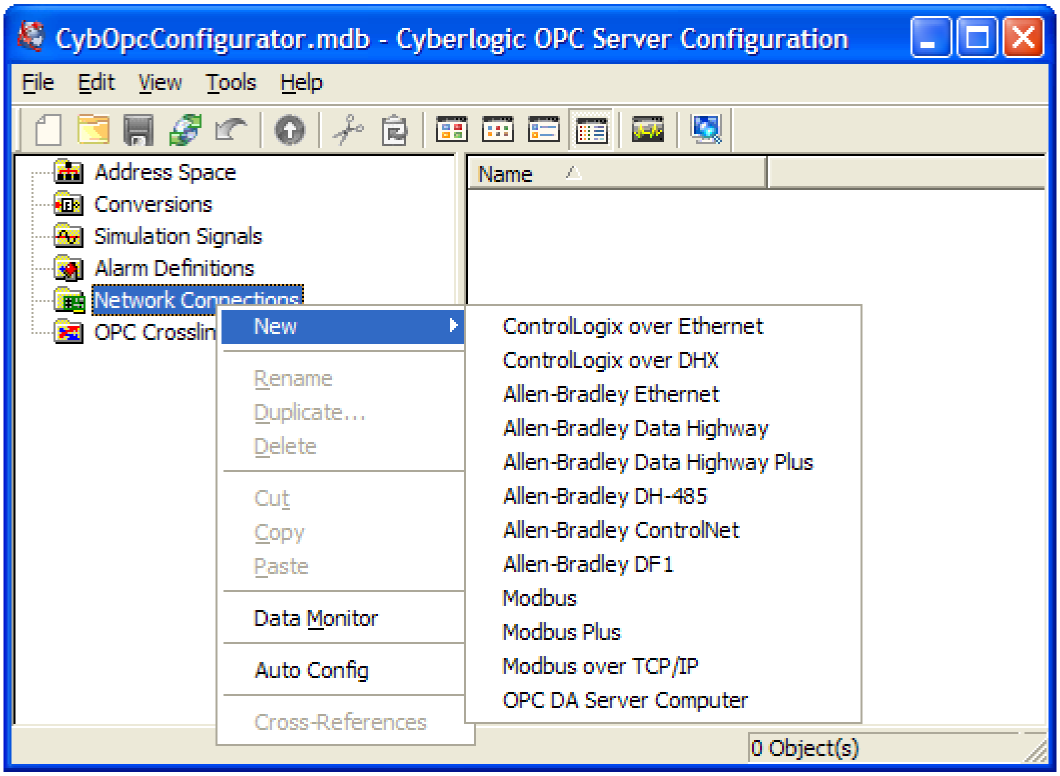
The features and details of the Network Connections tree configuration will vary depending upon the driver agent you are using. Each driver agent has its own help file. To access that help file, select the driver agent folder (or any folder below the driver agent folder) for which you need help. The driver agent folders are those folders directly below the Network Connections folder. A Help button will be available in the right pane of the editor window.

If the driver agent folder you need is not shown, you can create a network connection of that type, which will create the driver agent folder. You will then be able to access the help.

There are two ways to create a network connection: manual and automatic.

Manual Configuration

You may prefer to configure your network connections and network nodes manually. This will be necessary if you are doing the configuration on a computer that is not connected to the target networks or if you wish to change the default values selected during an auto configuration.



Right-click on the ***Network Connections*** root folder and select ***New***, then select the desired network type from the context menu.

The editor will create the proper driver agent and network connection folders.

Caution!

After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

Automatic Configuration

The simplest method of configuration is automatic configuration. Automatic configuration is available for some driver agents, such as the MBX and DHX driver agents, but is not available for others, including the ControlLogix driver agent.

Some types of controllers, such as ControlLogix devices, do not report enough information to permit automatic configuration to identify them. They may be detected, but will be reported simply as nodes of unknown type.

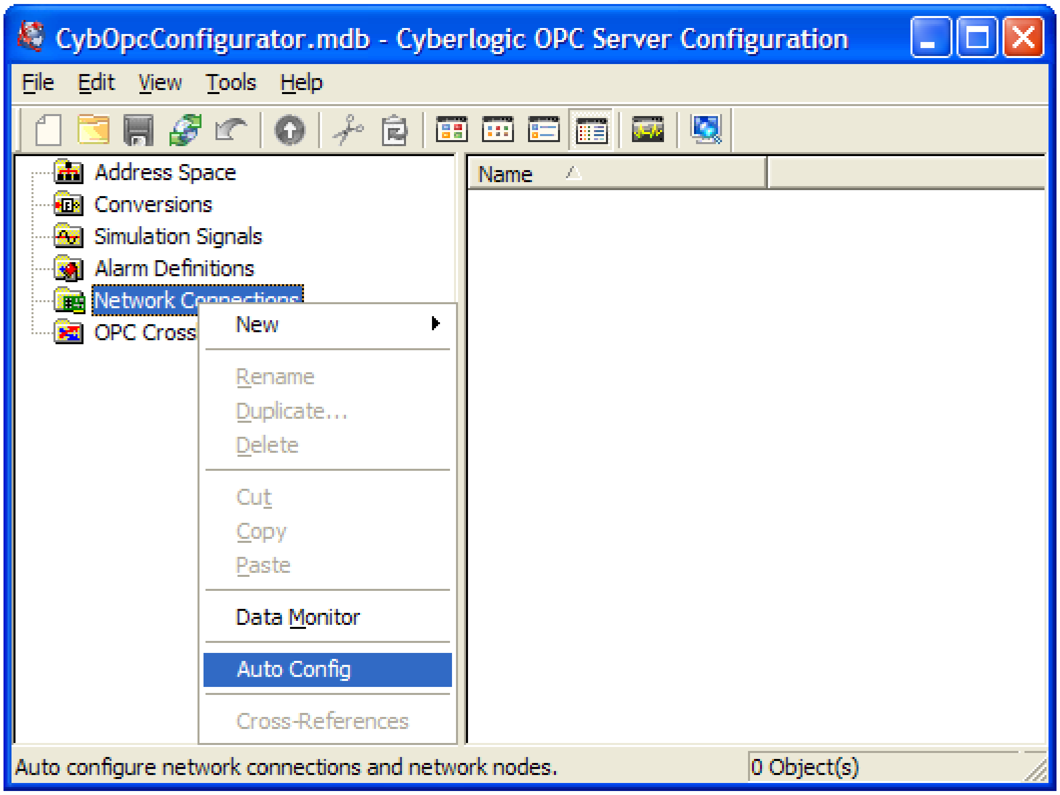
Caution!

Before you can use the automatic configuration feature, you must install and configure the low-level device drivers that the OPC Server will use. The configuration editors supplied with the device drivers will allow you to create the devices that the OPC Server will then be able to detect.

After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

Full Auto Configuration

This is the most common automatic configuration procedure. It will find all network connections, and detect and configure all network nodes.

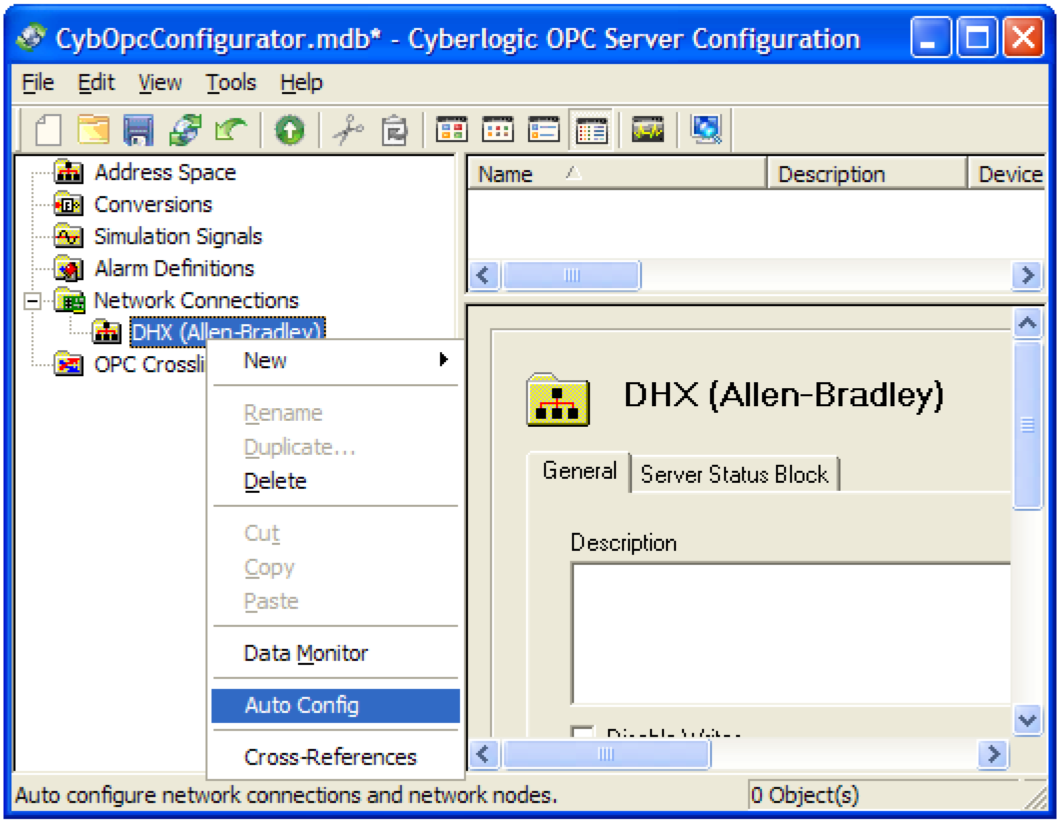


Auto configure network connections and network nodes.

To do this, right-click on the ***Network Connections*** root folder and select ***Auto Config*** from the context menu.

Automatic Configuration of a Single Driver Agent

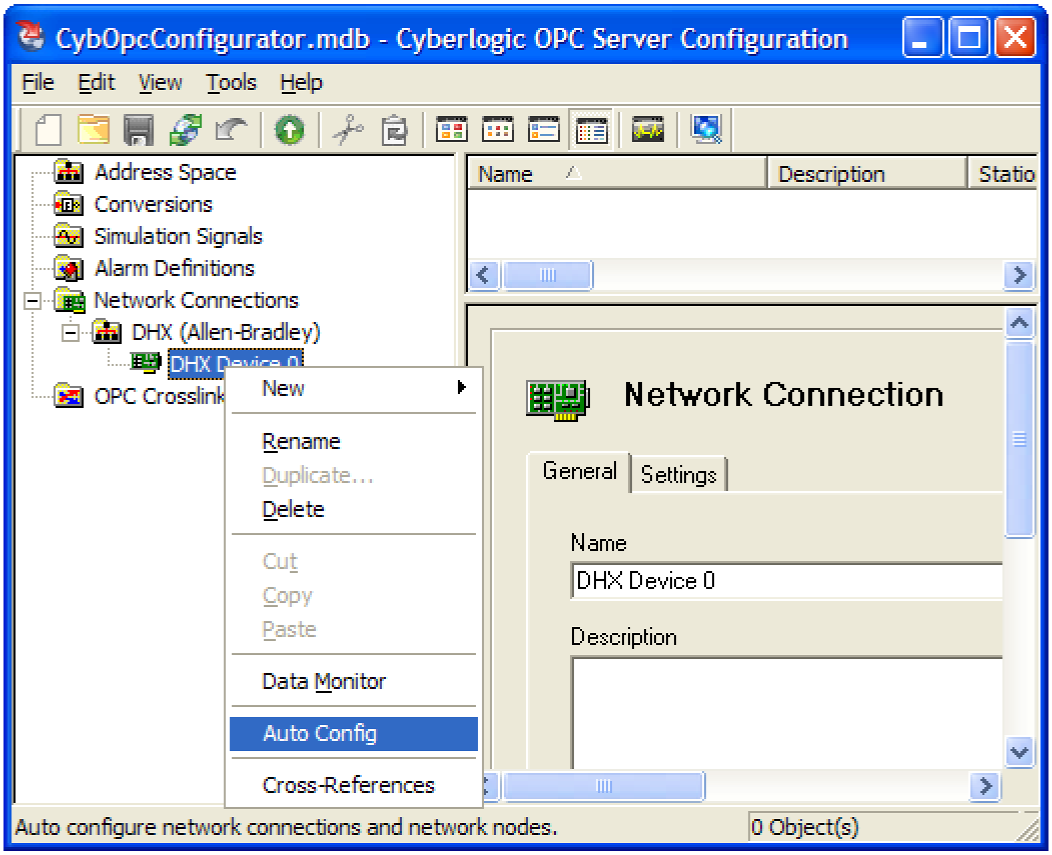
After a driver agent folder has been created, you can automatically find all network connections of that type available on your system. Typically, you would do this if you did part of the configuration while not connected to the target network and want to quickly finish the configuration once you are connected.



Right-click the ***driver agent folder*** and select ***Auto Config*** from the context menu.

Automatic Configuration of Network Nodes

After a network connection has been configured, you can automatically find and configure all of the network nodes attached to that network connection. You might do this, for example, if you add nodes to a network after it is configured and want to quickly update the configuration with the new nodes.



Name: DHX Device 0

Description:

Auto configure network connections and network nodes.

0 Object(s)

Right-click the specific ***network connection*** and select ***Auto Config*** from the context menu.

Address Space

The Address Space tree describes the hierarchical address structure of the Cyberlogic OPC Server. The intent of this structure is to permit the user to organize the data items into logical groups. For a complete description of the elements within the address space, refer to the Address Space Tree section of the Theory of Operation.

The features and details of the devices in the address space will vary depending upon the driver agent you are using. Each driver agent has its own help file. To access that help file, select an address space device of the driver agent for which you need help. A Help button will be available in the right pane of the editor window.

If the device type you need is not shown, simply create a device of that type and you will then be able to access the help.

To do this, right-click on either the ***Address Space*** root folder or on an existing ***device folder***, and select ***New***, then ***Device*** from the context menu. Select the desired ***driver agent*** to create the device.

Caution! After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

Conversions

The raw data associated with a data item may be a process value from an instrument. In most cases, these measurements are not expressed in engineering units. To simplify operations on the data, the Cyberlogic OPC Server allows you to associate a conversion with each data item. A user can define many different types of conversions. A number of data items can then use each such conversion. As a result, the user need not define the same conversion many times over.

The conversions feature also supports data range clamping. You can instruct the server to clamp the data within a specified range of engineering unit values. The clamping feature is available even if you choose not to apply a linear or square root conversion function to the data.

Conversion Types

Two types of conversion functions are available: linear and square root. These will handle the conversion needs for most instrument types.

Caution! The conversion functions work on the data as it is passed in both directions. You will specify the conversion to be applied to data passed from the server to the client application. When data is passed from the client to the server, the inverse conversion will be applied. This means that the client must accept data as being in engineering units and write data in engineering units.

In this section, we will discuss the functions used to make these conversions, as an aid in helping you to apply them to your application. The definitions of the variables used are as follows:

CV is the Converted Value reported to the client application.

DV is the raw Data Value received from the instrument.

ID_L and ID_H are the low and high Instrument Data values you will specify during configuration.

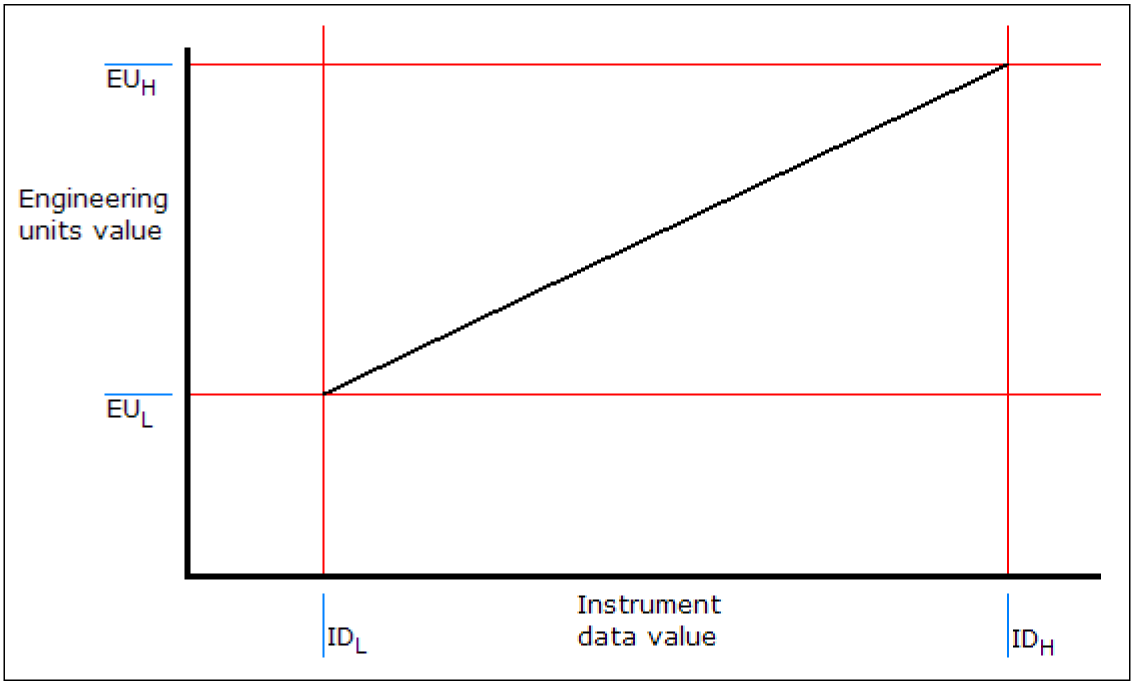
EU_L and EU_H are the low and high Engineering Units values you will specify during configuration.

Linear Conversion

This performs a standard linear conversion with offset, according to the following formula:

$$CV = \left(\frac{DV - ID_L}{ID_H - ID_L}\right) \bullet (EU_H - EU_L) + EU_L$$

The resulting function looks like this.

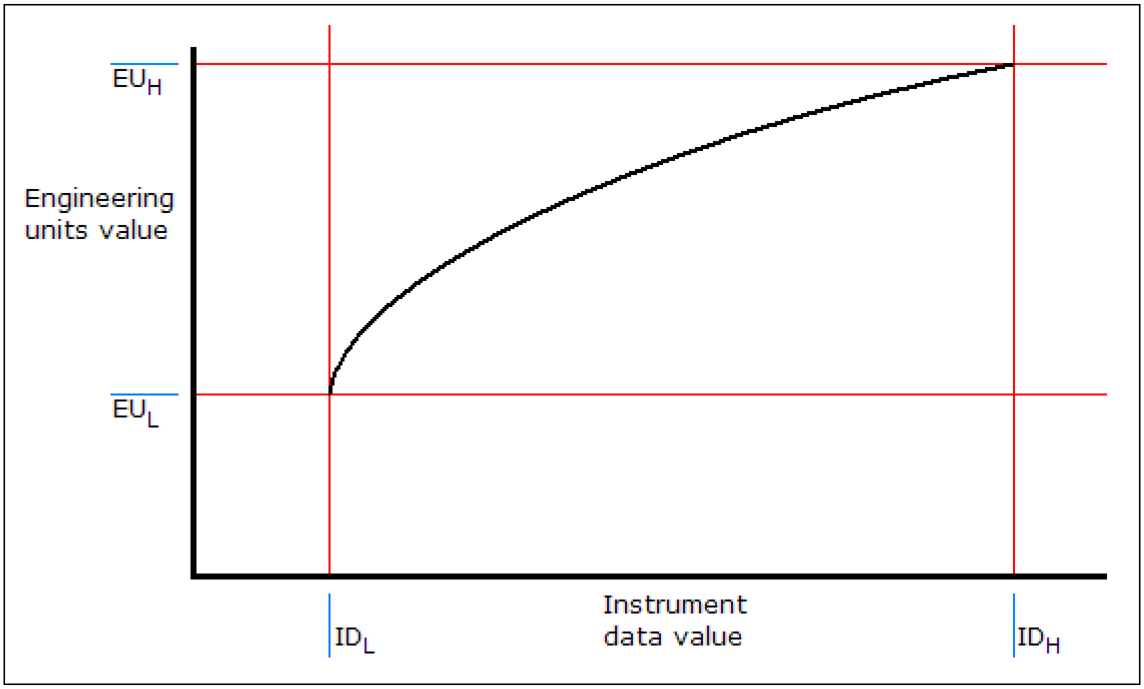


Square Root Conversion

This is similar to the linear conversion, but is proportional to the square root of the value. The formula is:

$$CV = \sqrt{\frac{DV - ID_L}{ID_H - ID_L}} \bullet (EU_H - EU_L) + EU_L$$

The resulting function looks like this.



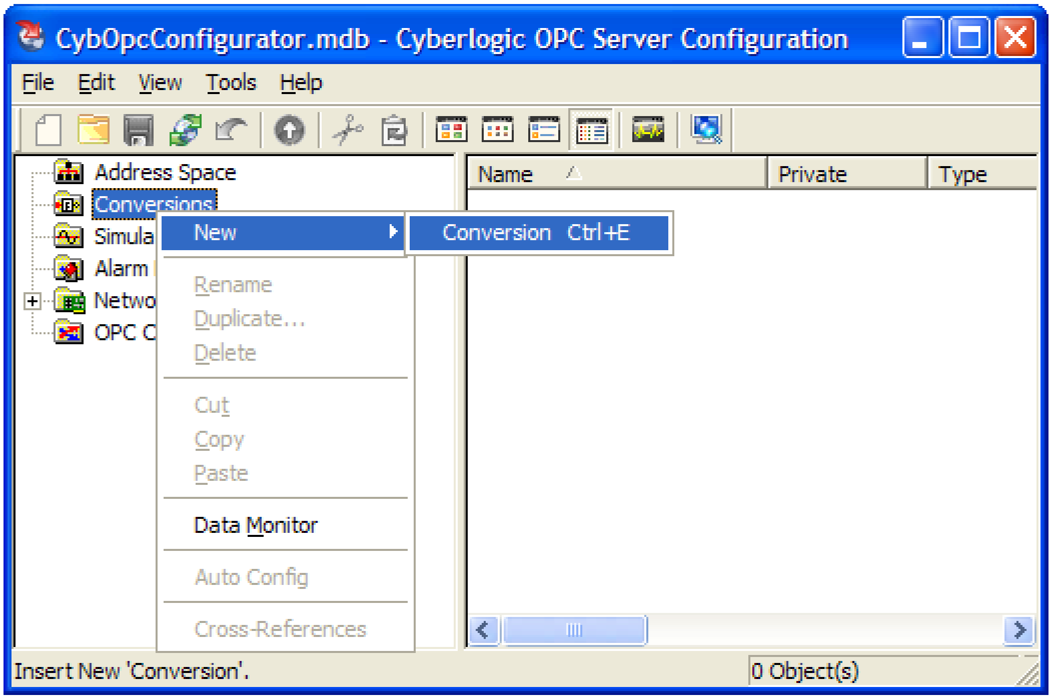
Creating and Deleting Conversions

Conversions are created and deleted from the main OPC Server Configuration Editor window.

Caution!

After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

Creating a Conversion



1. Right-click on the ***Conversions*** root folder and select ***New***, and then ***Conversion*** from the context menu.

2. Enter the information required in the Conversion dialog box, as described in Editing a Conversion.

3. Click ***Apply***.

Deleting a Conversion

To delete an existing conversion, select it and press the ***Delete*** key, or right-click on the conversion and select ***Delete*** from the context menu.

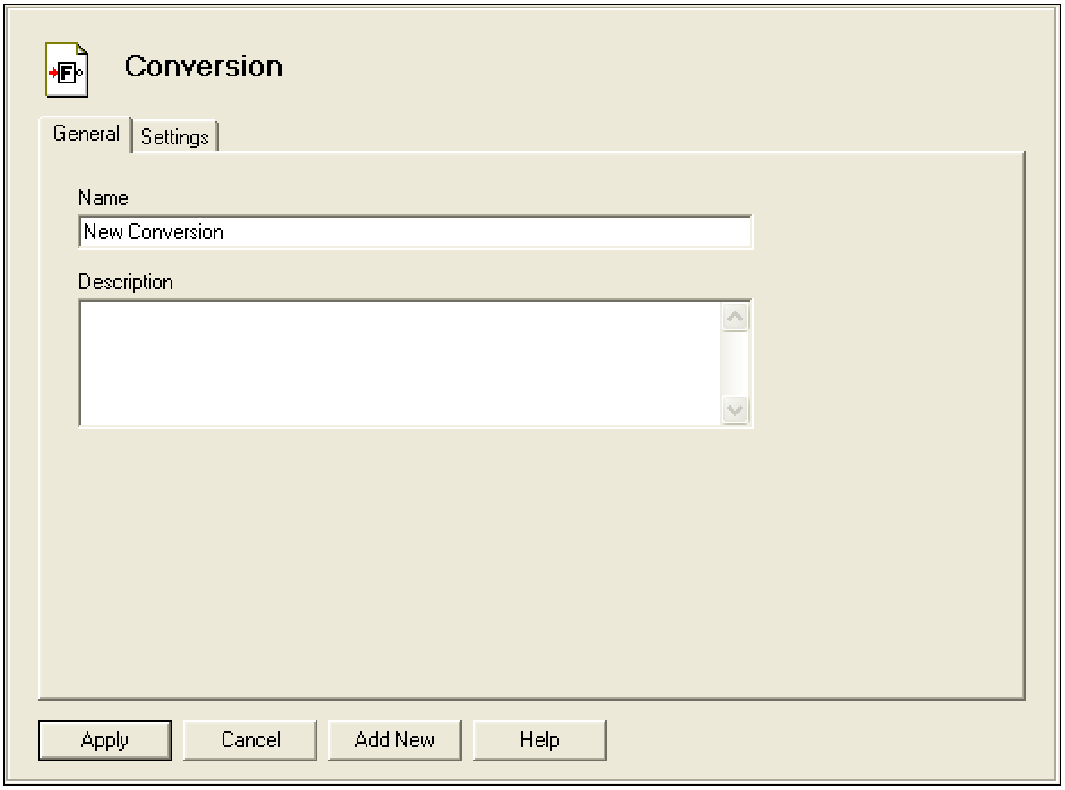
Editing a Conversion

The Conversion dialog box consists of two tabs, General and Settings.

Caution!

> After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

General Tab



Name

New Conversion

Description

Name

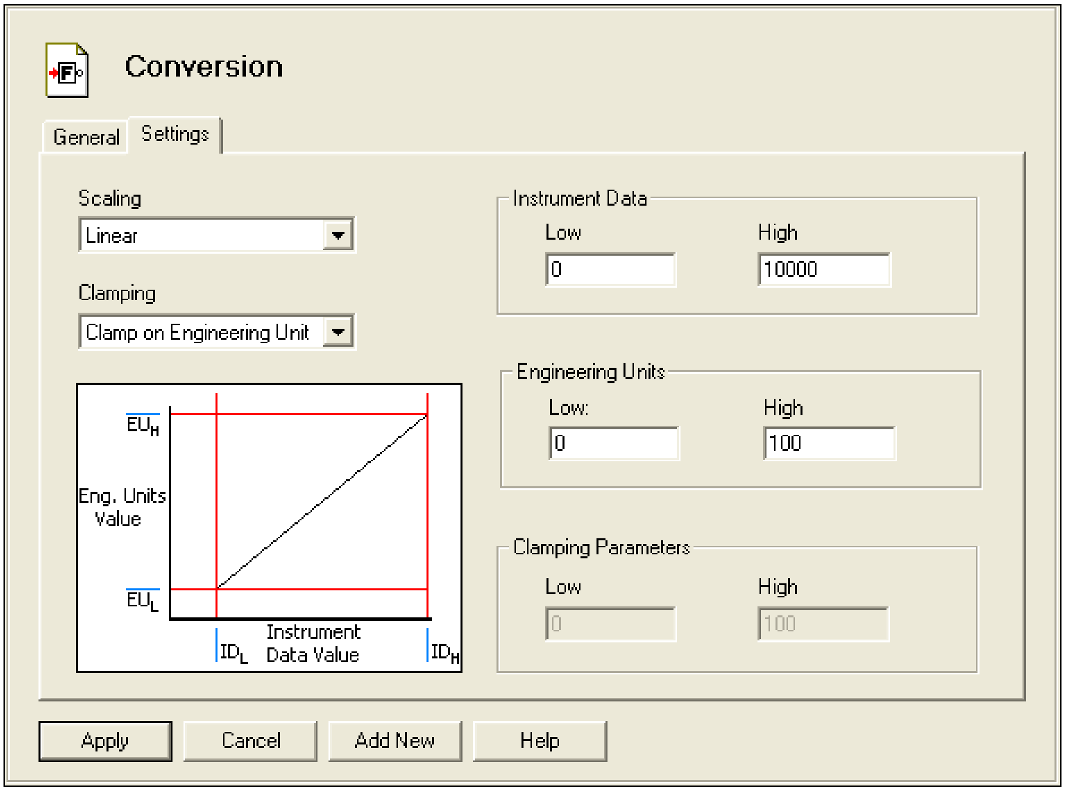
The name identifies the conversion. It can be up to 50 characters long, may contain spaces, but must not begin with a space. In addition, it must not contain any periods.

Description

This optional field further describes the conversion. It can be up to 255 characters long.

Settings Tab

All of the values you will specify on this tab are taken as 64-bit floating point numbers. Consequently, they may be positive or negative and have magnitudes in the range of 4.9 x 10^{-307} to 1.8 x 10^{+308} or 0.



Conversion

Scaling: Linear

Clamping: Clamp on Engineering Unit

Instrument Data
Low: 0
High: 10000

Engineering Units
Low: 0
High: 100

Clamping Parameters
Low: 0
High: 100

Scaling

Select the type of scaling you wish to use. The choices are None, Linear and Square Root.

Choosing None allows you to clamp the data without converting it. If you select linear or square root scaling, you must enter values for the Instrument Data and Engineering Units. These values specify the scaling factors applied to the data.

Clamping

Select the type of clamping you wish to use. The choices are None, Clamp on Engineering Unit and As Specified.

If you choose Clamp on Engineering Unit, the value will be clamped within the range specified in the Engineering Units box. If you choose As Specified, you must specify the desired clamping limits in the Clamping Parameters box.

When clamping is used, any values below the minimum of the clamping range will be set to the minimum value and any values above the maximum will be set to the maximum value. Clamping is applied to the data after the scaling conversion.

If you choose not to scale the data, you may still use the clamping feature. The limits, whether Engineering Units or As Specified, would then be applied to the raw data.

Instrument Data

Enter the limits of the raw value from the instrument.

The Instrument Data value entry fields are available only for linear and square-root conversions.

Engineering Units

Enter the limits of the scaled value.

You may enter Engineering Units values even if you choose None for the conversion type. This allows you to clamp on the Engineering Units limits, if you wish.

Clamping Parameters

Enter the values for the clamping range. These fields are available only if you choose As Specified for the clamping type.

Simulation Signals

The Server can simulate the data for each data item according to a predefined formula. This makes it easy to perform client-side testing without the need for a physical device. For detailed information, refer to the Simulation Signals Tree discussion in the Theory of Operation.

You can enable data simulation at any level in the server address space. Enabling data simulation at any level automatically enables it at all levels below. This permits quick switching between simulated and real data for a large number of data items.

Simulation Signal Types

The server can generate several types of simulation signals. Most of these signals have parameters that define properties such as amplitude, phase and number of steps. The signal definitions and waveform illustrations below will assist you in understanding the parameters and specifying the simulation you want.

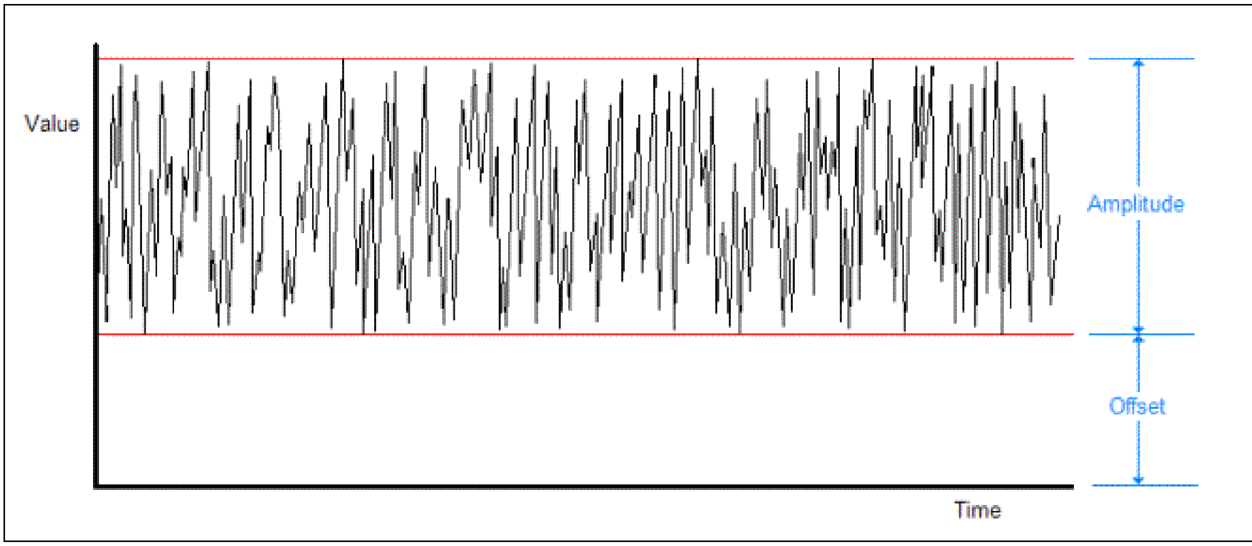
Read Count

This simulation function returns the number of read operations that have occurred.

Write Count

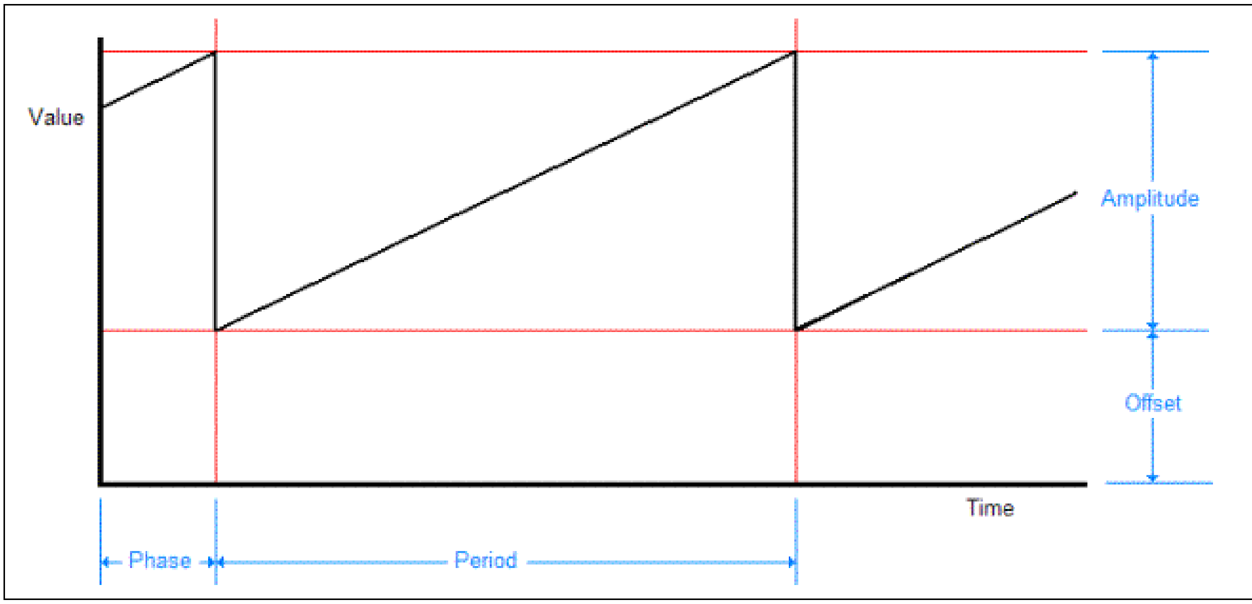
This simulation function returns the number of write operations that have occurred.

Random



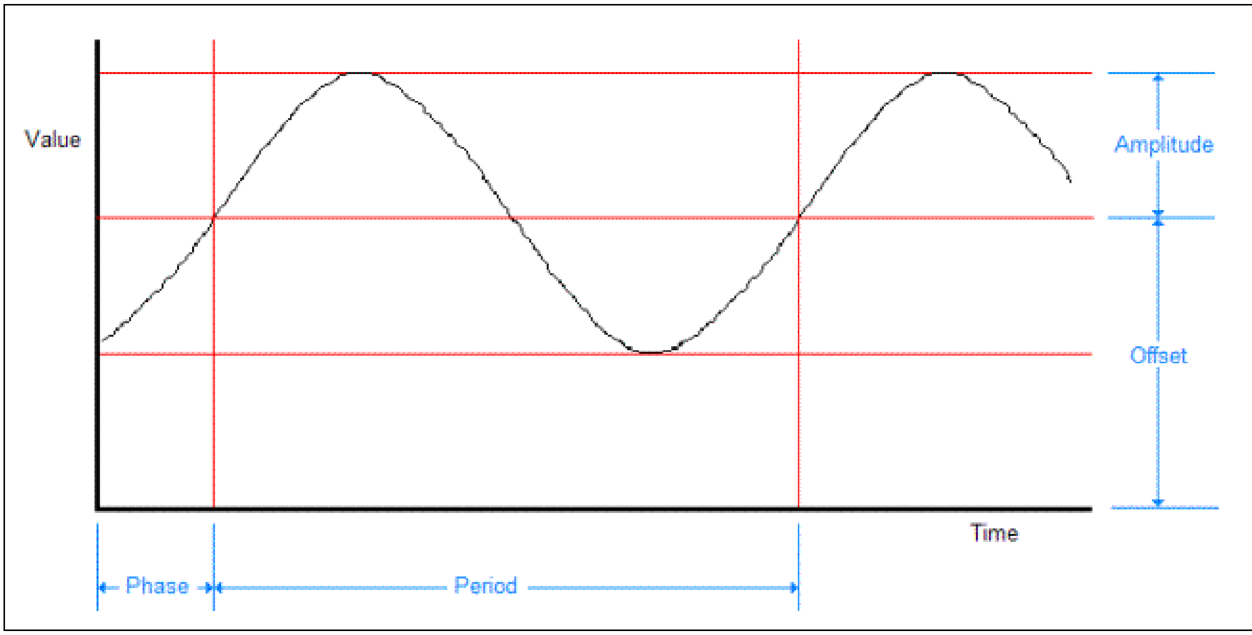
With this function, the value varies randomly. The offset value sets the minimum and the amplitude—added to the offset—sets the maximum.

Ramp



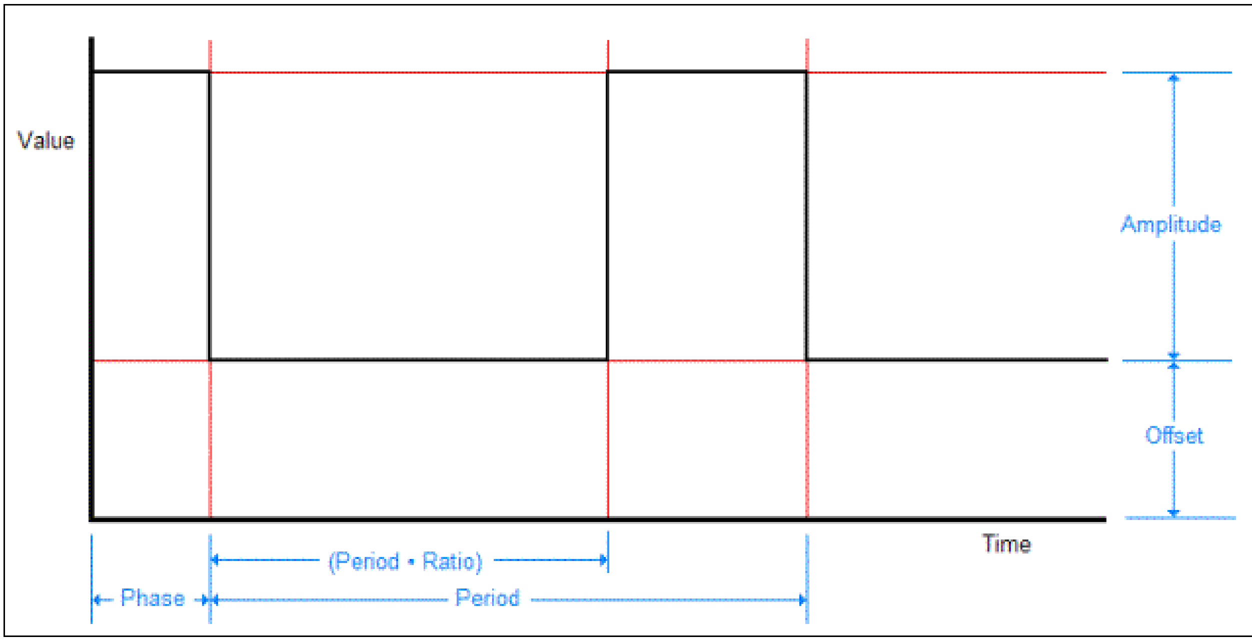
This function is a series of rising ramps. For a falling ramp, you can use the Triangle function with a ratio set to zero.

Sine



Mathematically, the sine function takes values between -1 and +1. This means that the value will vary both above and below the level set by the offset. Therefore, this is the only function for which the Offset parameter specifies the middle of the range, rather than the bottom. In addition, this is the only function for which the Amplitude parameter does not specify the peak-to-peak range of values.

Square



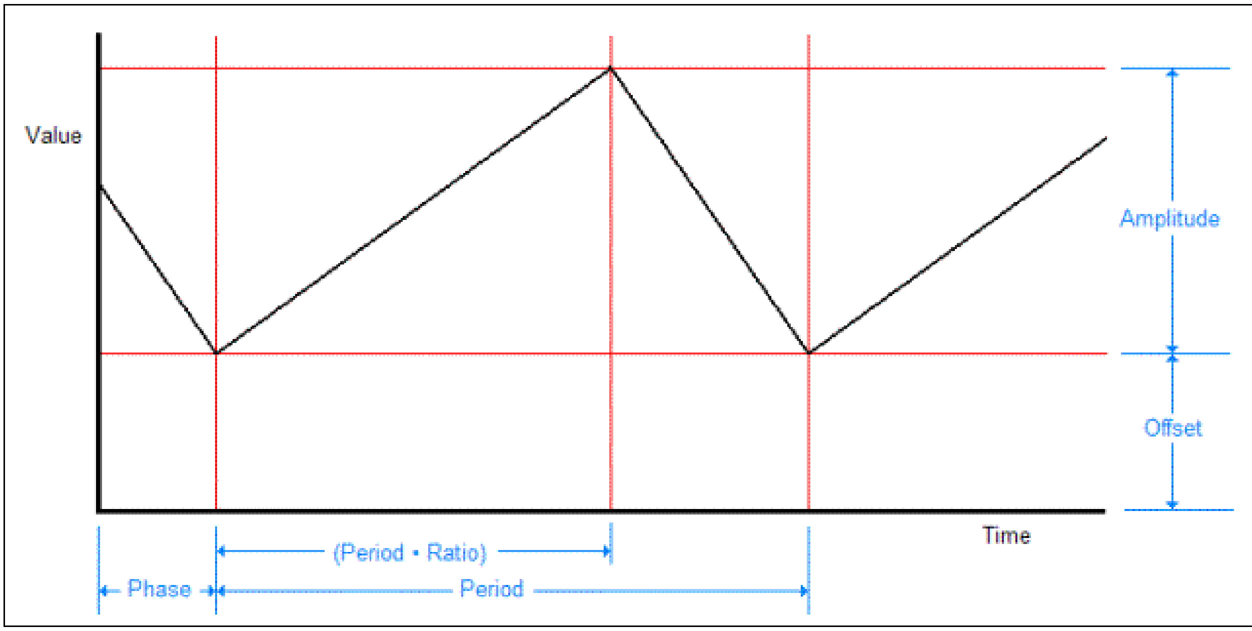
The Ratio parameter specifies the fraction of the cycle during which the value is low. This means that the relationship between ratio and the duty cycle is:

Ratio = 1 – Duty Cycle

or

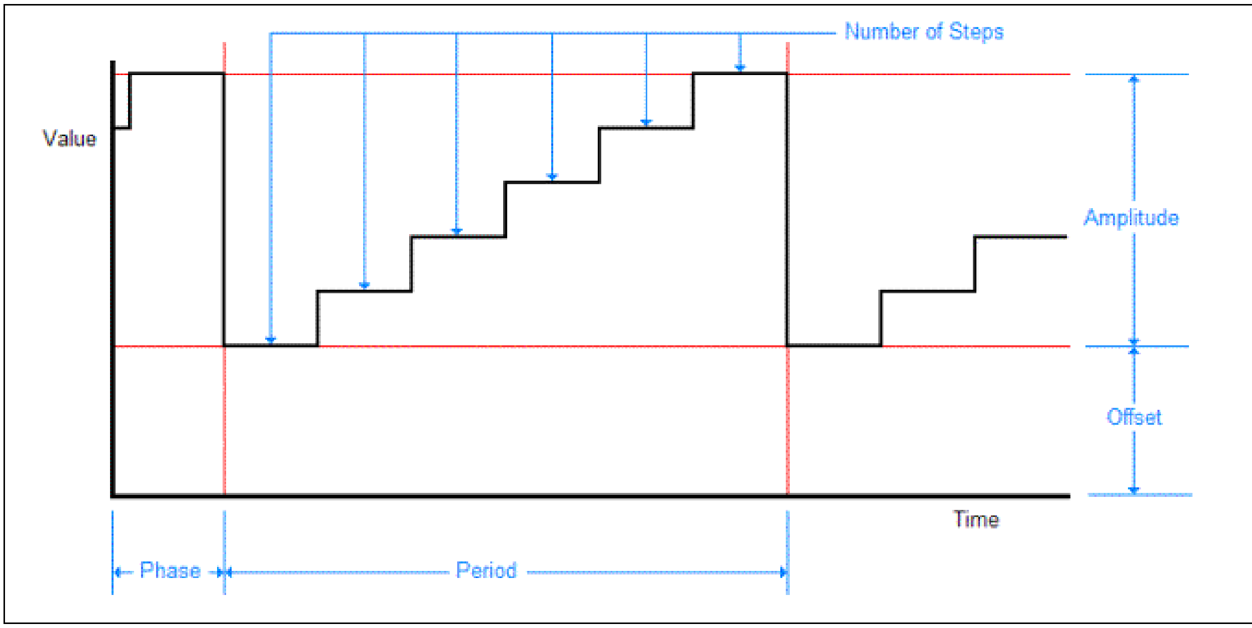
Duty Cycle = 1 – Ratio

Triangle



The Ratio parameter specifies the fraction of the cycle during which the value is rising. If the ratio is set to 1, this is the same as the ramp function. If the ratio is 0, this will be a falling ramp function.

Step



Notice that the Number Of Steps parameter specifies the number of levels that the value will take, not the number of step increases. Because both the bottom and top steps are counted, there will be one fewer step increase than the number of steps. Keep this in mind when specifying this parameter.

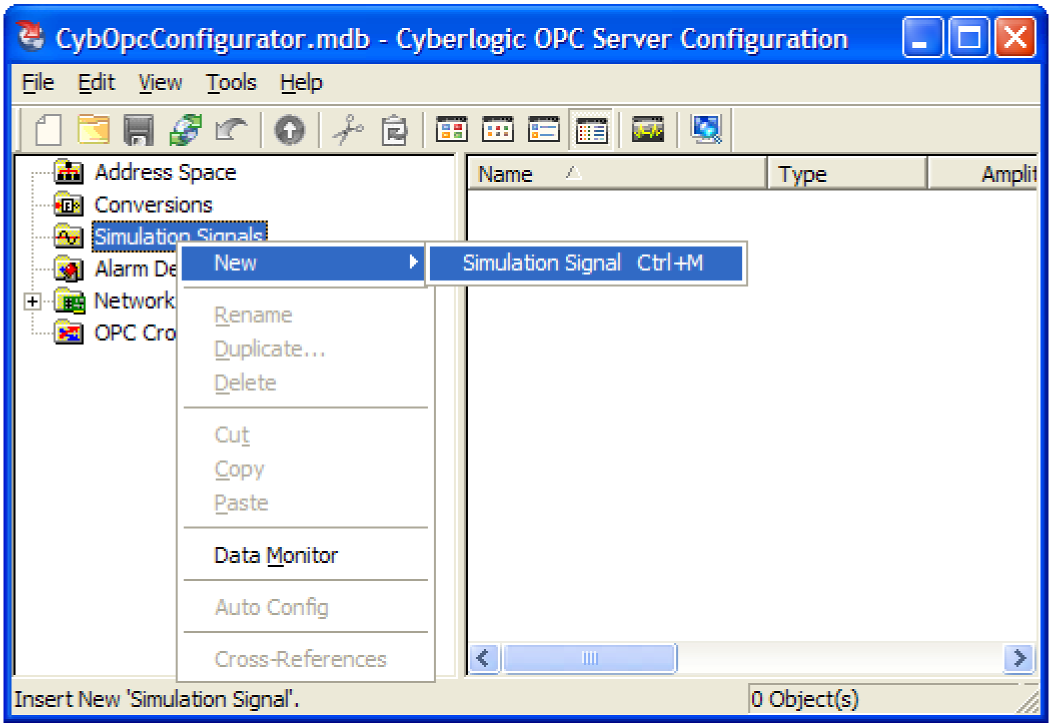
Creating and Deleting Simulation Signals

Simulation Signals are created and deleted from the main OPC Server Configuration Editor window.

Caution!

After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

Creating a Simulation Signal



1. Right-click on the ***Simulation Signals*** root folder and select ***New***, and then ***Simulation Signal*** from the context menu.

2. Enter the information required in the Simulation Signal dialog box, as described in Editing Simulation Signals.

3. Click ***Apply***.

Deleting a Simulation Signal

To delete an existing simulation signal, select it and press the ***Delete*** key, or right-click on the simulation signal and select ***Delete*** from the context menu.

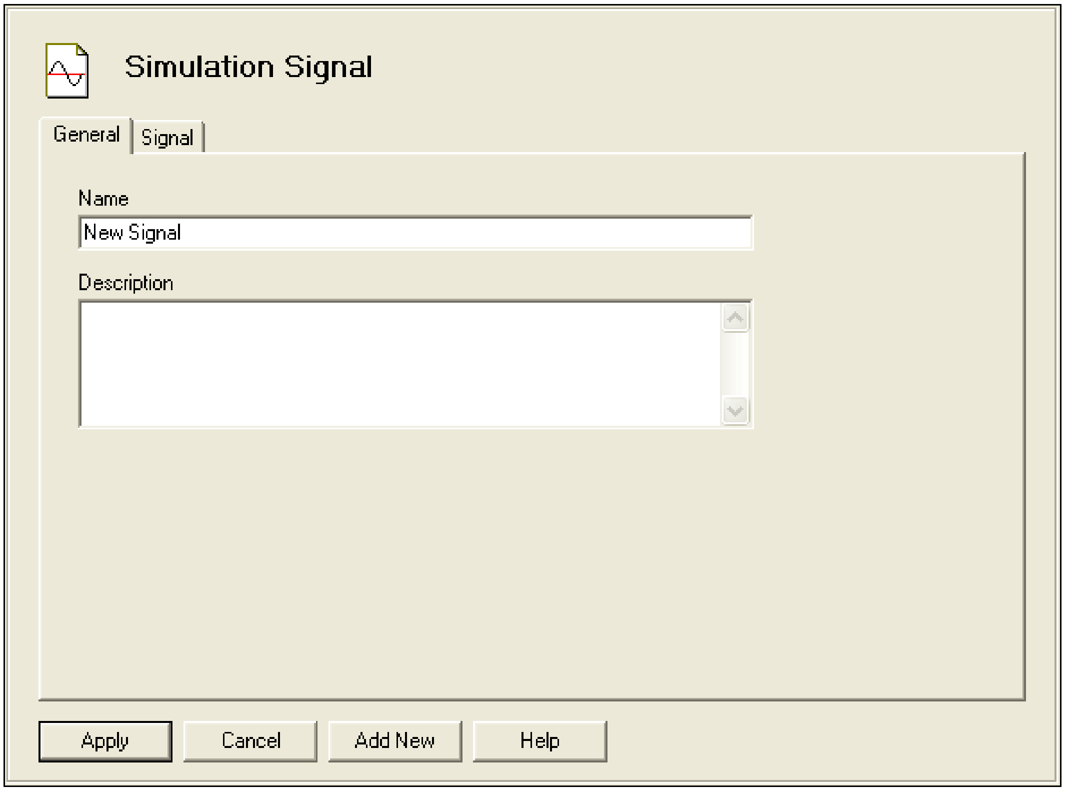
Editing Simulation Signals

The Simulation Signal dialog box consists of two tabs, General and Signal.

Caution!

After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

General Tab



Name
New Signal
Description

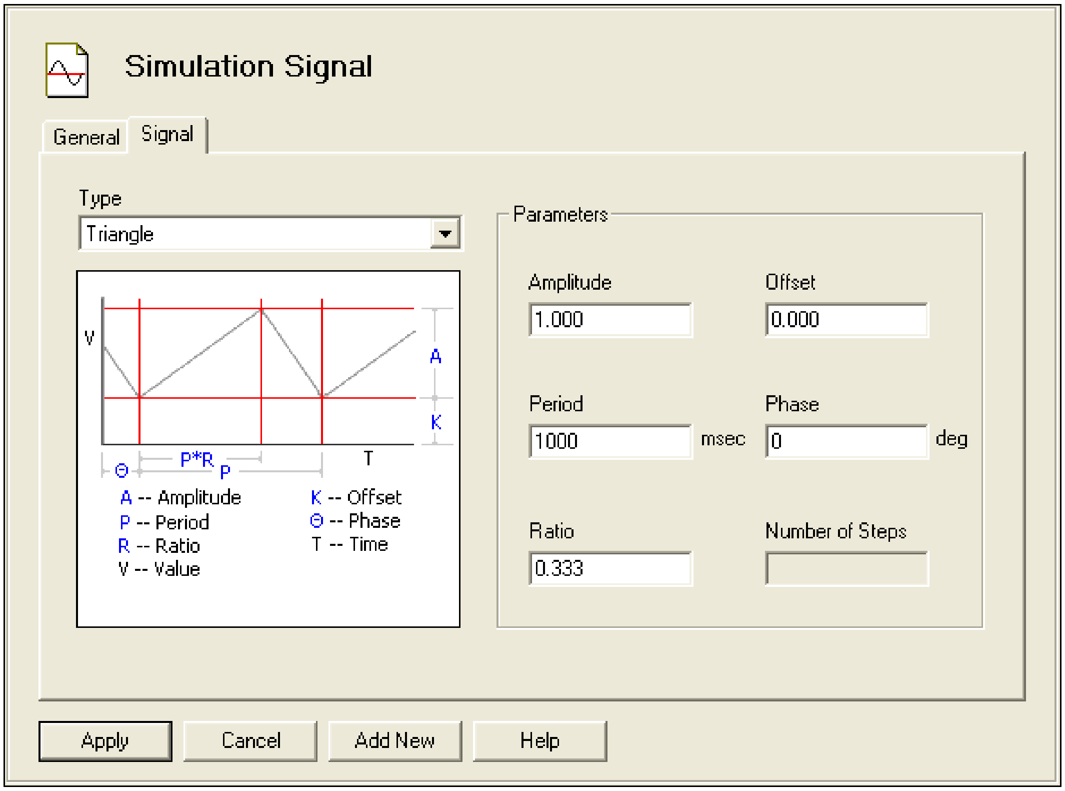
Name

The name identifies the simulation signal. It can be up to 50 characters long, may contain spaces, but must not begin with a space. It also must not contain any periods.

Description

This optional field further describes the simulation signal. It can be up to 255 characters long.

Signal Tab



Simulation Signal

Type: Triangle

Parameters

Amplitude: 1.000

Offset: 0.000

Period: 1000 msec

Phase: 0 deg

Ratio: 0.333

Number of Steps:

Type

Select the simulation signal type from the drop-down box. The available signal types are:

- Write Count
- Read Count
- Random
- Ramp
- Sine
- Square
- Triangle
- Step

For a detailed explanation of the different signal types, refer to the Simulation Signal Types section.

The signal type selection will enable the needed parameter fields, if any. You must enter the values for the parameter fields that are not dimmed.

Amplitude

This is the peak value of the signal, measured from the offset level.

All signal types except Write Count and Read Count use this parameter.

Offset

This is a fixed offset for the value of the data item. The generated waveform varies around this value.

All signal types except Write Count and Read Count use this parameter.

Period

This is the period of one cycle of the waveform, specified in milliseconds.

The Ramp, Sine, Square, Triangle and Step functions use this parameter.

Phase

This is a phase offset for the waveform, specified in degrees. The value you specify will be taken as a leading phase shift and cannot be a negative number. To create a lagging phase shift, subtract the desired shift from 360. For example, if you want a leading shift of 20 degrees, you would enter 20. If you want a lagging shift of 20 degrees, you would enter 340.

The Ramp, Sine, Square, Triangle and Step functions use this parameter.

Ratio

This is a decimal fraction between 0 and 1.

For the Square function, it specifies the fraction of the cycle during which the value is at the low level. A Square function with a period of 1000 ms and a ratio of 0.4 would be low for 400 ms and high for 600 ms.

For the Triangle function, it specifies the fraction of the cycle during which the signal is rising. A Triangle function with a period of 1000 ms and a ratio of 0.4 would rise for 400 ms and fall for 600 ms.

Only the Square and Triangle functions use this parameter.

Number of Steps

Only the Step function uses this parameter. It specifies the number of value levels in each signal period. The steps are of equal height and width.

Alarm Definitions

The Cyberlogic OPC Server supports the OPC Alarms and Events specification. If your client application is also OPC AE compliant, it will then be able to receive the alarms and events reported by the server. The user may define many different alarm conditions. A number of data items can then use each such condition. As a result, the user need not define the same alarm condition many times over.

Alarm Definition Types

There are two categories of alarms: limit and digital. Limit alarms are normally used for numeric data, and digital alarms are normally used for Boolean data, but either alarm type may be used with either data type. Alarms may not be used with string data, arrays or bit fields greater than 64 bits.

Limit Alarms

Limit alarms divide the range of values for the data item into five alarm states: LoLo, Lo, Normal, Hi and HiHi. These are normally used for numeric data items.

If you use a limit alarm with a Boolean data item, the software will convert its state to a numeric value before checking for alarm conditions. A value of false will be converted to 0 and a value of true will be converted to -1.

Each alarm state allows you to designate a message and a severity level. You may also indicate whether the alarm requires a client-side acknowledgment. If you wish, you can specify a deadband value. The deadband prevents the server from generating a large number of alarm messages when the signal jitters around one of the limits.

Digital Alarms

Digital alarms specify an alarm that must occur when a value is either true or false, and so they are normally used with Boolean data items.

If you use a Digital Alarm with a numeric data item, a value of 0 is treated as false and any other value is treated as true.

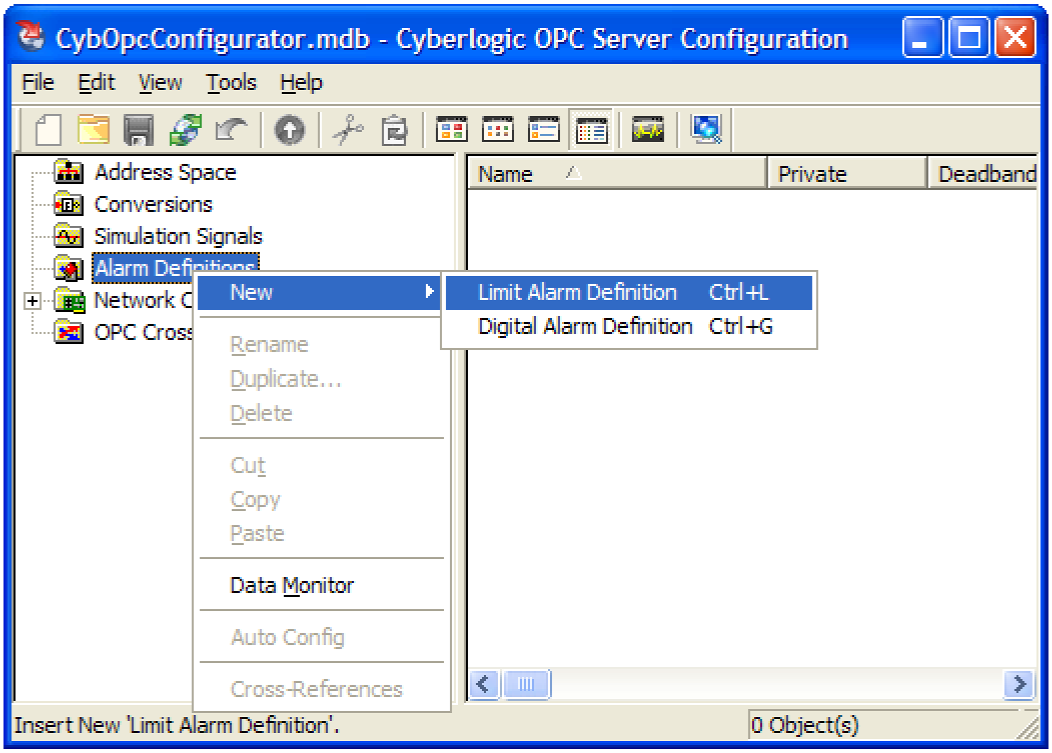
Each alarm state allows you to designate a message and a severity level. You may also indicate whether the alarm requires a client-side acknowledgment. If desired, you can have the server generate an alarm when the data item returns to its normal value.

Creating and Deleting Alarm Definitions

Alarms are created and deleted from the main OPC Server Configuration Editor window.

Caution! After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

Creating an Alarm Definition



1. Right-click on the ***Alarm Definitions*** root folder and select ***New***, and then ***Limit Alarm Definition*** or ***Digital Alarm Definition*** from the context menu.

2. Enter the information required in the Limit Alarm or Digital Alarm dialog box, as described in the Editing Limit Alarm Definitions or Editing Digital Alarm Definitions section.

3. Click ***Apply***.

Deleting an Alarm Definition

To delete an existing alarm definition, select it and press the ***Delete*** key, or right-click on the alarm definition and select ***Delete*** from the context menu.

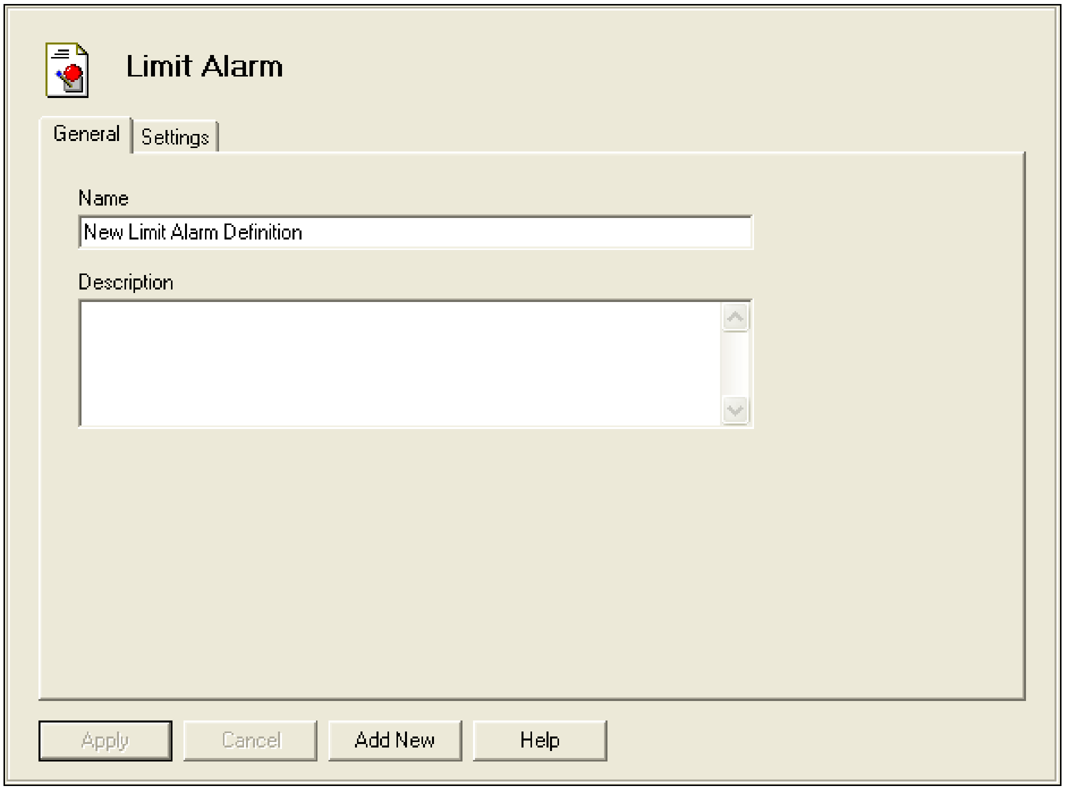
Editing Limit Alarm Definitions

The Limit Alarm dialog box consists of two tabs, General and Settings.

Caution!

> After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

General Tab



Name

New Limit Alarm Definition

Description

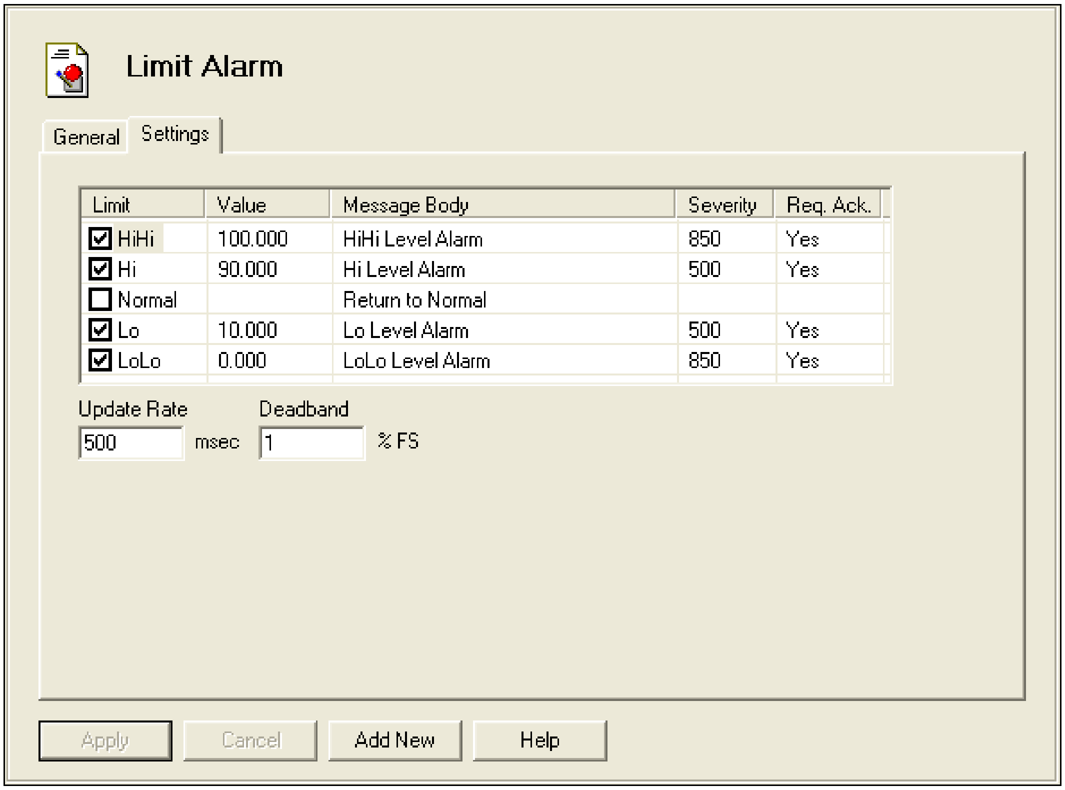
Name

The name identifies the limit alarm definition. It can be up to 50 characters long, may contain spaces, but must not begin with a space. It also must not contain any periods.

Description

This optional field further describes the limit alarm definition. It can be up to 255 characters long.

Settings Tab



Limit	Value	Message Body	Severity	Req. Ack.
☑ HiHi	100.000	HiHi Level Alarm	850	Yes
☑ Hi	90.000	Hi Level Alarm	500	Yes
□ Normal		Return to Normal		
☑ Lo	10.000	Lo Level Alarm	500	Yes
☑ LoLo	0.000	LoLo Level Alarm	850	Yes

Update Rate 500 msec

Deadband 1 % FS

Limit

Check the boxes to indicate which alarm conditions the server should report.

Value

Enter the signal level that will trigger an alarm.

Message Body

Enter the text that is associated with this alarm.

Severity

The client uses this field to filter which events it wants to receive. Enter a value between 1 and 1000, where 1 is the least severe and 1000 is the most severe.

Req Ack.

A value of Yes in this field indicates that an alarm must be acknowledged before it can clear.

Update Rate

Enter an interval, in milliseconds, at which the server will test the data item for an alarm state.

Deadband

Enter a deadband value in percent of full scale. The server will not reevaluate the alarm condition until the data item's value changes by the specified amount.

Without a deadband, a data item that jitters just above and then just below an alarm value will repeatedly trigger alarms, even though its value does not change significantly. The deadband helps to prevent this from happening.

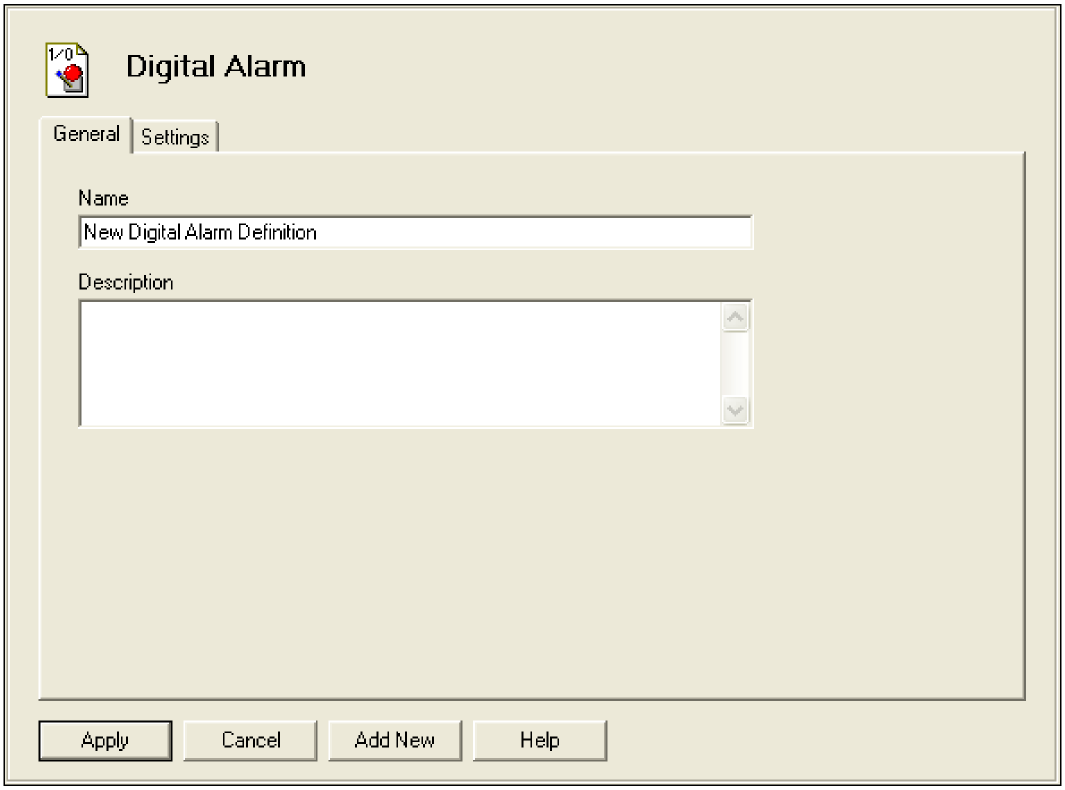
Caution! In keeping with the OPC specifications, the deadband functions apply only to data items that have a dwEUType of Analog. No data items have this type by default. To convert a data item to Analog, you must apply a conversion to it. This allows you to associate engineering units with the data item, and it is the engineering units range that is used for the deadband calculation.

Editing Digital Alarm Definitions

The Digital Alarm dialog box consists of two tabs, General and Settings.

Caution! After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

General Tab



Name

New Digital Alarm Definition

Description

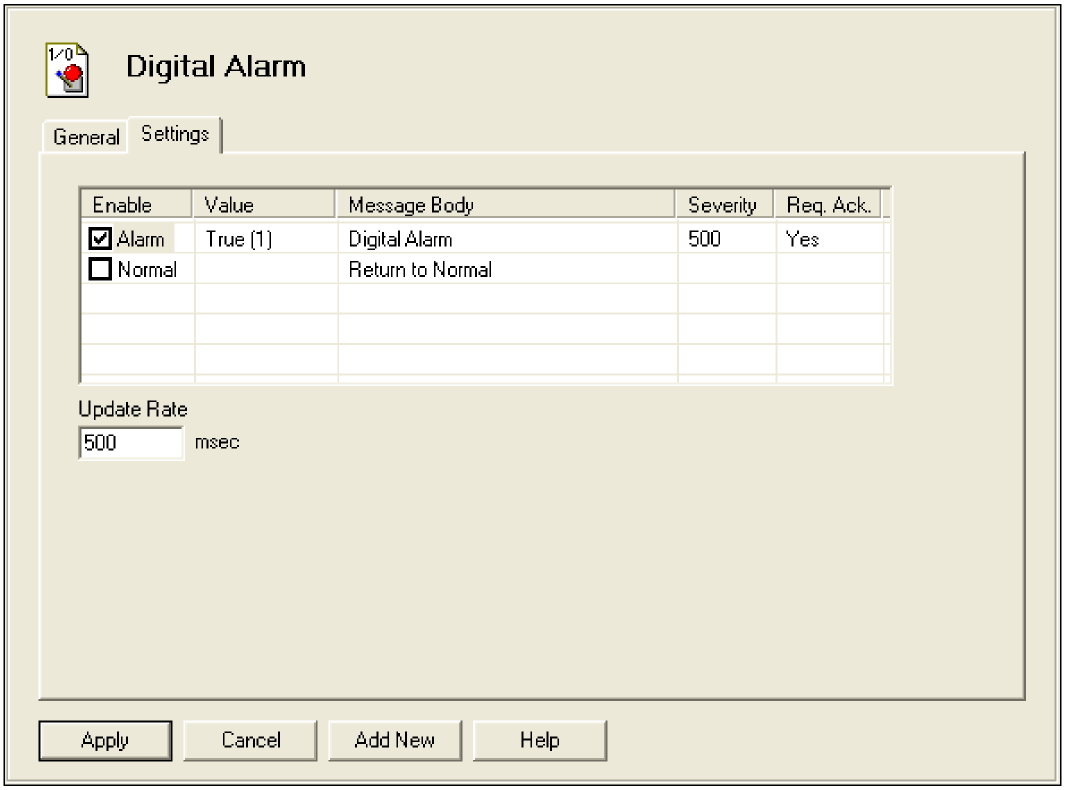
Name

The name identifies the digital alarm definition. It can be up to 50 characters long, may contain spaces, but must not begin with a space. It also must not contain any periods.

Description

This optional field further describes the digital alarm definition. It can be up to 255 characters long.

Settings Tab



Digital Alarm

Enable	Value	Message Body	Severity	Req. Ack.
☑ Alarm	True (1)	Digital Alarm	500	Yes
□ Normal		Return to Normal		

Update Rate

500 msec

Enable

Check the boxes to indicate which alarm conditions the server should report.

Value

Select either True (1) or False (0) as the data item state that will trigger an alarm.

Message Body

Enter the text that is associated with this alarm.

Severity

The client uses this field to filter which events it wants to receive. Enter a value between 1 and 1000, where 1 is the least severe and 1000 is the most severe.

Req Ack.

A value of Yes in this field indicates that an alarm must be acknowledged before it can clear.

Update Rate

Enter an interval, in milliseconds, at which the server will test the data item for an alarm state.

Database Operations

In addition to providing data to OPC clients in real time, the Cyberlogic OPC Server can store it in a database. The feature that does this is called Data Logger. Once the data is logged, it is available to any application that can access that database. It need not be an OPC client application.

Refer to the Data Logger Help for a full discussion.

OPC Crosslinks

This is where you can set up data transfers between PLCs and OPC servers. Before you can configure crosslinks, you must first configure the network connections to the desired PLCs or OPC servers. You must also configure address space data items to serve as the crosslink inputs and outputs.

Refer to the OPC Crosslink Help for a full discussion.

Saving and Undoing Configuration Changes

The Cyberlogic OPC Server Configuration Editor keeps track of recent configuration changes. Until you save these changes, you can revert to the previously saved configuration. The editor supports two types of save operations. The standard Save operation saves the changes without updating the server or the connected clients. The Save & Update Server operation saves the changes and also updates the server and all connected clients.

Caution!

After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

Saving Configuration Changes Without Updating the Server

To save the configuration without updating the server, open the ***File*** menu and select ***Save***, or click the ***Save*** button on the toolbar. The changes will be saved but the server will still be running with the old configuration.

Saving Configuration Changes and Updating Server

To save the configuration and update the server, open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** button on the toolbar.

Undoing Configuration Changes

To undo configuration changes and revert to the previously saved configuration, open the ***File*** menu and select ***Undo Changes***, or click the ***Undo Changes*** button on the toolbar.

Configuration Import/Export

The Cyberlogic OPC Server normally stores its configuration information in a binary file. The Cyberlogic OPC Server Configuration Editor and the runtime server module can easily read and operate on this file. However, a different file format may be preferred for quick viewing or processing by other applications.

The Export feature allows the entire server configuration to be saved in three text formats: comma delimited (.csv), tab delimited (.tab) and XML.

The Import feature allows you to import these exported files or selected portions of them. You may also import configurations from other vendors' OPC servers.

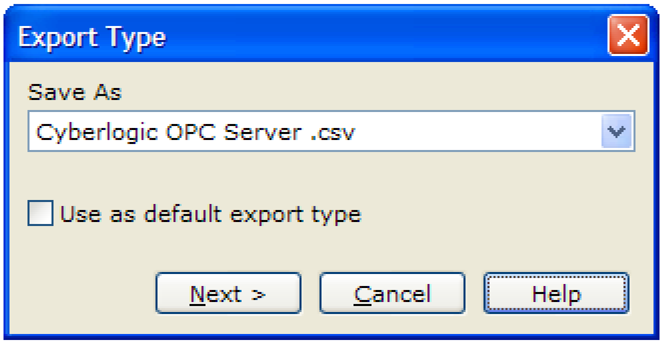
The import/export capability of the Cyberlogic OPC Server Configuration Editor reduces the time and effort required to configure the server. In addition, it can speed up the configuration of similar Cyberlogic OPC Servers and is useful for backing up and restoring server configurations. Furthermore, because it can import configurations from other OPC server brands, it can greatly reduce the effort needed to migrate from those servers to Cyberlogic's OPC Server.

Note To provide better results, the import process performs verification tests on the imported data. On slower systems, those with relatively low memory or those that are running other tasks concurrently, importing a configuration can take a significant length of time. You should take this into consideration when choosing the system to use for running the import operation.

Exporting a Server Configuration

This feature exports an entire server configuration to one of the supported file formats.

1. Open the ***File*** menu and select ***Export...*** .



Save As
Cyberlogic OPC Server .csv

□ Use as default export type

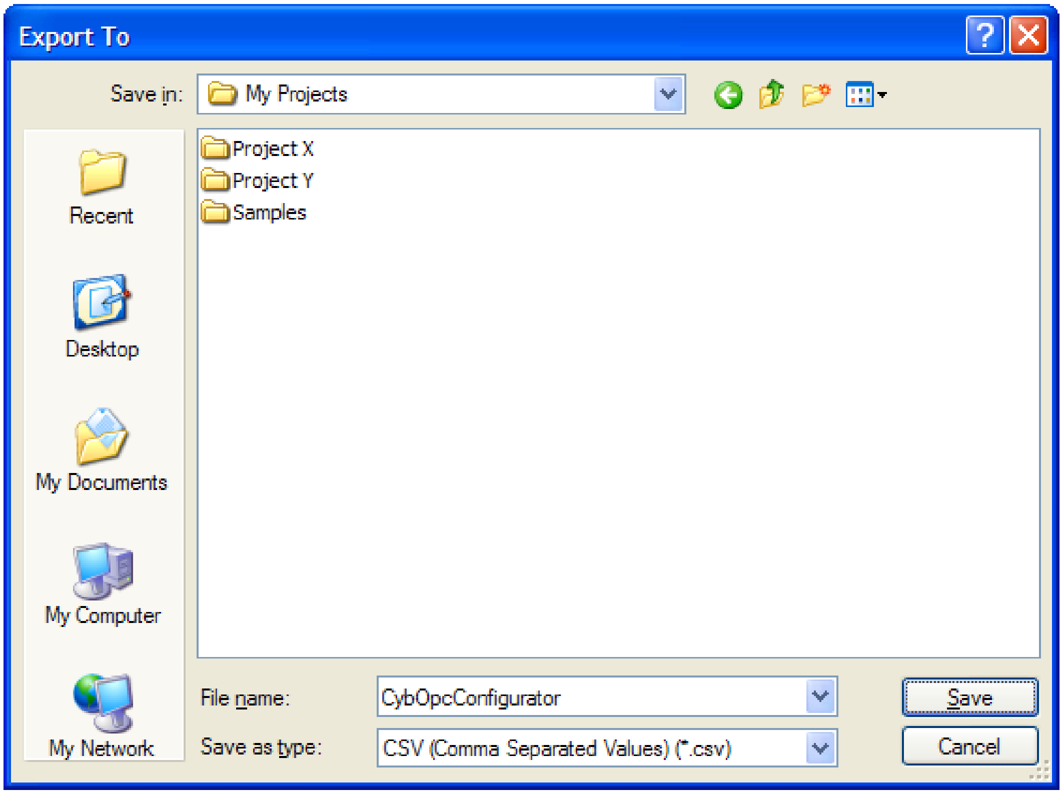
The Export Type dialog box opens.

2. From the ***Save As*** drop box, select the format to use for the exported file. Your choices are:

    - Comma separated values
    - Tab separated values
    - XML file

3. If you want to use this as the default selection when you run the export utility in the future, check ***Use as default export type***.

4. Click ***Next***.



Save in: My Projects

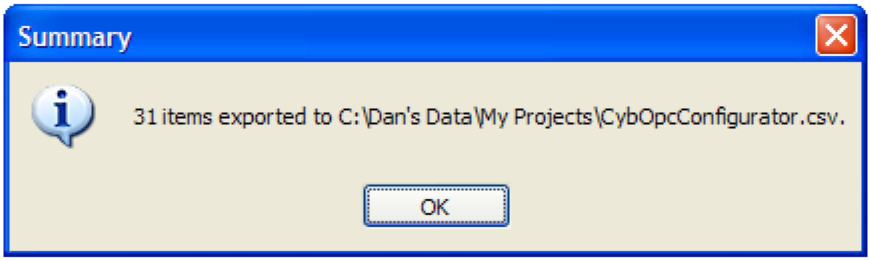
Project X
Project Y
Samples

File name: CybOpcConfigurator

Save as type: CSV (Comma Separated Values) (*.csv)

5. Select the desired directory and enter a ***File name***.

6. Click ***Save*** to create the export file.



31 items exported to C:\Dan's Data\My Projects\CybOpcConfigurator.csv.

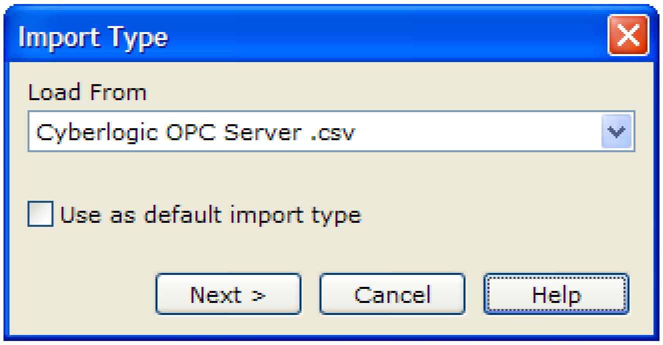
The Summary dialog will notify you about the number of exported items.

7. Click ***OK*** to complete the process.

Importing a Cyberlogic Server Configuration

You can import all or part of a server configuration from a previously exported file or from certain other configuration file formats. This section explains how to import an entire configuration that was previously exported from a Cyberlogic OPC Server.

1. Open the ***File*** menu and select ***Import*** and then ***Full...*** .



Load From: Cyberlogic OPC Server .csv

□ Use as default import type

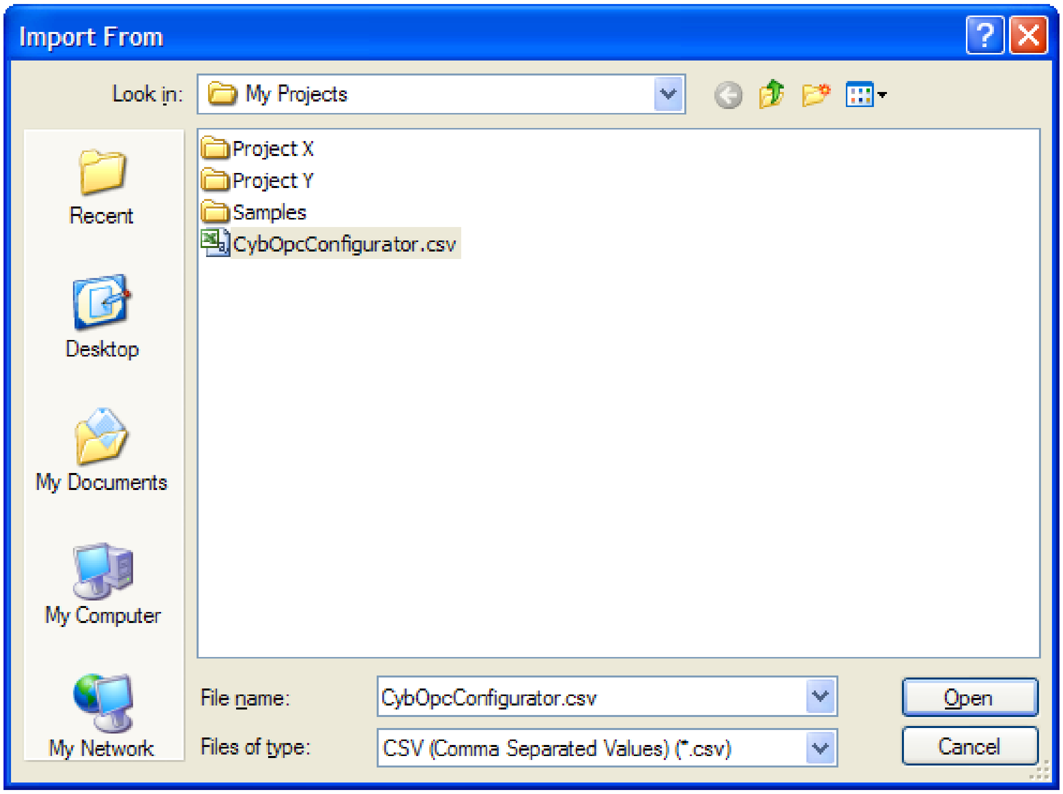
The Import Type dialog box opens.

2. From the ***Load From*** drop box, select the format of the file you wish to import. Your choices are:

   - Cyberlogic OPC Server .mdb (Access database format)
   - Cyberlogic OPC Server .csv (Comma separated values)
   - Cyberlogic OPC Server .tab (Tab separated values)
   - Cyberlogic OPC Server .xml (XML file)
   - Various other vendors' OPC server formats, depending on the driver agents you have installed

3. If you want to use this as the default selection when you run the import utility in the future, check ***Use as default import type***.

4. Click ***Next***.



Look in: My Projects

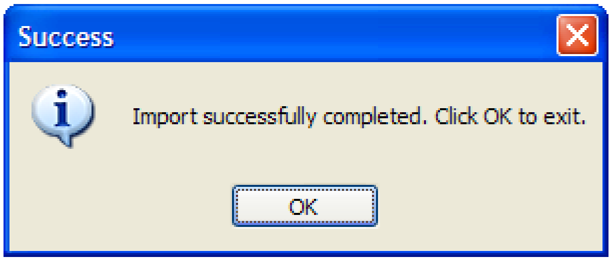
Project X
Project Y
Samples
CybOpcConfigurator.csv

File name: CybOpcConfigurator.csv

Files of type: CSV (Comma Separated Values) (*.csv)

5. Select the file containing the configuration you wish to import.

6. Click ***Open***.



Import successfully completed. Click OK to exit.

Progress dialog boxes will open to show the status of the import. When it is finished, the Success dialog box will be displayed.

7. Click ***OK*** to complete the process.

Caution!

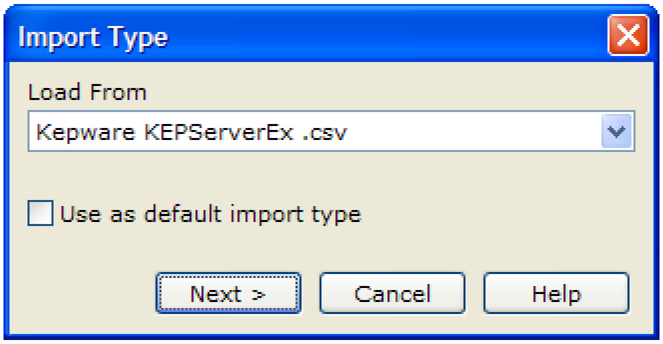
After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

Importing Configurations from Other Server Brands

Importing a configuration from a non-Cyberlogic OPC server is handled in the same manner as the import described above. However, because of variations in features between the different brands of servers, there may be additional conflicts and errors to deal with.

1. Use the other product's tools to export its configuration to a csv file. Refer to the documentation for that product for instructions on how to do this.

2. Open the ***File*** menu and select ***Import*** and then ***Full...*** .



Load From: Kepware KEPServerEx .csv

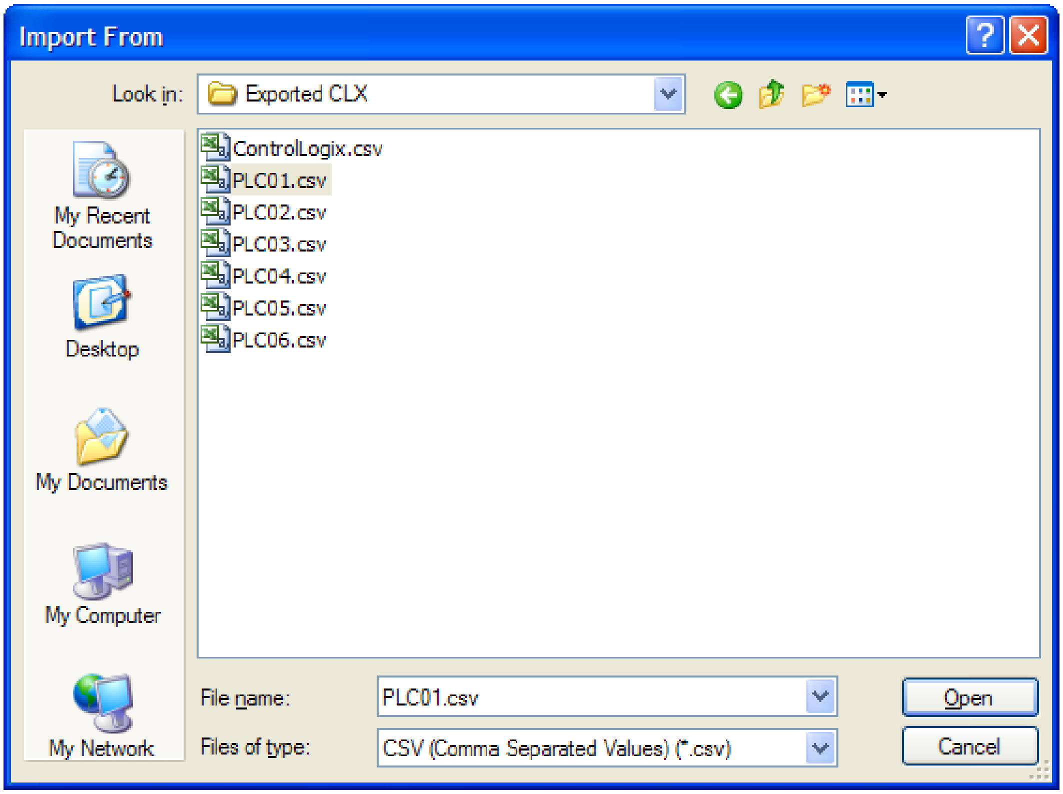
□ Use as default import type

   The Import Type dialog box opens.

3. From the ***Load From*** drop box, select the format of the file you wish to import.

   For this example, we will import from a Kepware OPC server, so the correct choice is ***Kepware KEPServerEx.csv***.

4. Click ***Next***.



Look in: Exported CLX

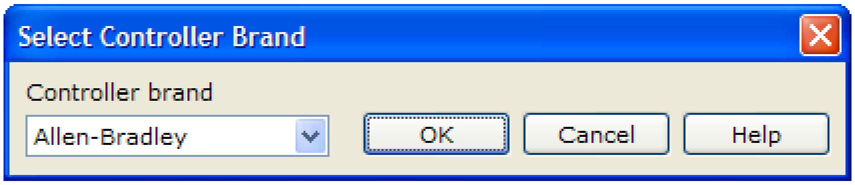
ControlLogix.csv
PLC01.csv
PLC02.csv
PLC03.csv
PLC04.csv
PLC05.csv
PLC06.csv

File name: PLC01.csv

Files of type: CSV (Comma Separated Values) (*.csv)

5. Select the file containing the configuration you wish to import.

6. Click ***Open***.

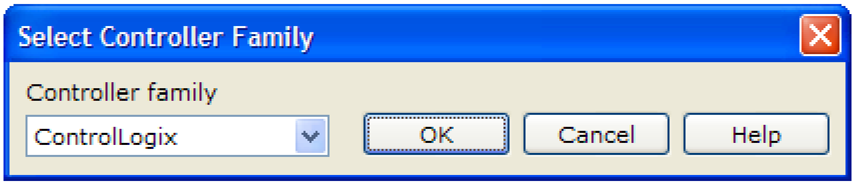


Controller brand: Allen-Bradley

The Select Controller Brand dialog box will open.

7. Select the ***Controller brand*** whose configuration you are importing.

8. Click ***OK***.

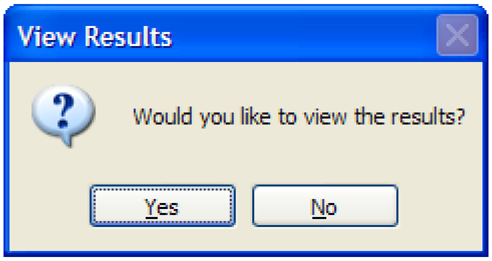


Controller family: ControlLogix

The import utility will partially process the file and then the Select Controller Family dialog box will open.

9. Select the ***Controller family*** whose configuration you are importing.

10. Click ***OK***.

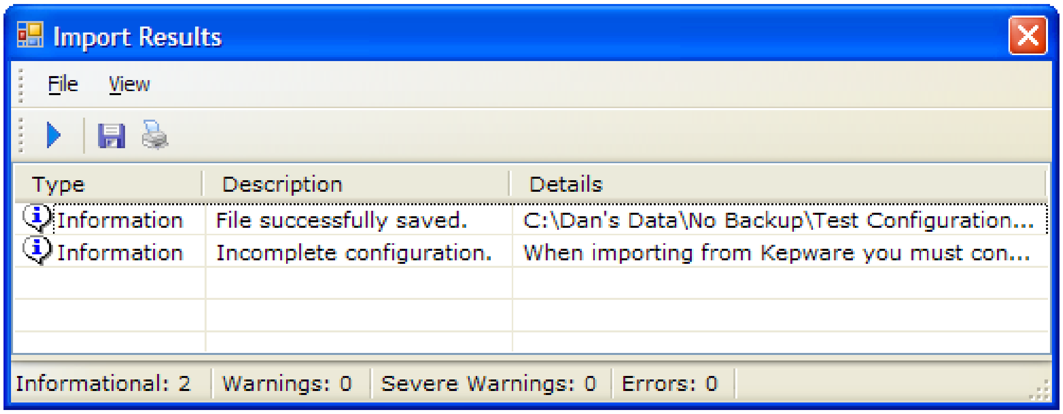


View Results

Would you like to view the results?

The utility will finish preprocessing the file. It will then give you the chance to view the results, which may contain warnings of errors or other useful information.

11. Click ***Yes***.



Import Results

Type	Description	Details
Information	File successfully saved.	C:\Dan's Data\No Backup\Test Configuration...
Information	Incomplete configuration.	When importing from Kepware you must con...

Informational: 2 | Warnings: 0 | Severe Warnings: 0 | Errors: 0

The results screen will show you the errors, warnings and other information with a description of each.

12. Click ▶ to continue with the import processing.

When the processing is finished, the import wizard will close and you will be returned to the OPC Server Configuration Editor.

Caution!

> After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

Selective Import of a Server Configuration

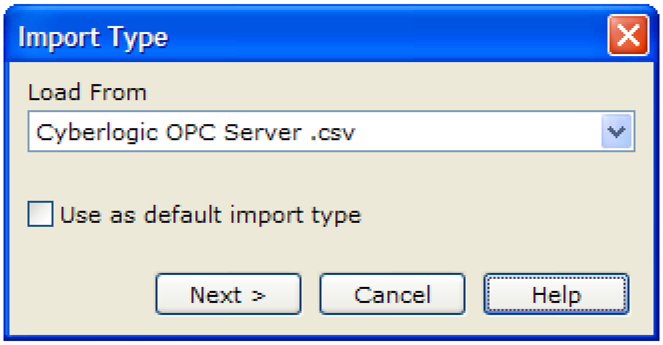
It is possible to import only a part of a source file. Selective imports are available when importing from Cyberlogic or other configurations. For this example, we will use a Cyberlogic configuration.

There are three main parts to this procedure:

- Opening the Import File
- Selecting and Importing Configuration Items
- Validating and Saving the Imported Configuration

Opening the Import File

1. Open the ***File*** menu and select ***Import*** and then ***Selective...*** .

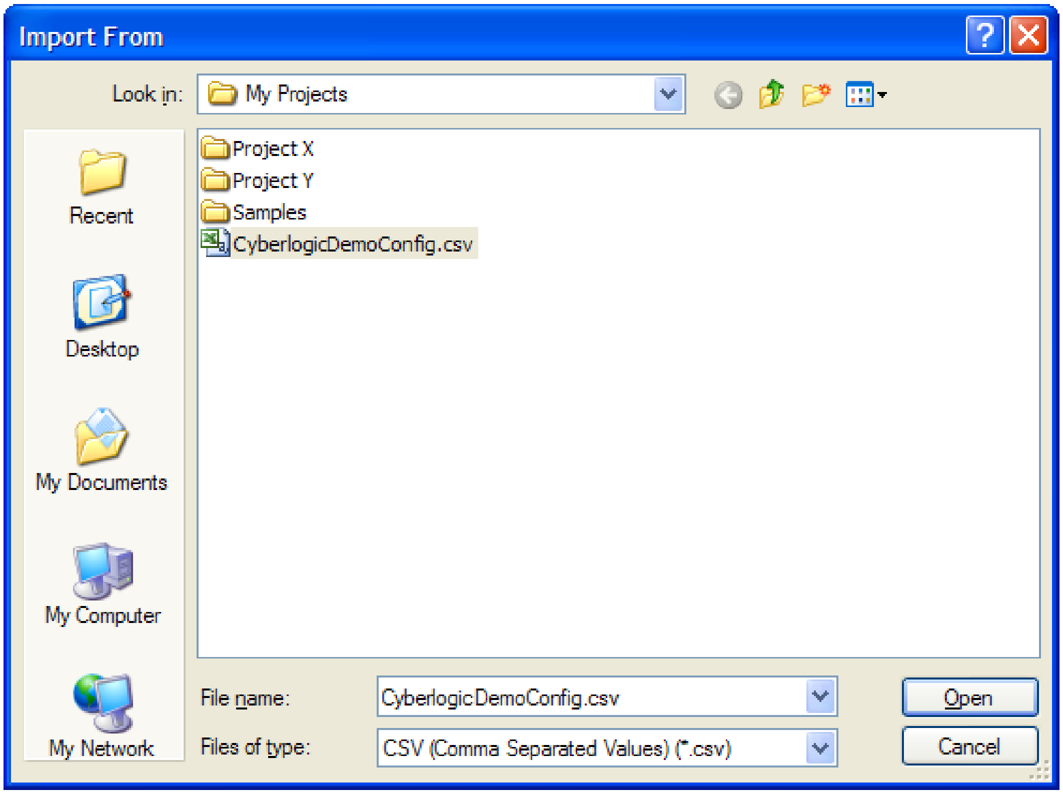


The Import Type dialog box opens.

2. From the ***Load From*** drop box, select the format of the file you wish to import. Your choices are:
   - Cyberlogic OPC Server .mdb (Access database format)
   - Cyberlogic OPC Server .csv (Comma separated values)
   - Cyberlogic OPC Server .tab (Tab separated values)
   - Cyberlogic OPC Server .xml (XML file)
   - Various other vendors’ OPC server formats, depending on the driver agents you have installed

3. If you want to use this as the default selection when you run the import utility in the future, check ***Use as default import type***.

4. Click ***Next***.



Look in: My Projects

File name: CyberlogicDemoConfig.csv

Files of type: CSV (Comma Separated Values) (*.csv)

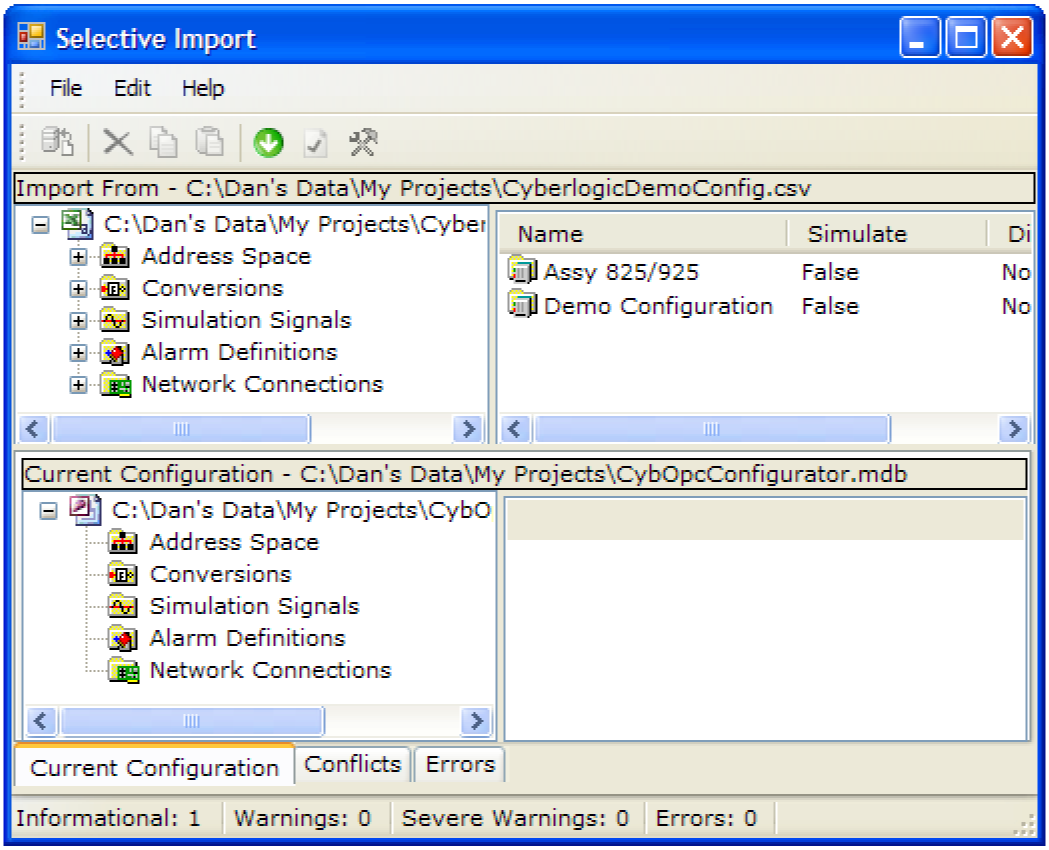
5. Select the file containing the configuration you wish to import.

6. Click ***Open***.

   The Selective Import editing screen will open.

Selecting and Importing Configuration Items

The upper pane of the Selective Import editing screen shows the configuration you are importing from and the lower pane shows the current configuration of your server.



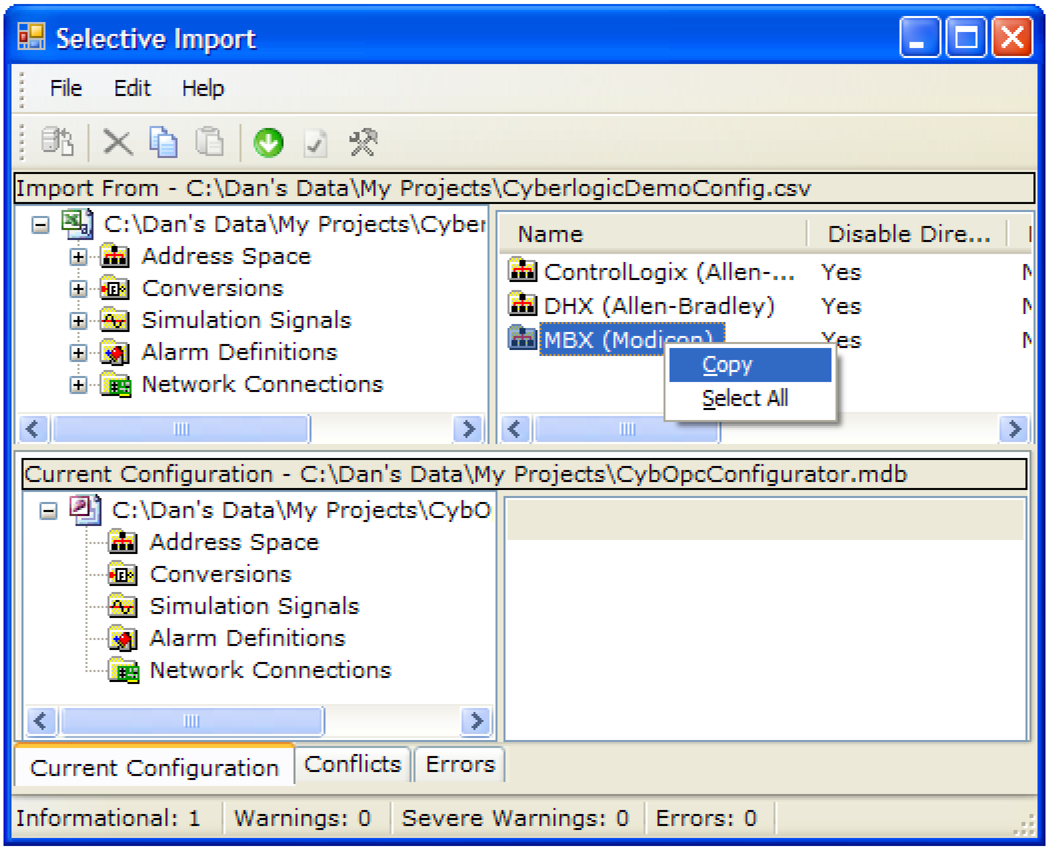
Import From - C:\Dan's Data\My Projects\CyberlogicDemoConfig.csv

Name	Simulate	Di
Assy 825/925	False	No
Demo Configuration	False	No

Current Configuration - C:\Dan's Data\My Projects\CybOpcConfigurator.mdb

Informational: 1 | Warnings: 0 | Severe Warnings: 0 | Errors: 0

1. Navigate through the ***Import From*** tree to locate the items you wish to import.



Import From - C:\Dan's Data\My Projects\CyberlogicDemoConfig.csv

- C:\Dan's Data\My Projects\Cyber
  - Address Space
  - Conversions
  - Simulation Signals
  - Alarm Definitions
  - Network Connections

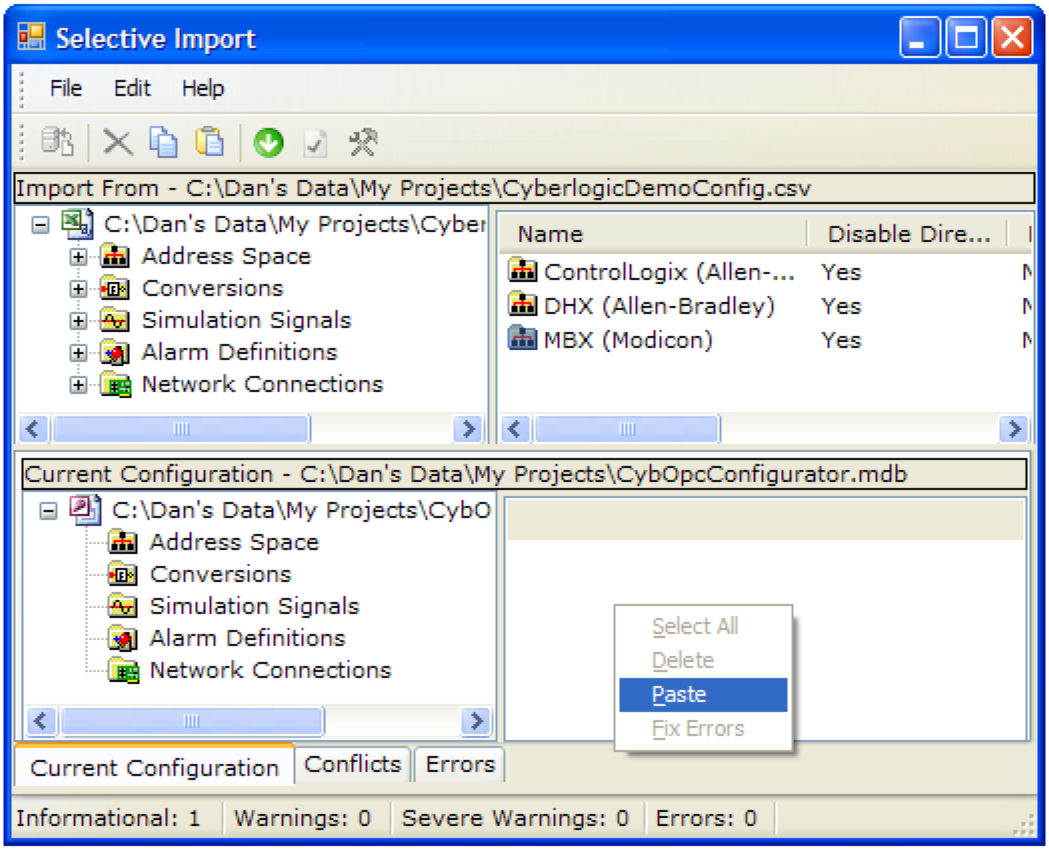
Name	Disable Dire...	I
ControlLogix (Allen-...	Yes	N
DHX (Allen-Bradley)	Yes	N
MBX (Modicon)	Yes	N

Current Configuration - C:\Dan's Data\My Projects\CybOpcConfigurator.mdb

- C:\Dan's Data\My Projects\CybO
  - Address Space
  - Conversions
  - Simulation Signals
  - Alarm Definitions
  - Network Connections

Informational: 1 | Warnings: 0 | Severe Warnings: 0 | Errors: 0

2. Highlight the desired items, right-click on them and select ***Copy***.



Selective Import

Import From - C:\Dan's Data\My Projects\CyberlogicDemoConfig.csv

C:\Dan's Data\My Projects\Cyber
- Address Space
- Conversions
- Simulation Signals
- Alarm Definitions
- Network Connections

Name	Disable Dire...
ControlLogix (Allen-...	Yes
DHX (Allen-Bradley)	Yes
MBX (Modicon)	Yes

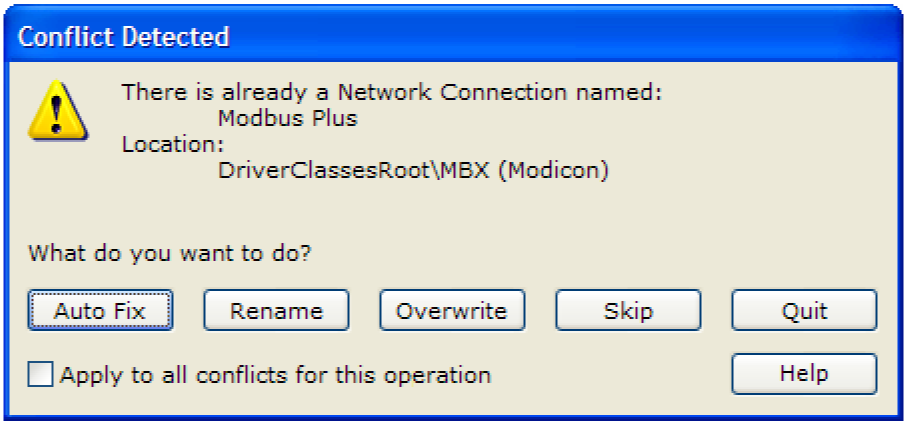
Current Configuration - C:\Dan's Data\My Projects\CybOpcConfigurator.mdb

C:\Dan's Data\My Projects\CybO
- Address Space
- Conversions
- Simulation Signals
- Alarm Definitions
- Network Connections

Informational: 1 | Warnings: 0 | Severe Warnings: 0 | Errors: 0

3. Navigate to the proper place in the lower pane, then right-click in the pane and select ***Paste***.

   The copied item will be imported into the server configuration.



Conflict Detected

There is already a Network Connection named:
Modbus Plus
Location:
DriverClassesRoot\MBX (Modicon)

What do you want to do?

☐ Apply to all conflicts for this operation

   If some of the items you are trying to paste already exist in your server's current configuration, the Conflict Detected dialog box will appear.

4. Click a button to resolve the conflicts. the choices are:

   - ***Auto Fix:*** The editor will rename the item so that it does not conflict with any other names.
   - ***Rename:*** You must enter a new name that will not conflict.

- ***Overwrite:*** The item you are pasting will replace the conflicting item in your current configuration.
- ***Skip:*** The editor will keep the item in your current configuration and not import the item you pasted.
- ***Quit:*** The paste operation will terminate immediately. Any items that were added on this paste operation before the editor detected the conflict will remain, but the conflicting item and all remaining items that were to be pasted will not be imported.

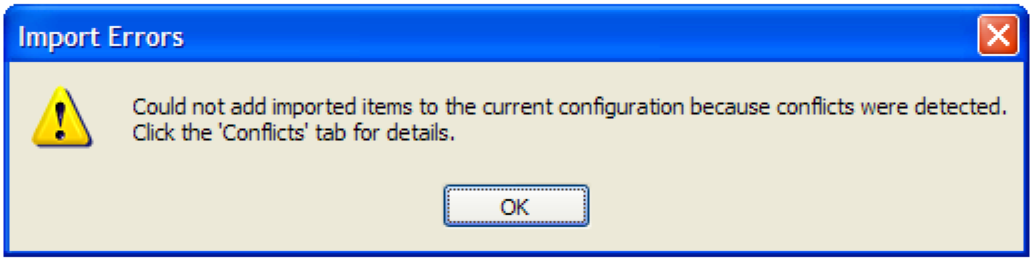
If you selected more than one item to paste and you check ***Apply to all conflicts for this operation*** before selecting ***Auto Fix, Rename, Overwrite*** or ***Skip***, then that selection will apply to all of the conflicting items detected for that paste operation.

5. Repeat this procedure for all of the items you wish to import.

Validating and Saving the Imported Configuration

Once you have imported all of the items you wish to add to your configuration, you must validate them before you can save the configuration.

1. Open the ***Edit*** menu, and select ***Validate***.

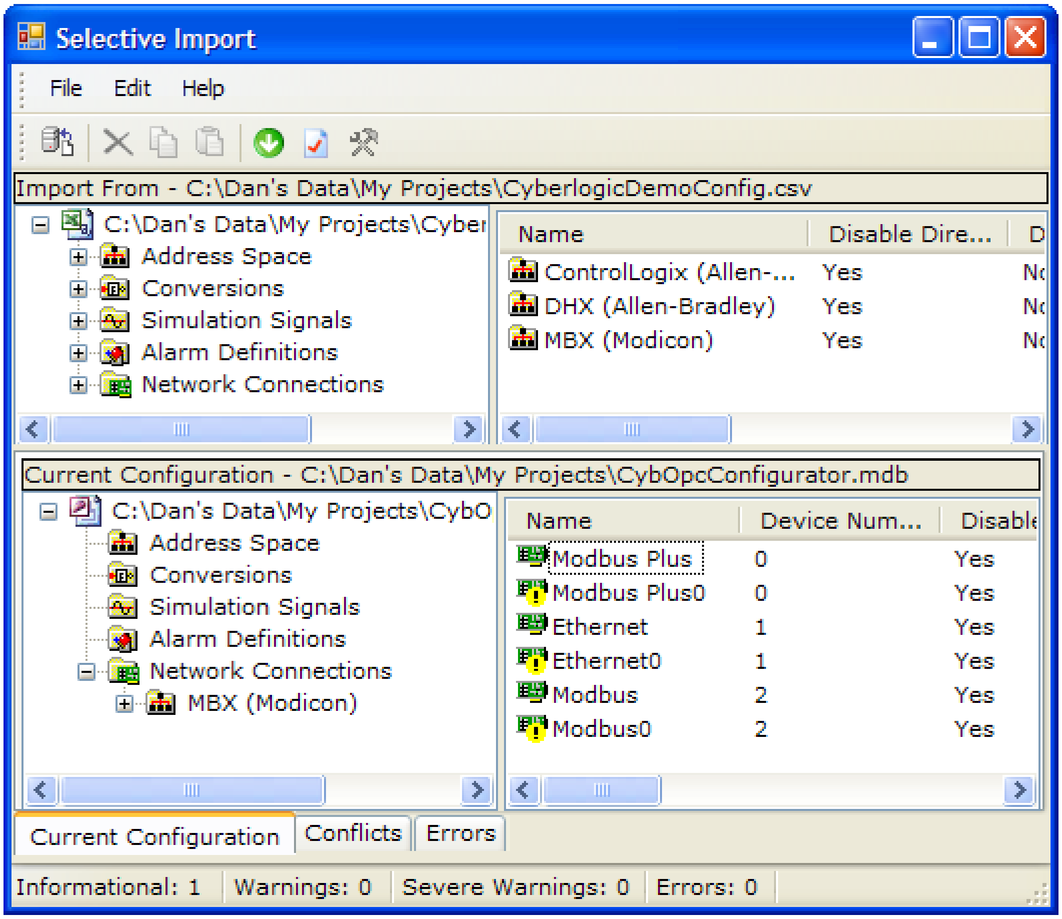


Import Errors

Could not add imported items to the current configuration because conflicts were detected.
Click the 'Conflicts' tab for details.

The editor will perform the validation and will inform you of any conflicts.

2. Click ***OK***.



Import From - C:\Dan's Data\My Projects\CyberlogicDemoConfig.csv

- C:\Dan's Data\My Projects\Cyber
  - Address Space
  - Conversions
  - Simulation Signals
  - Alarm Definitions
  - Network Connections

Name	Disable Dire...	D
ControlLogix (Allen-...	Yes	No
DHX (Allen-Bradley)	Yes	No
MBX (Modicon)	Yes	No

Current Configuration - C:\Dan's Data\My Projects\CybOpcConfigurator.mdb

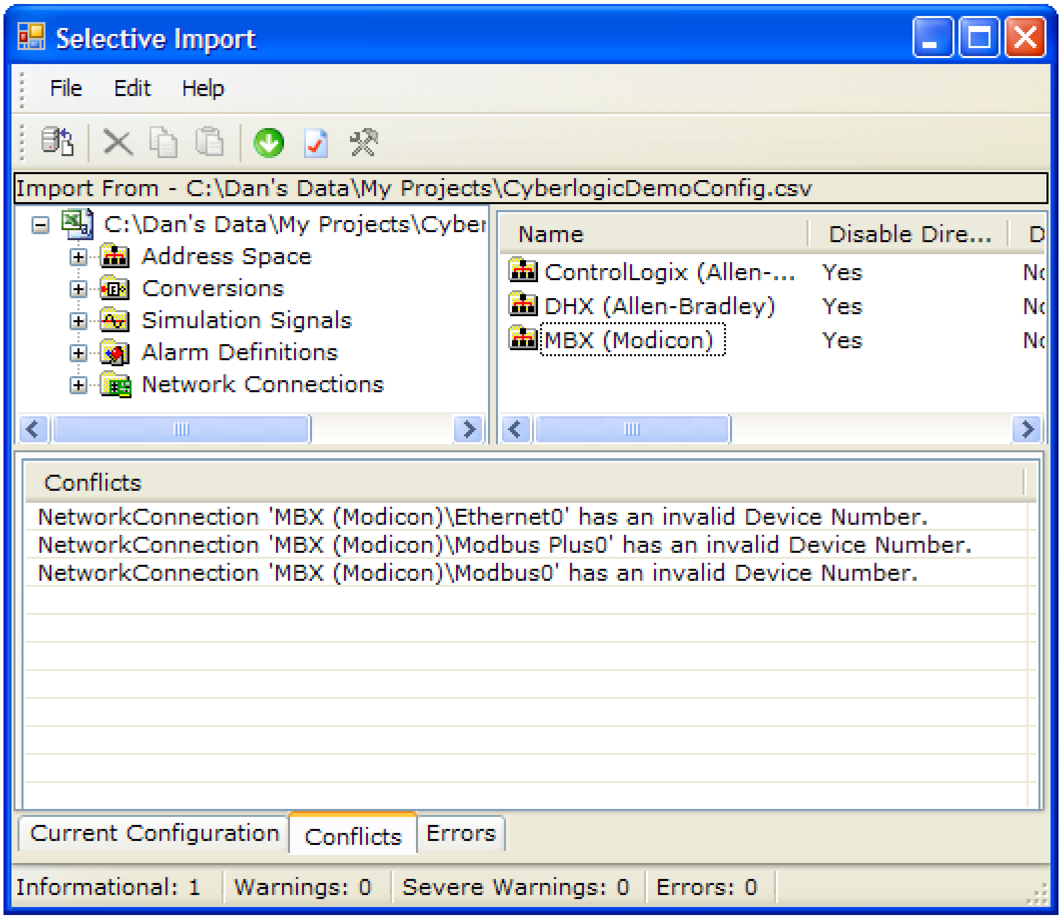
- C:\Dan's Data\My Projects\CybO
  - Address Space
  - Conversions
  - Simulation Signals
  - Alarm Definitions
  - Network Connections
    - MBX (Modicon)

Name	Device Num...	Disable
Modbus Plus	0	Yes
Modbus Plus0	0	Yes
Ethernet	1	Yes
Ethernet0	1	Yes
Modbus	2	Yes
Modbus0	2	Yes

Informational: 1 | Warnings: 0 | Severe Warnings: 0 | Errors: 0

The items that failed the validation will be highlighted with the yellow exclamation point symbol.

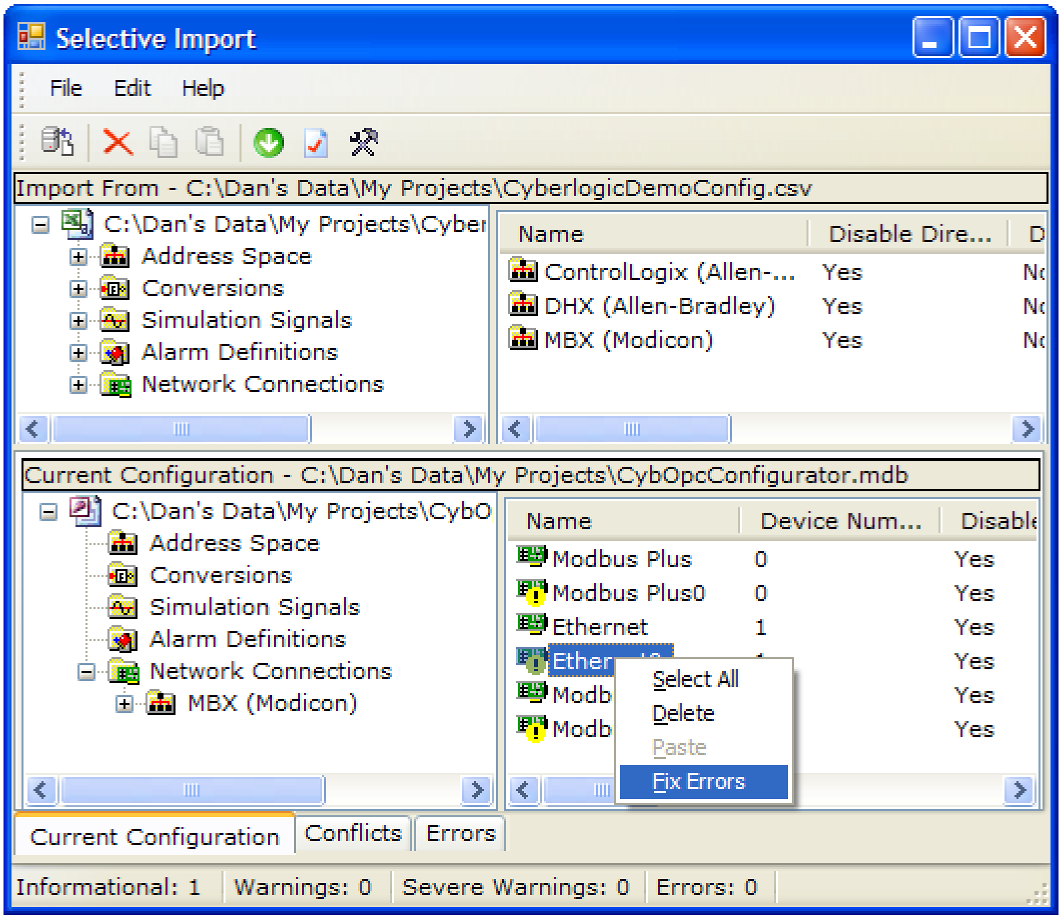
3. Click the ***Conflicts*** tab for an explanation of the problems.



NetworkConnection 'MBX (Modicon)\Ethernet0' has an invalid Device Number.
NetworkConnection 'MBX (Modicon)\Modbus Plus0' has an invalid Device Number.
NetworkConnection 'MBX (Modicon)\Modbus0' has an invalid Device Number.

Informational: 1 | Warnings: 0 | Severe Warnings: 0 | Errors: 0

In this instance, there are duplicate device numbers. Notice from the previous figure that the imported network connection Ethernet0 has the same device number as the network connection called Ethernet. You must change one of these device numbers to resolve the conflict. You must also resolve the other two conflicts that the validator detected.



Import From - C:\Dan's Data\My Projects\CyberlogicDemoConfig.csv

- C:\Dan's Data\My Projects\Cyber
  - Address Space
  - Conversions
  - Simulation Signals
  - Alarm Definitions
  - Network Connections

Name	Disable Dire...	D
ControlLogix (Allen-...	Yes	N
DHX (Allen-Bradley)	Yes	N
MBX (Modicon)	Yes	N

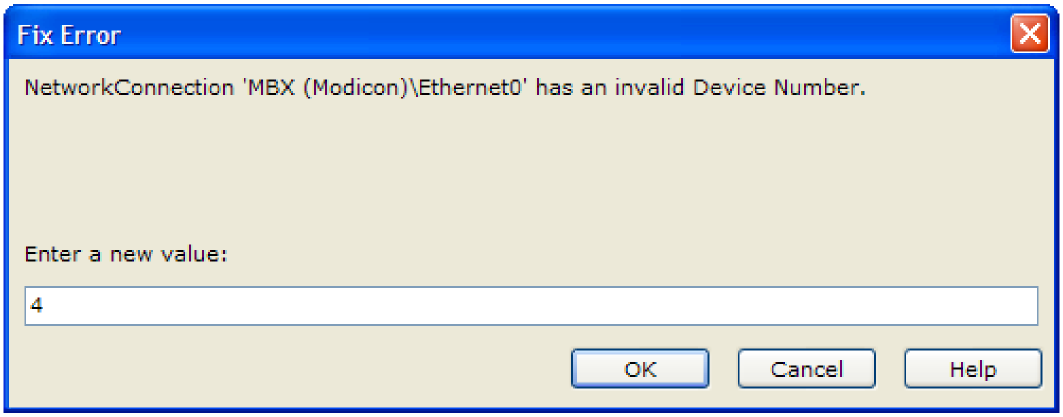
Current Configuration - C:\Dan's Data\My Projects\CybOpcConfigurator.mdb

- C:\Dan's Data\My Projects\CybO
  - Address Space
  - Conversions
  - Simulation Signals
  - Alarm Definitions
  - Network Connections
    - MBX (Modicon)

Name	Device Num...	Disable
Modbus Plus	0	Yes
Modbus Plus0	0	Yes
Ethernet	1	Yes
Ether		Yes
Modb		Yes
Modb		Yes

Informational: 1 Warnings: 0 Severe Warnings: 0 Errors: 0

4. Right-click on a problem item and select ***Fix Errors*** from the context menu.



NetworkConnection 'MBX (Modicon)\Ethernet0' has an invalid Device Number.

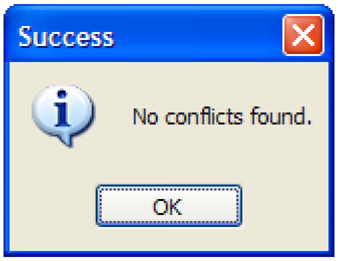
Enter a new value:

4

The Fix Error dialog box will help you to correct the problem.

5. In this case, ***enter a new value*** for the address and click ***OK***.

6. After you have cleared all of the errors, repeat the validation operation.

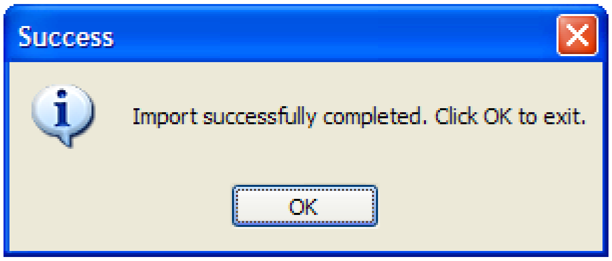


No conflicts found.

When it succeeds, you will get a confirmation dialog.

7. Click ***OK***.

8. From the File menu, select ***Finish***.



Import successfully completed. Click OK to exit.

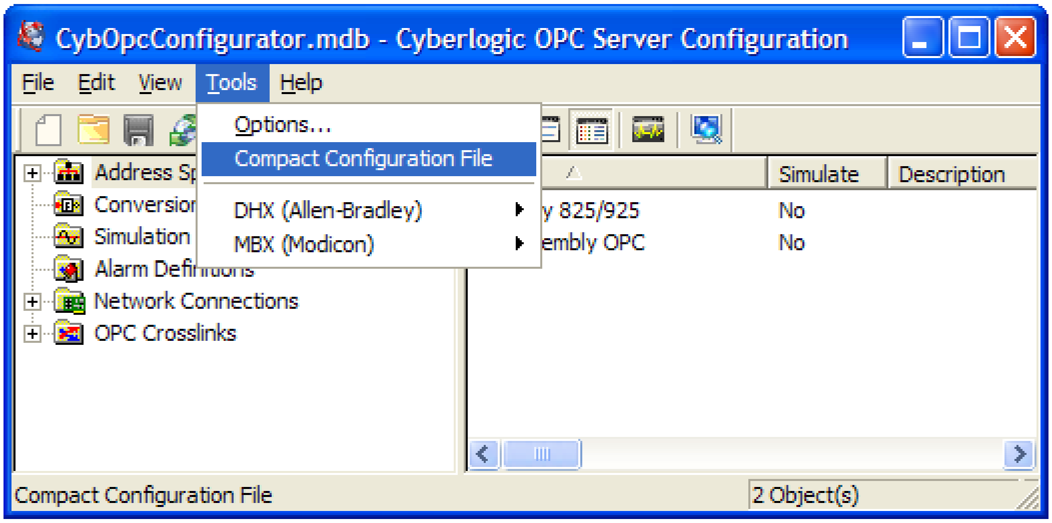
The import operation completes, your configuration is saved and the confirmation dialog appears.

9. Click ***OK*** to exit from the Import utility.

Caution!

After you edit the configuration, you must open the ***File*** menu and select ***Save & Update Server***, or click the ***Save & Update Server*** toolbar button, for the changes you have made to take effect. Otherwise, the server will still be running with the old configuration.

Compacting the Configuration File



Shortening or deleting records during configuration edits will result in wasted space in the configuration file. You can clean up this space by compacting the configuration file.

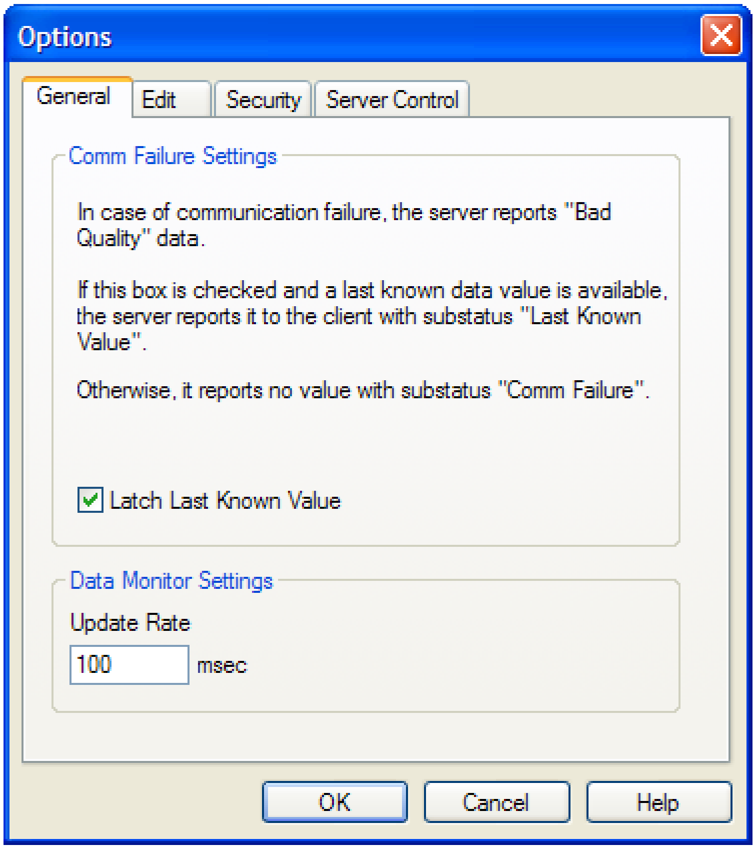
To do this, open the ***Tools*** menu and select ***Compact Configuration File***. You will be asked to confirm the operation, and then it will proceed automatically.

Editor Options

You can customize the editor by configuring several options.

To do this, open the ***Tools*** menu and select ***Options...*** . The options window contains four tabs: General, Edit, Security and Server Control.

General Tab



Comm Failure Settings

In case of communication failure, the server reports "Bad Quality" data.

If this box is checked and a last known data value is available, the server reports it to the client with substatus "Last Known Value".

Otherwise, it reports no value with substatus "Comm Failure".

☑ Latch Last Known Value

Data Monitor Settings

Update Rate

100 msec

Comm Failure Settings

This setting allows you to choose how the OPC server will report data to the clients when the communication fails.

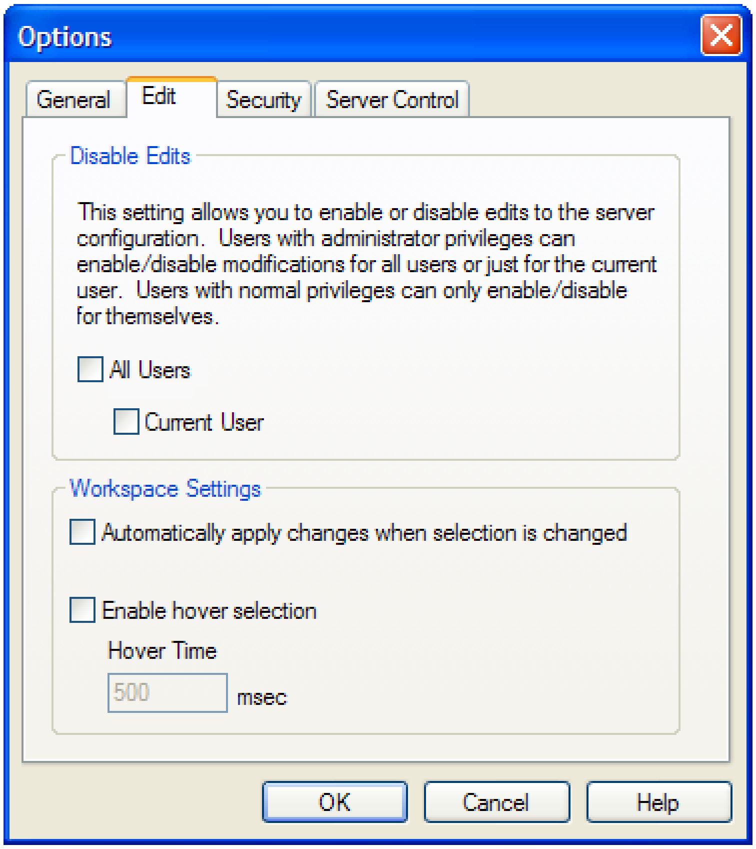
If Latch Last Known Value is checked and a last known value for the data is available, the server will report that value with a substatus of Last Known Value. If no last known value is available, the server will report no value with a substatus of Comm Failure.

If Latch Last Known Value is not checked, the server will report no value with a substatus of Comm Failure, regardless of whether or not a last known value is available.

Data Monitor Settings

Here you can specify the interval, in milliseconds, at which the Data Monitor will request data updates.

Edit Tab



Options

Disable Edits

This setting allows you to enable or disable edits to the server configuration. Users with administrator privileges can enable/disable modifications for all users or just for the current user. Users with normal privileges can only enable/disable for themselves.

□ All Users

□ Current User

Workspace Settings

□ Automatically apply changes when selection is changed

□ Enable hover selection

Hover Time

500 msec

Disable Edits

This section allows you to enable and disable configuration edits.

Users with administrator privileges can enable and disable edits for all users or just for the current user.

Users with normal privileges can enable and disable changes only for themselves.

Automatically Apply Changes When Selection Is Changed

This setting specifies what the editor should do when you make changes to the configuration of an object, and then select another object.

If the box is not checked, the editor will ask you if you want to save the changes.

If the box is checked, the editor will save the changes automatically, without asking.

Enable Hover Selection

This setting specifies how you want to select items in the right pane of the Selective Import Screen.

If this box is not checked, you must click on the items to select them.

If this box is checked, you can select an item by just pointing to it with the mouse.

Hover Time

When hover selection is enabled, this is the amount of time, in milliseconds, that the mouse pointer must hover before the item is selected.

Security Tab

For an OPC client and server to communicate, both systems must have proper DCOM security settings. There is no standard setting for OPC applications because each installation's security needs are unique. Therefore, you must decide how to configure security for your systems.

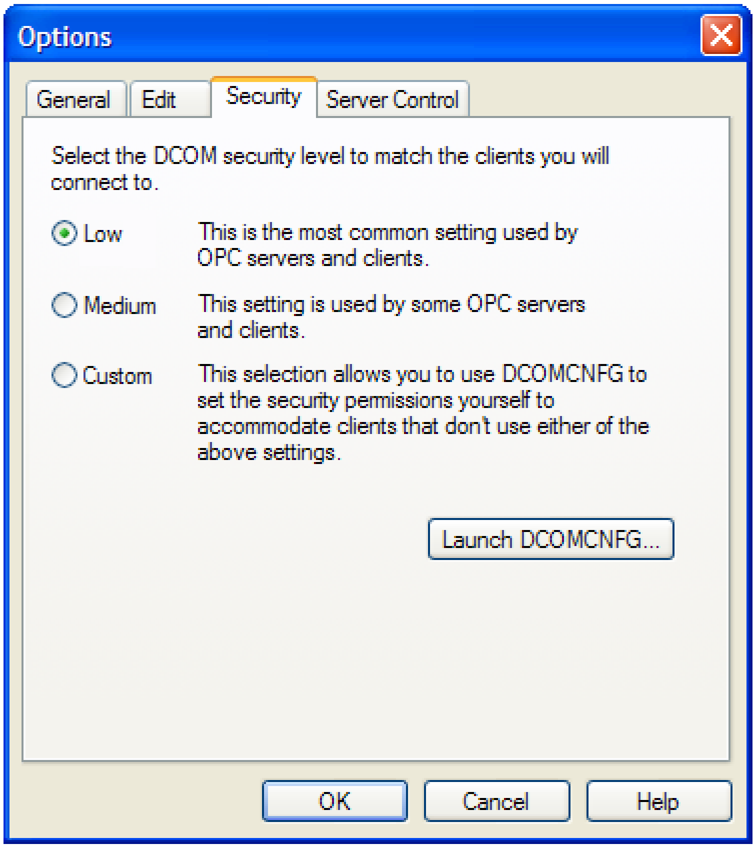
Caution!

If you change the selection on this tab, you must restart the Cyberlogic OPC Server for the new settings to take effect.

To restart the Server, open the Windows ***Control Panel***, go to ***Administrative Tools*** and then ***Services***. Right-click on ***Cyberlogic OPC Server*** and select ***Restart***.

For help in making these decisions and a detailed discussion of how to do the configuration, refer to the document *OPC & DCOM: A Guide to Using the Cyberlogic OPC Server via DCOM*. A copy of this document was installed on your system along with the software. To access it, open the Windows ***Start*** menu and go to ***Cyberlogic Suites.*** Next, open the ***Help*** sub-menu, then open ***OPC***, and then click on ***DCOM Help***.

For information about additional Windows security settings, including user accounts and the Windows firewall, refer to the Cyberlogic Control Panel Help.



Select the DCOM security level to match the clients you will connect to.

● Low — This is the most common setting used by OPC servers and clients.

○ Medium — This setting is used by some OPC servers and clients.

○ Custom — This selection allows you to use DCOMCNFG to set the security permissions yourself to accommodate clients that don't use either of the above settings.

As part of the security configuration, you must select the access permissions, authentication level and impersonation level to be used. Two settings for these parameters are used as defaults by many OPC-based products. These may be selected by choosing the Low or Medium settings from this screen.

Caution! The preconfigured Low and Medium security settings override only the access permissions, authentication level and impersonation level for the Cyberlogic OPC Server. The rest of the security settings must still be configured with the DCOMCNFG utility.

If neither of these is the correct setting for your situation, you can choose Custom and configure all of the security settings yourself through the Windows operating system.

Low

To use the low security settings, select ***Low*** and click the ***OK*** button. After that, click ***Launch DCOMCNFG...*** to configure the rest of the security settings.

The low security setting overrides the default server-specific security values, giving them the following settings:

Security Parameter	Setting	Description
Access Permissions	All Users	Allows calls from anyone.
Authentication Level	None	No authentication occurs.
Impersonation Level	Identify	The server can obtain the client's identity. The server can impersonate the client to do access control list (ACL) checks, but it cannot access system objects as the client.

Note

When the Server starts, it will set the security level with the following call:

```
CoInitializeSecurity(
NULL,
-1,
NULL,
NULL,
RPC_C_AUTHN_LEVEL_NONE,
RPC_C_IMP_LEVEL_IDENTIFY,
NULL,
EOAC_NONE,
NULL);
```

Medium

To use the medium security settings, select ***Medium*** and click the ***OK*** button. After that, click ***Launch DCOMCNFG...*** to configure the rest of the security settings.

The medium security setting overrides the default server-specific security values, giving them the following settings:

Security Parameter	Setting	Description
Access Permissions	All users	Allows calls from anyone.
Authentication Level	Packet	Authenticates credentials and verifies that all call data received is from the expected client.
Impersonation Level	Impersonate	The server can impersonate the client while acting on its behalf, but with restrictions. The server can access resources on the same computer as the client. If the server is on the same computer as the client, it can access network resources as the client. If the server is a computer different from the client, it can access only resources that are on the same computer as the server.

Note

When the Server starts, it will set the security level with the following call:

```
CSecurityDescriptor cSecurity;
cSecurity.InitializeFromThreadToken( );

CoInitializeSecurity(
cSecurity,
-1,
NULL,
NULL,
RPC_C_AUTHN_LEVEL_PKT,
RPC_C_IMP_LEVEL_IMPERSONATE,
NULL,
EOAC_NONE,
NULL);
```

Custom

To use custom security settings, select ***Custom*** and click the ***Launch DCOMCNFG...*** button.

When the selection is Custom, the server does not override the default security values. Instead, the settings you edited with DCOMCNFG are used.

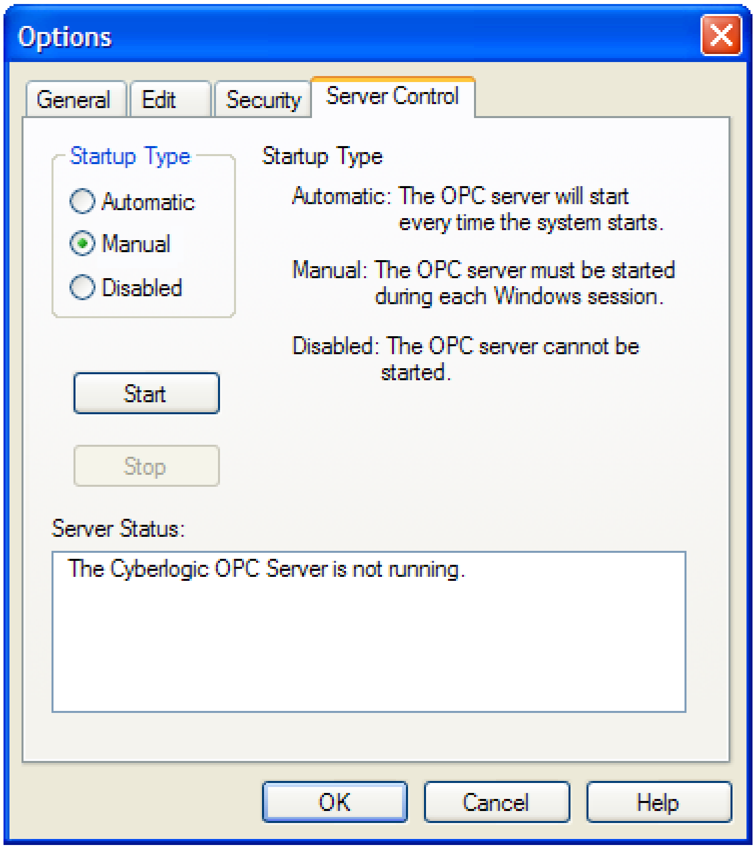
Launch DCOMCNFG...

Click this button to configure the security settings manually.

If you selected Custom, you must use DCOMCNFG to configure all of the security settings.

If you selected Low or Medium, you must use DCOMCNFG to configure all of the security settings except for the Cyberlogic OPC Server's access permissions, authentication level and impersonation level.

Server Control Tab



Startup Type

○ Automatic
● Manual
○ Disabled

Startup Type

Automatic: The OPC server will start every time the system starts.

Manual: The OPC server must be started during each Windows session.

Disabled: The OPC server cannot be started.

Server Status:

The Cyberlogic OPC Server is not running.

Startup Type

This setting allows you to select how the OPC server will start.

Automatic causes the OPC server to start when the system starts.

Manual requires you to manually start the OPC server for each Windows session.

Disabled prevents the OPC server from running.

Start

When the OPC server is stopped in automatic or manual mode, click this button to start it.

Stop

When the OPC server is running in automatic or manual mode, click this button to stop it.

Server Status

This window tells you if the OPC server is running or stopped.

Server Status Block

The Cyberlogic OPC Server has a set of 16-bit registers called the server status block. Physical devices on the network, such as PLCs, can read these registers to determine the current health and status of the server.

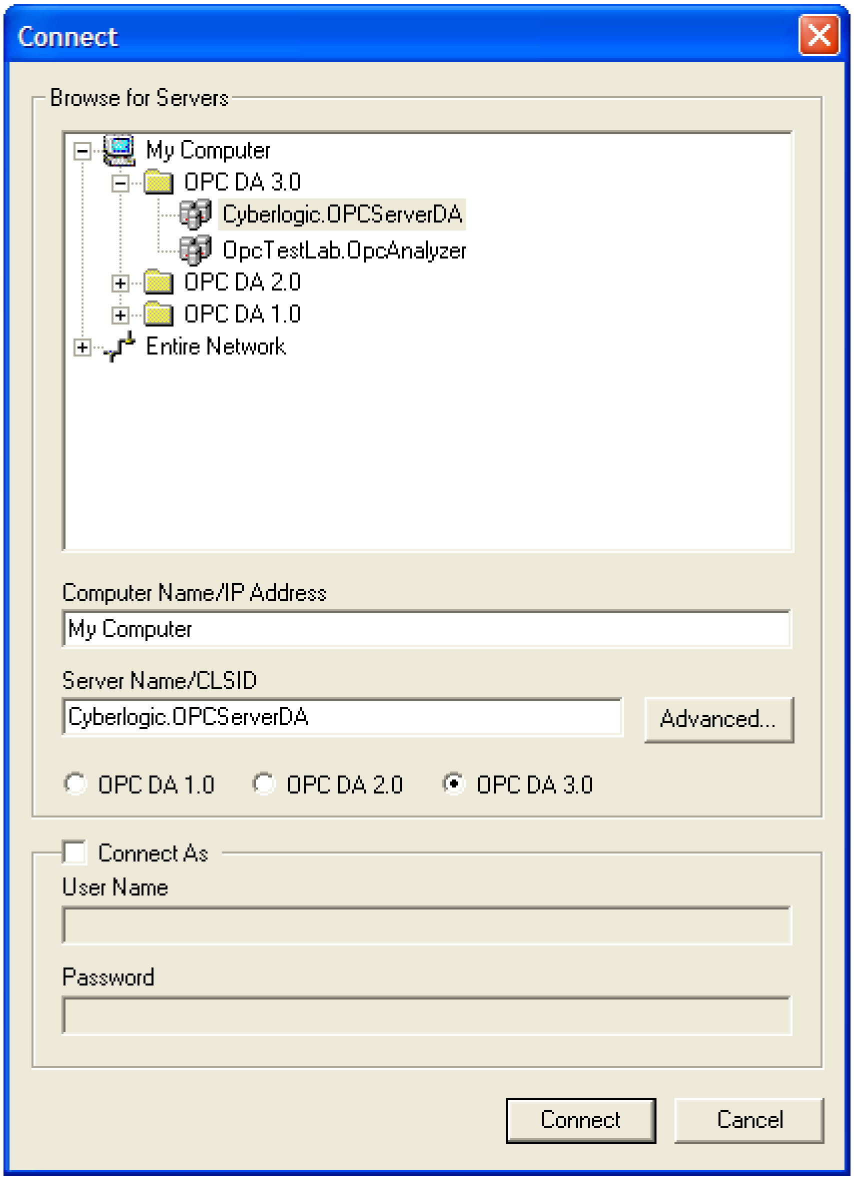
The location of the server status block depends upon the network type. For example, in the DHX OPC Server, the server status block is laid out as follows:

PLC-2	Other PLCs	Description
200	N7:0	Server version – Major (e.g. 5)
201	N7:1	Server version – Minor (e.g. 0)
202	N7:2	Server version – Build (e.g. 3)
203	N7:3	User configured server signature
204	N7:4	Server alive millisecond counter (Low word)
205	N7:5	Server alive millisecond counter (High word)

For information about location of the server status block for a particular driver agent, refer to the help file specific for that agent.

Connecting OPC Client Software

After completing your configuration, you will use an OPC client application to access the data from the Cyberlogic OPC Server. To do this, you must connect the client to the server. The exact method for doing this will vary somewhat from one client to another, but typically will be done by browsing a tree for available servers.



Computer Name/IP Address: My Computer

Server Name/CLSID: Cyberlogic.OPCServerDA

○ OPC DA 1.0 ○ OPC DA 2.0 ● OPC DA 3.0

□ Connect As

The figure illustrates this process for the Cyberlogic OPC Client application. You would navigate through the tree, looking for the available servers on the local machine or on other computers attached to your network. When you find the desired server, select it and click ***Connect***.

An important feature of the Cyberlogic OPC Client is the Connect As option. If you check this box, you can specify the user name and password of the account to be used to connect to the selected OPC server. This will override the default user account you configured for the client. Refer to the Cyberlogic OPC Client section for more details.

The servers available will be listed by their ProgID, Version-Independent ProgID or both. The example above shows a Version-Independent ProgID of Cyberlogic.OPCServerDA, with no version number appended. A ProgID would be Cyberlogic.OPCServerDA.8, with the .8 at the end specifying that this is version 8 of Cyberlogic’s OPC Server.

In general, it is preferable to use the Version-Independent ProgID to avoid the need to change the selection if you install a newer version of the server software. Some servers may allow you to have multiple versions installed at the same time. In such a case, you would use the ProgID to specify the exact version to connect to.

To connect an OPC Alarms and Events client, you would proceed in the same manner, selecting among the available AE servers. In the case of the Cyberlogic Alarms and Events server, the Version-Independent ProgID would be Cyberlogic.OPCServerAE.

The procedure for connecting an XML Data Access client application is explained in Appendix D: OPC XML Data Access Support.

VALIDATION & TROUBLESHOOTING

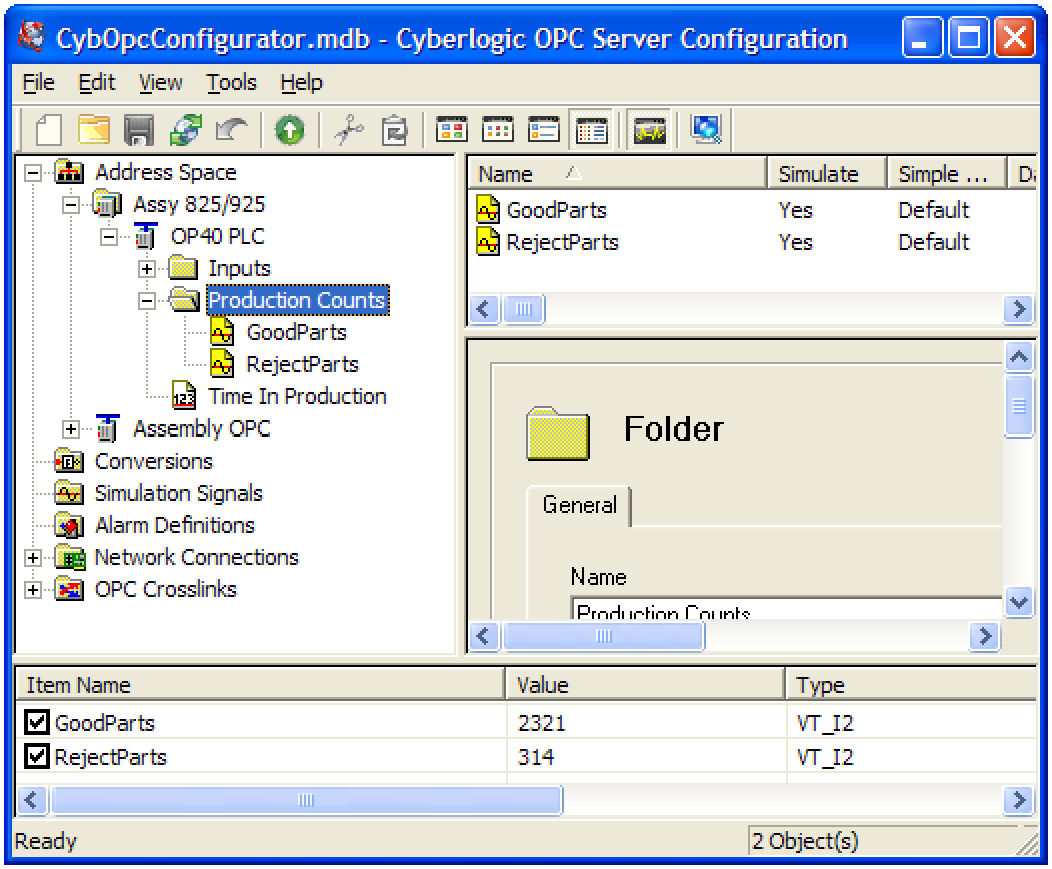
The following sections describe features that will help you to verify and troubleshoot your server's operation. The Data Monitor and Cyberlogic OPC Client allow you to view the data as it is received by the server. The DirectAccess feature lets you look at data values even if they have not been configured as data items. Status Items provide information about the health and performance of the server, network connections and nodes, devices, crosslinks and more.

Microsoft's Performance Monitor allows you to view relevant performance information. The Event Viewer may provide important status or error messages. Finally, there is a list of Cyberlogic OPC Server Messages and Frequently Asked Questions to assist in your troubleshooting.

Data Monitor

The Cyberlogic OPC Server Configuration Editor includes a built-in utility called the Data Monitor. It is a diagnostic tool that allows you to monitor the values of the data items.

To enable the Data Monitor, open the ***View*** menu and select ***Data Monitor***, or click the toolbar button. Another way is to right-click in the right pane and select ***Data Monitor*** from the context menu.



Name	Simulate	Simple ...	D
GoodParts	Yes	Default	
RejectParts	Yes	Default	

Name: Production Counts

Item Name	Value	Type
☑ GoodParts	2321	VT_I2
☑ RejectParts	314	VT_I2

With the Data Monitor enabled, the Cyberlogic OPC Server Configuration Editor acts as an OPC client to the Cyberlogic OPC Server. It creates an output display pane at the bottom of the main workspace window.

To choose the data items to view, select a device or folder in the Address Space tree. Each row in the Data Monitor corresponds to a data item in the selected folder or device.

Enable Checkbox

At the left end of each data item row is a checkbox that, when checked, enables monitoring of its data item. By default, this checkbox is not checked. To minimize unnecessary communications, enable only data items that you are interested in.

Item Name

Shows the name of the monitored data item.

Value

The data item's current value.

Type

The Data Monitor always requests data in the canonical (native) format. Therefore, the Type column shows the canonical data type of the requested data.

Timestamp

The timestamp for the data item's current value.

Quality, Substatus and Limit Status

Each data value returned by an OPC server has a 16-bit quality flag word associated with it. The low eight bits are currently defined in the form of three bit fields: Quality, Substatus and Limit Status. The Data Monitor displays the current value of each of these fields for the data item value. For more information, refer to the OPC Quality Flags section in the OPC Data Access specification.

Cyberlogic OPC Client

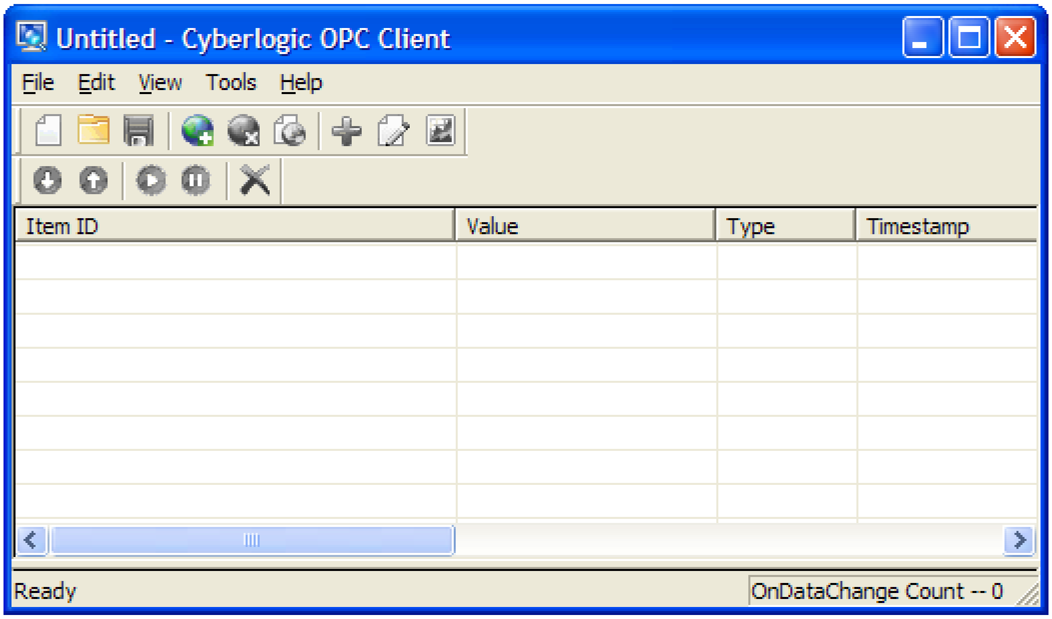
The Cyberlogic OPC Client is a stand-alone OPC DA client that you can use to test the operation of the Cyberlogic OPC Server and other OPC servers. Although its appearance resembles the Cyberlogic OPC Server Data Monitor, it contains many additional features. An important feature is its ability to view real-time values of data items from more than one device simultaneously. Running multiple instances of the client can also be useful when testing the server's response to various loads.

Typical Client Session

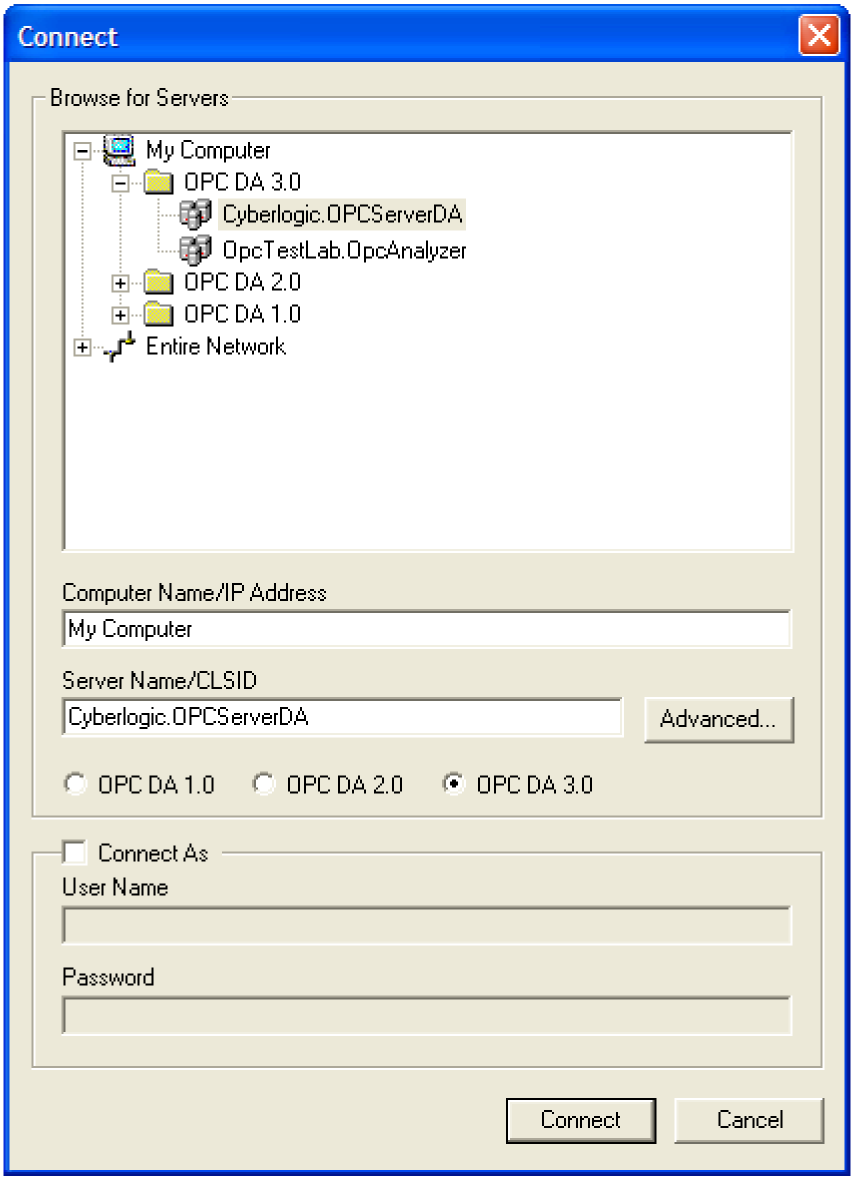
The following steps show how to use the Cyberlogic OPC Client. Use this only as a guideline of how to use the most common features. A detailed description of each feature follows this demonstration section.

1. Open the Windows ***Start*** menu and locate the ***Cyberlogic Suites*** sub-menu. From there, go to ***Diagnostics*** and select ***OPC Client***.

   You can also open the client from the OPC Server Configuration Editor's tool bar.



2. Click the ***Connect*** toolbar button, 🌐, or open the ***File*** menu and select ***Connect...***.



Computer Name/IP Address: My Computer

Server Name/CLSID: Cyberlogic.OPCServerDA

○ OPC DA 1.0 ○ OPC DA 2.0 ● OPC DA 3.0

□ Connect As

User Name

Password

The client application can connect to OPC servers running locally or on other machines on a network. Notice that the servers are organized into folders according to the OPC Data Access spec level they support.

3. Double-click on server ***Cyberlogic.OPCServerDA*** from the OPC DA 3.0 folder.

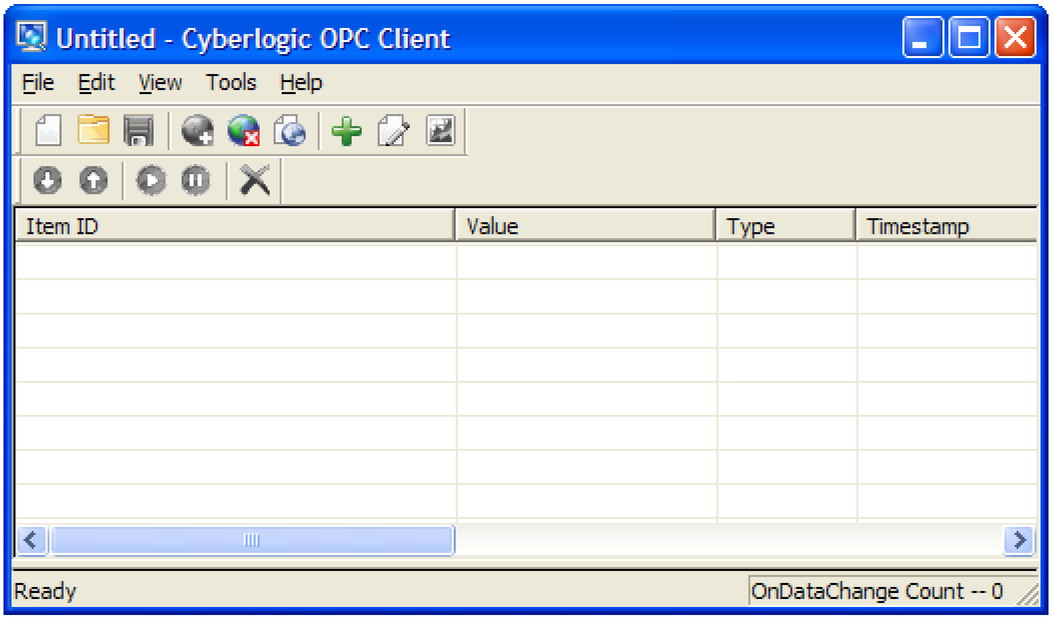
4. Choose the radio selection for ***OPC DA 3.0***.

   These choices allow you to restrict the client's operation to DA 1.0a level interfaces, 2.05a and below, or 3.00 and below.

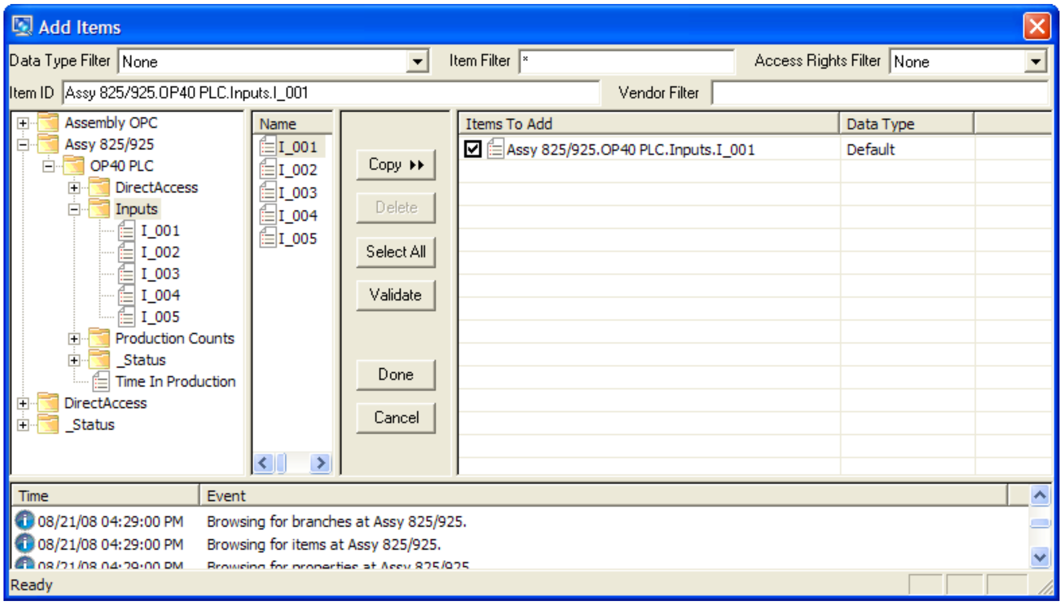
5. If you want to specify a user account to be used when connecting to this server, check ***Connect As*** and enter a ***User Name*** and ***Password***. This will override the default user account configured in the Client Options.

   For more information, refer to the Default User Tab section.

6. Click ***Connect***.



7. Click the ***Add Items*** toolbar button, or open the ***Edit*** menu and select ***Add Items…***.



Data Type Filter: None
Item Filter: *
Access Rights Filter: None
Item ID: Assy 825/925.OP40 PLC.Inputs.I_001
Vendor Filter:

Items To Add	Data Type
☑ Assy 825/925.OP40 PLC.Inputs.I_001	Default

```
Time                   Event
08/21/08 04:29:00 PM   Browsing for branches at Assy 825/925.
08/21/08 04:29:00 PM   Browsing for items at Assy 825/925.
08/21/08 04:29:00 PM   Browsing for properties at Assy 825/925
```

8. Navigate through the tree to find the folder containing the data item you wish to display.

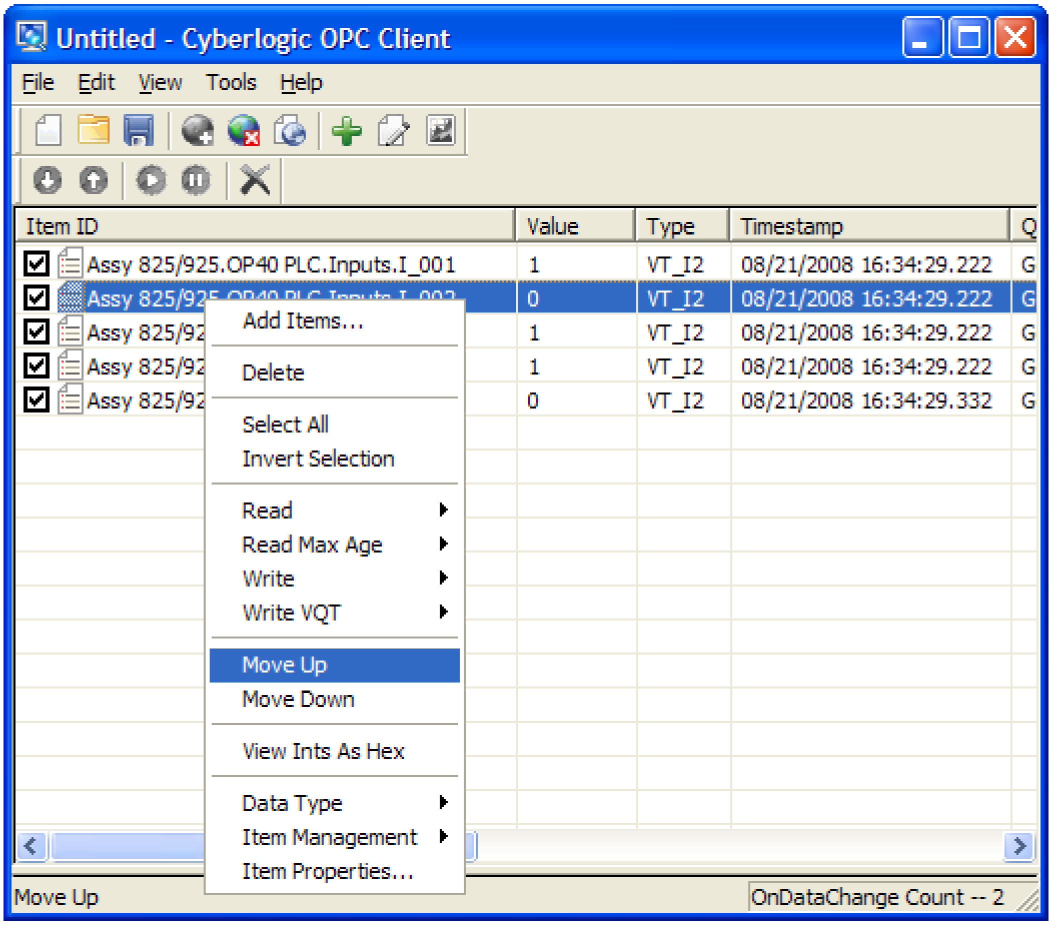
9. Select the data item from the ***Name*** box.

   If you had selected the data item, rather than the folder, from the tree, the Name box would display the properties of that item, which could then be displayed.

   You may limit the items shown in the Name box by using the Data Type Filter, Item Filter and Access Rights Filter boxes.

10. Click ***Copy*** to add the data item or property to the list.

11. When all of the desired data items have been added, click ***Done***.



Item ID	Value	Type	Timestamp	Q
☑ Assy 825/925.OP40 PLC.Inputs.I_001	1	VT_I2	08/21/2008 16:34:29.222	G
☑ Assy 825/925.OP40 PLC.Inputs.I_002	0	VT_I2	08/21/2008 16:34:29.222	G
☑ Assy 825/92	1	VT_I2	08/21/2008 16:34:29.222	G
☑ Assy 825/92	1	VT_I2	08/21/2008 16:34:29.222	G
☑ Assy 825/92	0	VT_I2	08/21/2008 16:34:29.332	G

Move Up

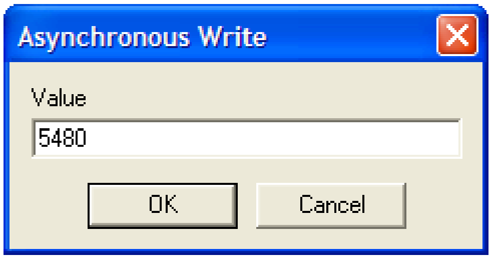
OnDataChange Count -- 2

12. Check the box next to each of the items to enable them.

    A data item must be enabled for the client to display its real-time values.

13. Right-click on an item to open a context menu that allows you to delete the item, move it up or down the list, view its properties and do other useful functions.

14. Select a data item that is not write-protected, and then click the toolbar's ***Asynchronous Write*** button, or open the ***Edit*** menu and select ***Write*** and then either ***Asynchronous...*** or ***Synchronous...***.



Value

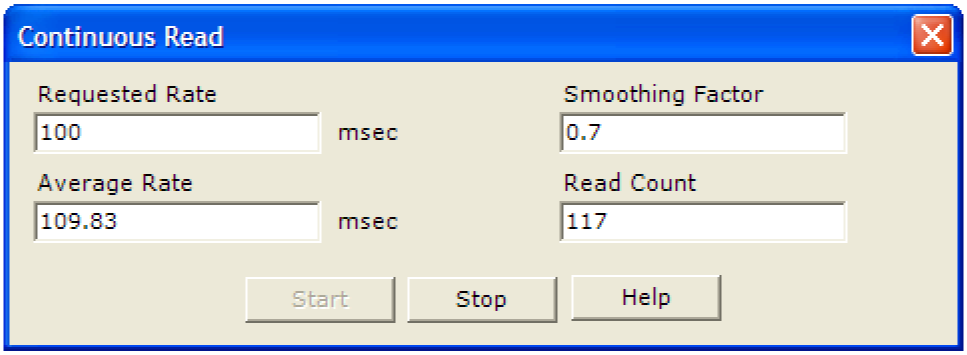
5480

15. Enter the ***Item Value*** you want to write.

16. Click ***OK***.

    The dialog box will close and the value will be written to the data item.

17. Select a data item and then open the ***Edit*** menu and select ***Read*** and then ***Continuous Asynchronous Read...*** .

    Requested Rate: 100 msec

    Smoothing Factor: 0.7

    Average Rate: 109.83 msec

    Read Count: 117

    The Continuous Read window will open.

18. Enter a value for ***Requested Rate*** and ***Smoothing Factor***, then click ***Start***.

    The Read Count field will display the number of reads that have occurred, and the Average Rate field will display the average length of time for those reads. The Average Rate calculation employs exponential smoothing, using the formula:

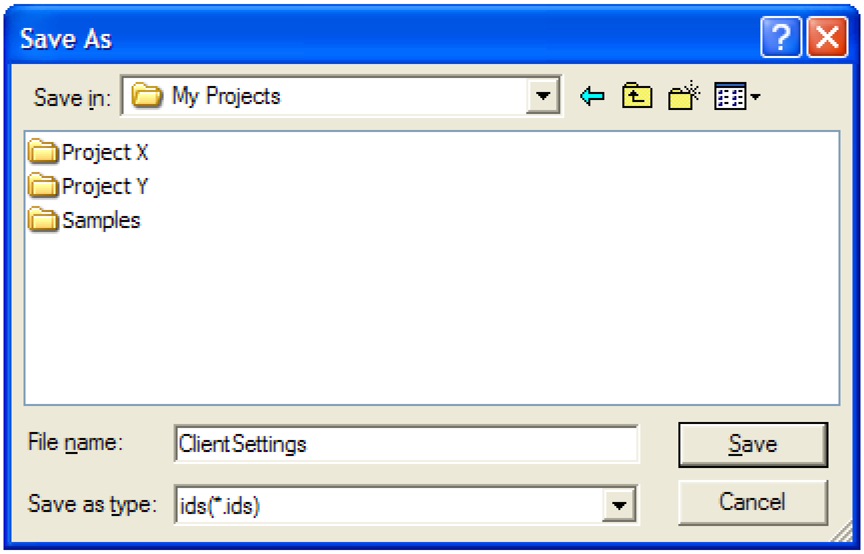
    Average Rate = Old Average Rate • ɑ + New Time • (1-ɑ)

    where ɑ is the Smoothing Factor. This value must be less than 1, but not less than 0. If it is 0, the Average Rate is simply the latest time for the read.

    This type of rate monitoring with smoothing is also available for continuous write and continuous browse operations.

19. Click ***Stop*** and close the dialog when you are finished.

20. Open the ***File*** menu and select ***Save As...*** .



Save in: My Projects

File name: ClientSettings

Save as type: ids(*.ids)

21. Browse to the desired directory and enter a ***File name***.

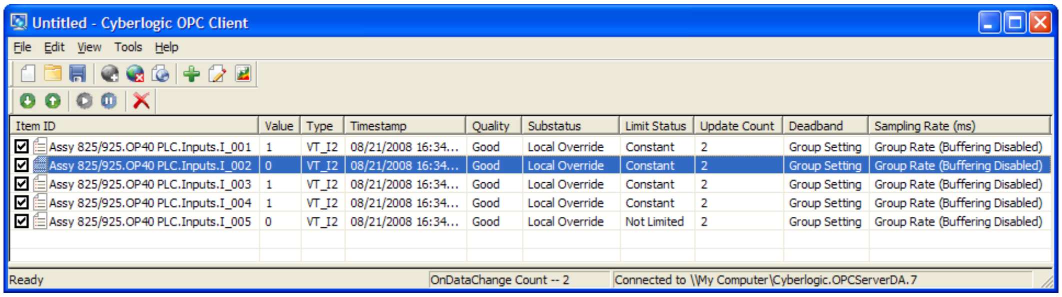
22. Click ***Save*** to save the client configuration for later use.

    When you are ready to reload a previously saved configuration, open the ***File*** menu, select ***Open...*** , browse for the directory and file with the desired configuration, and then click ***Open***.

23. To disconnect from the Server, click the ***Disconnect*** button or open the ***File*** menu and choose ***Disconnect***.

Main View Window

The main window of the Cyberlogic OPC Client resembles the Data Monitor of the Cyberlogic OPC Server Configuration Editor. Each data item uses one row with several data fields.



Item ID	Value	Type	Timestamp	Quality	Substatus	Limit Status	Update Count	Deadband	Sampling Rate (ms)
☑ Assy 825/925.OP40 PLC.Inputs.I_001	1	VT_I2	08/21/2008 16:34...	Good	Local Override	Constant	2	Group Setting	Group Rate (Buffering Disabled)
☑ Assy 825/925.OP40 PLC.Inputs.I_002	0	VT_I2	08/21/2008 16:34...	Good	Local Override	Constant	2	Group Setting	Group Rate (Buffering Disabled)
☑ Assy 825/925.OP40 PLC.Inputs.I_003	1	VT_I2	08/21/2008 16:34...	Good	Local Override	Constant	2	Group Setting	Group Rate (Buffering Disabled)
☑ Assy 825/925.OP40 PLC.Inputs.I_004	1	VT_I2	08/21/2008 16:34...	Good	Local Override	Constant	2	Group Setting	Group Rate (Buffering Disabled)
☑ Assy 825/925.OP40 PLC.Inputs.I_005	0	VT_I2	08/21/2008 16:34...	Good	Local Override	Not Limited	2	Group Setting	Group Rate (Buffering Disabled)

Ready | OnDataChange Count -- 2 | Connected to \\My Computer\Cyberlogic.OPCServerDA.7

Enable Checkbox

At the left end of each data item row is a checkbox that, when checked, enables monitoring of its data item. By default, this checkbox is not checked. To minimize unnecessary communications, enable only data items that you are interested in.

Item ID

This is the fully qualified Item ID string for the data item. The OPC client must use this string to access the data item.

Value

The data item’s current value.

Type

This column shows the data type of the requested data.

To change this, right-click on the data item and select ***Data Type*** from the context menu.

Timestamp

The timestamp for the data item’s current value.

Quality, Substatus and Limit Status

Each data value returned by an OPC server has a 16-bit quality flag word associated with it. The low eight bits are currently defined in the form of three bit fields: Quality, Substatus and Limit Status. The Data Monitor displays the current value of each of these fields for the data item value.

For more information, refer to the OPC Quality Flags section in the OPC Data Access specification.

Update Count

This is simply the number of times the data item has been updated.

Deadband

This applies to DA 3.0 analog values only. It is the minimum change in a value, expressed as percent of full scale, that must be exceeded for the data value to be updated in the cache on the basis of the value having changed.

Sampling Rate

This applies to DA 3.0 values only. It is the interval at which the server will read the item’s value from the device.

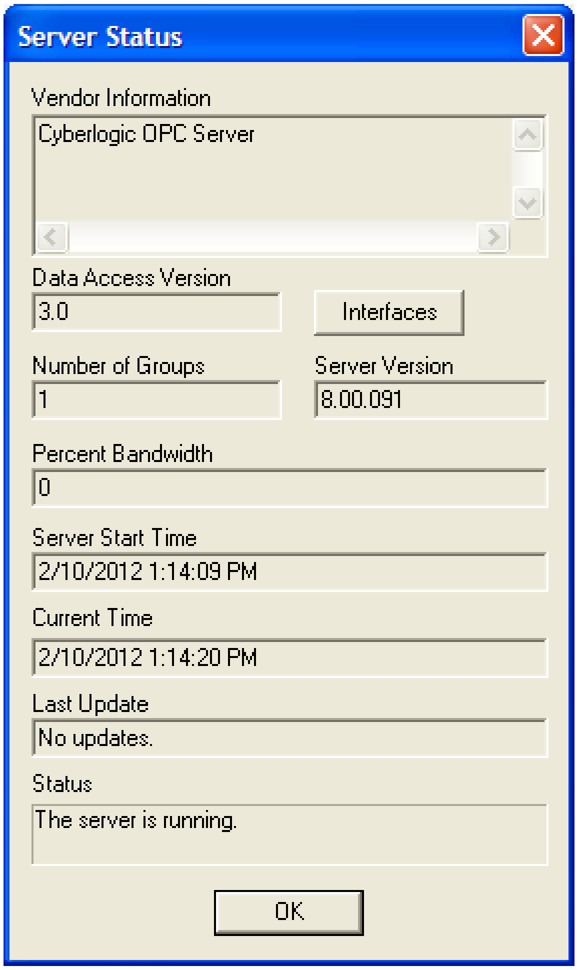
Arranging Data Item Order

By default, the client controls always add a new data item at the end of the data item list. To change this order, select an item and then click the ***Move Up*** or ***Move Down*** button on the toolbar, or open the ***Edit*** menu and select ***Move Up*** or ***Move Down***.

You can sort the data items in ascending or descending order based upon values in each column by clicking on the column's header bar.

Server Status

To view the server properties, open the ***File*** menu and select ***Server Status…***. The Server Status window will open.



Vendor Information: Cyberlogic OPC Server

Data Access Version: 3.0

Number of Groups: 1

Server Version: 8.00.091

Percent Bandwidth: 0

Server Start Time: 2/10/2012 1:14:09 PM

Current Time: 2/10/2012 1:14:20 PM

Last Update: No updates.

Status: The server is running.

Data Access Version

This indicates the OPC Data Access specification level used by the client to communicate to the server.

Interfaces

This button is available only for DA 3.0 servers. Click it to display a list of all of the COM interfaces supported by this server object.

Number of Groups

This indicates the total number of groups being managed by the server on behalf of this client. Since the Cyberlogic OPC Client uses a single group for all data items, this value is always equal to 1.

Server Version

This field displays the software revision level of the OPC server.

Percent Bandwidth

The behavior of this field is server-specific. Typically, it shows the approximate percent of bandwidth currently used by server. A value greater than 100% indicates that the combination of items and update rate is too high. The server may also return 0xFFFFFFFF if this value is unknown.

Server Start Time

This is the time (UTC) that the server was started. This is constant for the server instance and is not reset when the server changes states.

Last Update

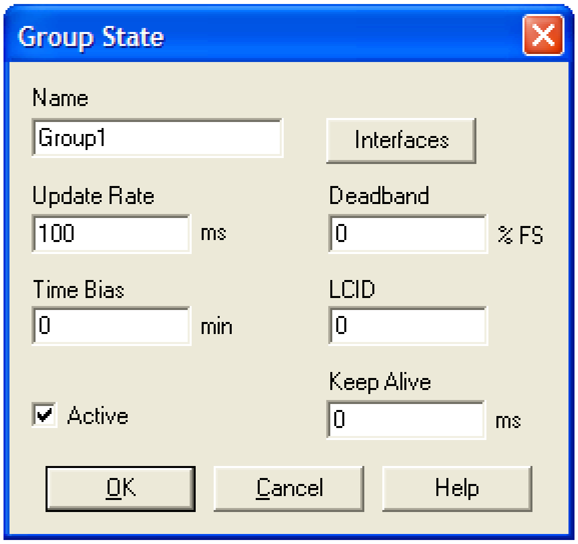
This is the time the server last sent a data value update.

Status

This text indicates the status of the server.

Group State

All of the data items you are viewing are part of a single OPC group. To view and edit various parameters for this group, open the ***Edit*** menu and select the ***Group State...*** option.



Name: Group1

Update Rate: 100 ms

Deadband: 0 % FS

Time Bias: 0 min

LCID: 0

☑ Active

Keep Alive: 0 ms

Name

This is the name of the group.

Interfaces

Click this button to display a list of all of the COM interfaces supported by this group object.

This button is available only for DA 3.0 servers.

Update Rate

This is the update rate returned by the server, which may be different from the requested update rate. In general, the OPC Server rounds the requested value up to the next available supported rate.

It is given as the interval between updates, specified in milliseconds.

Deadband

The percent change in an item value that will cause the server to send an update to a client.

This parameter applies only to analog items. The range of the Deadband is from 0 to 100 percent of full scale (FS).

Time Bias

This indicates the time zone in which the data was collected and is specified in minutes. The data collection time zone may be different from the time zone of either the client or the server.

The default time bias for the group is that of the server.

Note The Time Bias behaves like the Bias field in the Win32 TIME_ZONE_INFORMATION structure, which is to say it does not account for daylight saving time (DST).

The time bias is set only when the group is created or when Set State is called. In general, a client computes the data's local time by: Time Stamp + Time Bias + DST Bias (if any).

LCID

This value identifies the language the server uses when returning values as text. The following table shows the LCID codes for a few common languages.

Language	**LCID (hex)**
English (United States)	0x0409
German (Standard)	0x0407
French (Standard)	0x040c
Spanish (Traditional)	0x040a
Italian (Standard)	0x0410

A zero value indicates that the local language should be used.

Active

If you clear the Active checkbox for a group, you will disable all data item updates for that group.

Groups and items within groups have an Active flag. The active state of the group is maintained separately from the active state of the individual data items, so changing the state of the group does not change the state of the items.

Keep Alive

When a subscription has a non-zero Keep Alive time, the client will receive a callback on the subscription at least at the rate indicated by the Keep Alive time, even if there are no new events to report.

This feature is available with DA 3.0 servers only.

Saving/Reloading Data Items

To speed up the process of entering data items, the current client configuration can be saved to an ids file. To do that, open the ***File*** menu and choose ***Save...***.

To reload a previously saved configuration, select ***Open...*** from the ***File*** menu and then choose the ids file with the desired configuration.

For either of these options to be available, the client must be connected to the server. In addition, the items contained in the ids file must correspond to those items available within the present server configuration.

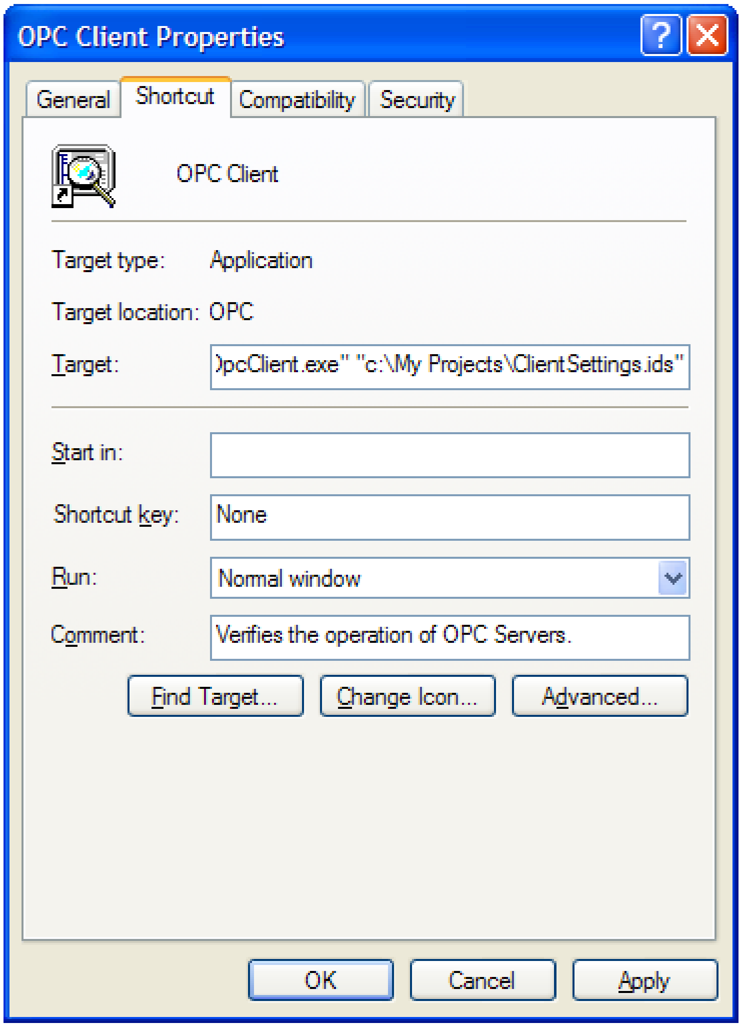
Shortcuts and Command Line Parameters

For quick access to client configuration files you have saved, you can set up Windows shortcuts that will open the client and load a specified ids configuration file. Here is the procedure to create such a shortcut.

1. Open the Windows ***Start*** menu and locate the ***Cyberlogic Suites*** sub-menu. From there, go to ***Diagnostics***.

2. Right-click on the ***OPC Client*** entry, drag it to the desktop, then drop it and select ***Copy Here*** from the context menu.

3. Right-click on the shortcut and select ***Properties*** from the context menu.



Target type: Application

Target location: OPC

Target:)pcClient.exe" "c:\My Projects\ClientSettings.ids"

Start in:

Shortcut key: None

Run: Normal window

Comment: Verifies the operation of OPC Servers.

The shortcut properties box will open.

4. Select the ***Shortcut*** tab.

5. Add the path and configuration file name to the ***Target*** field.

   Notice that the path and file name are enclosed in quotes and preceded by a space.

6. Click ***OK*** to save the changes.

Now, when you double-click the shortcut, the client will open and automatically load the configuration file.

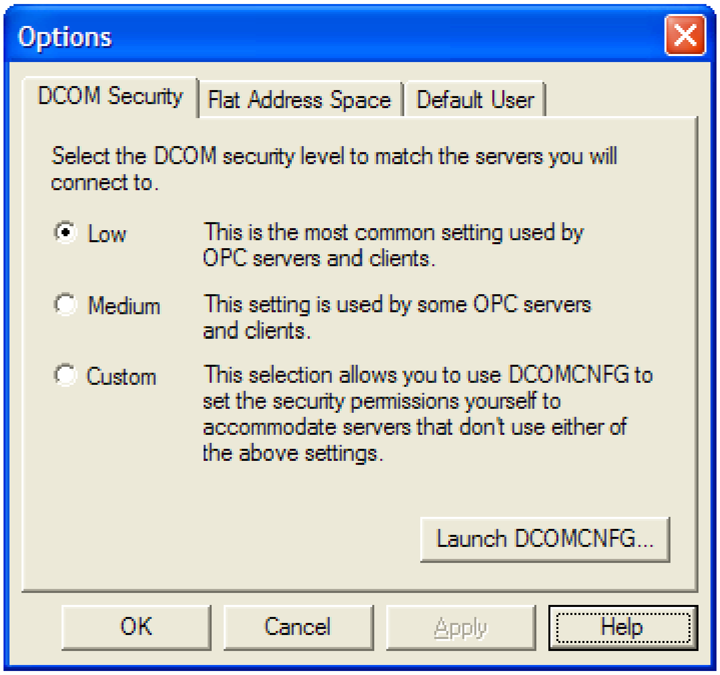
Client Options

Open the ***Tools*** menu and select ***Options...*** to set the client property preferences.

Security Tab

For an OPC client and server to communicate, both systems must have proper DCOM security settings. There is no standard setting for OPC applications, because each installation's security needs are unique. Therefore, you must decide how to configure security for your systems.

For help in making these decisions and a detailed discussion of how to do the configuration, refer to the document *OPC & DCOM: A Guide to Using the Cyberlogic OPC Server via DCOM*. A copy of this document was installed on your system along with the software. To access it, open the Windows ***Start*** menu and go to ***Cyberlogic Suites.*** Next, open the ***Help*** sub-menu, then open ***OPC***, and then click on ***DCOM Help***.



Select the DCOM security level to match the servers you will connect to.

● Low — This is the most common setting used by OPC servers and clients.

○ Medium — This setting is used by some OPC servers and clients.

○ Custom — This selection allows you to use DCOMCNFG to set the security permissions yourself to accommodate servers that don't use either of the above settings.

As part of the security configuration, you must select the access permissions, authentication level and impersonation level to be used. Two settings for these parameters are used as defaults by many OPC-based products. These may be selected by choosing the ***Low*** or ***Medium*** settings from this screen.

If neither of these is the correct setting for your situation, you must choose ***Custom*** and click ***Launch DCOMCNFG...*** to configure all of the security settings yourself through the Windows operating system.

Caution! The preconfigured Low and Medium security settings override only the access permissions, authentication level and impersonation level for the Cyberlogic OPC Client. The rest of the security settings configured with the DCOMCNFG utility still apply.

Low and Medium

For details of these settings, refer to the discussion of the Server Options Security Tab.

Custom

If neither of the preconfigured settings are suitable for your installation, you must choose ***Custom***. When the selection is Custom, the client does not override the default security values. Instead, the settings you edited with DCOMCNFG are used.

Launch DCOMCNFG...

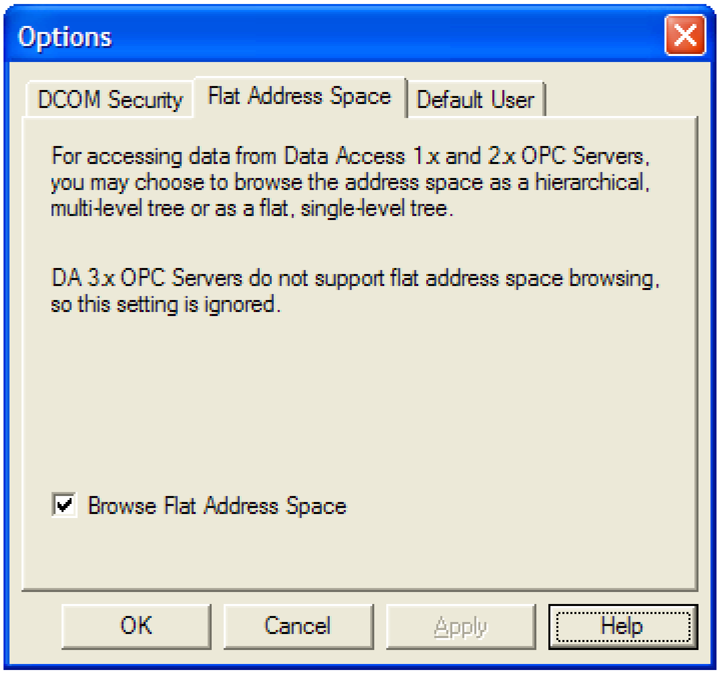
Click this button to configure the security settings manually.

If you selected Custom, you must use DCOMCNFG to configure all of the security settings. If you selected Low or Medium, you must use DCOMCNFG to configure all of the security settings except for the Cyberlogic OPC Client’s access permissions, authentication level and impersonation level.

Caution! If you change the selection on this tab, you must close the client and reopen it before the new settings will take effect.

Flat Address Space Browsing Tab

The OPC Server address space is normally shown with a multi-level tree structure. When browsing for elements, you may prefer to see the address space as a flat structure with all of the elements at a single level. This is supported in Data Access 1.x and 2.x compliant servers, but not in 3.x compliant servers.

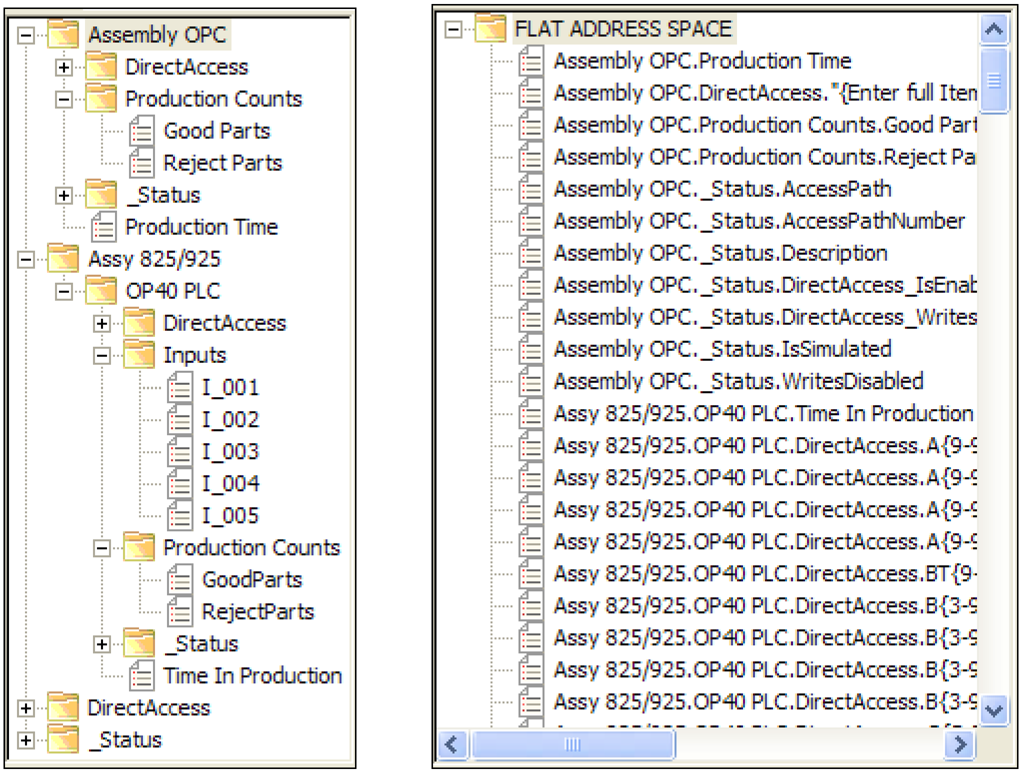


For accessing data from Data Access 1.x and 2.x OPC Servers, you may choose to browse the address space as a hierarchical, multi-level tree or as a flat, single-level tree.

DA 3.x OPC Servers do not support flat address space browsing, so this setting is ignored.

☑ Browse Flat Address Space

If your server supports this feature, check ***Browse Flat Address Space*** to use it.

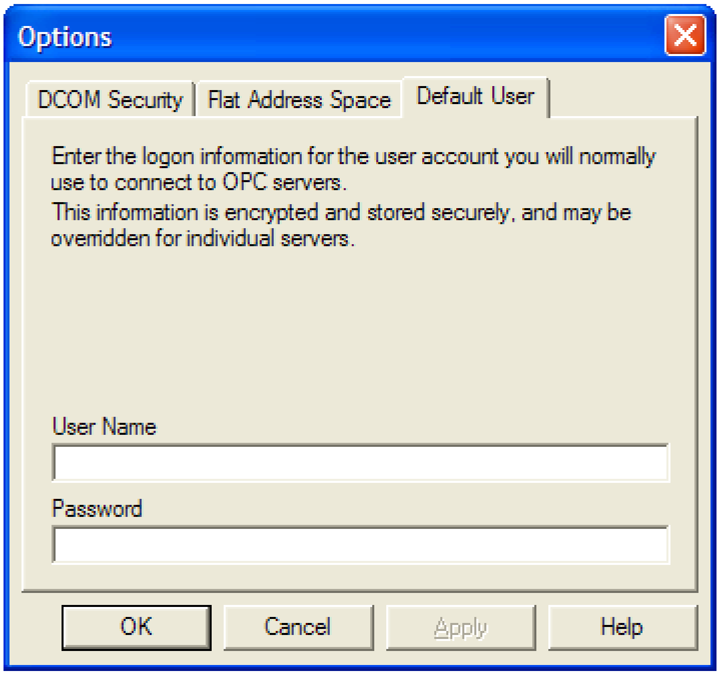


```
⊟ Assembly OPC
    ⊞ DirectAccess
    ⊟ Production Counts
        Good Parts
        Reject Parts
    ⊞ _Status
      Production Time
⊟ Assy 825/925
    ⊟ OP40 PLC
        ⊞ DirectAccess
        ⊟ Inputs
            I_001
            I_002
            I_003
            I_004
            I_005
        ⊟ Production Counts
            GoodParts
            RejectParts
        ⊞ _Status
          Time In Production
⊞ DirectAccess
⊞ _Status
```

```
⊟ FLAT ADDRESS SPACE
    Assembly OPC.Production Time
    Assembly OPC.DirectAccess."{Enter full Iten
    Assembly OPC.Production Counts.Good Part
    Assembly OPC.Production Counts.Reject Pa
    Assembly OPC._Status.AccessPath
    Assembly OPC._Status.AccessPathNumber
    Assembly OPC._Status.Description
    Assembly OPC._Status.DirectAccess_IsEnab
    Assembly OPC._Status.DirectAccess_Writes
    Assembly OPC._Status.IsSimulated
    Assembly OPC._Status.WritesDisabled
    Assy 825/925.OP40 PLC.Time In Production
    Assy 825/925.OP40 PLC.DirectAccess.A{9-9
    Assy 825/925.OP40 PLC.DirectAccess.A{9-9
    Assy 825/925.OP40 PLC.DirectAccess.A{9-9
    Assy 825/925.OP40 PLC.DirectAccess.A{9-9
    Assy 825/925.OP40 PLC.DirectAccess.BT{9-
    Assy 825/925.OP40 PLC.DirectAccess.B{3-9
    Assy 825/925.OP40 PLC.DirectAccess.B{3-9
    Assy 825/925.OP40 PLC.DirectAccess.B{3-9
    Assy 825/925.OP40 PLC.DirectAccess.B{3-9
```

Flat Address Space Browsing:
The left pane shows the normal view and the right pane shows the flat view.

Default User Tab



Options

Enter the logon information for the user account you will normally use to connect to OPC servers.

This information is encrypted and stored securely, and may be overridden for individual servers.

User Name

Password

This tab allows you to specify a user name and password for the default account that will be used to connect to OPC servers. If you wish, you can override this default for individual servers when you connect to them.

Note The user name and password are encrypted and stored on the system in a secure manner.

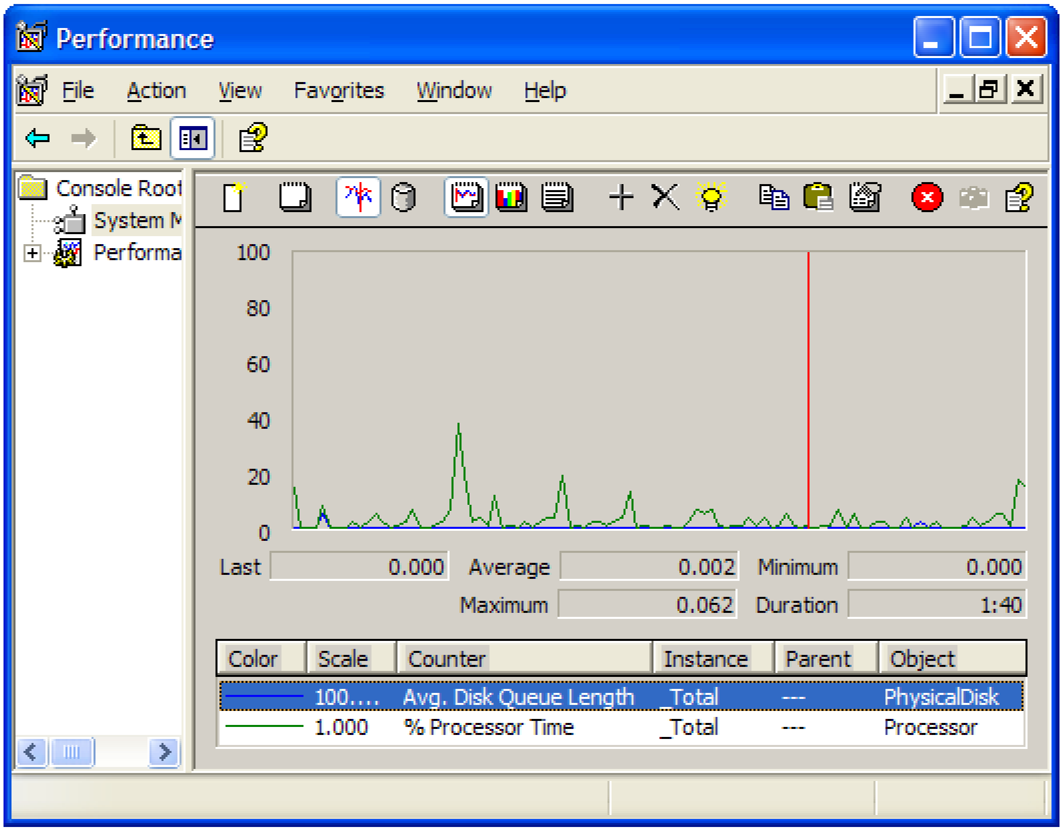
Performance Monitor

Microsoft provides a diagnostic tool, the Performance Monitor, as part of the Windows operating system. Applications supporting the Performance Monitor allow users to monitor relevant performance information. Multiple devices can be monitored simultaneously for comparison.

To run the program, open the Windows ***Start*** menu and locate the ***Cyberlogic Suites*** sub-menu. From there, go to ***Diagnostics*** and select ***Performance Monitor***.

How to Use the Performance Monitor

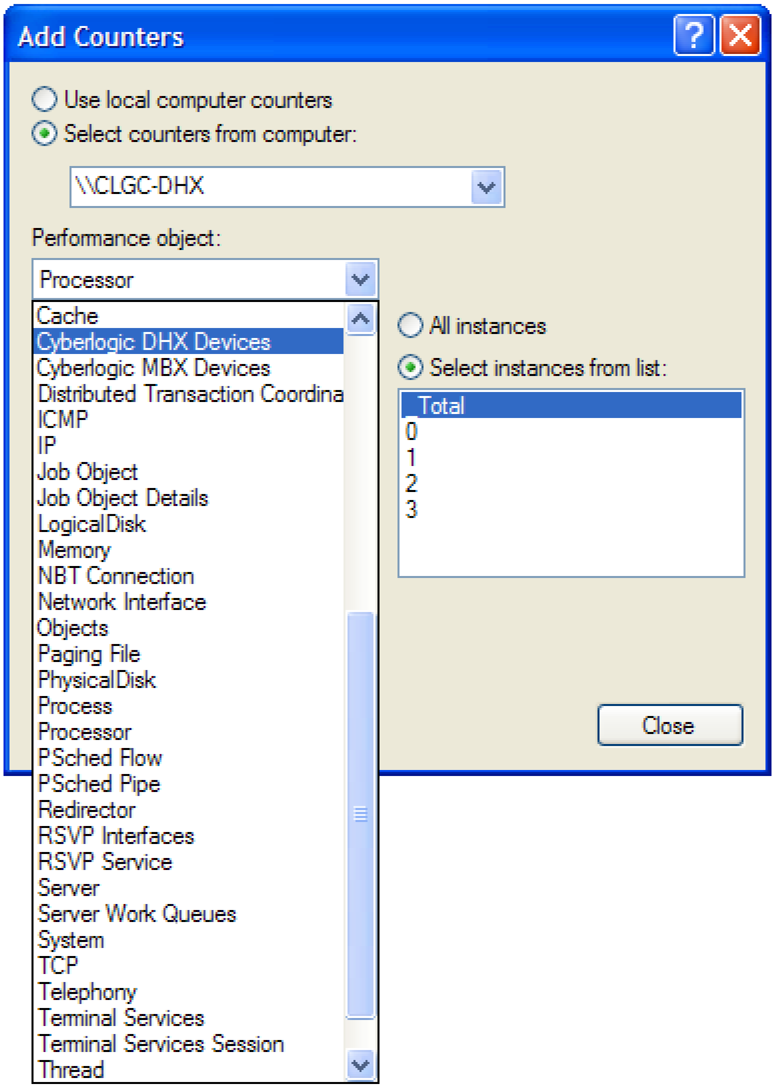
Since extensive help is provided for this program by Microsoft, only a few points that are relevant to the Cyberlogic drivers will be shown here. In this example, we will use the tool to check the performance of the DHX Driver. You would use the same procedure for any of the other drivers.



Last 0.000 Average 0.002 Minimum 0.000
Maximum 0.062 Duration 1:40

Color	Scale	Counter	Instance	Parent	Object
🟦	100....	Avg. Disk Queue Length	_Total	---	PhysicalDisk
🟩	1.000	% Processor Time	_Total	---	Processor

1. When the Performance Monitor program starts, click the + button on the tool bar.



Add Counters

○ Use local computer counters

● Select counters from computer:

\\CLGC-DHX

Performance object:

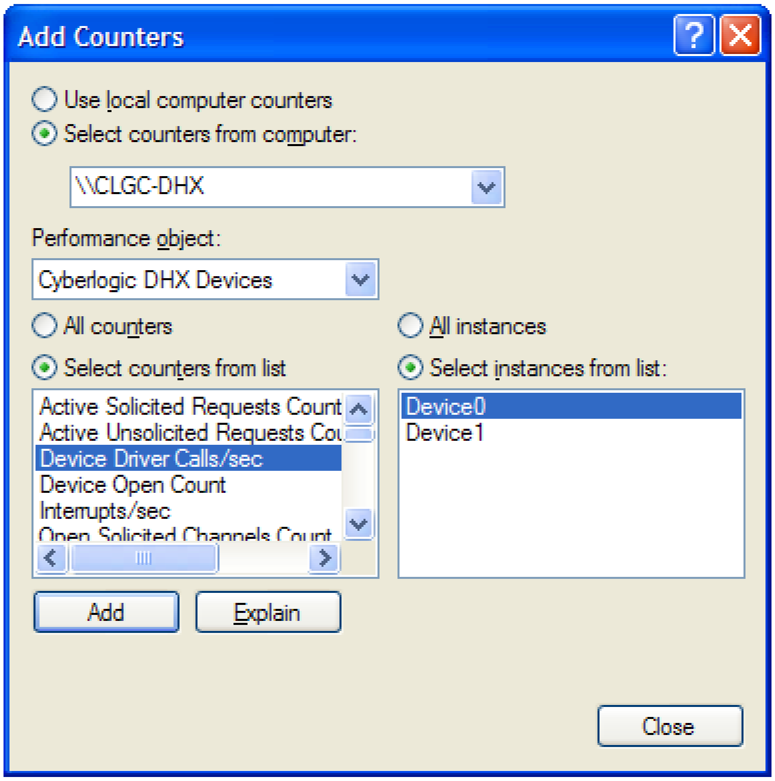
Processor

○ All instances

● Select instances from list:

Total

2. Select ***Cyberlogic DHX Devices*** from the ***Performance object*** list.



Add Counters

○ Use local computer counters
● Select counters from computer:

\\CLGC-DHX

Performance object:

Cyberlogic DHX Devices

○ All counters
● Select counters from list

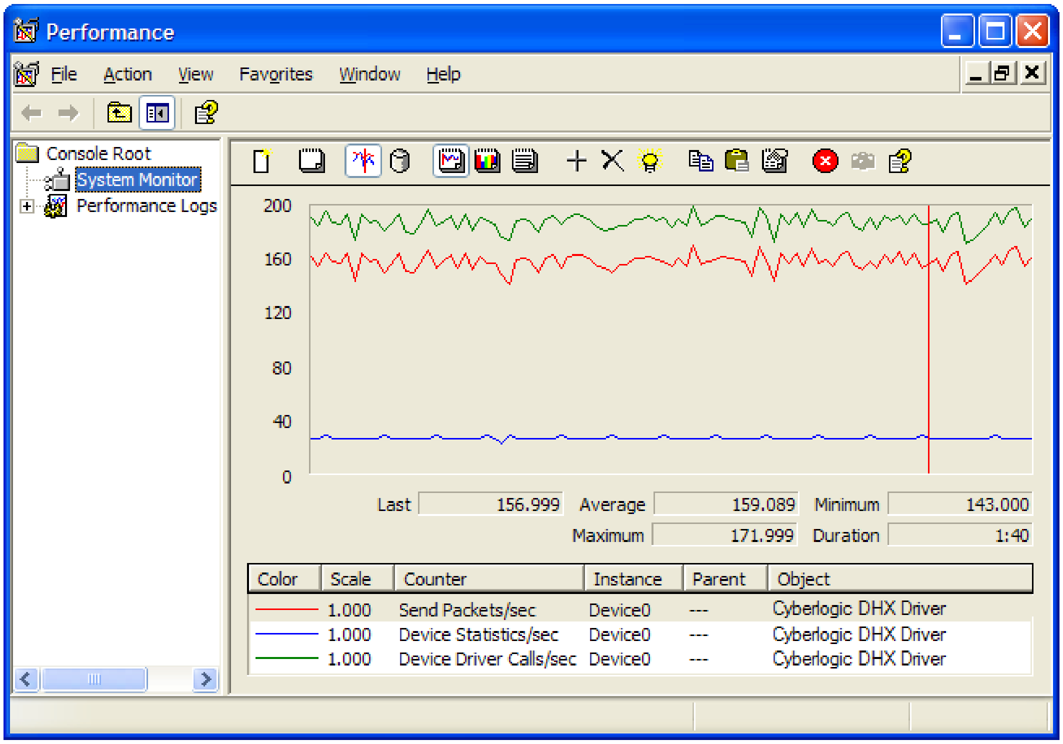
- Active Solicited Requests Count
- Active Unsolicited Requests Cou
- Device Driver Calls/sec
- Device Open Count
- Interrupts/sec
- Open Solicited Channels Count

○ All instances
● Select instances from list:

- Device0
- Device1

3. Choose a counter and the DHX device, and click ***Add***. Repeat this for all the counters you want to view.

4. Click ***Close***. The counters you chose will then be displayed in graphical format.



Last 156.999 Average 159.089 Minimum 143.000
Maximum 171.999 Duration 1:40

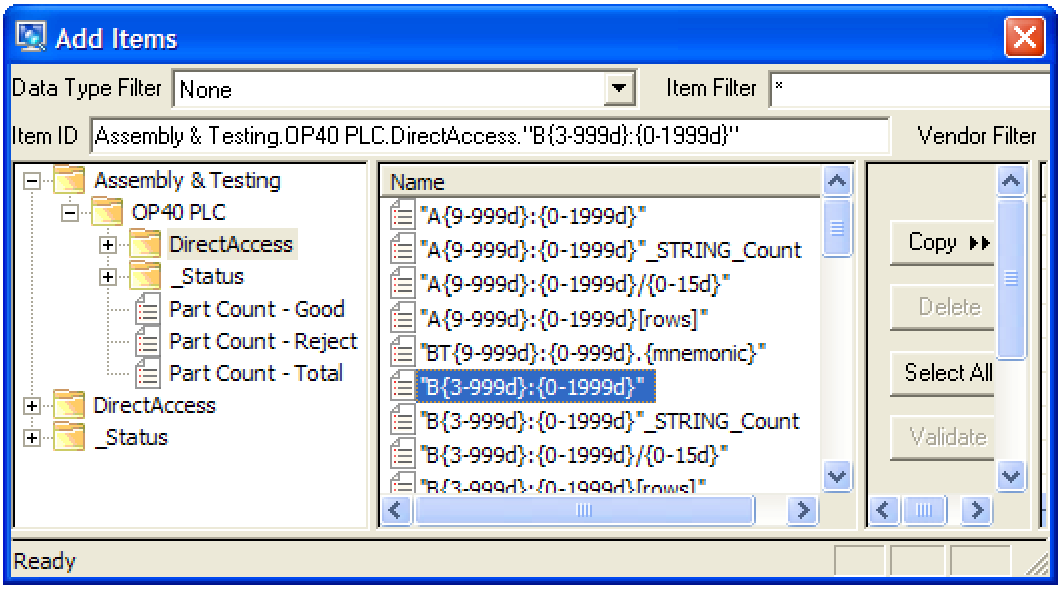
Color	Scale	Counter	Instance	Parent	Object
🟥	1.000	Send Packets/sec	Device0	---	Cyberlogic DHX Driver
🟦	1.000	Device Statistics/sec	Device0	---	Cyberlogic DHX Driver
🟩	1.000	Device Driver Calls/sec	Device0	---	Cyberlogic DHX Driver

DirectAccess

At run time, in addition to the user-configured branches, the Cyberlogic OPC Server dynamically creates DirectAccess branches in its address space. These are created for network nodes, devices and crosslinks. For detailed information on DirectAccess to crosslinks, refer to the OPC Crosslink Help.

DirectAccess allows read and write operations. However, for extra security, write operations are disabled by default. If writes are permissible, they can be enabled on a node-by-node basis as part of the network node configuration, and on a device-by-device basis as part of the device configuration.

Device DirectAccess



Add Items

Data Type Filter: None

Item Filter: *

Item ID: Assembly & Testing.OP40 PLC.DirectAccess."B{3-999d}:{0-1999d}"

Vendor Filter

- Assembly & Testing
  - OP40 PLC
    - DirectAccess
    - _Status
    - Part Count - Good
    - Part Count - Reject
    - Part Count - Total
- DirectAccess
- _Status

Name

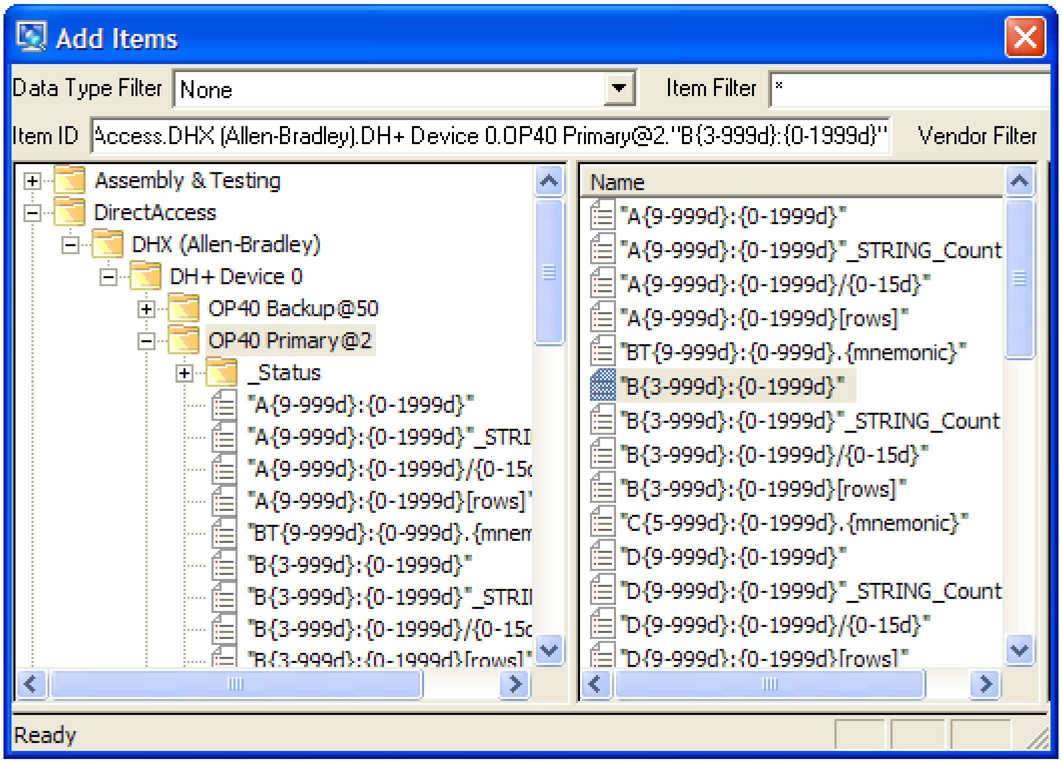
"A{9-999d}:{0-1999d}"
"A{9-999d}:{0-1999d}"_STRING_Count
"A{9-999d}:{0-1999d}/{0-15d}"
"A{9-999d}:{0-1999d}[rows]"
"BT{9-999d}:{0-999d}.{mnemonic}"
"B{3-999d}:{0-1999d}"
"B{3-999d}:{0-1999d}"_STRING_Count
"B{3-999d}:{0-1999d}/{0-15d}"
"B{3-999d}:{0-1999d}[rows]"

Ready

Each device in the address space will contain all of its configured data items, plus a DirectAccess branch, as shown in the example above. This branch will appear only for devices that have DirectAccess enabled. OPC clients can then use this branch to access any register in the device by directly specifying the register address.

In the DirectAccess branch for a device, the Cyberlogic OPC Server reports a list of hints about the types of data items that may exist on the selected device. These are not valid item addresses. Rather, they are just hints to help the user to specify a proper address. For more details on using these hints, refer to the Address Hints section.

Network Node DirectAccess



Add Items

Data Type Filter: None

Item Filter: *

Item ID: Access.DHX (Allen-Bradley).DH+ Device 0.OP40 Primary@2."B{3-999d}:{0-1999d}"

Vendor Filter

Assembly & Testing
DirectAccess
DHX (Allen-Bradley)
DH+ Device 0
OP40 Backup@50
OP40 Primary@2
_Status
"A{9-999d}:{0-1999d}"
"A{9-999d}:{0-1999d}"_STRI
"A{9-999d}:{0-1999d}/{0-15c
"A{9-999d}:{0-1999d}[rows]"
"BT{9-999d}:{0-999d}.{mnem
"B{3-999d}:{0-1999d}"
"B{3-999d}:{0-1999d}"_STRI
"B{3-999d}:{0-1999d}/{0-15c
"B{3-999d}:{0-1999d}[rows]"

Name
"A{9-999d}:{0-1999d}"
"A{9-999d}:{0-1999d}"_STRING_Count
"A{9-999d}:{0-1999d}/{0-15d}"
"A{9-999d}:{0-1999d}[rows]"
"BT{9-999d}:{0-999d}.{mnemonic}"
"B{3-999d}:{0-1999d}"
"B{3-999d}:{0-1999d}"_STRING_Count
"B{3-999d}:{0-1999d}/{0-15d}"
"B{3-999d}:{0-1999d}[rows]"
"C{5-999d}:{0-1999d}.{mnemonic}"
"D{9-999d}:{0-1999d}"
"D{9-999d}:{0-1999d}"_STRING_Count
"D{9-999d}:{0-1999d}/{0-15d}"
"D{9-999d}:{0-1999d}[rows]"

Ready

DirectAccess to network nodes is achieved through a branch called DirectAccess at the root of the address space. This branch acts like a device folder that contains all of the configured network connections.

As you can see in the example above, each network connection branch contains its configured network nodes. However, only network nodes that enable DirectAccess are present. OPC clients can then use this branch to access any bit or register in any configured network node by directly specifying its address.

For network nodes in the DirectAccess branch, the Cyberlogic OPC Server reports a list of hints about the types of data items that may exist on the selected node. These are not valid item addresses. Rather, they are just hints to help the user to specify a proper address.

Address Hints

In the PLC-5 example above, "B{3-999d}:{0-1999d}" is an address hint. The B indicates the file type, which in this case is a binary file.

The next field, {3-999d}, specifies the file number, which must be a decimal number between 3 and 999. A colon follows the file number.

The last field, {0-1999d}, specifies the register number, which must be a decimal number between 0 and 1999.

Therefore, to access the register located at B3:100 using DirectAccess to the network node, you would edit the Item ID field at the top of the dialog box to read:

DirectAccess.DHX (Allen-Bradley).DH+ Device 0.OP40 Primary@2."B3:100"

To access the same register using DirectAccess to the device, you would edit the Item ID to read:

Assembly & Testing.OP40 PLC.DirectAccess."B3:100"

An input address hint might be of the form "I:{0-277o}/{0-17o}". In this case, the number ranges are in octal and a typical address is "I:3/1".

Here is a brief explanation of the other address hints:

{Any valid reference}#{Conversion}

This form allows you to apply a previously configured data conversion to a raw register value in order to convert it into a form that is more useful to the client. When the conversion name is preceded by a # sign, the canonical data type for the requested data will always be VT_R8 (64-bit floating point).

{Any valid reference}@{Conversion}

This form allows you to apply a previously configured data conversion to a raw register value in order to convert it into a form that is more useful to the client. When the conversion name is preceded by an @ sign, the canonical data type will match the data type of the requested register or the specified {Data Type Override}.

Note

The address hints are shown enclosed in double-quotes, and the item address you specify in place of the hint must also be enclosed in double-quotes. If a data type override is used, it is not enclosed in the double-quotes.

Previous versions of the Cyberlogic OPC Server did not require the double-quotes, but had the requirement that any periods (.) in the address had to be replaced with a forward slash (/). This format is still valid, for compatibility with existing configurations. However, the double-quote format is preferred for new configurations.

Other types of controllers will have address hints that are appropriate for the type of addressing they use. For more information about DirectAccess and additional information on address hints, refer to the help file for your specific driver agent.

Status Items

The Cyberlogic OPC Server provides status items that are accessible to any connected OPC client application. These items provide health and performance information about the server itself, as well as the network connections, network nodes, devices and crosslinks.

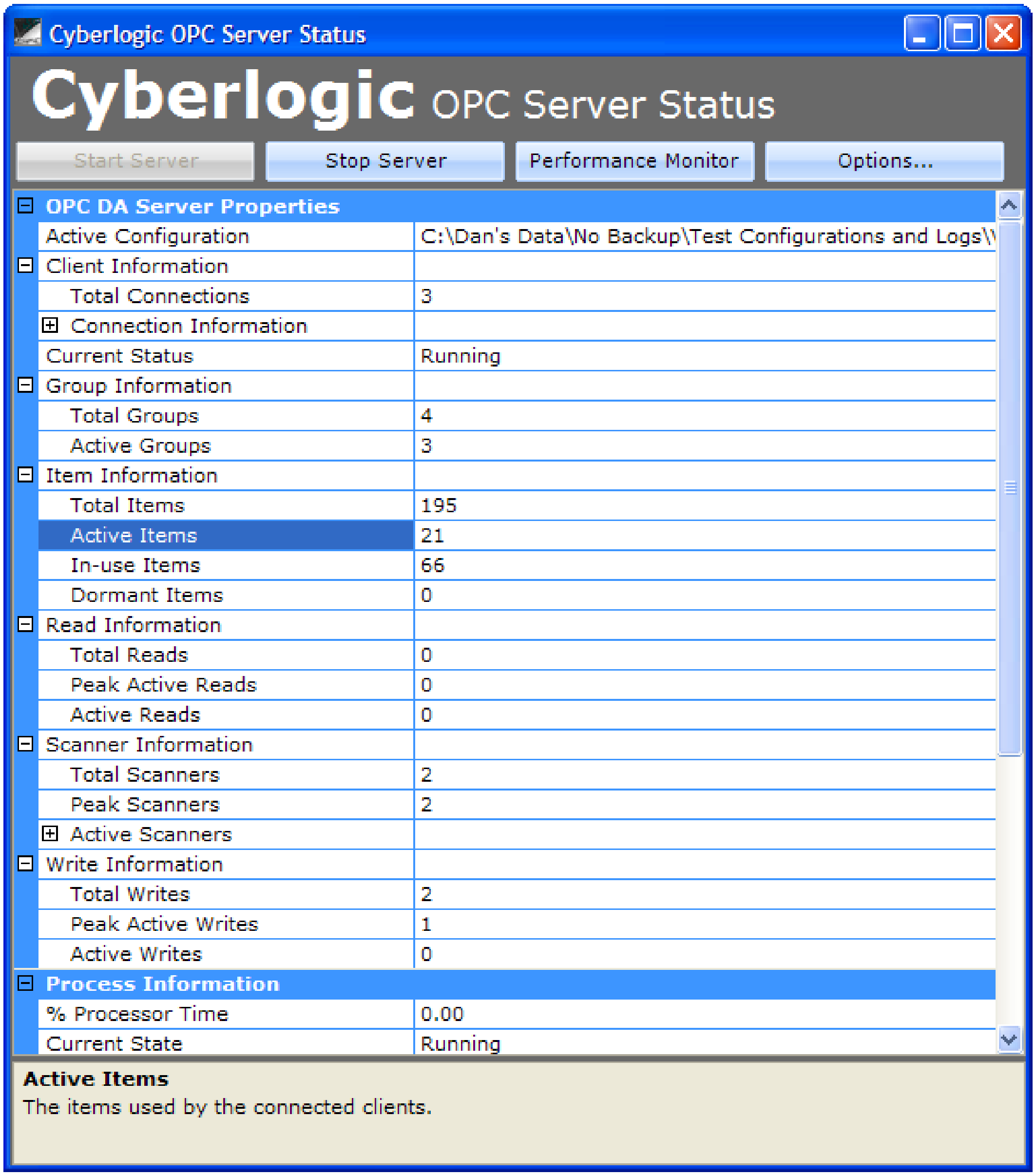
In addition, a Cyberlogic OPC Server Status application is provided as part of all Cyberlogic OPC Server Suites. This application provides information about the overall operation of the OPC DA server in a more readable form.

The following sections provide detailed information on the Cyberlogic OPC Server Status Application as well as Status Item Definitions.

Cyberlogic OPC Server Status Application

The Cyberlogic OPC Server Status application provides access to a wealth of information about the operation of the Cyberlogic OPC DA server that is running on your system. It also provides an easy means of starting and stopping the server and launching the Windows Performance Monitor.

To launch the Cyberlogic OPC Server Status application, open the Windows ***Start*** menu and locate the ***Cyberlogic Suites*** sub-menu. From there, go to ***Diagnostics*** and select ***OPC Status***.



⊟ **OPC DA Server Properties**	
Active Configuration	C:\Dan's Data\No Backup\Test Configurations and Logs\\
⊟ Client Information	
Total Connections	3
⊞ Connection Information	
Current Status	Running
⊟ Group Information	
Total Groups	4
Active Groups	3
⊟ Item Information	
Total Items	195
Active Items	21
In-use Items	66
Dormant Items	0
⊟ Read Information	
Total Reads	0
Peak Active Reads	0
Active Reads	0
⊟ Scanner Information	
Total Scanners	2
Peak Scanners	2
⊞ Active Scanners	
⊟ Write Information	
Total Writes	2
Peak Active Writes	1
Active Writes	0
⊟ **Process Information**	
% Processor Time	0.00
Current State	Running

Active Items
The items used by the connected clients.

The application will open, showing you the available status information. For an explanation of the displayed items, refer to the Status Item Definitions section.

When the application is running, an icon will appear in the Windows System Tray.

Start Server

Click this button to start the Cyberlogic OPC server.

Stop Server

Click this button to stop the Cyberlogic OPC server.

Performance Monitor

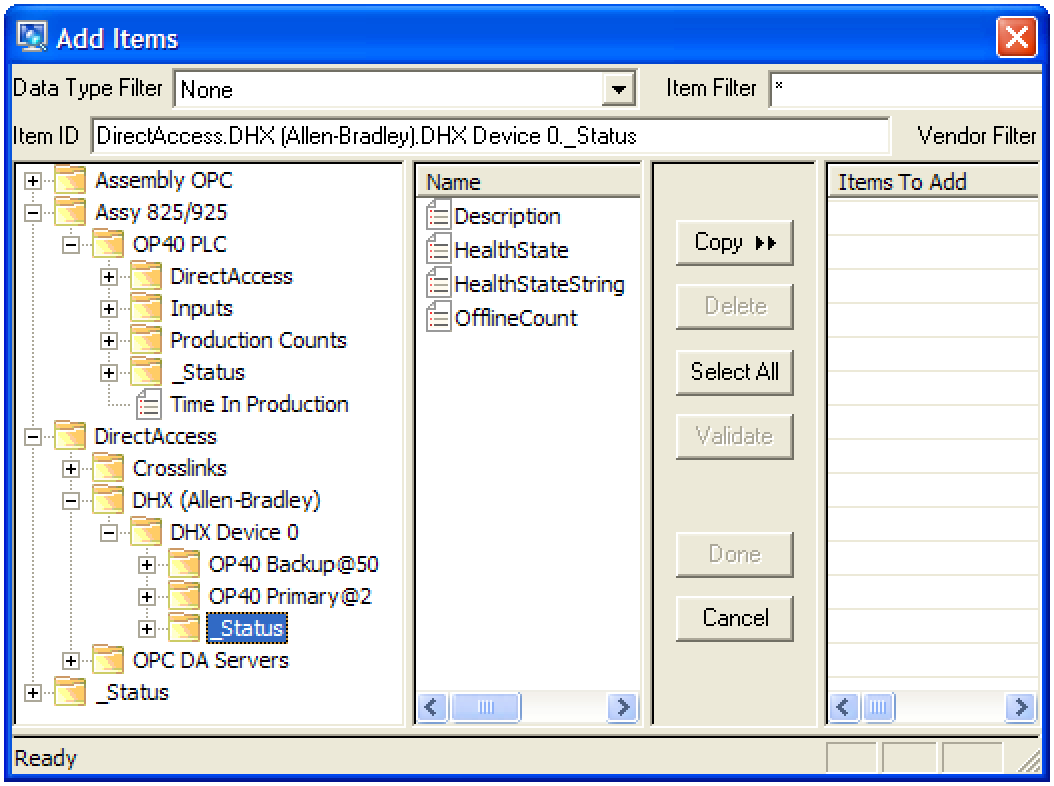
Click this button to launch the Windows Performance Monitor.

Options...

Click this button to open a selection that allows you to indicate if you want the application to start when Windows starts.

Status Item Definitions

When you connect to the Cyberlogic OPC Server with a client application and browse for items to display, the status items are shown in folders called *_Status*.



Data Type Filter: None

Item Filter: *

Item ID: DirectAccess.DHX (Allen-Bradley).DHX Device 0._Status

Ready

The contents of each folder will vary depending on the type of item that it is providing status for:

- Global Status
- DA Server Status
- Date and Time Status
- Network Connection Status
- Network Node Status
- Device Status

For Status Items that refer to OPC Crosslink or Data Logger, refer to their respective help files.

Global Status

The items in this branch apply to the entire OPC Server and are not tied to any specific component.

ActiveConfiguration

The name of the configuration file that is currently used by the server.

ComObjectsCount

The total number COM objects currently used by the server.

The OPC DA specification is based on an object-oriented model called COM (Component Object Model). In this model, the data is provided by the so-called COM objects. An OPC group or a data item are examples of this type of object.

ServerMemory_Max_KB

The maximum amount of virtual memory (in kilobytes) that Windows can allot to the OPC Server.

Virtual memory is a combination of both RAM and temporary hard disk space. On 64-bit systems, this value will be approximately 4,000,000 KB. On 32-bit systems, it defaults to approximately 2,000,000 KB. On 32-bit systems with the 4-Gigabyte Tuning (4GT) enabled—up to approximately 3,000,000 KB.

For more information on this subject, search microsoft.com for "4-Gigabyte Tuning".

ServerMemory_Used_KB

The amount of virtual memory (in kilobytes) used by the OPC Server.

ServerMemory_PercentUsed

The percentage of ServerMemory_Max_KB actually used by the OPC Server.

Percentages between 50% and 80% should serve as a warning. Values greater than 80% indicate that server performance is likely impacted by the lack of resources. In this case, stopping and restarting the OPC Server is recommended. If the issue continues, consider adding more memory to the system or reducing the size of the active configuration. On 32-bit systems, you may also consider enabling the 4-Gigabyte Tuning (4GT).

For more information on this subject, search microsoft.com for "4-Gigabyte Tuning".

ServerMemory_OutOfMemoryCount

The number of times the OPC Server has experienced out-of-memory errors since it started.

A value other than zero indicates that the OPC Server may be running in an inconsistent state. Stopping and restarting the OPC Server is recommended. If the issue continues, consider adding more memory to the system or reducing the size of the active configuration. On 32-bit systems, you may also consider enabling the 4-Gigabyte Tuning (4GT).

For more information on this subject, search microsoft.com for "4-Gigabyte Tuning".

SystemPhysicalMemory_Total_KB

The total amount of RAM (in kilobytes) in the entire system.

SystemPhysicalMemory_Used_KB

The amount of RAM (in kilobytes) in the system that is in use.

SystemPhysicalMemory_PercentUsed

The amount of RAM in the system that is in use expressed as a percentage of total RAM.

DA Server Status

This branch is located directly under the *_Status* branch at the root of the address space (_Status.DA_Server). The items in this branch provide global status information about the overall operation of the OPC Data Access (DA) component of the Cyberlogic OPC server. Most of the items can also be viewed through the Cyberlogic OPC Server Status Application, which presents the data in a more readable form.

Clients_Count

The current number of client connections to the OPC DA server.

Most client applications use a single server connection for all of their I/O requests, so this number typically represents the number of connected OPC clients.

Clients_Info

This item provides status information for all current OPC DA server connections.

This information includes:

- Connection sequence number
- Domain/Computer name
- User name
- Client application name
- Total number of OPC groups
- Number of active OPC groups
- Number of OPC groups that established an advise channel for callbacks
- Number of OPC groups that enabled the OnDataChange callbacks

Clients_UpdateInfo

This item provides data update status for all current OPC DA server connections.

This information includes:

- Connection sequence number
- Total number of data updates (in hex)
- Last data update time (FILETIME in hex)

Groups_ActiveCount

The number of OPC groups set to an active state.

Active data items, which are part of these groups, are being updated by the server’s data acquisition engine. The updates can be either solicited or unsolicited.

Groups_TotalCount

The total number of OPC groups created by all OPC clients connected to the server.

Items_ActiveCount

Number of data items whose data value or other property has been set to an active state by some OPC client.

Active data items are updated by the server’s data acquisition engine. The updates can be either solicited or unsolicited.

Items_DormantCount

The number of data items that recently participated in the data acquisition (were active), but that are currently dormant (not in use).

While dormant, the server maintains the last data value for these items, which allows quicker re-activation. The maximum dormant time for a data item defaults to 10 minutes. If a dormant data item does not become active within that time, its data cache is removed, reducing the amount of memory used by the server.

Items_InUseCount

The number of data items that are either set active by an OPC client or that are used internally, such as status items.

The in-use data items are updated by the server’s data acquisition engine.

Items_TotalCount

This number includes all configured data items, status items, and the items dynamically created through the DirectAccess branches.

Scanner_Count

The number of scanner modules currently used by the server.

The Cyberlogic OPC Server uses so-called scanner modules to handle all of its solicited data updates. Each scanner runs at a different scan interval. The number of scanners depends on the current requirements of the connected OPC clients.

Scanner_HighCount

The greatest number of scanners that operated simultaneously at some point in time.

The server operates most efficiently when there are fewer scanners being used. If this number is high, you may want to review the requested update/sampling rates from your OPC clients. Try to combine scan/sampling rates that are close to each other.

Scanner_ItemCounts

This item provides the status information for all scanner modules currently in use.

This information includes:

- Total data item reference count for the scanner
- Number of data items requiring device reads
- Number of data items operating on internal data
- Scan interval in milliseconds

It is not unusual for only the reference count and the scan interval to have a non-zero values, that is, no device or internal reads are performed. The server's data acquisition component optimizes communications, so, for a given data item, only the highest-rate scanner acquires the data, while the lower-rate scanners only distribute the data to the appropriate requesters.

Read_ActiveCount

This is the number of synchronous and asynchronous read requests being currently serviced by the server.

Read_HighActiveCount

This is the highest number of simultaneous read requests at some point in time.

Read_TotalCount

This is the total number of synchronous and asynchronous reads serviced by the server.

Write_ActiveCount

The number of synchronous and asynchronous write requests currently being serviced by the server.

Write_HighActiveCount

The highest number of simultaneous write requests at some point in time.

Write_TotalCount

The total number of synchronous and asynchronous writes serviced by the server.

Date and Time Status

This branch is located directly under the *_Status* branch at the root of the address space (_Status.CurrentTime). The items in this branch provide the current date, time, and time-zone information. The date and time is provided in both the Coordinated Universal Time (UTC) and local time.

Local_Year

The year part of the current local date (e.g. 2011).

Local_Month

The month part of the current local date:

January = 1
February = 2
March = 3
April = 4
May = 5
June = 6
July = 7
August = 8
September = 9
October = 10
November = 11
December = 12

Local_DayOfWeek

The day of the week of the current local date:

Sunday = 0
Monday = 1
Tuesday = 2
Wednesday = 3
Thursday = 4
Friday = 5
Saturday = 6

Local_Day

The day of the month of the current local date (1-31).

Local_Hour

The hour part of the current local time (0-23).

Local_Minute

The minute part of the current local time (0-59).

Local_Second

The seconds part of the current local time (0-59).

Local_TimeChangeCount

This counter increments each time the system time changes. Typically, this will happen when the time changes from standard time to daylight saving time, and vice versa. Also, manual changes to the system clock will increment this count. However, small changes to the system time by the operating system, which are the result of synchronizations to an external time server, will not change this counter.

Local_DateString

Current local date as a string. The string is formatted according to the current locale (e.g. 12/22/2011 in the US).

Local_TimeString

Current local time as a string. The string is formatted according to the current locale (e.g. 2:10:47 PM in the US).

Local_DateTimeString

Current local date and time as a string. The string is formatted according to the current locale (e.g. 12/22/2011 2:12:09 PM in the US).

Local_Bias

Current bias for local time translation on this computer, in minutes. The bias is the difference, in minutes, between Coordinated Universal Time (UTC) and local time. All translations between UTC and local time are based on the following formula:

UTC = local time + bias

When the standard time is in effect, the bias is calculated using this formula:

bias = Local_Bias + Local_StandardBias

When the daylight saving time is in effect, the bias is calculated using this formula:

bias = Local_Bias + Local_DaylightBias

Local_StandardName

String associated with the standard time name. For example, "Eastern Standard Time" indicates Eastern Standard Time in the US. This string can be empty.

Local_StandardDate

A local date and time when the transition from daylight saving time to standard time occurs on this system (e.g. 11/6/2011 2:00:00 AM).

Local_StandardBias

Bias value to be used during local time translations that occur during standard time.

This value is added to the value of the Local_Bias to form the bias used during standard time. In most time zones, the value of this member is zero.

Local_DaylightName

String associated with the daylight saving time name. For example, " Eastern Daylight Time" indicates Eastern Daylight Time in the US. This string can be empty.

Local_DaylightDate

A local date and time when the transition from standard time to daylight saving time occurs on this system (e.g. 3/13/2011 2:00:00 AM).

Local_DaylightBias

Bias value to be used during local time translations that occur during daylight saving time.

This value is added to the value of the Local_Bias to form the bias used during daylight saving time. In most time zones, the value of this member is –60.

Local_InDaylightSavings

A boolean flag. When set true, the system is operating in the daylight saving time. Else, the system is operating in the standard time.

UTC_Year

The year part of the current UTC date (e.g. 2011).

UTC_Month

The month part of the current UTC date:

January = 1
February = 2
March = 3
April = 4
May = 5
June = 6
July = 7
August = 8
September = 9
October = 10
November = 11
December = 12

UTC_DayOfWeek

The day of the week of the current UTC date:

Sunday = 0
Monday = 1
Tuesday = 2
Wednesday = 3
Thursday = 4

Friday = 5
Saturday = 6

UTC_Day

The day of the month of the current UTC date (1-31).

UTC_Hour

The hour part of the current UTC time (0-23).

UTC_Minute

The minute part of the current UTC time (0-59).

UTC_Second

The seconds part of the current UTC time (0-59).

UTC_DateString

Current UTC date as a string. The string is formatted according to the current locale (e.g. 12/22/2011 in the US).

UTC_TimeString

Current UTC time as a string. The string is formatted according to the current locale (e.g. 2:10:47 PM in the US).

UTC_DateTimeString

Current UTC date and time as a string. The string is formatted according to the current locale (e.g. 12/22/2011 2:12:09 PM in the US).

Network Connection Status

The following items are shown in folders called *_Status* located directly under the network connection branches in the DirectAccess tree of the address space root. These branches are present only when DirectAccess at a given network connection is enabled. For information on how to enable DirectAccess for a network connection, refer to the help file for the driver agent you are configuring.

Description

This is the description text as configured in the Description field.

HealthState

Indicates the current health state of the network connection in numeric form.

The valid values are:

- 0 = Online

- 2 = Offline

HealthStateString

Indicates the current health state of the network connection in text form.

The valid values are:

- Online
- Offline

OfflineCount

The number of times this network connection transitioned from the Online state to the Offline state.

Network Node Status

The following items are shown in folders called *_Status* located directly under the network node branches in the DirectAccess tree of the address space root. These branches are present only when DirectAccess at a given network node is enabled. For information on how to enable DirectAccess for a network node, refer to the help file for the driver agent you are configuring.

Description

This is the description text as configured in the Description field.

HealthState

Indicates the current health state of the network node in numeric form.

The valid values are:

- 0 = Online
- 1 = Online Delay
- 2 = Offline

The network node enters the Online Delay state after it re-establishes connection to the associated physical device, but is still running diagnostic tests before transitioning to the Online state.

HealthStateString

Indicates the current health state of the network node in text form.

The valid values are:

- Online
- Online Delay
- Offline

The network node enters the Online Delay state after it re-establishes connection to the associated physical device, but is still running diagnostic tests before transitioning to the Online state.

OfflineCount

The number of times this network node transitioned from the Online state to the Offline state.

Device Status

The following items are shown in folders called _*Status* located directly under the device branches in the address space. These branches are present only when the DirectAccess at a given device is enabled. For information on how to enable DirectAccess for a device, refer to the help file for the driver agent you are configuring.

Caution! If you want to view the status items that relate to unsolicited communication, that is, those that begin with *Unsolicited_*, you must create at least one unsolicited message filter group for the device. This is required even if you have configured the device to accept all unsolicited messages. You can leave the filter group empty; it is not necessary to create any filters within it.

AccessPath

This item shows the currently used access path in text form.

AccessPathNumber

This item shows the currently used access path in numeric form.

Description

This is the description text as configured in the Description field.

DirectAccess_IsEnabled

Indicates whether or not DirectAccess is enabled.

The valid values are:

- 0 = Disabled
- 1 = Enabled

DirectAccess_WritesDisabled

Indicates whether or not DirectAccess writes are enabled.

The valid values are:

- 0 = Disabled
- 1 = Enabled

IsSimulated

This indicates whether or not the data items under this device are simulated.

The valid values are:

- 0 = Simulation is not forced
- 1 = Simulated

ResetAllErrorCounts

An Off to On transition of this item resets all access path dynamic enable error counts to zero.

This resets only the counts; the last error information is not cleared. This item can be written to by any OPC client.

ResetAllErrorInfo

Set this item to the ON state to reset all data logger error information. This includes the error counts and the last error information. It is automatically reset to the OFF state following the reset operation.

Unsolicited_AcceptAll

This item reflects the state of the Accept All Unsolicited checkbox.

Unsolicited_DataAcceptedMsgCount

The number of unsolicited messages that delivered data to at least one data item under this device.

Unsolicited_DataRejectedMsgCount

The number of unsolicited messages that passed through the unsolicited filter, but could deliver data to no data items under this device.

Unsolicited_PassedFilterMsgCount

The number of unsolicited messages that passed through the unsolicited filter associated with this device.

Unsolicited_ReceivedMsgCount

The number of unsolicited messages that were received by this device.

WritesDisabled

Indicates whether or not writes are enabled for data items under this device.

The valid values are:

- 0 = Disabled

- 1 = Enabled

In addition, the following status items are available for each defined access path.

Description

This is the description text as configured in the Description field.

IsEnabled

Indicates whether or not the access path is enabled.

The valid values are:

- 0 = Disabled
- 1 = Enabled

DynamicEnable_ErrorCount

This is the error count for the dynamic enable item ID. It is incremented each time bad quality data is received for that item ID.

This item is present only if the path's enable check box is checked and dynamic enable is configured.

DynamicEnable_ItemID

This is the item ID string associated with the dynamic enable.

This item is present only if the path's enable check box is checked and dynamic enable is configured.

DynamicEnable_UpdateCount

The number of times the access path has changed from enabled to disabled or disabled to enabled. This count is incremented each time IsEnabled changes state.

This item is present only if the path's enable check box is checked and dynamic enable is configured.

DynamicEnable_LastError

The last error code associated with the dynamic enable item ID.

This item is present only if the path's enable check box is checked and dynamic enable is configured.

DynamicEnable_LastErrorQuality

The last error quality associated with the dynamic enable item ID.

This item is present only if the path's enable check box is checked and dynamic enable is configured.

DynamicEnable_LastErrorString

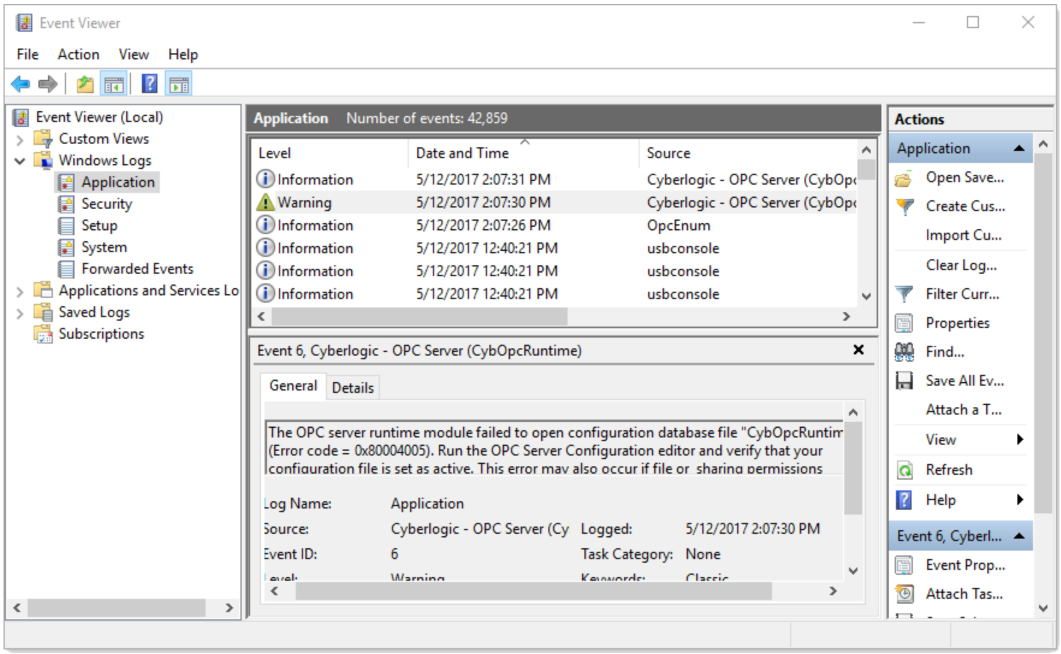
The last error code string associated with the dynamic enable item ID.

This item is present only if the path's enable check box is checked and dynamic enable is configured.

Event Viewer

During startup and operation, the Cyberlogic OPC Server may detect problems or other significant events. When a noteworthy event is detected, the server sends an appropriate message to the Windows Event Logger. You can view these messages using the following procedure.

1. Open the Windows ***Start*** menu and locate the ***Cyberlogic Suites*** sub-menu. From there, go to ***Diagnostics*** and select ***Event Viewer***.



Level	Date and Time	Source
Information	5/12/2017 2:07:31 PM	Cyberlogic - OPC Server (CybOpc
Warning	5/12/2017 2:07:30 PM	Cyberlogic - OPC Server (CybOpc
Information	5/12/2017 2:07:26 PM	OpcEnum
Information	5/12/2017 12:40:21 PM	usbconsole
Information	5/12/2017 12:40:21 PM	usbconsole
Information	5/12/2017 12:40:21 PM	usbconsole

Event 6, Cyberlogic - OPC Server (CybOpcRuntime)

The OPC server runtime module failed to open configuration database file "CybOpcRuntim
(Error code = 0x80004005). Run the OPC Server Configuration editor and verify that your
configuration file is set as active. This error may also occur if file or sharing permissions

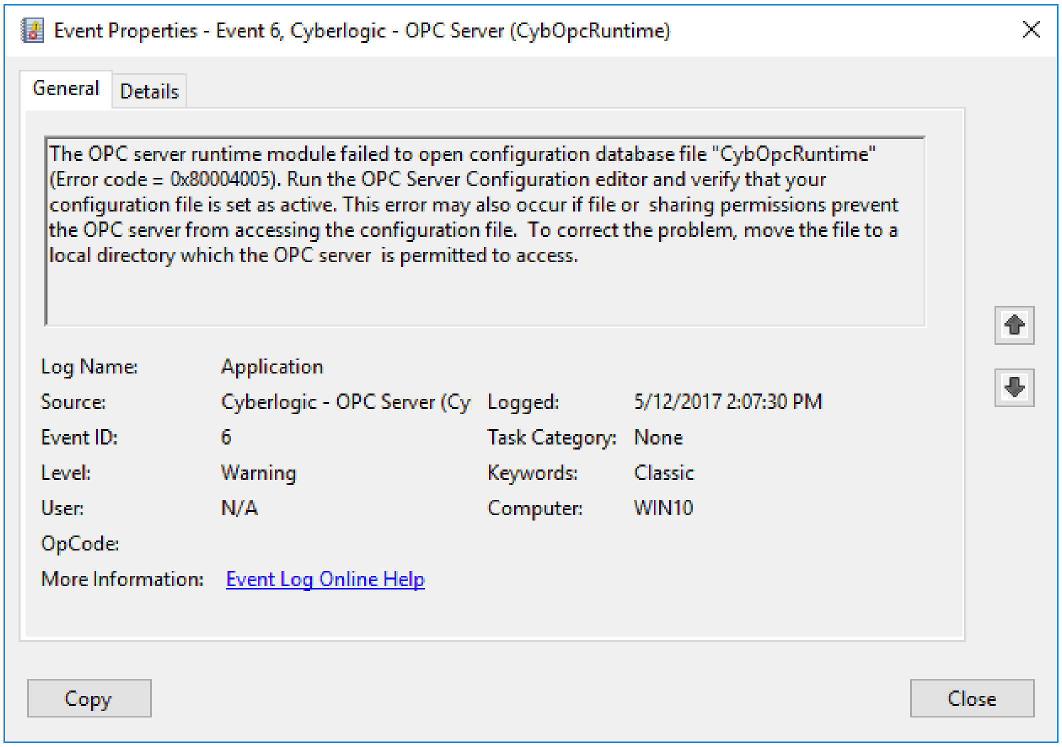
Log Name:	Application		
Source:	Cyberlogic - OPC Server (Cy	Logged:	5/12/2017 2:07:30 PM
Event ID:	6	Task Category:	None
Level:	Warning	Keywords:	Classic

2. Select ***Windows Logs|Application*** from the Event Viewer tree.

3. Look for entries with ***CybOpcRuntime*** in the ***Source*** column.

Caution! The Event Viewer does not clear itself after rebooting. Check the time stamps of the messages to be sure that you are not looking at an old error message.

4. Double-click on the desired entry to display a complete event message.



Event Properties - Event 6, Cyberlogic - OPC Server (CybOpcRuntime)

The OPC server runtime module failed to open configuration database file "CybOpcRuntime" (Error code = 0x80004005). Run the OPC Server Configuration editor and verify that your configuration file is set as active. This error may also occur if file or sharing permissions prevent the OPC server from accessing the configuration file. To correct the problem, move the file to a local directory which the OPC server is permitted to access.

Log Name:	Application		
Source:	Cyberlogic - OPC Server (Cy	Logged:	5/12/2017 2:07:30 PM
Event ID:	6	Task Category:	None
Level:	Warning	Keywords:	Classic
User:	N/A	Computer:	WIN10
OpCode:			
More Information:	Event Log Online Help		

5. For further descriptions of the event log messages, refer to the Cyberlogic OPC Server Messages section.

Cyberlogic OPC Server Messages

This section shows Error Log messages that can be generated by the main Cyberlogic OPC Server module. Each driver agent can also log error messages. For a list of these messages, refer to the help file for the driver agent you are using.

The OPC server runtime module failed to open configuration database file "<file name>" (Error code = <error code>). Run the OPC Server Configuration editor and verify that your configuration file is set as active. This error may also happen if the configuration file resides on a shared network drive. To correct the problem, move the file to a local drive.

The OPC server could not open the file that contains your configuration. Check the editor to be sure that the configuration file is set as the active configuration. If the configuration file is on a shared drive on another system, you may not have the needed access rights. Move the file to a drive on your local system.

The OPC server runtime module failed to load configuration database file "<file name>" (Error code = <error code>). Your configuration file may be corrupt. Run the OPC Server Configuration editor and verify that you have a valid configuration file. If the editor is also unable to load the configuration data, create a new configuration file.

The OPC server detected that the file that contains your configuration information may be corrupted. Try to open the file with the configuration editor. If you cannot open the file, and no backup is available, you will have to create a new configuration.

Registration DLL failed to load. The OPC Crosslink has been disabled. Reinstall the product.

A necessary registration DLL could not be loaded. This may indicate a corrupted installation. Repair the existing installation, or remove and reinstall the software.

The OPC Crosslink has not been activated. The feature has been disabled.

Run the Activation Wizard to activate the OPC Crosslink, Crosslink Premier or Crosslink Enterprise Suite, or the DHX or MBX OPC Enterprise Suite. You will need the activation codes that came with your license. If you have not purchased a license for any of these products, contact Cyberlogic's Sales Department.

This is a <hours>-hour promotional copy of the OPC Crosslink. The server started at <start time> and the OPC Crosslink will stop at <stop time>.

This is a time-limited installation of the software. After the stop time, the driver agent will not allow any further I/O operations.

This is a promotional copy of the OPC Crosslink. The allowed operation time has expired. The I/O operations of Crosslink have been disabled.

This is a time-limited installation of the software. The stop time has been reached or exceeded, so the driver agent will not allow any further I/O operations.

The Cyberlogic License Server failed to respond with valid license information. The I/O operations of the OPC Crosslink have been disabled. Contact the manufacturer's technical support.

The driver agent experienced a problem when it tried to contact the Cyberlogic License Server. If the license server is not running, start it and then try restarting the driver. If the license server is already running, contact Cyberlogic Tech Support.

Memory allocation error in <function name>. Close some applications. Add more memory to your system. Contact the manufacturer's technical support.

The specified function failed to allocate the needed memory. This is a fatal error. If you are running low on memory, close some applications or add more memory to your system. If the problem continues, contact technical support for more information on a possible solution.

Unexpected error in <function name>. Please contact the manufacturer's technical support.

Indicates a possible programming bug in the server. Contact technical support for more information on a possible solution.

Unexpected error in <function name> (Error code = <error code>). Please contact the manufacturer's technical support.

Indicates a possible programming bug in the server. Contact technical support for more information on a possible solution.

Handler not installed.

During startup, the Cyberlogic OPC Server failed to register the Service Control Handler. Contact technical support for more information on a possible solution.

Bad service request.

The Cyberlogic OPC Server detected an unsupported service request. Contact technical support for more information on a possible solution.

Memory allocation error in <function name>. The server may not operate correctly. Close some applications. Add more memory to your system. Contact the manufacturer's technical support.

The specified function failed to allocate the needed memory. The server will continue to operate, but some functions may not work. If you are running low on memory, close some applications or add more memory to your system. If the problem continues, contact technical support for more information on a possible solution.

Communication module for driver class <driver agent name> failed to load (Error code = <error code>). All configuration related to this driver class will be ignored. To resolve this problem, please contact the manufacturer's technical support.

This error will be generated if your configuration file was generated on a system with the listed driver agent installed, but the driver agent is not installed on your system. Install the listed driver agent to correct the problem.

If you believe that the indicated driver agent is installed, this message may indicate that you have a corrupted installation.

Service started.

The Cyberlogic OPC Server started successfully.

Service stopped.

The Cyberlogic OPC Server has stopped.

Frequently Asked Questions

I am not connected to the network, but my data items are being updated. What's going on?

Simulation Signals are generating data for the items. Verify that the Simulate check box is cleared for the data item and for each parent up the chain from the data item.

I created a new data item in the Address Space. When I try to look at it with the Data Monitor, the item is shown as Not Available. The entire configuration appears correct. What do I do?

You may not have updated the runtime module of the Cyberlogic OPC Server with your recent configuration changes. To save current configuration and update the server, select ***Save & Update Server*** from the File menu of the OPC Server Configuration Editor, or click the ***Save & Update Server*** button on the standard buttons toolbar.

I can't find any information specific to my communication network in your help file.

This help file describes only the common features of the Cyberlogic OPC Server. For information related to a particular driver agent, refer to the help file specific for that agent.

I cannot update the server with my new or changed configuration. It always returns a message that the update failed.

On some systems, Windows will spontaneously unregister the server application. You must manually re-register it. To do this, locate the file *CybOpcRuntimeService.exe*. In most installations, it will be in the directory *C:\Program Files\Common Files\Cyberlogic Shared\OPC*.

From the ***Accessories*** group of the Windows ***Start*** menu, run ***Command Prompt***. (In the following commands, <Enter> indicates that you should press the Enter key.)

You must change to the drive and directory you just located. To change the drive to C:, for example, type:

```
C: <Enter>
```

Once you are at the correct drive, change the directory by typing this command. (There is a space after the cd.)

```
cd \Program Files\Common Files\Cyberlogic Shared\OPC <Enter>
```

Now type the following. (Note that there is a space before the slash.)

```
CybOpcRuntimeService.exe /unregserver <Enter>
```

Finally, type the following. (Again, there is a space before the slash.)

```
    CybOpcRuntimeService.exe /service <Enter>
```

Close the command prompt window.

I cannot get XML Data Access to work. The Event Viewer shows an error for a User called ASPNET, with the description: "Access denied attempting to launch a DCOM Server using DefaultLaunchPermission".

You must add the User account ASPNET to the DCOM security settings for the OPC server software, giving it launch and access rights.

To do this, you will use the DCOM configuration editor, dcomcnfg.exe. For details on how to use this editor, refer to the document *OPC & DCOM: A Guide to Using the Cyberlogic OPC Server via DCOM*. A copy of this document was installed on your system along with the software. To access it, open the Windows ***Start*** menu and go to ***Cyberlogic Suites.*** Next, open the ***Help*** sub-menu, then open ***OPC***, and then click on ***DCOM Help***.

Note that on some systems, you may not get the Event Viewer error message.

APPENDIX A: ITEM PROPERTIES

In the Cyberlogic OPC Server, all data items have properties, or attributes, associated with them. These attributes are values related to the data item. The OPC Data Access specification defines several standard properties and allows vendors to define custom properties.

Properties with IDs from 1 – 4999 are defined by the OPC Data Access specification. Refer to the OPC Data Access specification for more information about these properties.

IDs 5000 and above are custom properties defined by each server vendor.

Standard Properties

Property Name	ID	Data Type	Description
DataType	1	VT_I2	Canonical Data Type: The canonical (native) data type of the item value (property 2).
Value	2	Matches the value of prop. 1	The actual value of the data item. The value type matches the value of property 1.
Quality	3	VT_I2	An indication of the reliability of the data value (property 2).
Timestamp	4	VT_DATE	The time the data value (property 2) was last updated.
AccessRights	5	VT_I4	Indicates whether the data item can inherently be read from and/or written to. For example, inputs can generally be read from but not written to.
FastestScanRate	6	VT_R4	The best possible rate, in milliseconds, at which the server can obtain data from the data source.
ItemEUType	7	VT_I4	Item EU Type
EUUnits	100	VT_BSTR	A text description of the engineering units associated with the data item.
Description	101	VT_BSTR	A textual description of the data item.
HighEU	102	VT_R8	The highest scaled value possible for the data item. Analog data items only.
LowEU	103	VT_R8	The lowest scaled value possible for the data item. Analog data items only.
HighIR	104	VT_R8	The highest possible value returned by the instrumentation. Analog data items only.
LowIR	105	VT_R8	The lowest possible value returned by the instrumentation. Analog data items only.
CloseLabel	106	VT_BSTR	A textual description for the data item when it is non-zero (closed). Discrete data items only.
OpenLabel	107	VT_BSTR	A textual description for the data item when it is in a zero (open). Discrete data items only.
TimeZone	108	VT_I4	The difference, in minutes, between Universal Coordinated Time (UTC) and local time. Local time + bias = UTC.
SoundFile	313	VT_BSTR	A sound file associated with this data item.

Vendor-Defined Properties

Property Name	ID	Data Type	Description
ItemID	5000	VT_BSTR	The fully qualified item name (e.g. PressLine.Op30.GoodParts)
Name	5001	VT_BSTR	The short item name (e.g. GoodParts)
UsageCnt	5002	VT_I4	The number of open references to this data item.
DataTypeStr	5003	VT_BSTR	The data type as a string.
DefDisplay	5009	VT_BSTR	The default operator display associated with this data item.
FgColor	5010	VT_I4	The foreground color in which the item should be displayed. Expressed as a COLORREF.
BkColor	5011	VT_I4	The background color in which the item should be displayed. Expressed as a COLORREF.
Blink	5012	VT_BOOL	Indicates if the item should blink.
BMPFile	5013	VT_BSTR	A graphic file associated with this data item.
HTMLFile	5014	VT_BSTR	A web link associated with this data item.
AVIFile	5015	VT_BSTR	A video file associated with this data item.
LastAccessPathNumber	5100	VT_I4	One-based number of the last access path used to update the data item.
LastAccessPath	5101	VT_BSTR	A string indicating the last access path used to update the data item.
LastUnsolicitedFilter	5102	VT_BSTR	A string indicating the last unsolicited filter used to update the data item.
LastUnsolicitedSource	5103	VT_BSTR	A string indicating the last unsolicited data source used to update the data item.
LastUpdateSolicited	5104	VT_BOOL	True (non-zero) if the last value was updated as a result of a solicited request. False (zero) if it was updated by an unsolicited request.
Simulated	5105	VT_BOOL	True (non-zero) if the item’s data value is simulated.
CurrentScanRate	5106	VT_UI4	Current scan rate in milliseconds for this data item.

ActualScanRate	5107	VT_UI4	Actual scan rate in milliseconds for this data item.

APPENDIX B: QUALITY CODES

The OPC specification requires that each data item value must have an associated quality code. These codes fall into three main categories: good, bad and uncertain. This appendix describes all of the quality codes used by the Cyberlogic OPC Server. Because the low two bits in the quality code indicate the limit conditions, they are shown here as LL.

Good Quality Codes

110000LL - Non-specific

The value is good. There are no special conditions.

110110LL - Local Override

The value has been overridden. The Cyberlogic OPC Server returns this code when a simulated signal is used.

Bad Quality Codes

000000LL - Non-specific

The value is bad but the reason is unknown. This is the default quality code used by each data item.

000001LL - Configuration Error

At runtime, the server may detect that the physical device does not support the requested register type. For example, some devices do not support 6xxxxx registers, so you would get this code if you attempt to access, for example, register 600102 in such a device.

000010LL – Not Connected

This code usually indicates an invalid register address.

000011LL – Device Failure

The server could not complete the requested operation due to an internal failure, such as insufficient memory.

000101LL - Last Known Value

Communication has failed, but the last known value is available. Note that the age of the value may be determined from the time stamp.

000110LL - Communication Failure

Communication has failed and there is no last known value available.

Uncertain Quality Codes

010001LL - Last Usable Value

This code is used only with unsolicited communications. The data item was not updated within the Unsolicited Late Interval. The returned value should be regarded as stale.

APPENDIX C: DATA ACCESS AUTOMATION SUPPORT

The purpose of OPC Data Access Automation is to allow applications which have an OLE Automation Interface, such as Visual Basic and Visual Basic for Applications, to access process data from OPC Data Access servers. This is done through a DLL that functions as a wrapper, translating between the OPC interface provided by the server and the automation interface needed by the client. The wrapper does not support VB Script or Java Script, however.

Compatibility Considerations

The DLL implementing the Data Access Automation layer was developed by the OPC Foundation and made available to OPC software vendors.

Caution!

> Some providers made custom changes to the DLL, but did not change its name or ProgID. Consequently, all of the different versions appear to be the same, so you cannot install more than one version in a single system without causing conflicts.

The DLL provided with Cyberlogic's software, OPCDAAuto.dll, is the standard OPC Foundation file with no modifications. To avoid conflicts with other, altered versions that may be on your system, Cyberlogic's software installation program copies the file onto your hard drive but does not register it. If you wish to use our version, you must register it. Doing so will change the registration from any other version that may be on your system to the Cyberlogic version. This, in turn, may affect the operation of software that uses the other version.

Registering the DLL

It is not necessary to copy the DLL to the System 32 directory. You can leave it in the directory where the installation program placed it and simply register it.

1. From the Windows ***Start*** menu, open ***Command Prompt***.

2. Change to the directory in which the DLL resides. The default installation directory is:

   C:\Program Files\Common Files\Cyberlogic Shared\OPC

3. Type the command: ***regsvr32 opcdaauto.dll***

4. Press the ***Enter*** key.

   The DLL will be registered.

5. Close the command prompt window.

APPENDIX D: OPC XML DATA ACCESS SUPPORT

Cyberlogic's OPC servers include support for OPC XML Data Access 1.0 (XML DA), but this is an optional feature that is not part of the default installation. In addition, the installation and operation of XML DA requires certain Windows components that may not already be installed on your system. Furthermore, in some systems, the necessary configuration may be incompatible with other software running on the system. In this case, the user must choose which will run and which will be disabled.

This appendix will assist you in determining what features and settings are required for your system.

Overview of the Procedure

You will first install Windows Internet Information Services (IIS), with certain required components. After that, you will install the OPC XML DA component of the Cyberlogic OPC server and verify its security settings. Depending on your operating system, you may then need to select an operating mode for ASP.NET. Finally, you will connect an OPC XML DA client to the server.

Some of the procedures will vary, depending on the specific Windows operating system you are installing under. These variations will be identified so you can follow the procedure that applies to your system.

To get started, go to Install Windows Internet Information Services.

Install Windows Internet Information Services

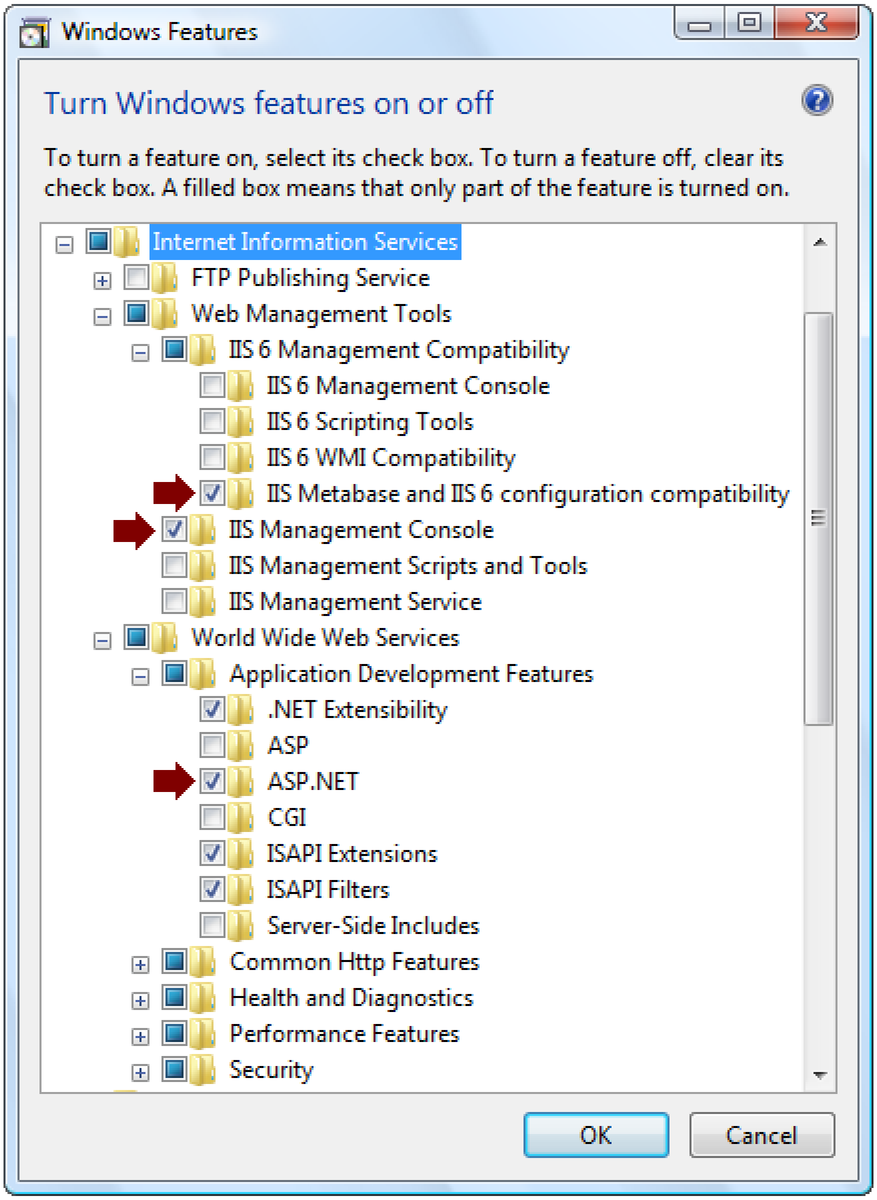
This is a Windows component, and therefore may require your Windows installation CD.

There are two procedures for installing IIS, depending on your operating system:

- Windows
- Windows Server

Windows

1. Open the ***Start*** menu and navigate to ***Control Panel***.
2. Open ***Programs and Features***, and then ***Turn Windows features on or off***.



Turn Windows features on or off

To turn a feature on, select its check box. To turn a feature off, clear its check box. A filled box means that only part of the feature is turned on.

- ■ Internet Information Services
  - □ FTP Publishing Service
  - ■ Web Management Tools
    - ■ IIS 6 Management Compatibility
      - □ IIS 6 Management Console
      - □ IIS 6 Scripting Tools
      - □ IIS 6 WMI Compatibility
      - ☑ IIS Metabase and IIS 6 configuration compatibility
    - ☑ IIS Management Console
    - □ IIS Management Scripts and Tools
    - □ IIS Management Service
  - ■ World Wide Web Services
    - ■ Application Development Features
      - ☑ .NET Extensibility
      - □ ASP
      - ☑ ASP.NET
      - □ CGI
      - ☑ ISAPI Extensions
      - ☑ ISAPI Filters
      - □ Server-Side Includes
    - ■ Common Http Features
    - ■ Health and Diagnostics
    - ■ Performance Features
    - ■ Security

3. Expand the ***Internet Information Services*** branch.

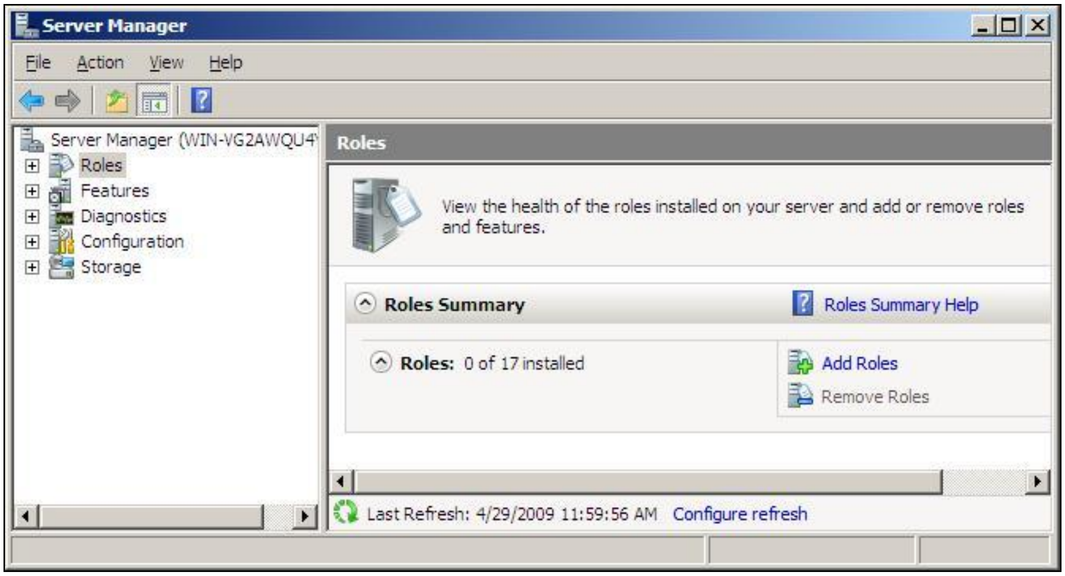
4. Check the boxes for ***IIS Metabase and IIS 6 configuration compatibility, IIS Management Console*** and ***ASP.NET***, as shown in the figure above.

5. Click ***OK*** and then follow the prompts to complete the installation.

6. When you are finished with the IIS installation, skip to Install the Cyberlogic OPC Server XML Data Access Support.

Windows Server

1. Open the ***Start*** menu, go to ***Administrative Tools*** and select ***Server Manager***.

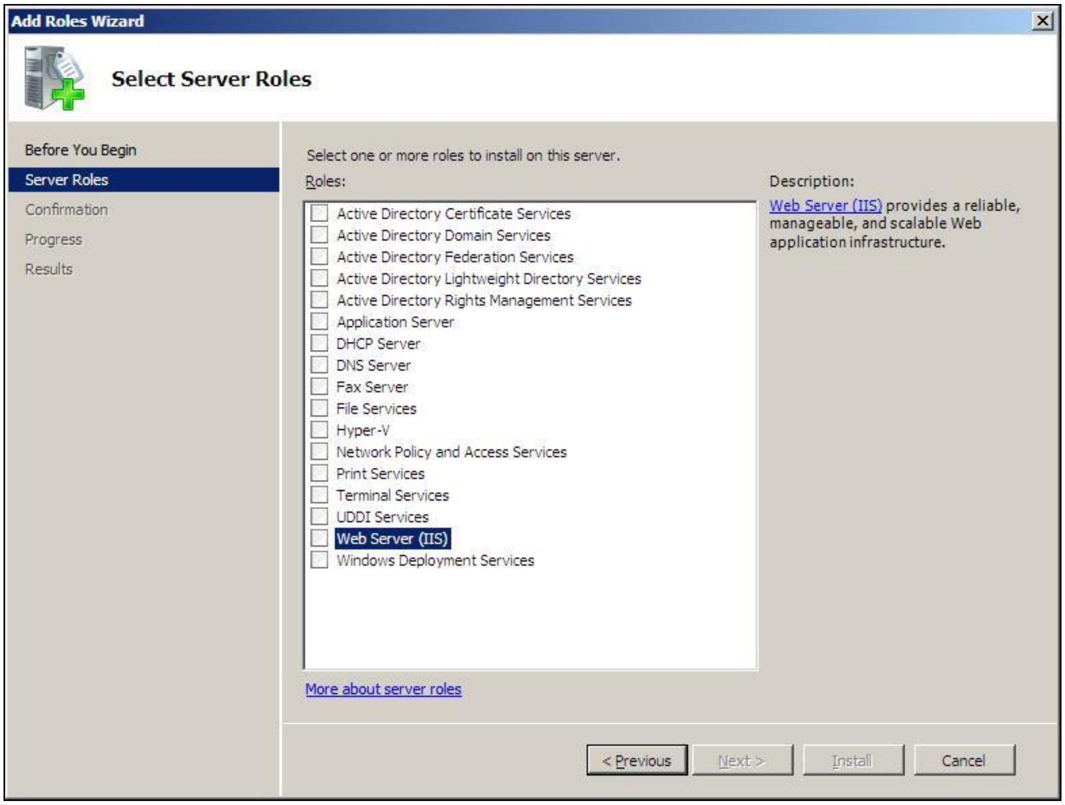


View the health of the roles installed on your server and add or remove roles and features.

Roles: 0 of 17 installed

Last Refresh: 4/29/2009 11:59:56 AM

2. Select the ***Roles*** branch and then click ***Add Roles***.



Select one or more roles to install on this server.

Roles:

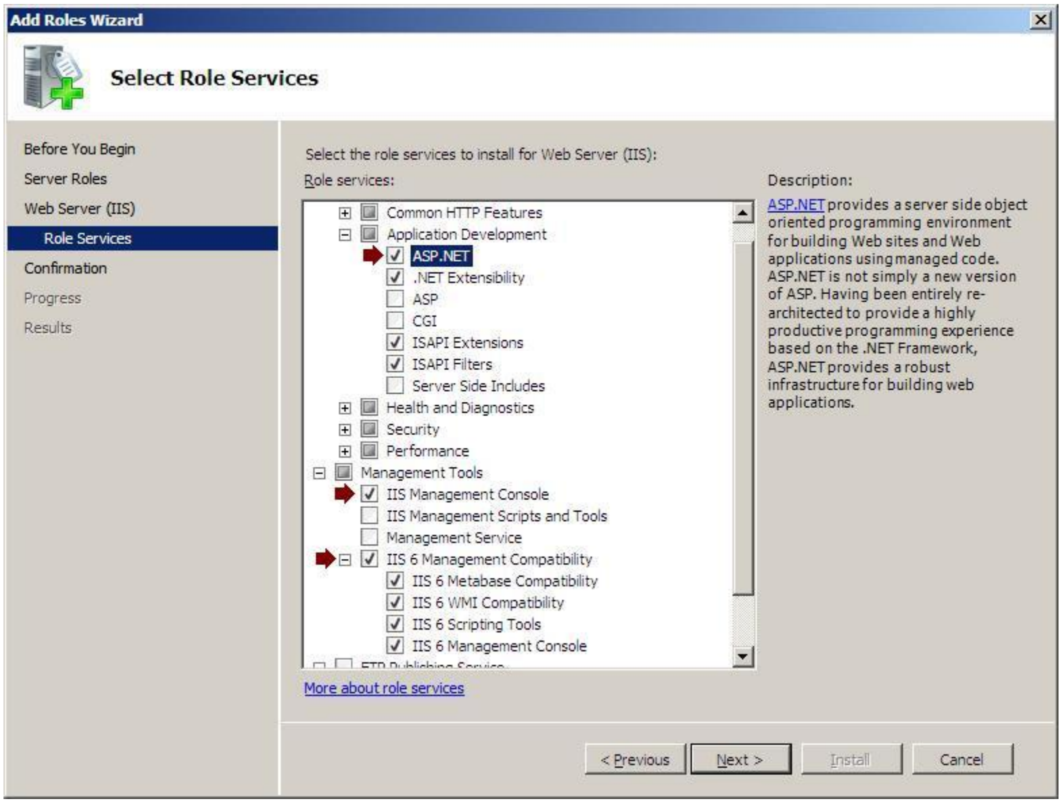
- □ Active Directory Certificate Services
- □ Active Directory Domain Services
- □ Active Directory Federation Services
- □ Active Directory Lightweight Directory Services
- □ Active Directory Rights Management Services
- □ Application Server
- □ DHCP Server
- □ DNS Server
- □ Fax Server
- □ File Services
- □ Hyper-V
- □ Network Policy and Access Services
- □ Print Services
- □ Terminal Services
- □ UDDI Services
- □ Web Server (IIS)
- □ Windows Deployment Services

Description:

Web Server (IIS) provides a reliable, manageable, and scalable Web application infrastructure.

3. Select ***Web Server (IIS)***.

4. Click ***Next***.



Select Role Services

Select the role services to install for Web Server (IIS):

Role services:

- ⊞ ▨ Common HTTP Features
- ⊟ ▨ Application Development
  - ☑ ASP.NET
  - ☑ .NET Extensibility
  - □ ASP
  - □ CGI
  - ☑ ISAPI Extensions
  - ☑ ISAPI Filters
  - □ Server Side Includes
- ⊞ ▨ Health and Diagnostics
- ⊞ ▨ Security
- ⊞ ▨ Performance
- ⊟ ▨ Management Tools
  - ☑ IIS Management Console
  - □ IIS Management Scripts and Tools
  - □ Management Service
  - ⊟ ☑ IIS 6 Management Compatibility
    - ☑ IIS 6 Metabase Compatibility
    - ☑ IIS 6 WMI Compatibility
    - ☑ IIS 6 Scripting Tools
    - ☑ IIS 6 Management Console
- ⊞ □ FTP Publishing Service

Description:

ASP.NET provides a server side object oriented programming environment for building Web sites and Web applications using managed code. ASP.NET is not simply a new version of ASP. Having been entirely re-architected to provide a highly productive programming experience based on the .NET Framework, ASP.NET provides a robust infrastructure for building web applications.

5. On the Select Role Services screen, check ***ASP.NET, IIS Management Console*** and ***IIS 6 Management Compatibility***.

6. Click Next, and then follow the prompts to complete the installation.

7. When you are finished with the IIS installation, continue with Install the Cyberlogic OPC Server XML Data Access Support.

Install the Cyberlogic OPC Server XML Data Access Support

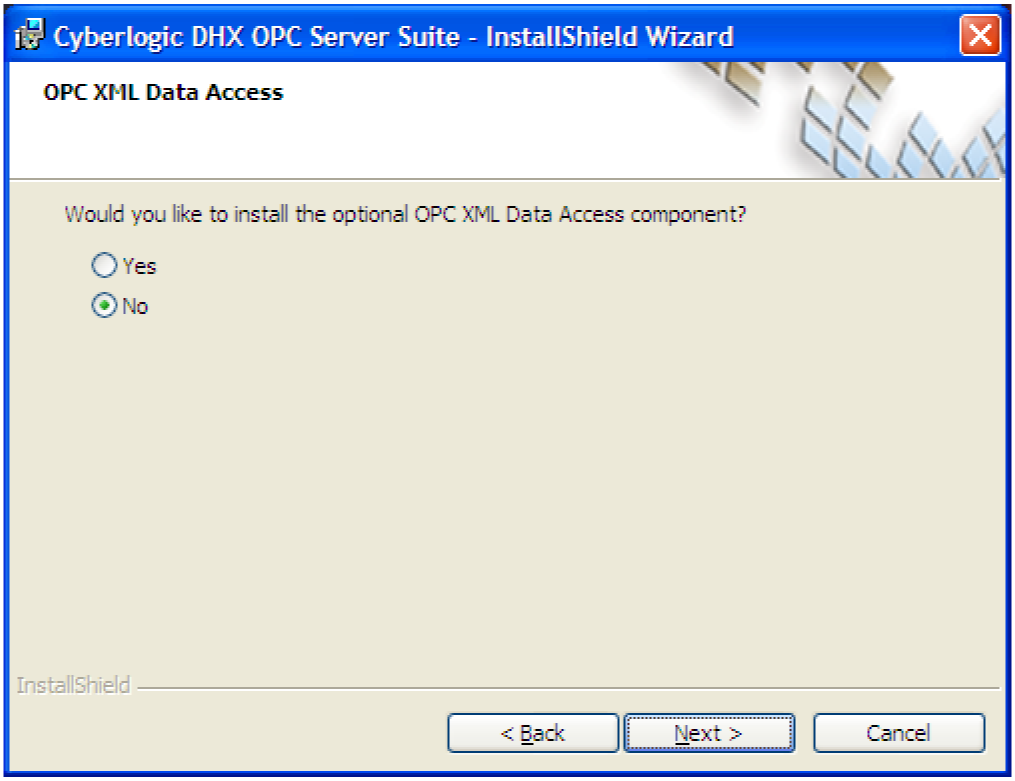
This procedure is the same for all operating systems.

1. Run the ***Cyberlogic OPC Server Suite installation program*** from the disk or download.

2. If you have already installed the OPC server and wish to add XML DA support, select the option to ***Modify*** the installation.

3. If you are presented with the tree showing the components to install, click ***Next***.

4. You will then be asked if you would like to install the OPC XML Data Access component. Select ***Yes***.



OPC XML Data Access

Would you like to install the optional OPC XML Data Access component?

○ Yes
● No

5. Click ***Next***, and then follow the prompts to complete the installation.

To continue with the setup, go to Adding a User Account to the Cyberlogic OPC Users Group.

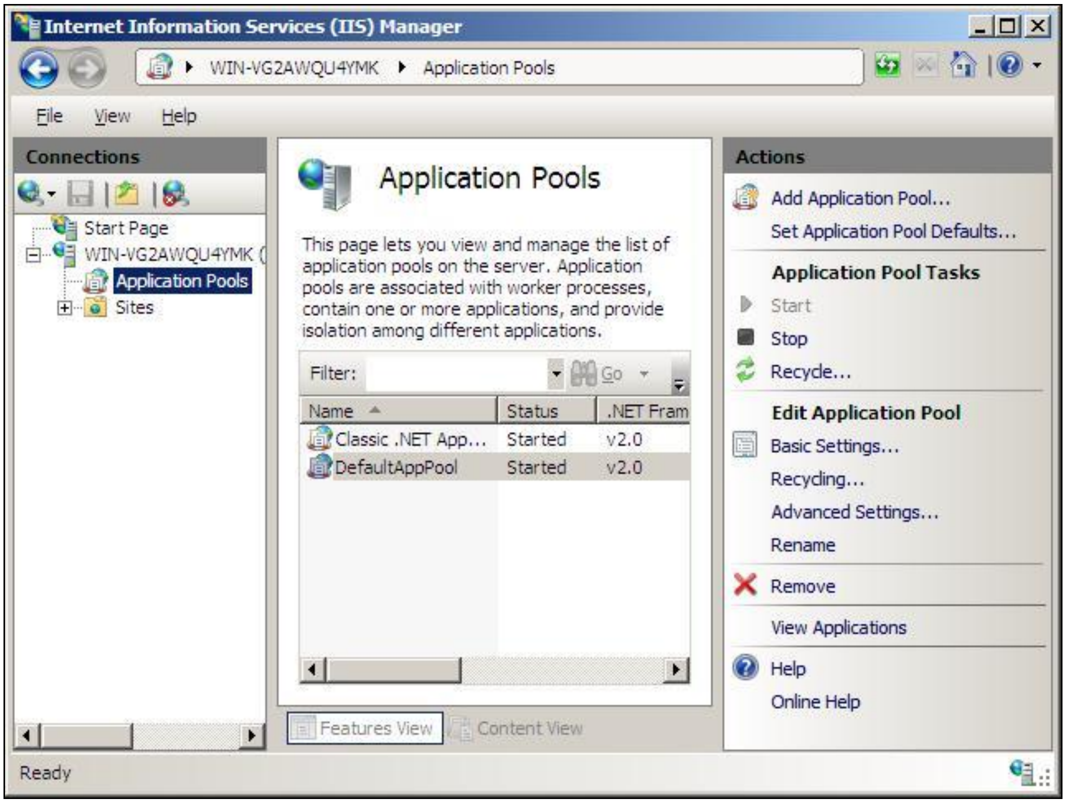
Adding a User Account to the Cyberlogic OPC Users Group

The installation software will add default user accounts required by IIS to the Cyberlogic OPC Users group. This group is given the permissions necessary to run the Cyberlogic OPC software. The accounts added by the installation software will depend on the operating system and the IIS revision level.

In some installations, IIS may be configured for a different account than its default. If that is the case on your system, you must manually add this account to the group. The following procedure shows how to determine if IIS is using a different account, and how to add that account to the Cyberlogic OPC Users group.

1. Open the ***Start*** menu and go to the ***Windows Control Panel***.

2. From there, open ***Administrative Tools*** and select ***Internet Information Services (IIS) Manager***.

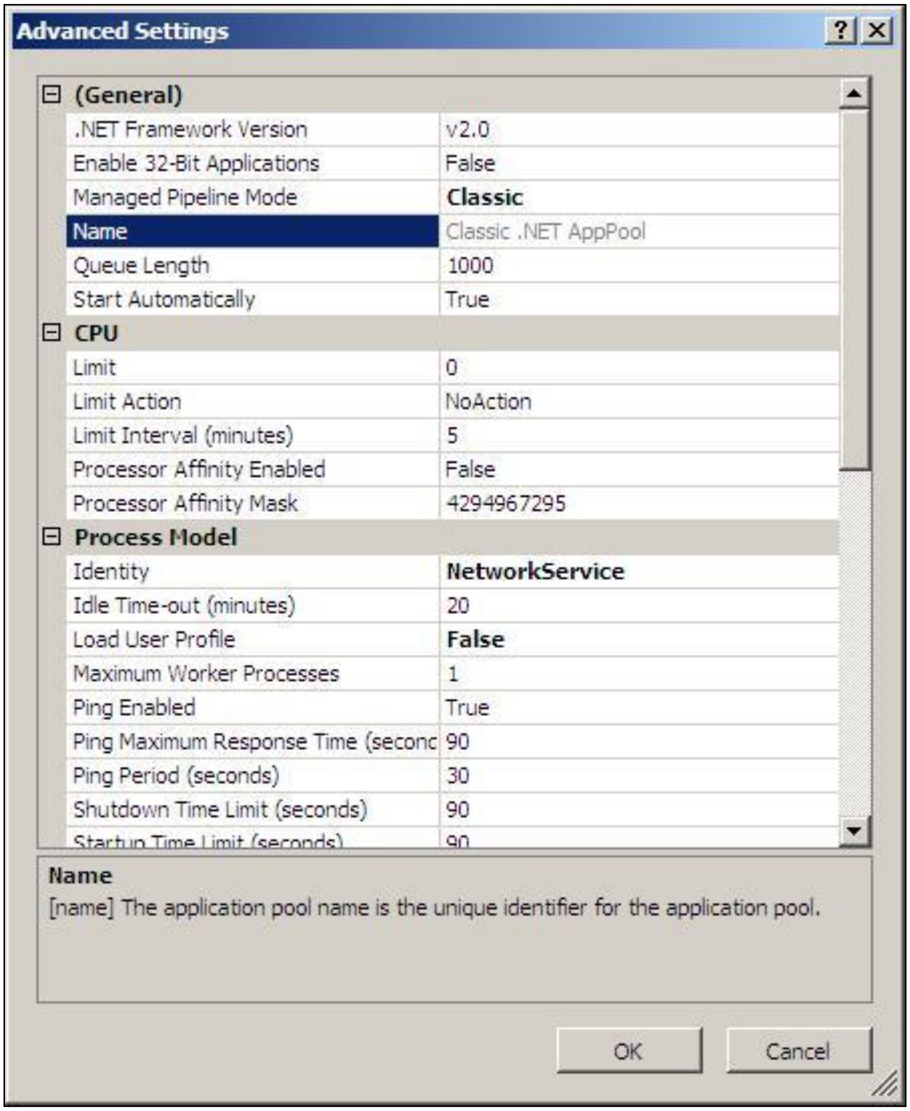


This page lets you view and manage the list of application pools on the server. Application pools are associated with worker processes, contain one or more applications, and provide isolation among different applications.

Name	Status	.NET Fram
Classic .NET App...	Started	v2.0
DefaultAppPool	Started	v2.0

3. In the left pane, select ***Application Pools***.

4. In the center pane, select an application pool, and then click ***Advanced Settings...*** in the right pane.



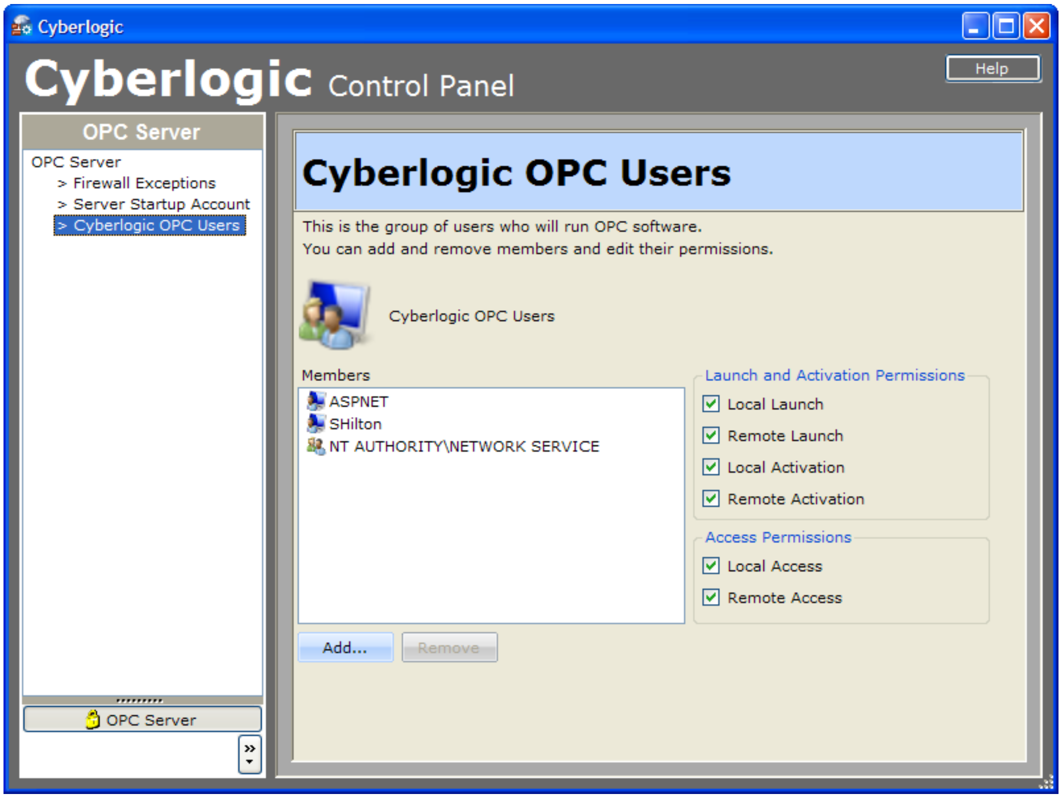
(General)	
.NET Framework Version	v2.0
Enable 32-Bit Applications	False
Managed Pipeline Mode	**Classic**
Name	Classic .NET AppPool
Queue Length	1000
Start Automatically	True
CPU	
Limit	0
Limit Action	NoAction
Limit Interval (minutes)	5
Processor Affinity Enabled	False
Processor Affinity Mask	4294967295
Process Model	
Identity	**NetworkService**
Idle Time-out (minutes)	20
Load User Profile	**False**
Maximum Worker Processes	1
Ping Enabled	True
Ping Maximum Response Time (seconc	90
Ping Period (seconds)	30
Shutdown Time Limit (seconds)	90
Startup Time Limit (seconds)	90

Name
[name] The application pool name is the unique identifier for the application pool.

5. Look under ***Process Model*** for the value of ***Identity***, and make a note of this user account.

6. Cancel this operation and close the IIS Manager.

7. Open the Windows ***Start*** menu, go to ***Cyberlogic Suites***, then open the ***Configuration*** sub-menu, and then select ***Cyberlogic Control Panel***.



Cyberlogic OPC Users

This is the group of users who will run OPC software.
You can add and remove members and edit their permissions.

Cyberlogic OPC Users

Members

ASPNET
SHilton
NT AUTHORITY\NETWORK SERVICE

Launch and Activation Permissions

☑ Local Launch
☑ Remote Launch
☑ Local Activation
☑ Remote Activation

Access Permissions

☑ Local Access
☑ Remote Access

8. In the Cyberlogic Control Panel, select ***Cyberlogic OPC Users***.

9. Verify that the IIS user account is shown. If it is not, click ***Add...*** to add it to the group.

10. When you have finished, go to Connecting an XML DA Client.

Connecting an XML DA Client

When you open an OPC XML Data Access client application, you must specify the location of the server you want to connect to. The client may ask for an Endpoint, a Server URL or simply for a Server. The prompt will vary from one client to another. In any case, the form of the information you must enter is:

http://localhost/CybOPCXML/Cyberlogic.OPCServerDA.asmx

This is the exact form you would use if the client and server were on the same system. Otherwise, you must replace localhost with the IP address, computer name or web address of the server.