



OPC Crosslink Help

*Data Bridge for PLCs and
OPC DA Server Devices*

OPC CROSSLINK HELP

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. 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.

One of the plug-in features is OPC Crosslink™, which includes the OPC DA Server Driver Agent. This feature allows the OPC server to function as a data bridge between PLCs, between OPC DA servers and also between PLCs and OPC DA servers.

Note

This document includes only the information that is specific to OPC Crosslink. For information on the common features of the Cyberlogic OPC Server, refer to the [Cyberlogic OPC Server Help](#). For information related to a particular driver agent, refer to the help file specific for that driver agent.

OPC Crosslink is part of the OPC Crosslink Suite, OPC Crosslink Premier Suite, OPC Crosslink Enterprise Suite, DHX OPC Enterprise Suite and MBX OPC Enterprise 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 OPC Crosslink.

This document includes only the information that is specific to OPC Crosslink. For information on the common features of the Cyberlogic OPC Server, refer to the [Cyberlogic OPC Server Help](#). For information related to a particular driver agent, refer to the help file specific for that driver agent.

Learn How OPC Crosslink Works

If you are not familiar with the way that OPC Crosslink handles data, you should begin by reading the [Theory of Operation](#).

Read a Quick-Start Guide

First-time users of OPC Crosslink will want to read the [Quick-Start Guide](#), which walks through a typical configuration session, step-by-step.

Get Detailed Information on the Configuration Editor

Experienced users who want specific information on features of the configuration editor will find it in the [Configuration Editor Reference](#) section.

Verify That It's Working or Troubleshoot a Problem

If you have already configured OPC Crosslink, 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

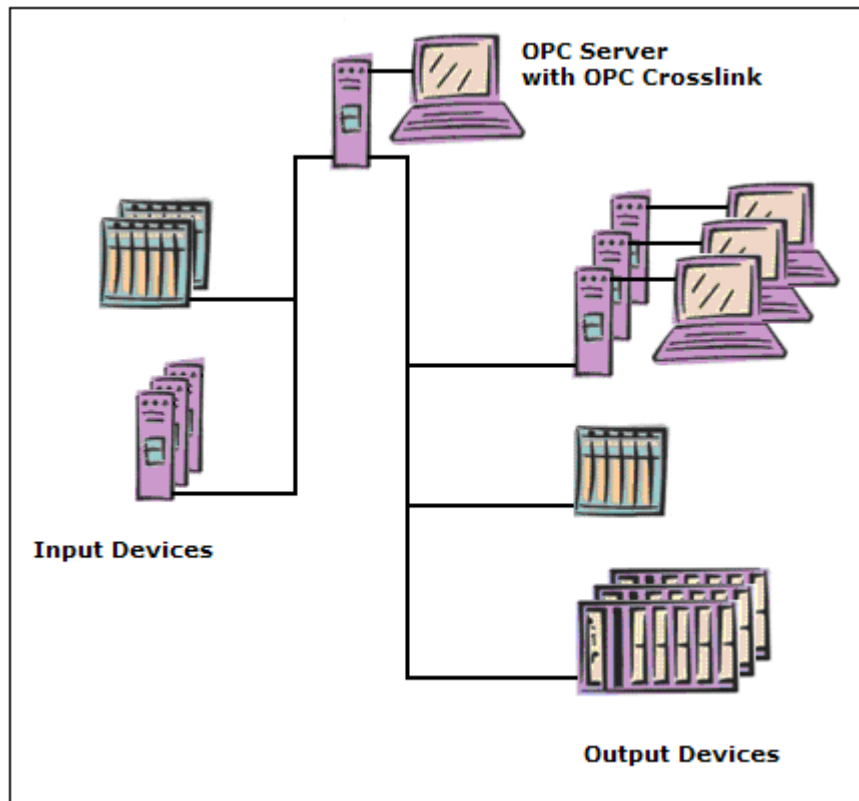
To obtain support information, open the Windows **Start** menu and go to **Cyberlogic Suites**, and then select **Product Information**.

THEORY OF OPERATION

In this section, you will learn the details about all major architectural features of OPC Crosslink. 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.

The OPC Crosslink Suite, OPC Crosslink Premier Suite, OPC Crosslink Enterprise Suite, DHX OPC Enterprise Suite and MBX OPC Enterprise Suite include two optional components for the Cyberlogic OPC Server. One is the OPC DA Driver Agent, which treats other OPC servers like field components and communicates with them just like other driver agents communicate with PLCs. (For detailed information on this feature, refer to the OPC DA Driver Agent Help file.)

The second of these features is OPC Crosslink, which gives the Cyberlogic OPC Server the ability to transfer data between field components: from one OPC server to another, from one PLC to another, or between PLCs and OPC servers.



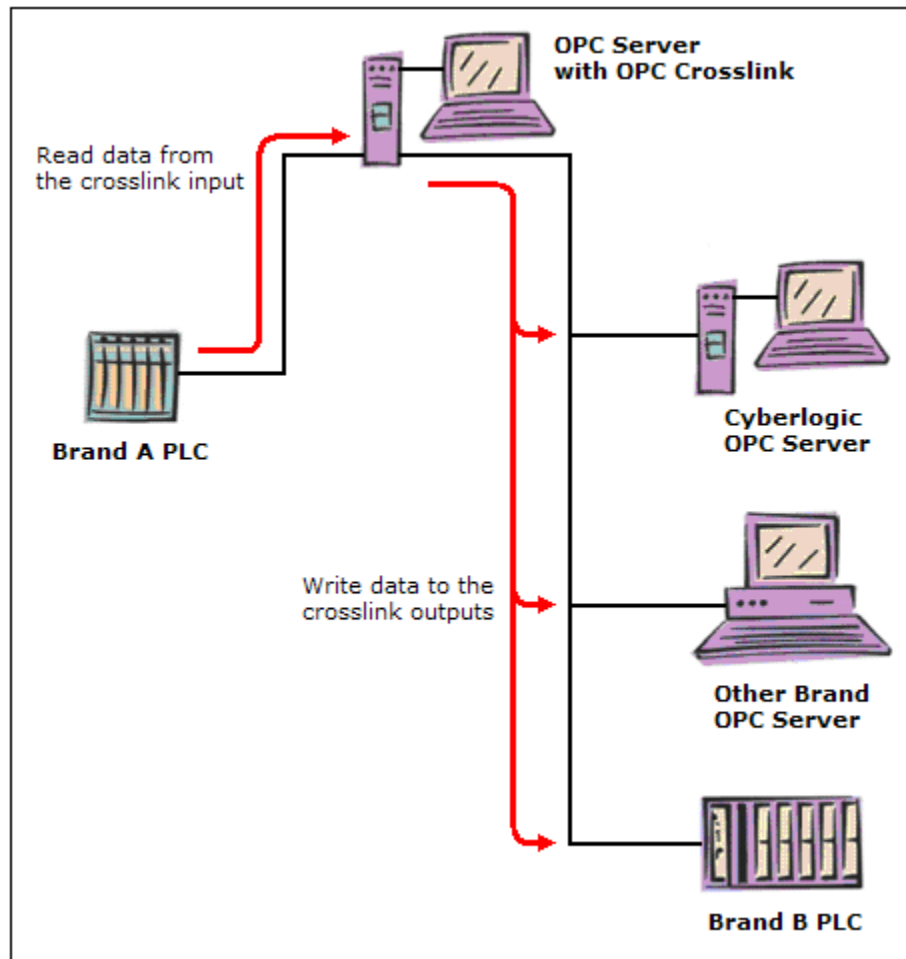
The illustration above shows the general functional capability of OPC Crosslink. It can read data from an input device and then write it to one or more output devices. These input and output devices may be OPC servers, PLCs or both. That allows you to transfer data from a PLC to another PLC, from an OPC server to another OPC server, from a PLC to an OPC server, or from an OPC server to a PLC. These transfers can be configured to occur at regular intervals, when the data changes, or when a trigger condition is detected.

But notice that each device is actually a group of redundant OPC servers or PLCs. This is made possible by the device-level redundancy that is a standard part of Cyberlogic's OPC Server. When configuring a device, you can associate an unlimited number of field components or OPC servers with that device, in a prioritized list. This list tells the OPC server the order that it should use to try to communicate with the listed data sources. If the PLC or OPC server at the top of the list is not available, the next one on the list—and then the next, and so on—will be tried until communication can be established. Once communication is established, the data from that device will be available to all OPC client software applications that wish to use it.

When a device higher on the priority list becomes available, the OPC server will switch back to communicating through that device. In this way, data will always be obtained from the highest-priority device that is available.

OPC Crosslink Example

The basic function of OPC Crosslink is to pass data from one device, such as a PLC or OPC server, directly to one or more other devices.



To set up a data transfer, you choose a data item that receives data from a PLC or OPC server and designate it as the crosslink input. Note that this input may be associated with an input bit, output bit, input register or any other type of data location anywhere in the

chosen input device. The crosslink input provides the data that OPC Crosslink will transfer.

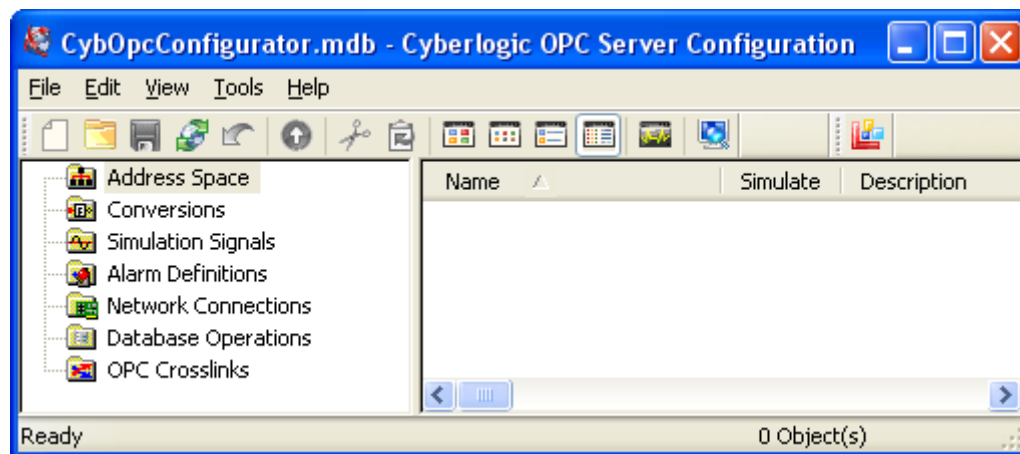
You then choose another data item, called the crosslink output, to receive the data. Again, this data item may be associated with any writable memory location that is capable of accepting that type of data, anywhere in the chosen output device. OPC Crosslink will then read the data from the crosslink input and write it to the crosslink output.

You are not restricted to a one-to-one transfer. A given crosslink input value can be written to an unlimited number of crosslink outputs. Furthermore, both input and outputs can be associated with the same device or different devices.

OPC Crosslink provides several ways to control the transfer. It can be scheduled to occur when the data changes, when triggered by a change in the state of a data item, or at a specific interval. You can also enable or disable the transfer by controlling the state of a designated data item.

Refer to the Configuration Editor section for information on how to configure [OPC Crosslinks](#).

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. Refer to the [Cyberlogic OPC Server Help](#) for a detailed discussion of this tree.

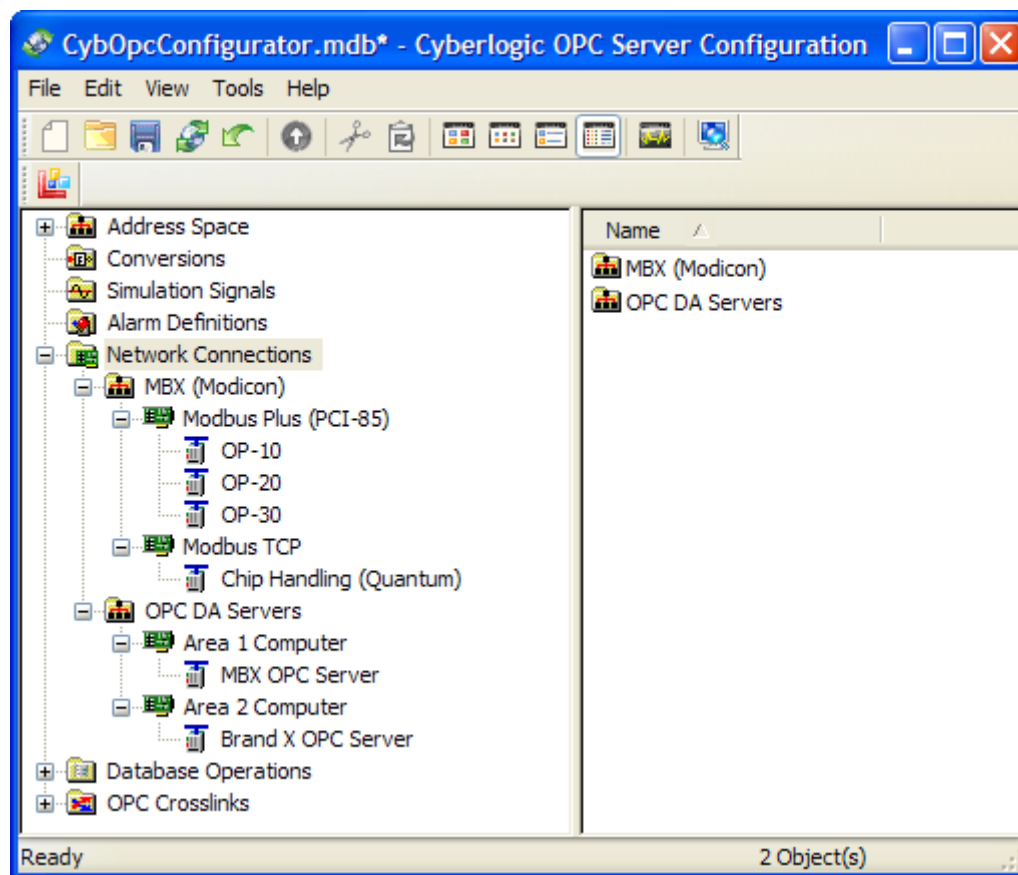
- The Simulation Signals Tree is optional. If you want to be able to use simulated data item values instead of real values, you can create various types of simulated data functions in this tree. Simulations are often useful for troubleshooting client applications. Refer to the [Cyberlogic OPC Server Help](#) for a detailed discussion of this tree.
- 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. Refer to the [Cyberlogic OPC Server Help](#) for a detailed discussion of this tree.
- 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. Refer to the [Data Logger Help](#) for a detailed discussion of this tree.
- 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 the trees that are relevant to OPC Crosslink. 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 MBX architecture, the network connections will be MBX devices. In some cases an MBX device corresponds to a physical network card, such as a PCI-85. In other cases, it is an abstract object, such as an Ethernet MBX device, that behaves like a network card. In the case of OPC DA Servers that OPC Crosslink uses, the computer that hosts the OPC server corresponds to the network connection. Network connections are grouped by their driver agents, such as MBX (Modicon) or DHX (Allen-Bradley).

Each network connection allows access to one or more physical devices on the network or OPC servers on the computer. The server refers to each of these as a network node. A typical network node might be a PLC-5 on a Data Highway Plus network, a Quantum controller on a Modbus TCP network, or a DHX OPC Server on a remote computer.

A user can define many network connections, each having many network nodes. These network connections and network nodes will be used to define 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. That means you will have to enter the network parameters for each node just one time. If you later make any changes to a network node, they will automatically apply to 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 "MBX OPC Server", you could call it "Assembly OPC Server" or "Manufacturing Area Data" 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 OPC servers and controllers attached to the network connections and create corresponding network nodes in the server configuration file.

Health Watchdog

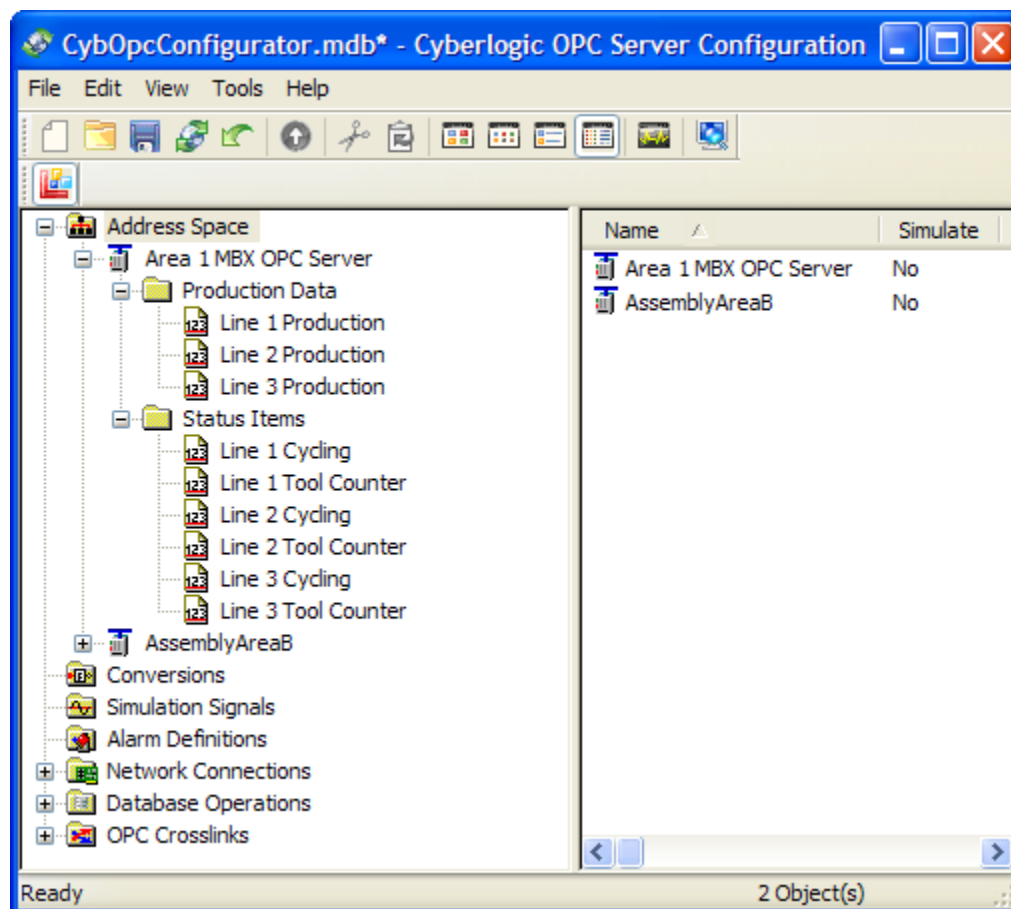
This feature allows you to configure redundant networks with automatic failover and recovery. The server monitors the health of the connection to each network node. If there is no network activity for a specified amount of time, the server sends a communication request to the node to verify that it can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

Once a failed 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.



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.

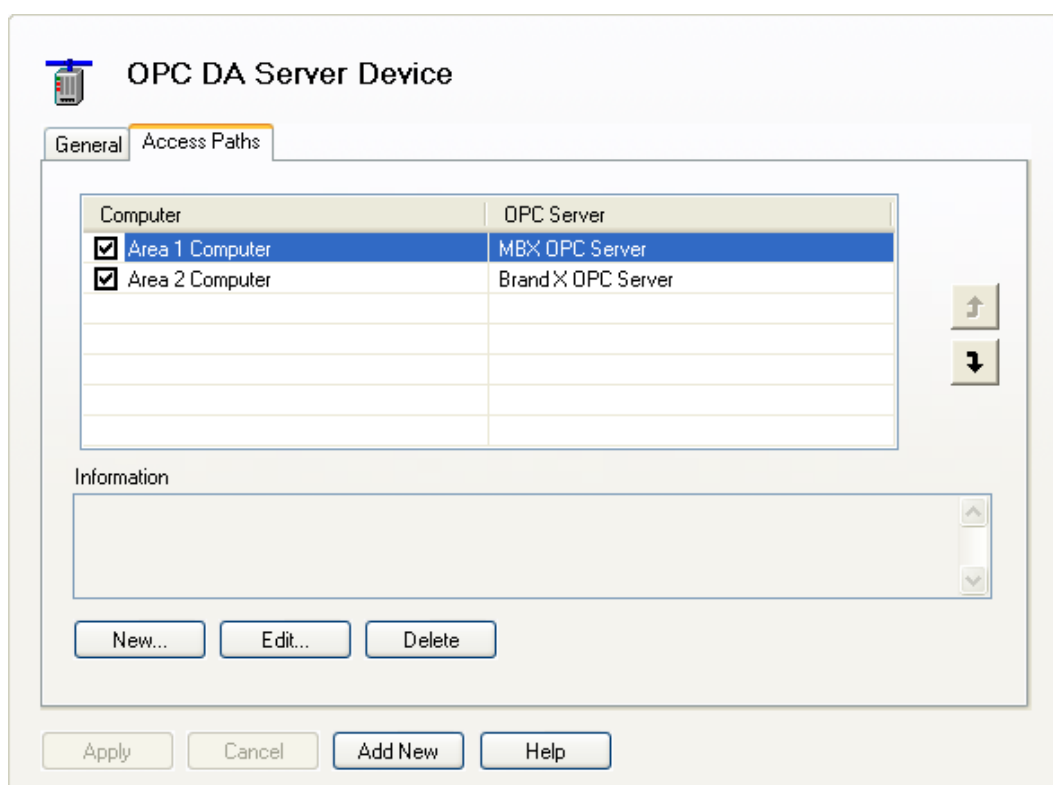
Note A device in the address space is not the same thing as a network node. Each network node represents a single physical device or OPC server, while an address space device may be associated with many physical devices or OPC servers.

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.

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 or OPC server. They tell the server where and how to obtain these values during solicited data reads and writes.



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. The same is true for primary and backup OPC servers.

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.

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 or OPC server, a range of registers, a bit inside a register or a range of bits.

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 or be undesirable for another reason. 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.

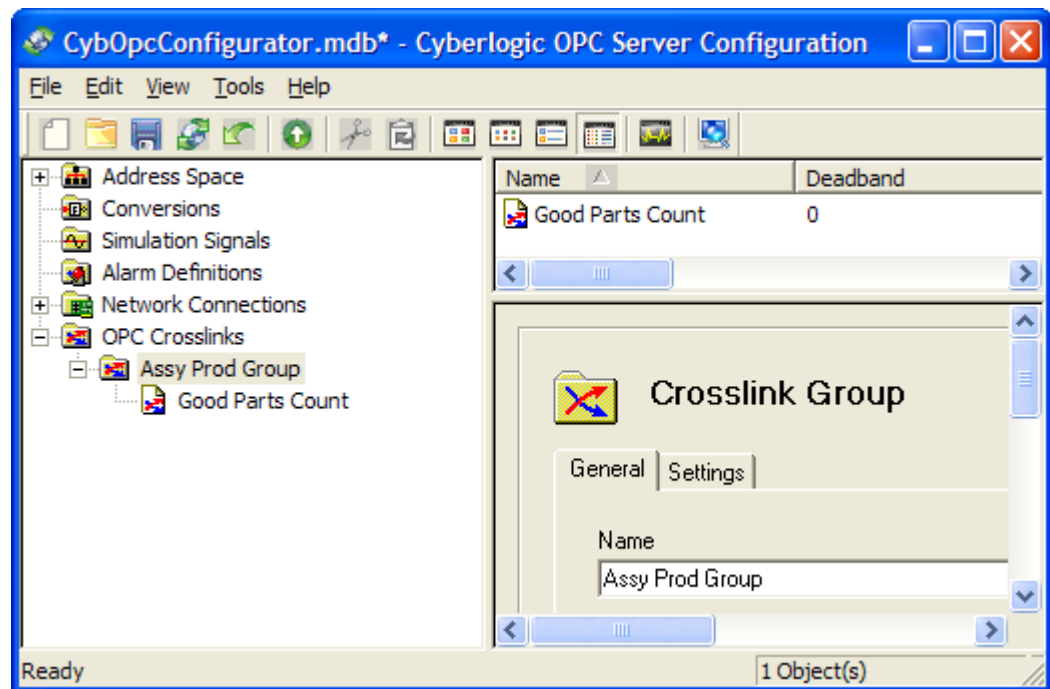
The DirectAccess branch acts like a device folder that contains all configured driver agents. Each driver agent branch contains its configured network connections, and each network connection branch contains its configured network nodes. However, only driver agents, network connections and network nodes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

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.



Crosslinks are organized into crosslink groups, which are enabled as a group. The crosslinks in a group also use the same trigger for writing to the outputs, which may be when the data changes, at a specified interval, or when a specified data item changes.

Each crosslink consists of a crosslink input and one or more crosslink outputs. You select these by browsing the address space and selecting the desired data items. When the crosslink group is enabled and the write criteria are met, the input value will be written to each of the crosslink outputs.

Refer to the Configuration Editor section for information on how to configure [OPC Crosslinks](#).

QUICK-START GUIDE

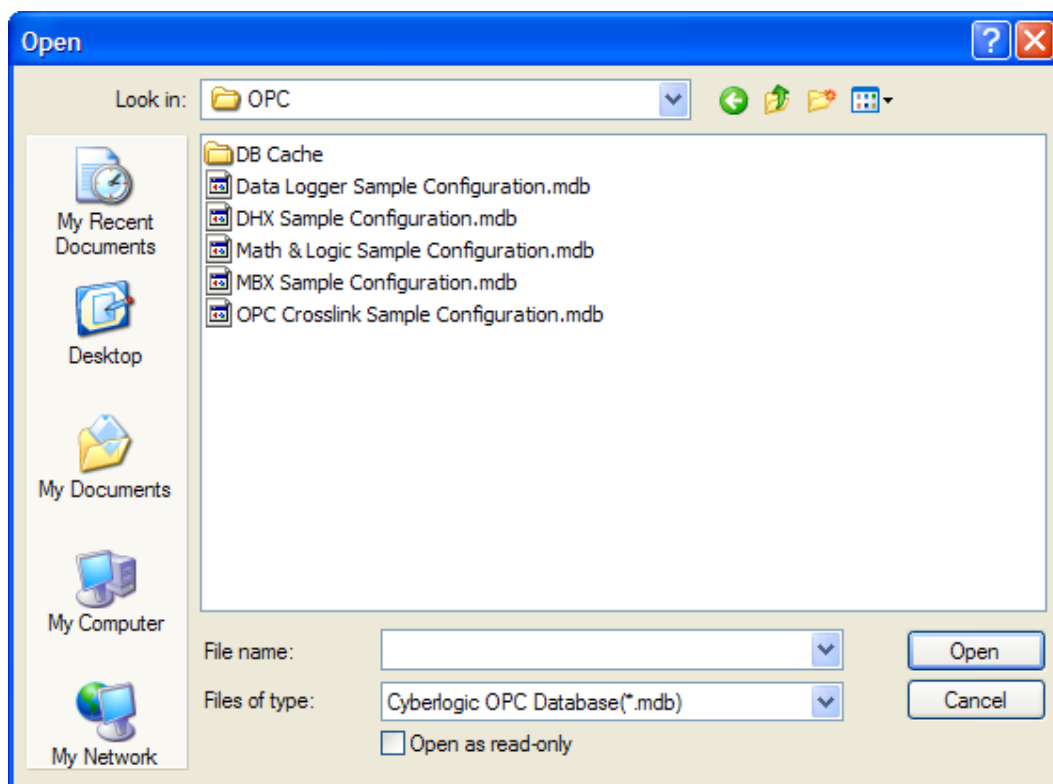
Before you can use the OPC server, you must configure it by using the OPC Server Configuration Editor. Every server requires configuration of the Network Connections branch, OPC Crosslink users must configure the OPC Crosslinks branch, and most users will want to configure the Address Space branch. The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

To help you get started quickly, Cyberlogic provides [Sample Configuration Files](#) you can study and modify, and a [Step-By-Step Example](#) of a typical configuration session.

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.

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



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 of the OPC Crosslink feature. 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](#), the [Cyberlogic OPC Server Help](#), and to the help file for the driver agent you are using.

This example assumes that you are connected over Ethernet to two other OPC servers. We will configure a crosslink that reads data from one of these OPC servers and writes it to another one.

Note

In this example, we will configure an OPC server to OPC server crosslink. However, you can also create crosslinks that pass data between OPC servers and PLCs, or from one PLC to another. You can even create crosslinks that read from Modicon controllers and write to A-B controllers, and vice-versa.

If you want to create crosslinks that involve PLCs, you must have the appropriate driver agent installed for that family of controllers: the MBX Driver Agent for Modicon controllers, or the DHX Driver Agent for A-B/ControlLogix controllers.

The procedure is divided into several sections:

- [Configuring the Network Connections Tree Automatically](#)
- [Configuring the Network Connections Tree Manually](#)
- [Creating Address Space Device Folders and Devices](#)
- [Configuring the Access Paths](#)
- [Using DirectImport](#)
- [Configuring a Trigger](#)
- [Configuring a Crosslink Group](#)
- [Configuring a Crosslink](#)
- [Saving the Configuration and Updating the Server](#)
- [Verifying Your Configuration](#)

We will start with [Configuring the Network Connections Tree Automatically](#).

Configuring the Network Connections Tree Automatically

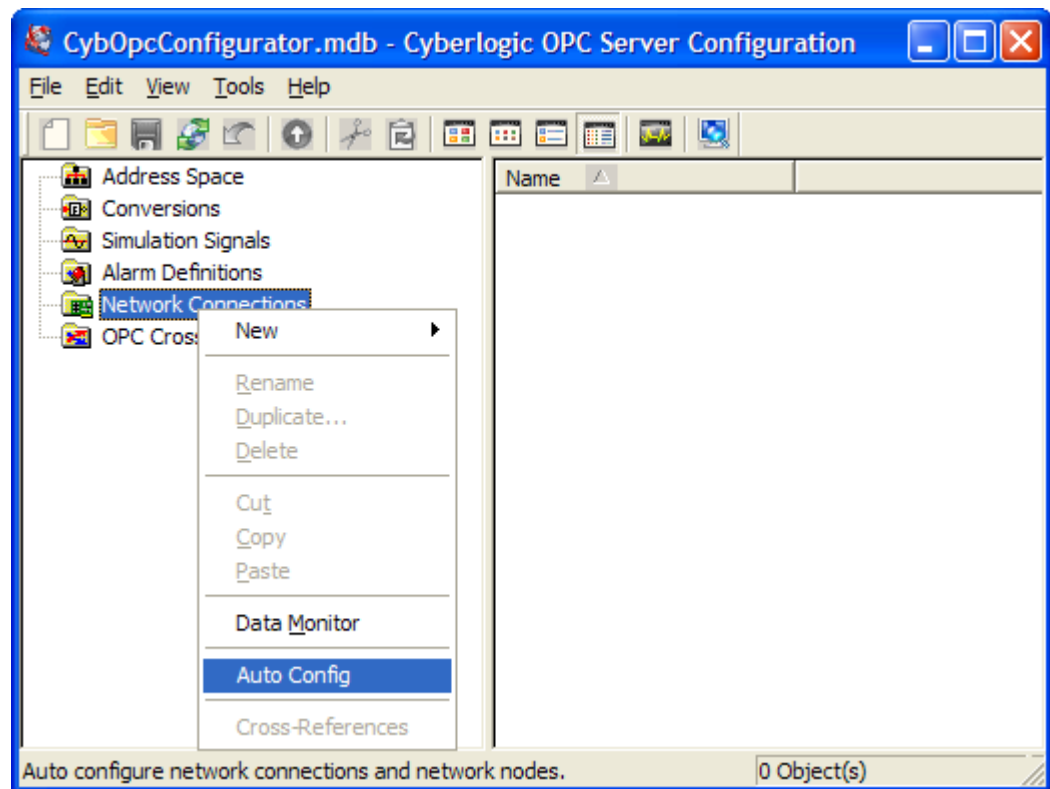
There are two ways to configure the [Network Connections Tree](#). The simplest method is to use automatic configuration, which is described in this section. If you want to communicate with an OPC server in another computer, the remote computer must be

connected to the network, and its OPC server must be running for automatic configuration to be possible.

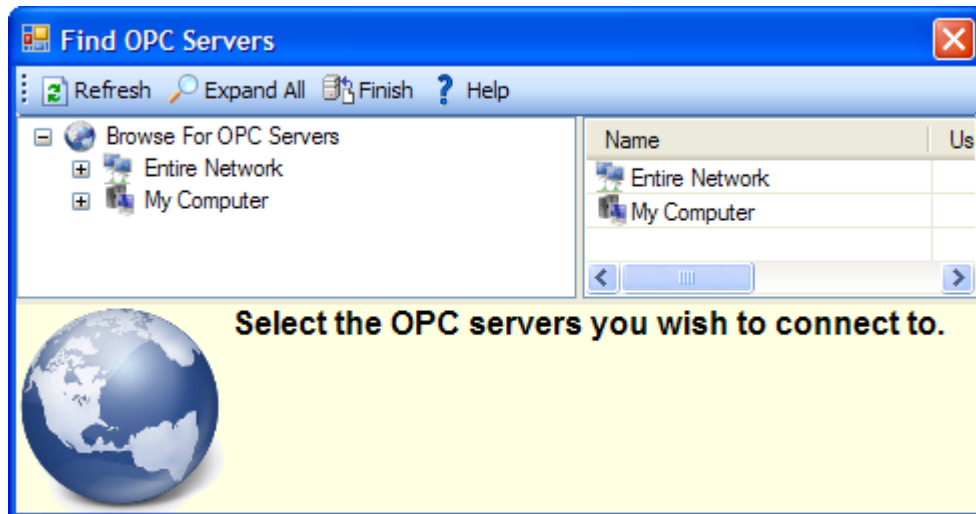
Note

In complex systems, it is possible that some of the OPC server systems you want to communicate with may not yet be connected. In those 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](#).

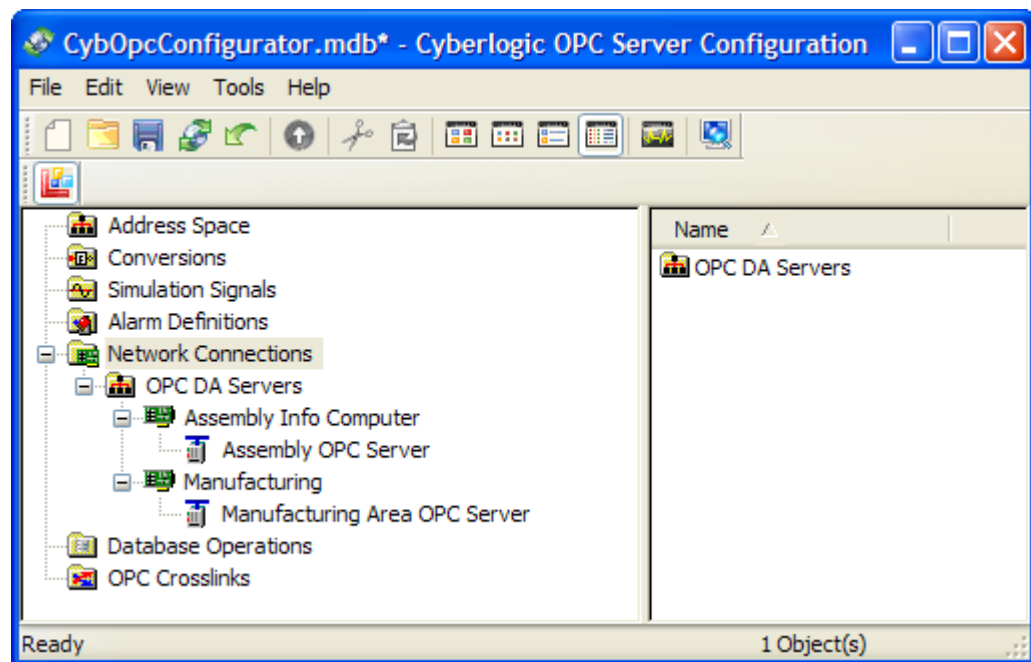


1. Select the **Network Connections** root folder and select **Auto Config** from the Edit menu (or right-click on the **Network Connections** root folder and select **Auto Config** from the context menu).



The Auto Config window will allow you to browse for computers and will identify all of the OPC DA servers on each.

2. Select the desired servers and then click the **Finish** button.



This screen shows that the editor has configured connections to two OPC servers:

- *Assembly OPC Server* on the *Assembly Info Computer*
- *Manufacturing Area OPC Server* on the *Manufacturing* computer

You can assign them different names, if you wish.

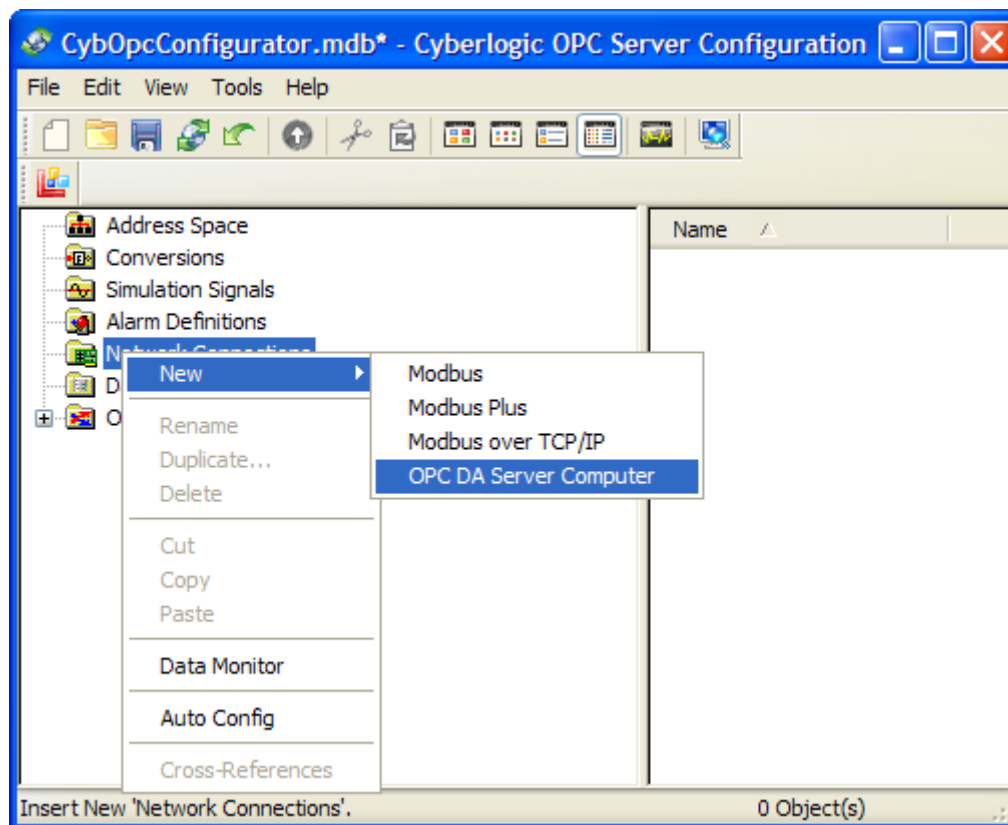
The next step is [Configuring the Network Connections Tree Manually](#).

Configuring the Network Connections Tree Manually

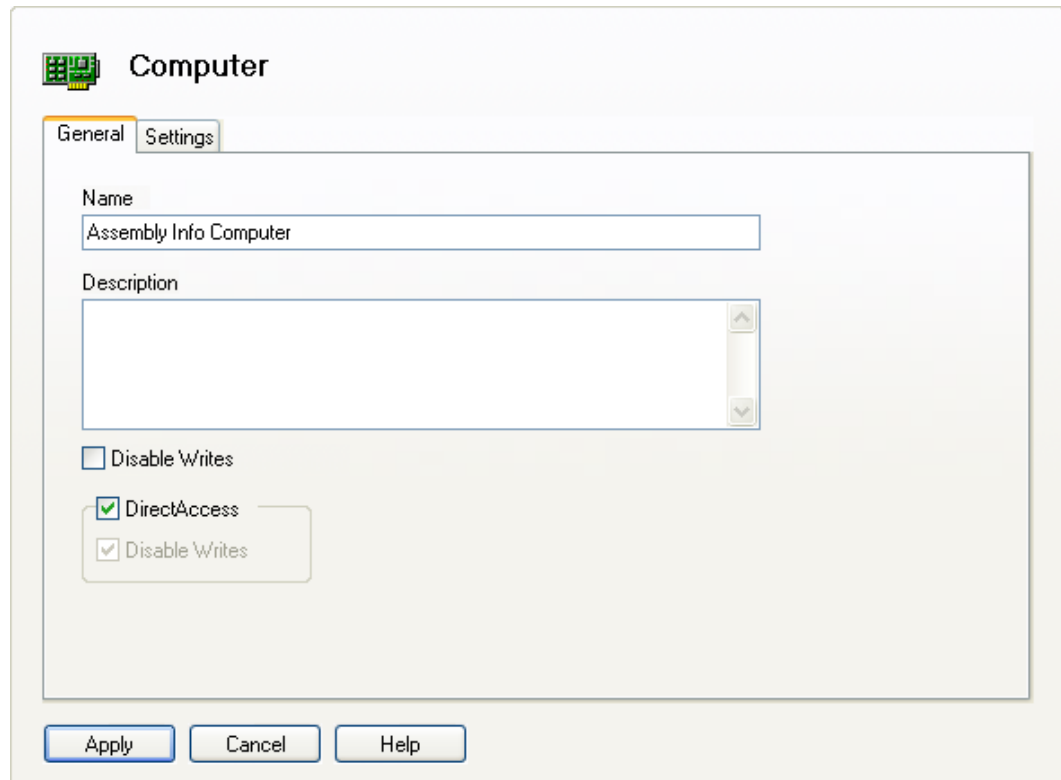
If automatic configuration was able to configure all of the computers and OPC servers you need, then you can skip this section and go to [Creating Address Space Device Folders and Devices](#).

Some of the OPC servers that you want to use may not yet be running or their computers may not yet be connected to the network. If you want to configure network connections for these servers, you must do it manually.

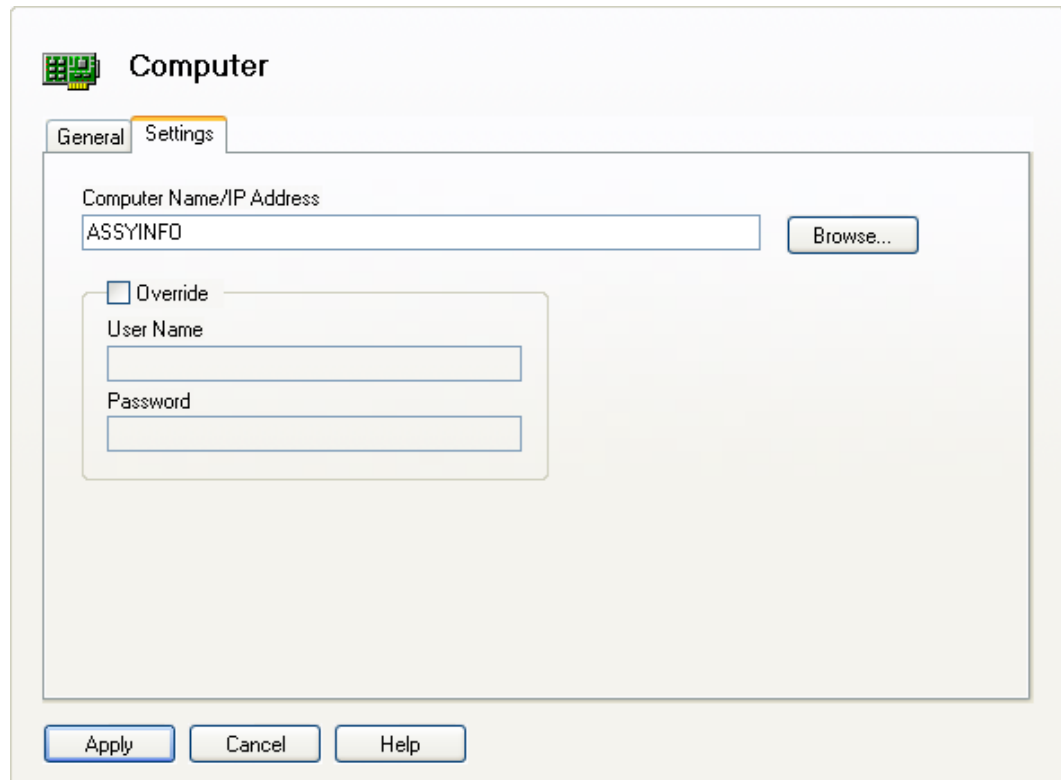
In the previous section, Auto Config was able to configure both of the needed OPC servers. In this section, we will repeat that configuration, this time doing it manually.



1. Right-click on the **Network Connections** branch and select **New**, then **OPC DA Server Computer** from the context menu.



2. Click on the newly-created computer connection and select its **General** tab.
3. Enter a descriptive name in the **Name** field.
4. Select the **Settings** tab.



Computer

General Settings

Computer Name/IP Address

ASSYINFO Browse...

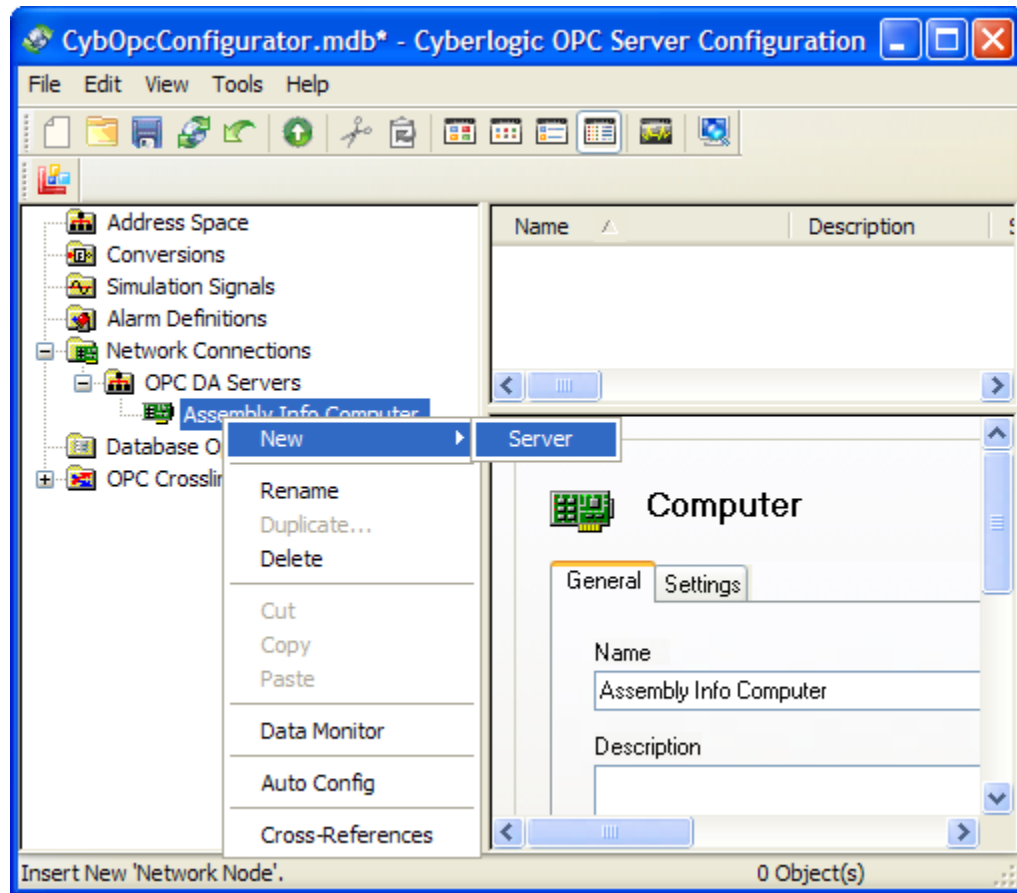
☐ Override

User Name

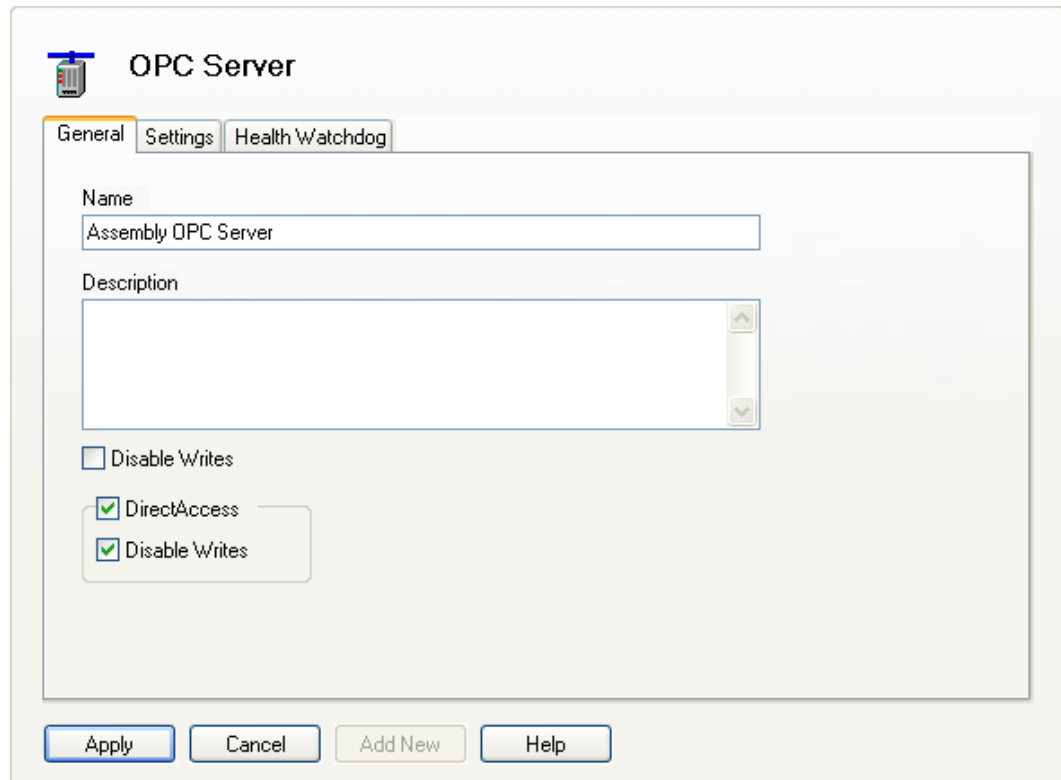
Password

Apply Cancel Help

5. Enter the computer's name or its IP address in the **Computer Name/IP Address** field.
6. Click **Apply** to complete the creation of the computer connection.



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



The screenshot shows the 'OPC Server' configuration window with the 'General' tab selected. The window has a title bar with a server icon and the text 'OPC Server'. Below the title bar are three tabs: 'General', 'Settings', and 'Health Watchdog'. The 'General' tab contains the following fields and controls:

- Name:** A text box containing the text 'Assembly OPC Server'.
- Description:** A multi-line text box that is currently empty.
- Disable Writes:** An unchecked checkbox.
- DirectAccess:** A checked checkbox.
- Disable Writes (grouped):** A checked checkbox, located within a rounded rectangular container.

At the bottom of the window are four buttons: 'Apply', 'Cancel', 'Add New', and 'Help'.

8. Click on the newly-created OPC server and select its **General** tab.
9. Enter a descriptive name in the **Name** field.
10. Select the **Settings** tab.

OPC Server

General Settings Health Watchdog

Server Name/CLSID
Cyberlogic.OPCServerDA

OPC DA Spec Level
OPC DA 3.0

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

Apply Cancel Add New Help

11. Enter the ***Server Name/CLSID***.
12. Select the ***OPC DA Spec Level***.
13. Click ***Apply*** to complete the creation.
14. Repeat the above procedures for the other OPC server.

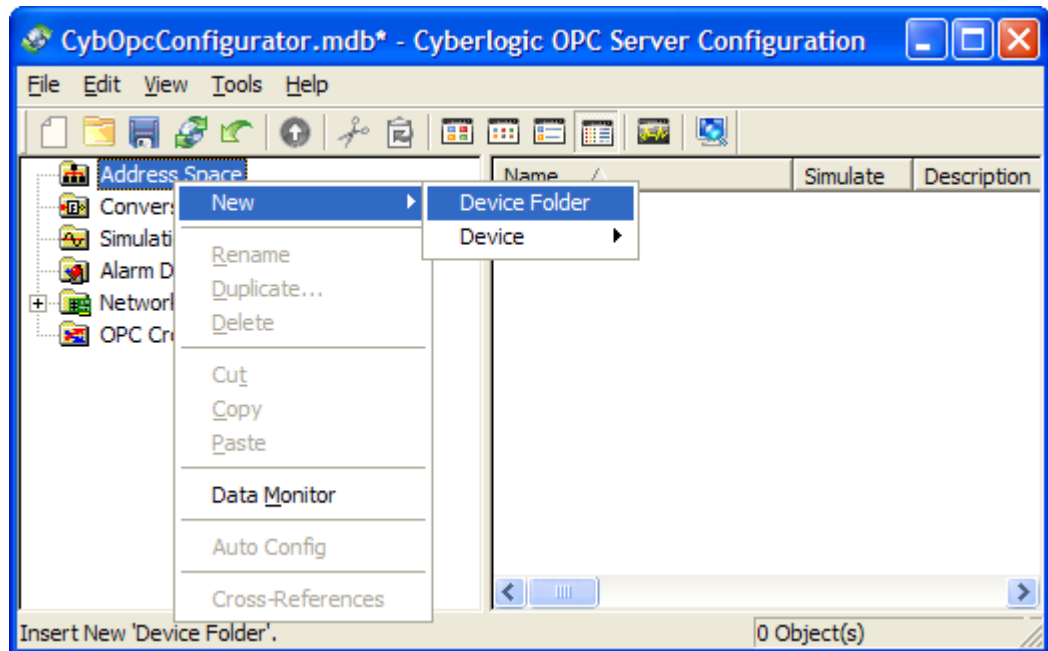
Go on to [Creating Address Space Device Folders and Devices](#) to continue.

Creating Address Space Device Folders and Devices

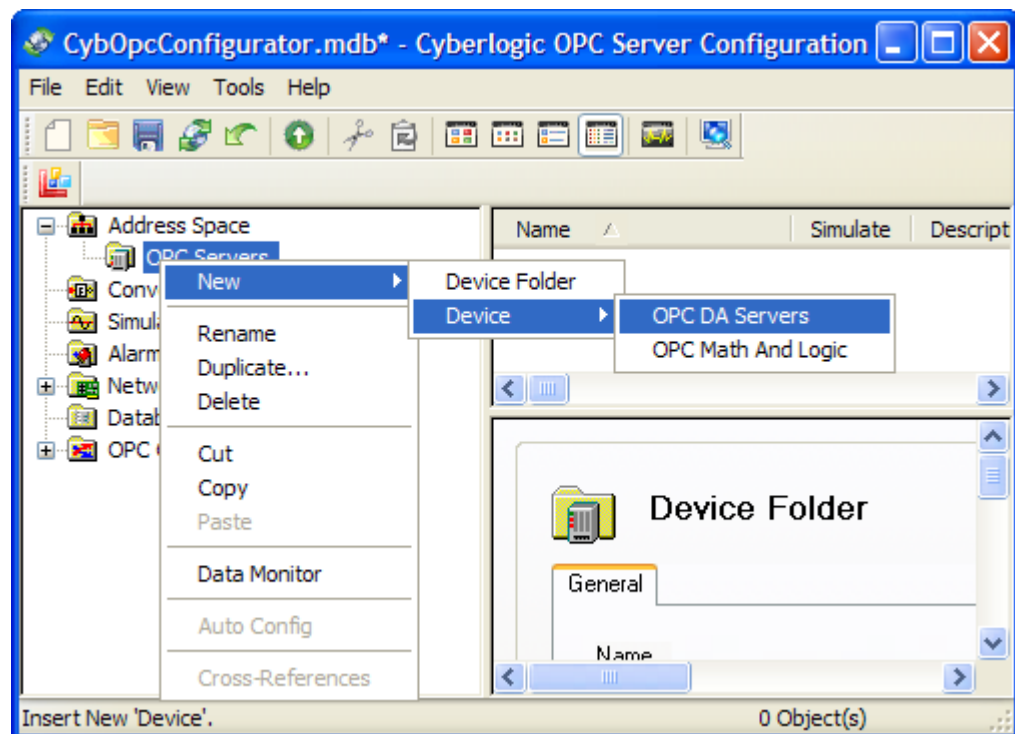
In the [Address Space Tree](#), you will create devices that will obtain data from network nodes, and the data items that will receive the data. For this example, we will set up devices for the two OPC servers, but you can also set up devices for PLCs. If you have many devices, you may also create device folders to organize these devices in a logical way.

Note

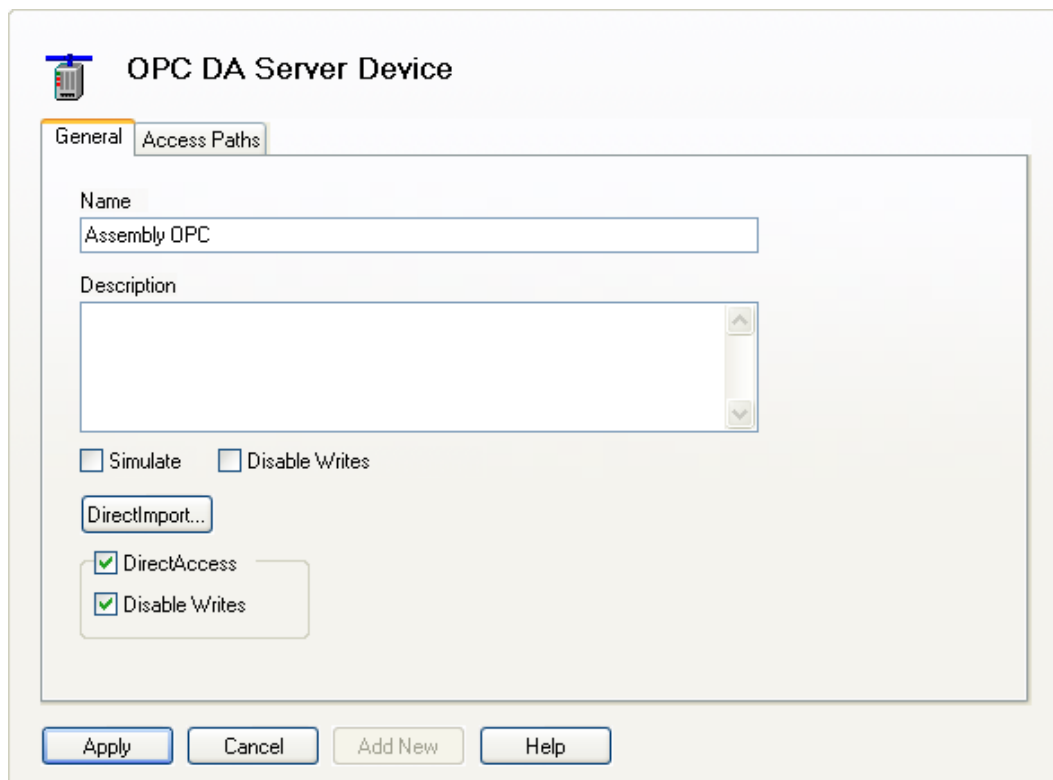
If you are willing to limit yourself to using DirectAccess to obtain data from PLCs and OPC servers, it is not necessary to configure the Address Space Tree at all. However, you will not be able to take advantage of many of the features of the Cyberlogic OPC Server, including redundant networks and PLCs, unsolicited communication, and data conversion and 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 **OPC Servers**.
4. Click the **Apply** button.



5. Right-click on the device folder and select **New**, then **Device**, and then **OPC DA Servers** from the context menu.



The screenshot shows the 'OPC DA Server Device' configuration dialog box. It has two tabs: 'General' (selected) and 'Access Paths'. The 'General' tab contains the following fields and options:

- Name:** A text box containing 'Assembly OPC'.
- Description:** A large text area with a vertical scrollbar, currently empty.
- Simulate:** An unchecked checkbox.
- Disable Writes:** An unchecked checkbox.
- DirectImport...:** A button.
- DirectAccess:** A checked checkbox.
- Disable Writes:** A checked checkbox.

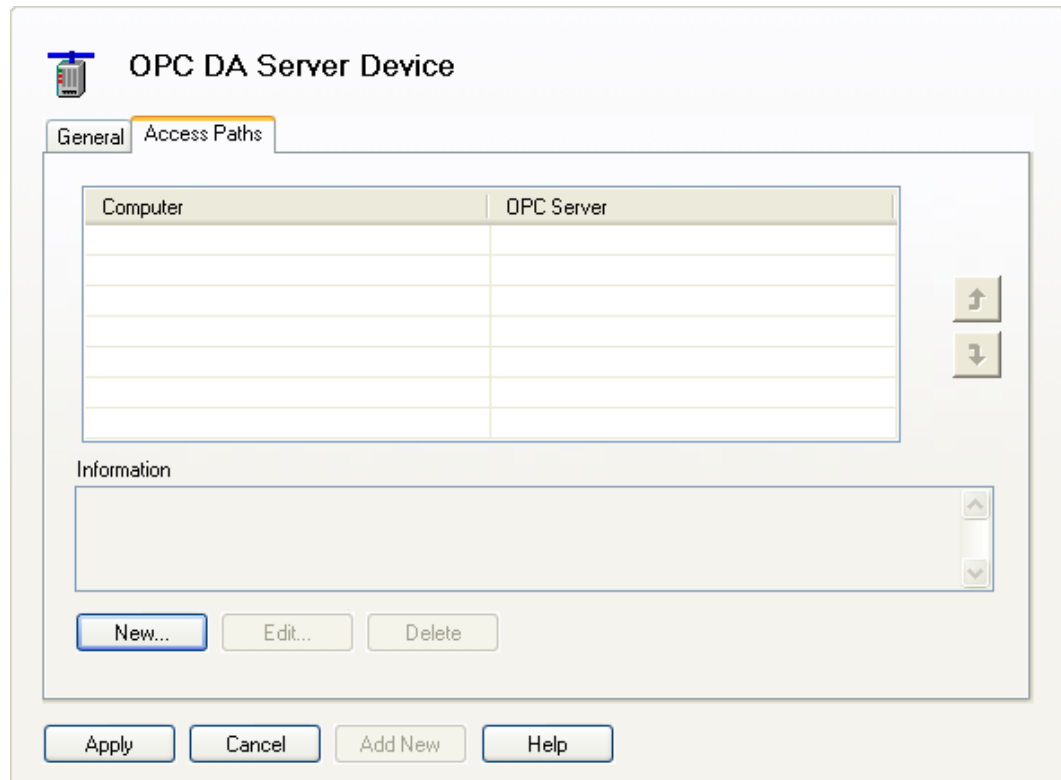
At the bottom of the dialog are four buttons: 'Apply', 'Cancel', 'Add New', and 'Help'.

6. Click on the newly-created device and go to its **General** tab.
7. Enter a descriptive name in the **Name** field. For this exercise, use the name **Assembly OPC**.
8. Enter an optional description, if you wish.
9. Click **Apply**.
10. Repeat steps 5 through 9 to create another OPC DA server device for the manufacturing area OPC server, naming it **Manufacturing OPC**.

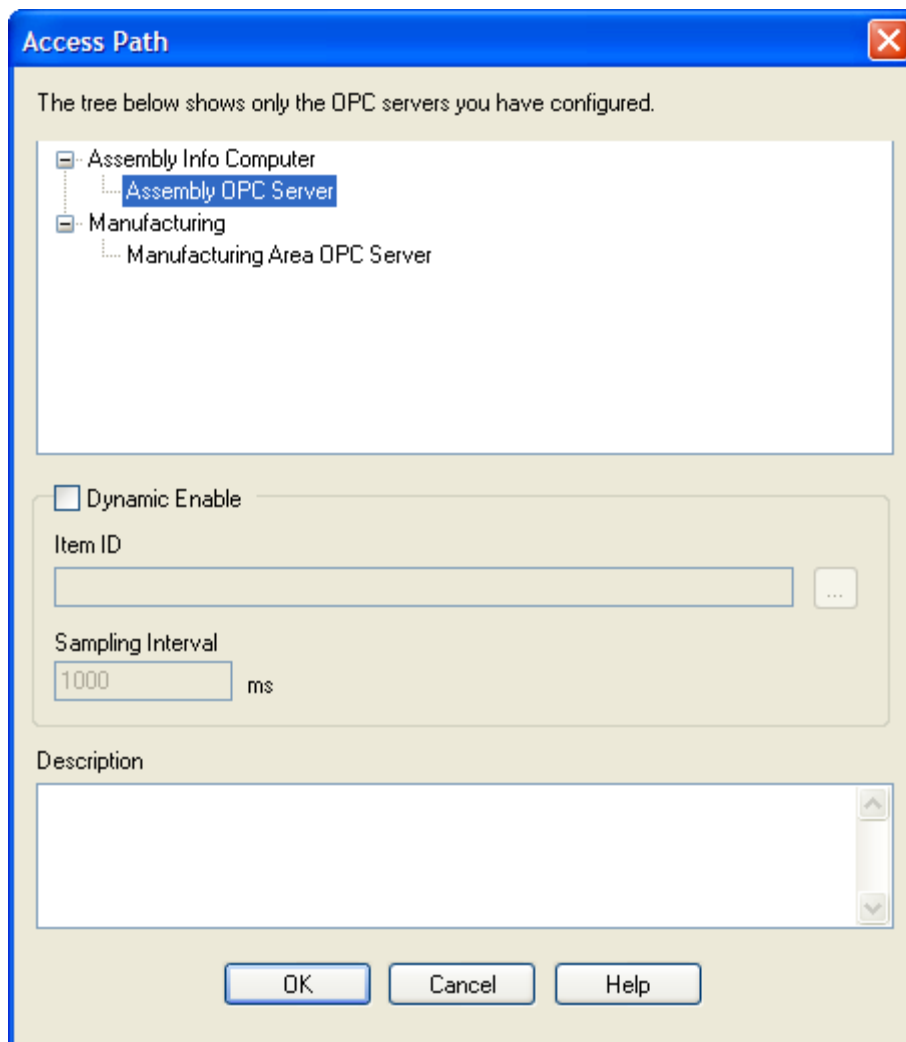
An OPC DA server device represents a logical data source associated with one or more physical OPC servers to which this server communicates. In the next section, [Configuring the Access Paths](#), you will make this association.

Configuring the Access Paths

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



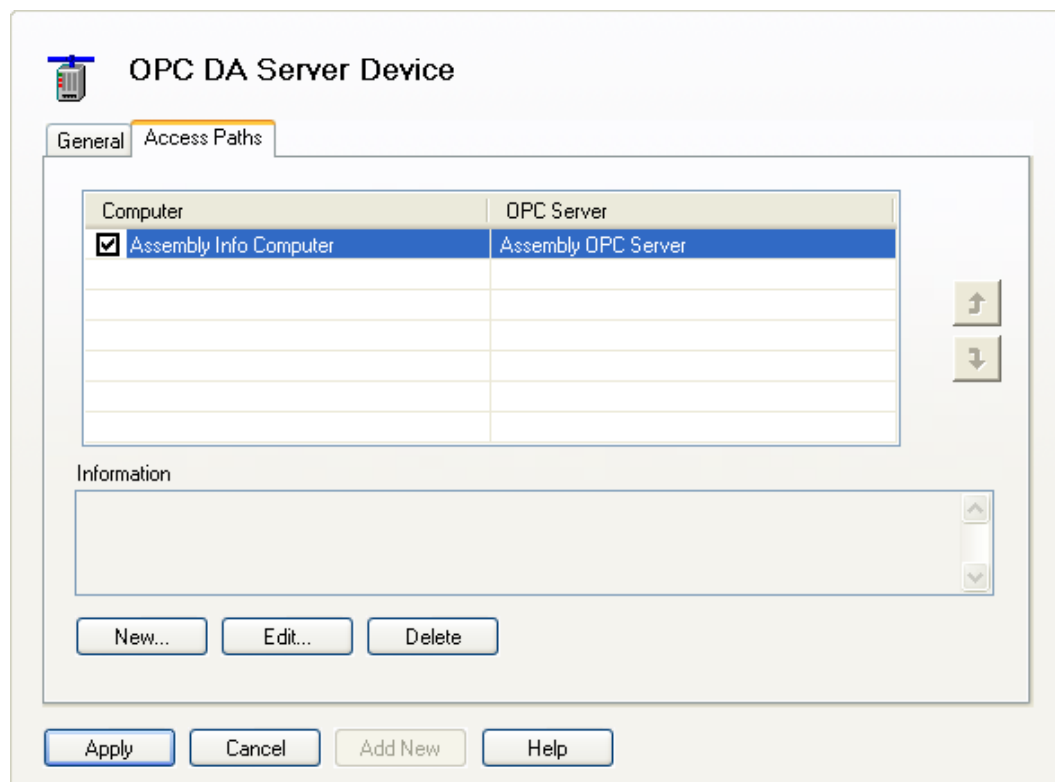
1. Click on the **Assembly OPC** device and select its **Access Paths** tab.
2. Click the **New...** button.



3. In the Access Path dialog, select the **Assembly OPC Server** under Assembly Info Computer.
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. Click **OK**.



6. Click **Apply**.
7. Repeat the procedure for the **Manufacturing Area** device, choosing the access path to **Manufacturing Area OPC Server**.

To continue, go to [Using DirectImport](#).

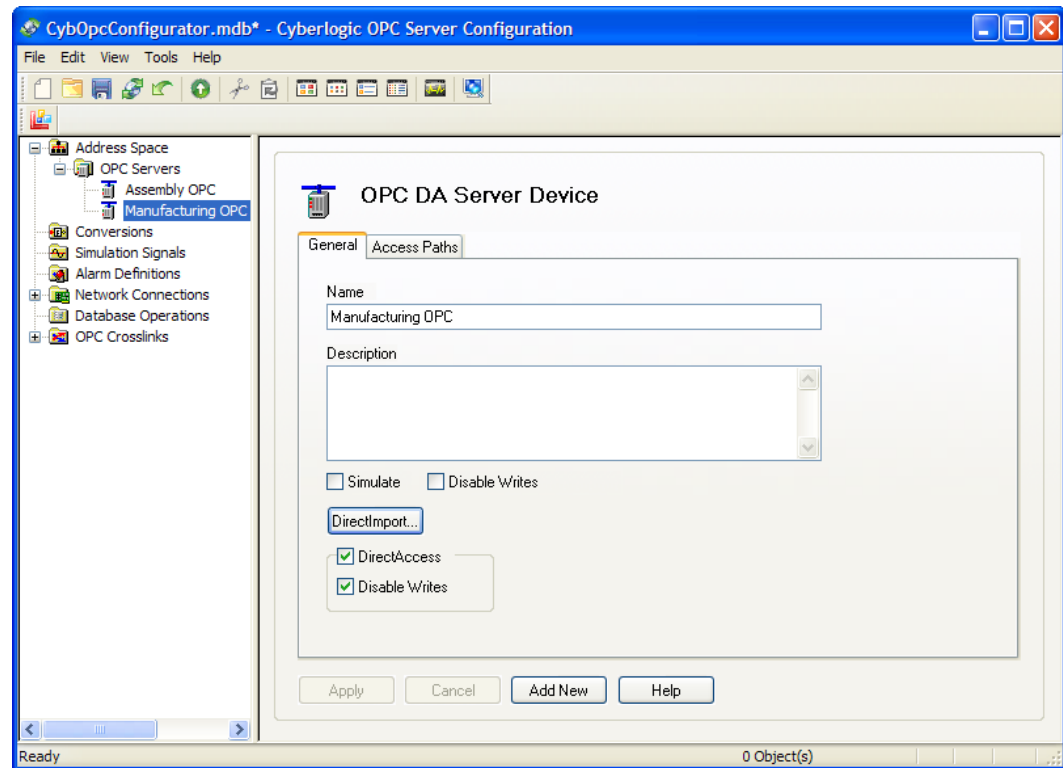
Using DirectImport

DirectImport allows you to import data items and the folders that contain them directly from the OPC server. If you have only a few folders or data items to configure, they can be configured individually, as explained in the [Configuration Editor Reference](#). However, for OPC servers with large or complex configurations, the DirectImport feature can dramatically speed up this configuration.

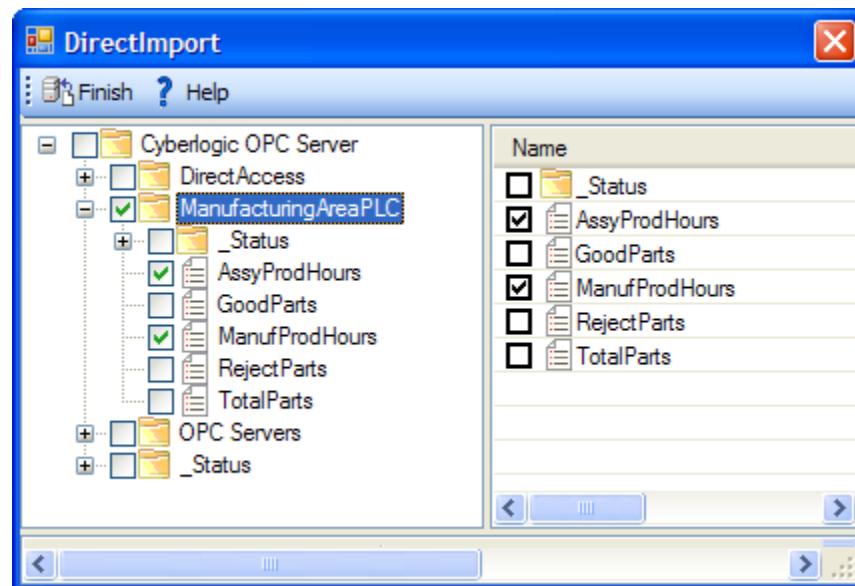
Note

DirectImport requires communication with the OPC server you are importing from. If communication is not available, you can skip this section and go to [Configuring a Trigger](#).

First, we will use DirectImport to configure the data items and folders for the Manufacturing Area device that we have created.



1. Select the **Manufacturing OPC** device.
2. Select its **General** tab and click **DirectImport...**

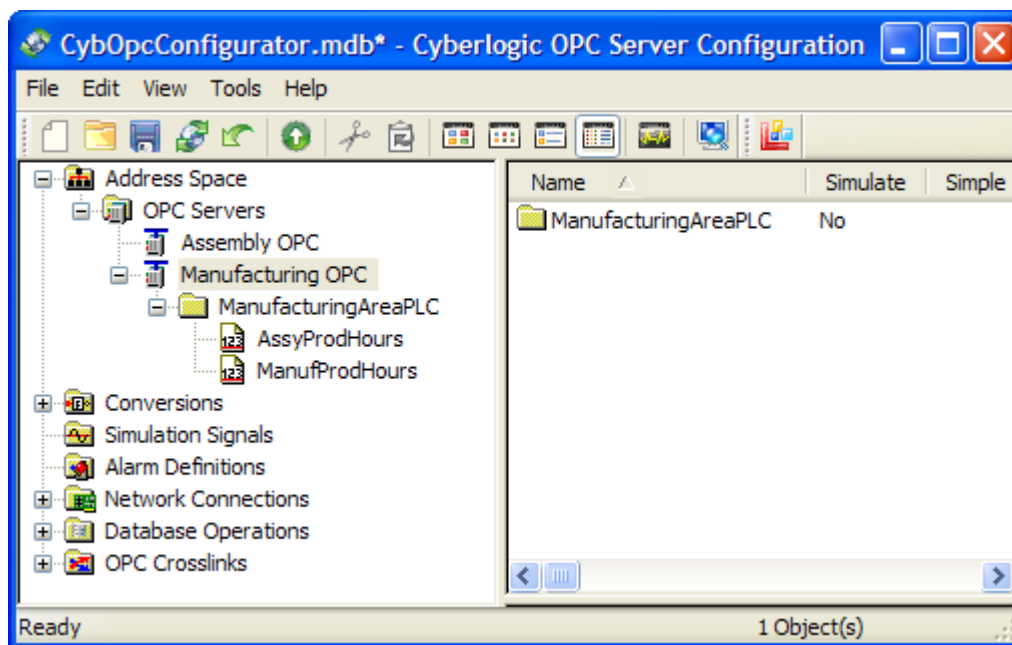


The DirectImport window will open and will show all of the data items in the OPC server you are importing from. In this case, the OPC server has a device for the PLC that controls the manufacturing area. Within that PLC are two registers we want to use.

- 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.

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



The selected items will be imported into the address space tree. Notice that the device appears as a folder, with the data items within it.

- You may then edit these folders and data items, if you wish to use different names or arrange them differently.
- Repeat the process to configure the data items for the **Assembly OPC** device.

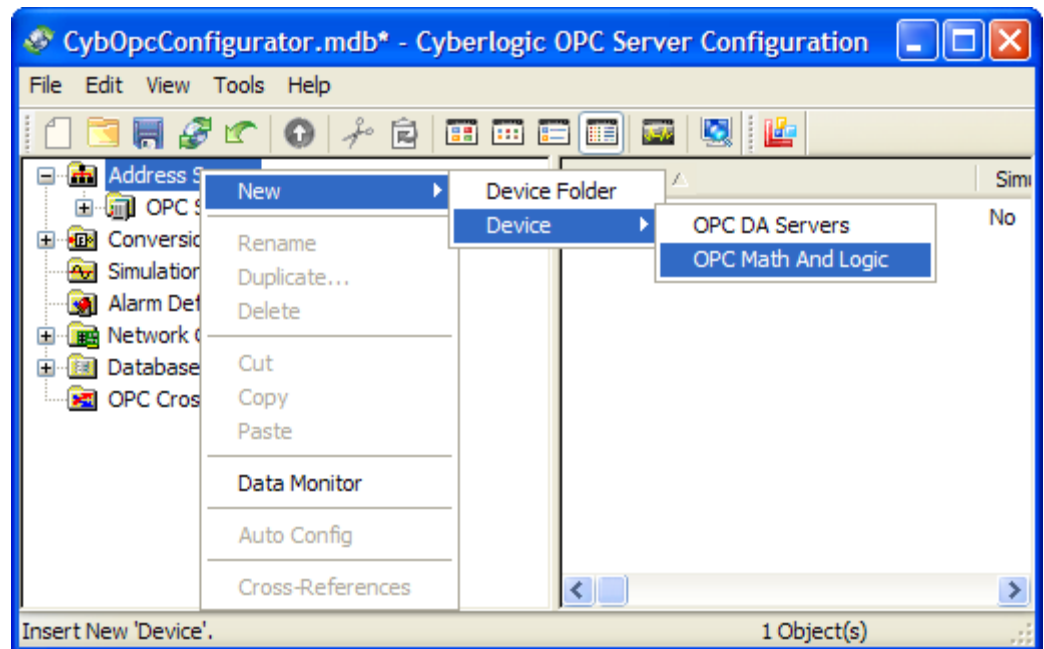
Next, go to [Configuring a Trigger](#).

Configuring a Trigger

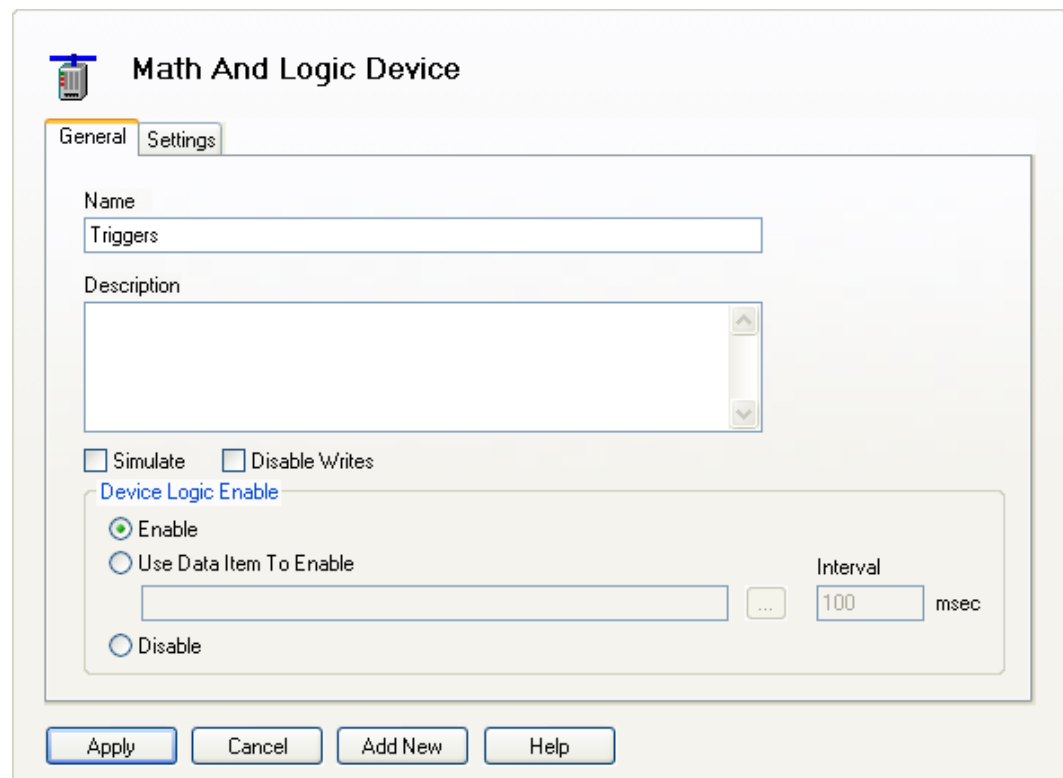
There are many ways to trigger a crosslink to transfer its data. In this example, we will use a Math & Logic trigger item.

Note

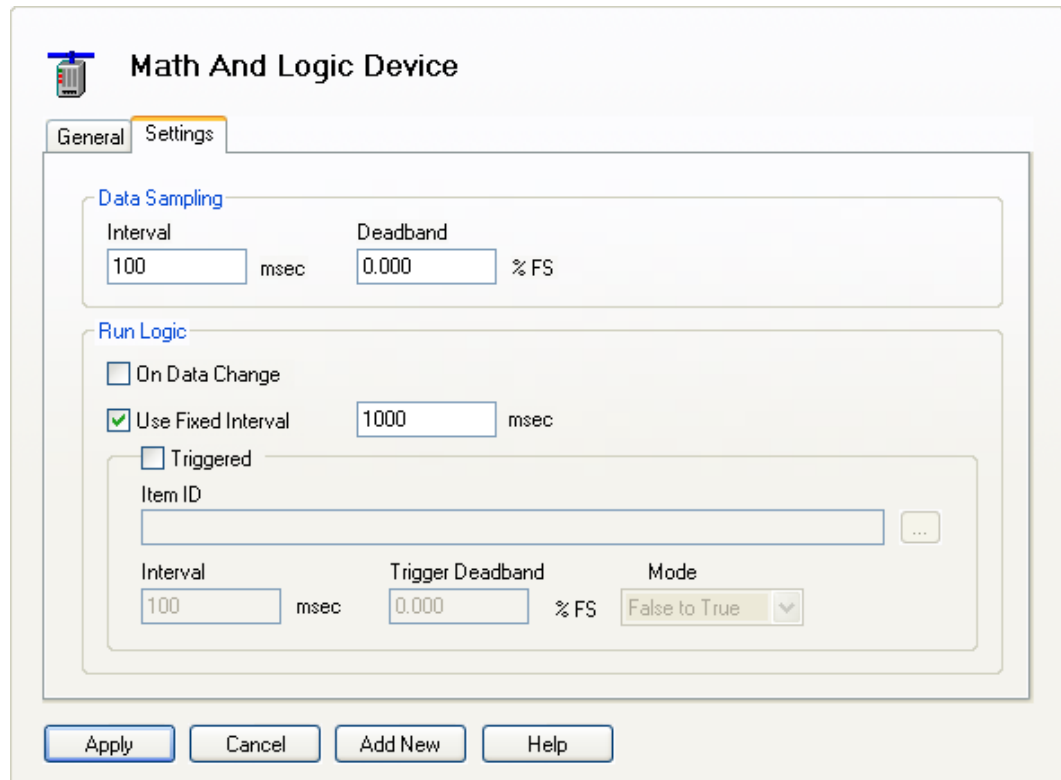
The full Math & Logic feature is part of the Premier and Enterprise suites. However, the standard OPC Crosslink Suite includes the ability to use preprogrammed Math & Logic data items as trigger and switch signals. This is the type we will use here. If you have a Premier or Enterprise suite, you can also use Math & Logic to create your own custom-programmed data items.



1. Right-click on the **Address Space** root and select **New** from the context menu, then select **Device** and then **OPC Math & Logic**.



2. Select the device's **General** tab, and enter **Triggers** in the **Name** field.



The screenshot shows the 'Math And Logic Device' settings window. It has two tabs: 'General' and 'Settings'. The 'Settings' tab is active. Under the 'Data Sampling' section, the 'Interval' is set to 100 msec and the 'Deadband' is 0.000 % FS. Under the 'Run Logic' section, the 'On Data Change' checkbox is unchecked, the 'Use Fixed Interval' checkbox is checked with an interval of 1000 msec, and the 'Triggered' checkbox is unchecked. Below the 'Triggered' checkbox is an 'Item ID' text field and a browse button (...). At the bottom of the 'Run Logic' section, there are three fields: 'Interval' (100 msec), 'Trigger Deadband' (0.000 % FS), and 'Mode' (False to True). At the bottom of the dialog are four buttons: 'Apply', 'Cancel', 'Add New', and 'Help'.

Math And Logic Device

General Settings

Data Sampling

Interval: 100 msec Deadband: 0.000 % FS

Run Logic

☐ On Data Change

☒ Use Fixed Interval: 1000 msec

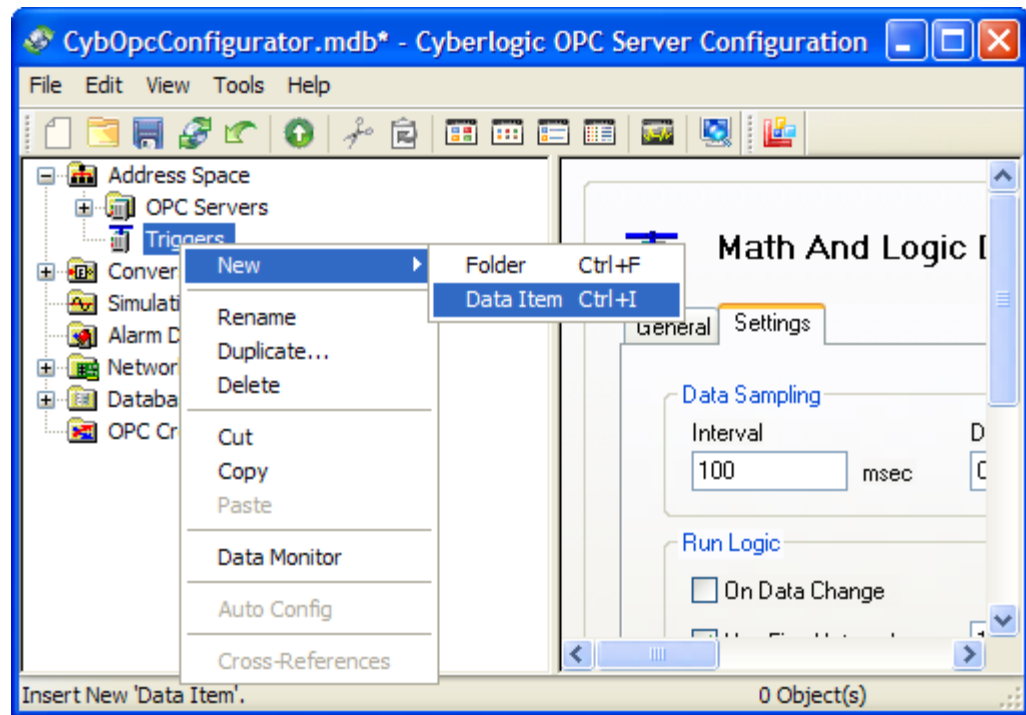
☐ Triggered

Item ID: ...

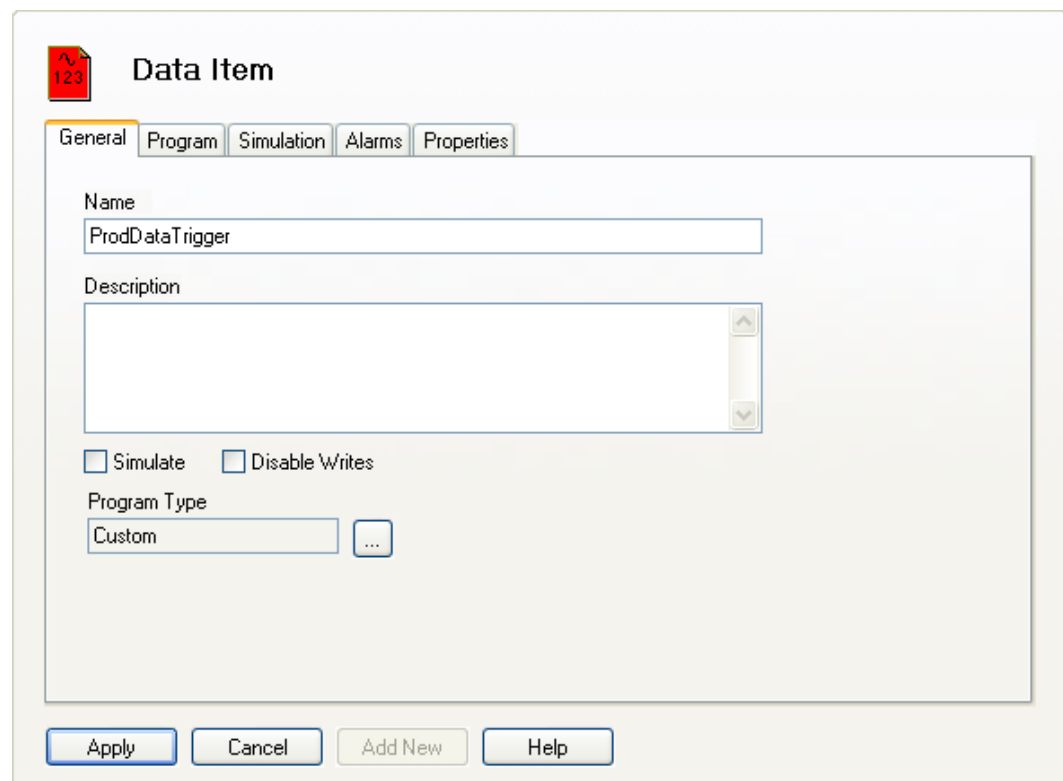
Interval: 100 msec Trigger Deadband: 0.000 % FS Mode: False to True

Apply Cancel Add New Help

3. On the **Settings** tab, check the **Used Fixed Interval** box and enter **1000 msec** as the interval.
4. Uncheck **On Data Change** and **Triggered**.
5. Click **Apply**.



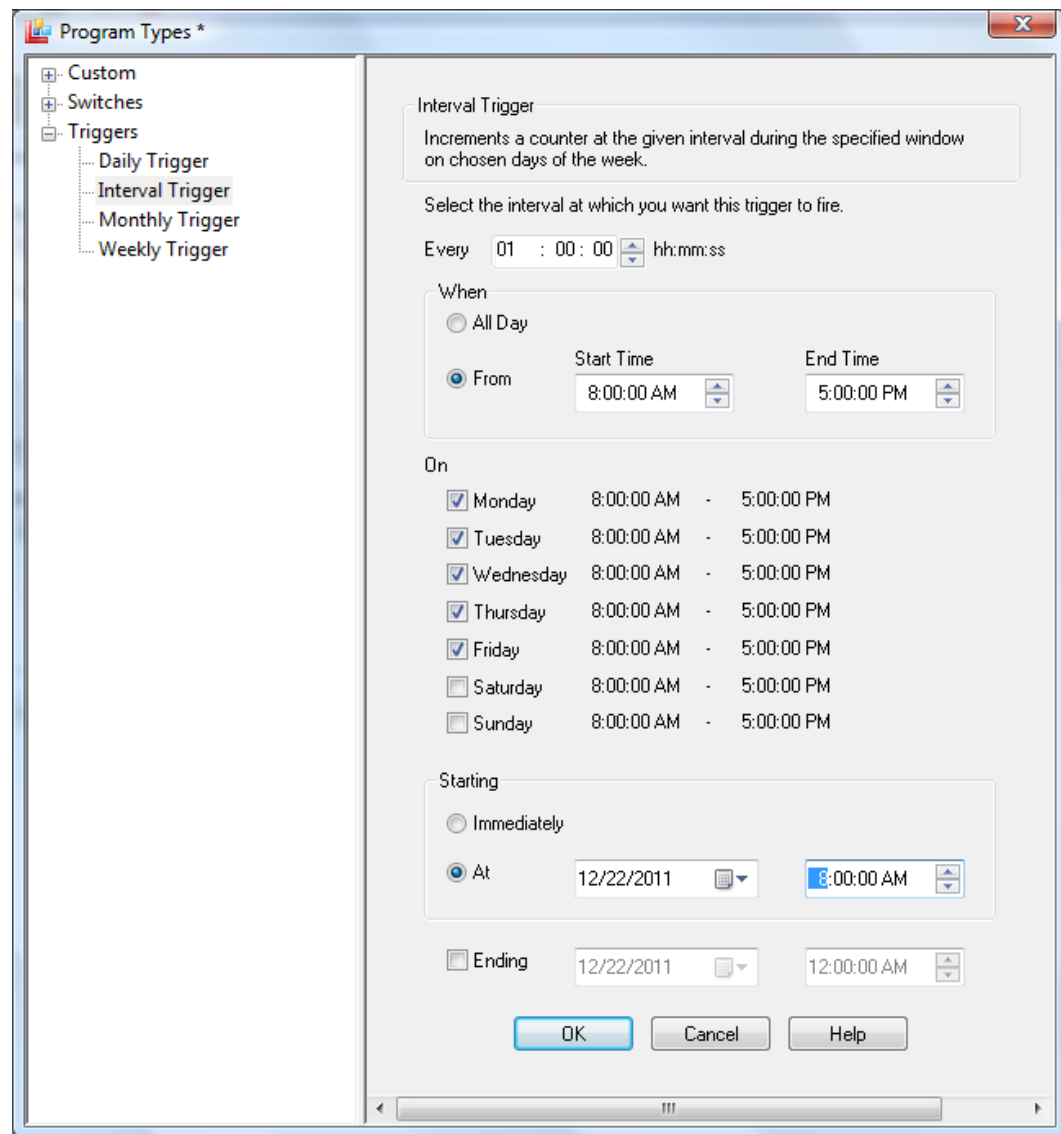
6. Right-click on the **Triggers** device you just created, and select **New** from the context menu, and then select **Data Item**.



7. Go to the **General** tab and enter **ProdDataTrigger** in the **Name** field.

8. Click the browse button beside the **Program Type** field.

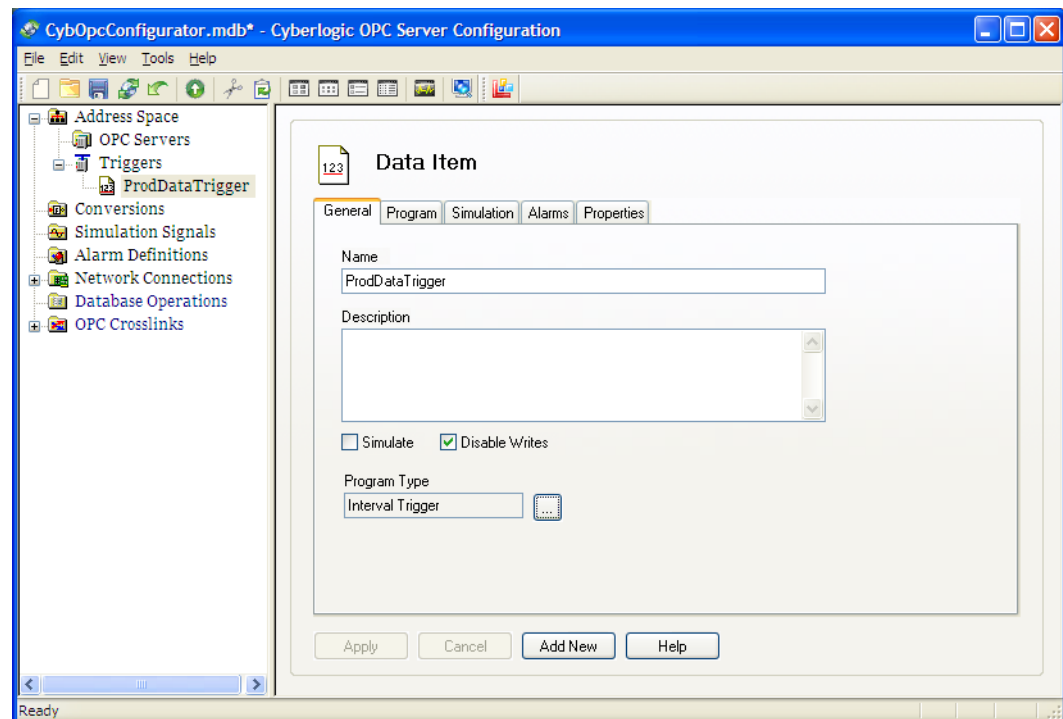
The Select Program Type window will open.



9. Open the **Triggers** branch and select **Interval Trigger**.
10. Set **Every** to **01:00:00** to trigger every 1 hour.
11. Select **From** in the When group.
12. Set the **Start Time** to **8:00:00 AM**.
13. Set the **End Time** to **5:00:00 PM**.
14. Check the day boxes for **Monday** through **Friday**.

15. Select **At** in the Starting group and set the date to today's date and set the time to **8:00:00 AM**.

16. Click **OK**.



The Interval Trigger program, with the parameters you selected, will be applied to the data item. This will let you use this data item to trigger the logging operations every hour on the hour, between 8:00 a.m. and 5:00 p.m. on weekdays.

17. Click **Apply**.

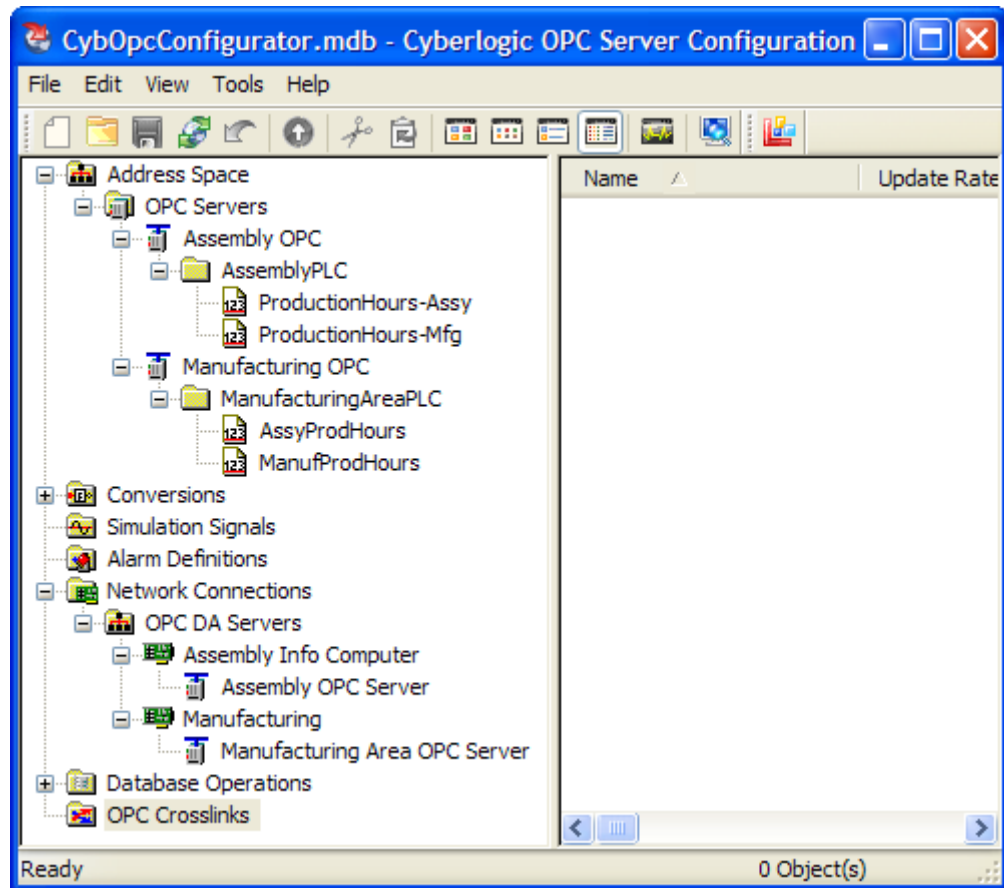
Next, go to [Configuring a Crosslink Group](#).

Configuring a Crosslink Group

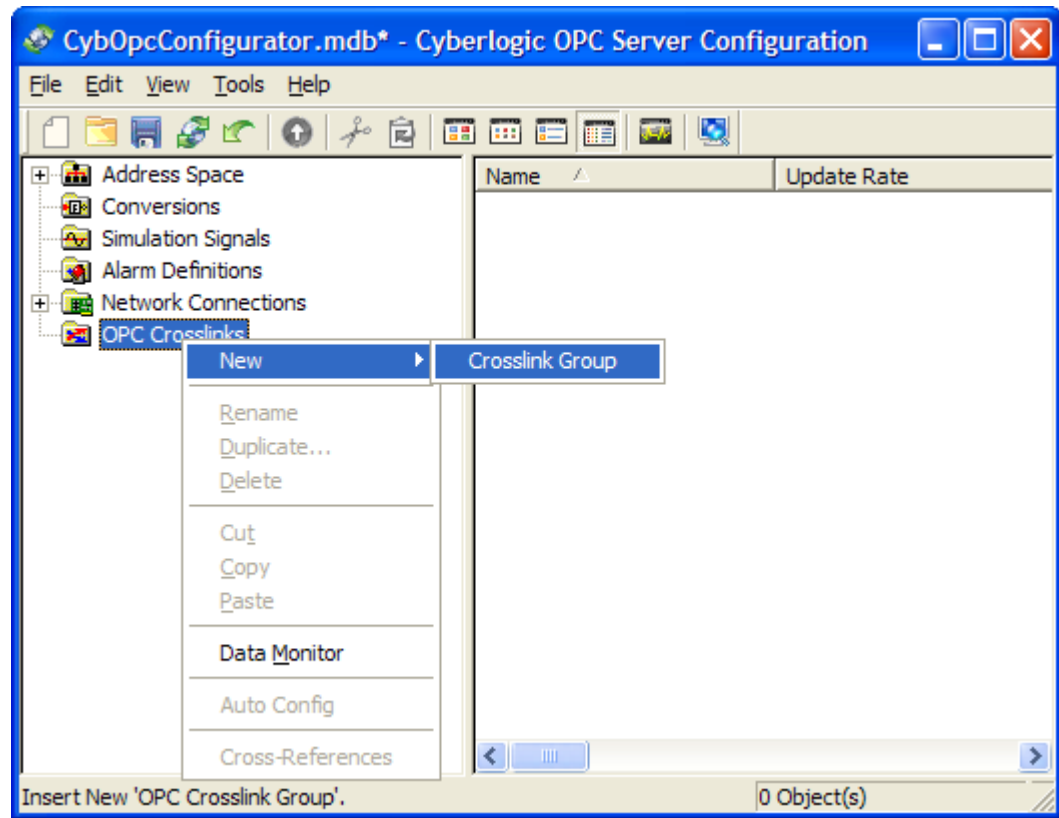
Crosslinks transfer data:

- From one PLC to another
- From one OPC DA server to another
- From a PLC to an OPC DA server
- From an OPC DA server to a PLC

A crosslink defines where the data comes from and where it goes. Crosslinks are organized into crosslink groups, which define when the data is to be transferred.



For this example, we will transfer data from the Assembly OPC server to the Manufacturing OPC server. Specifically, we will copy ProductionHours-Assy from the Assembly server to AssyProdHours in the Manufacturing server.



1. Right-click on the **OPC Crosslinks** tree and select **New** from the context menu.
2. Select **Crosslink Group**.

Crosslink Group

General Settings

Name
Sample Crosslinks

Description

☒ Enable DirectAccess ☐ Disable DirectAccess Writes

Crosslink Transfers

☒ Enable
☐ Use Data Item To Enable
☐ Disable

Interval
 msec

Apply Cancel Add New Help

3. Enter **Sample Crosslinks** in the **Name** field.
4. Choose the **Enable** radio selection in the **Crosslink Transfers** group.
5. Select the **Settings** tab.

The screenshot shows the 'Crosslink Group' dialog box with the 'Settings' tab selected. The 'Read Inputs' section has 'Interval' set to 100 msec and 'Deadband' set to 0.000 % FS. The 'Write Outputs' section has 'On Data Change' and 'Use Fixed Interval' unchecked, and 'Triggered' checked. The 'Item ID' field is empty, and the 'Interval' for the triggered output is set to 100 msec, 'Deadband' to 0.000 % FS, and 'Mode' to 'False to True'. The 'Add New' button is disabled.

Crosslink Group

General Settings

Read Inputs

Interval: 100 msec Deadband: 0.000 % FS

Write Outputs

☐ On Data Change

☐ Use Fixed Interval 100 msec

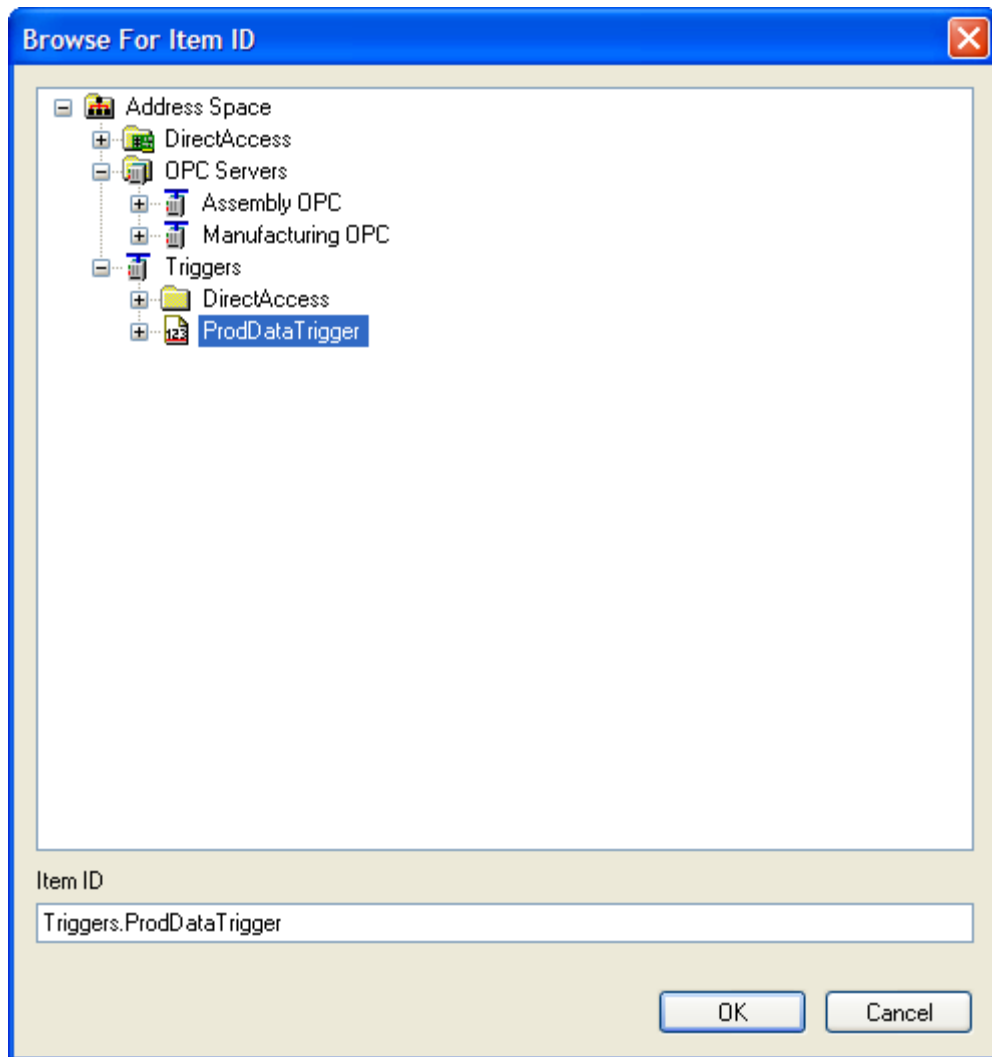
☒ Triggered

Item ID: ...

Interval: 100 msec Deadband: 0.000 % FS Mode: False to True

Apply Cancel Add New Help

6. In the **Write Outputs** section, uncheck **On Data Change** and **Use Fixed Interval**.
7. Check **Triggered**.
8. Beside the **Item ID** field, click the **browse button**.



9. The browse window shows you the Address Space tree. Open the branch for the **Triggers** device and select **ProdDataTrigger**.
10. Click **OK**.

The screenshot shows the 'Crosslink Group' dialog box with the 'Settings' tab selected. The 'Read Inputs' section has 'Interval' set to 100 msec and 'Deadband' set to 0.000 % FS. The 'Write Outputs' section has 'On Data Change' and 'Use Fixed Interval' unchecked, and 'Triggered' checked. The 'Item ID' field contains 'Triggers.ProdDataTrigger'. Below this, 'Interval' is 100 msec, 'Deadband' is 0.000 % FS, and 'Mode' is set to 'Any Change' in a dropdown menu. At the bottom are buttons for 'Apply', 'Cancel', 'Add New', and 'Help'.

11. For the **Mode** selection, choose **Any Change**.

These settings will cause the crosslink input to be written to the crosslink output when there is any change in the value of ProdDataTrigger.

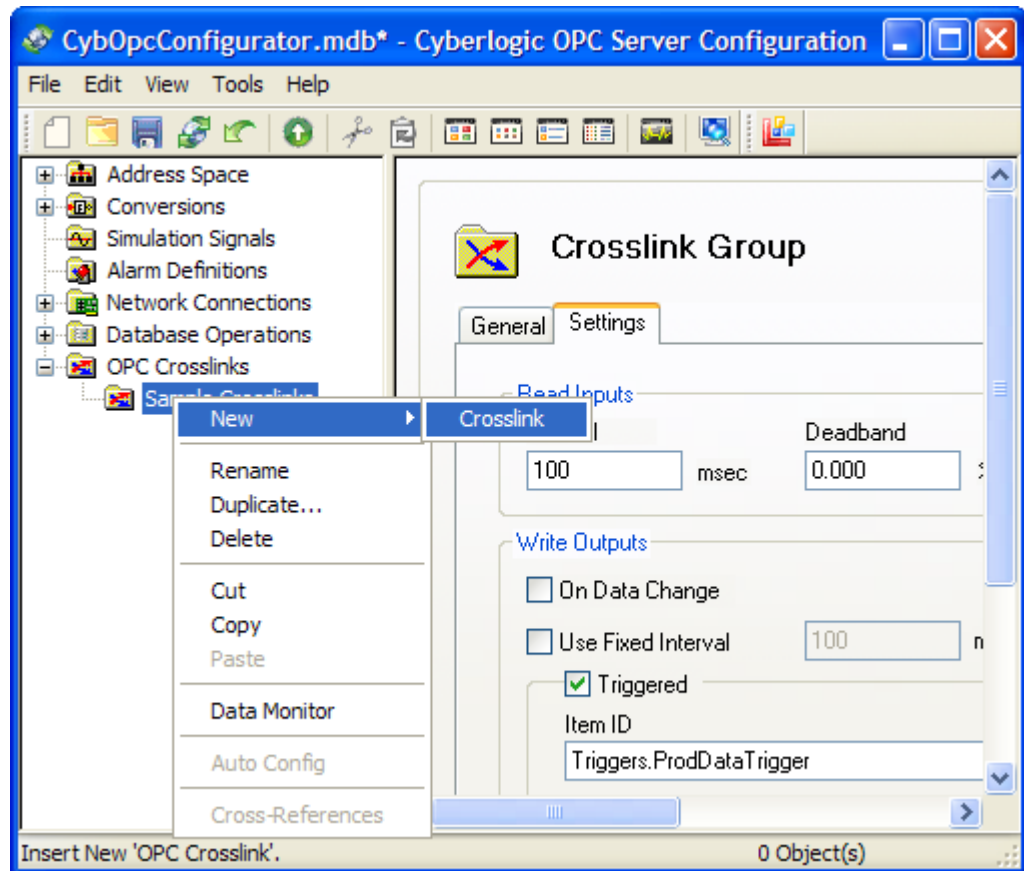
12. Click **Apply**.

Proceed to [Configuring a Crosslink](#) to continue.

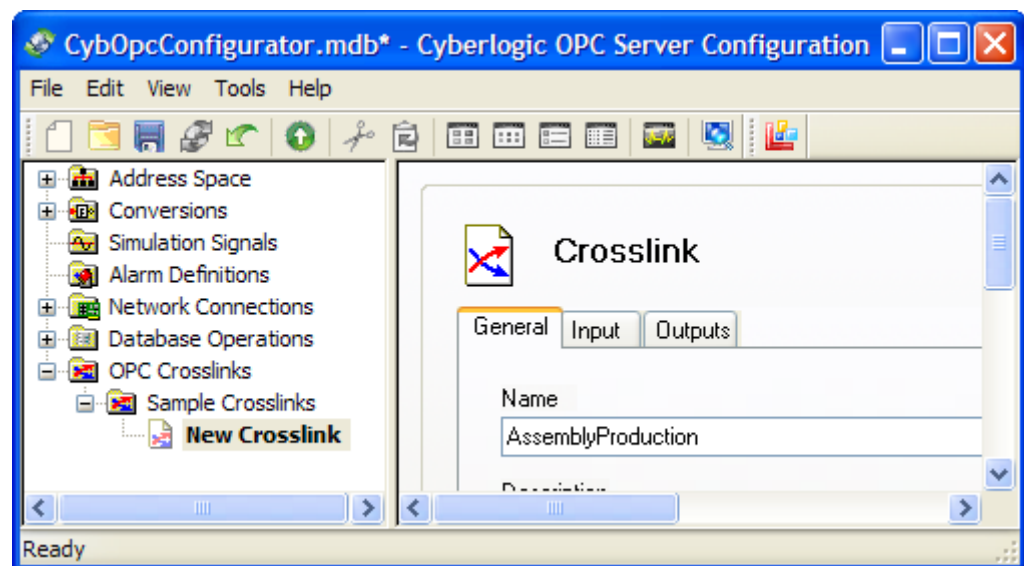
Configuring a Crosslink

A crosslink designates the actual data to be read (known as the crosslink input) and one or more locations to which it should be written (known as the crosslink outputs). Both inputs and outputs can be any data items configured in the Address Space tree or accessible through DirectAccess.

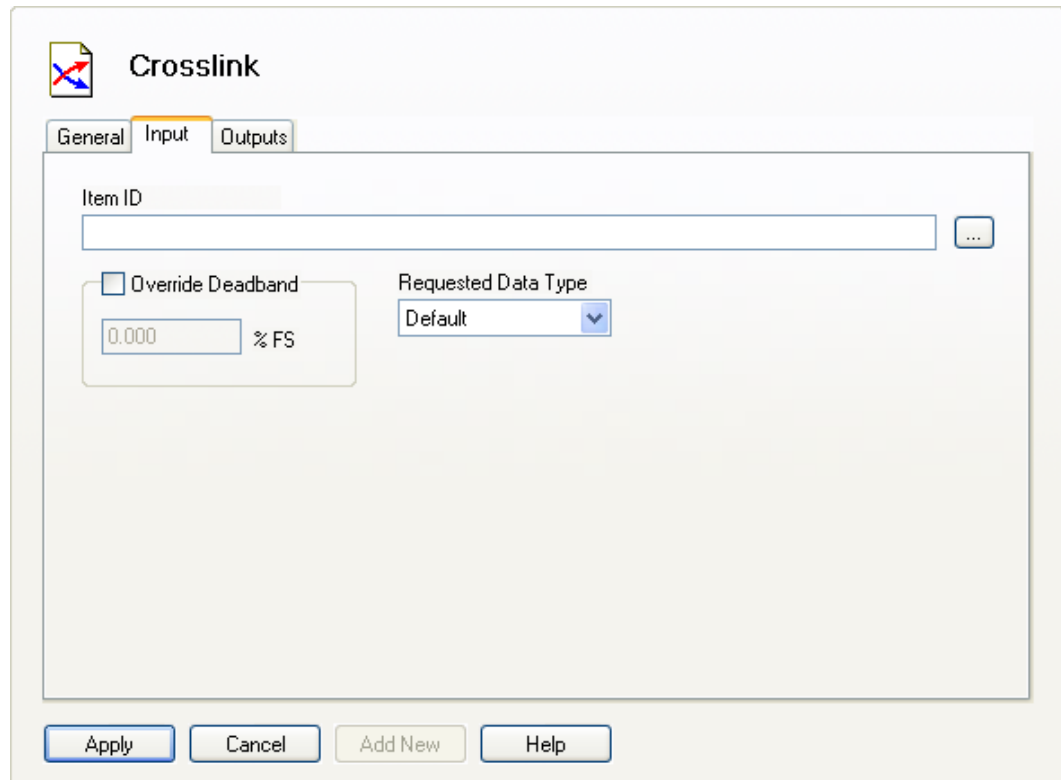
Crosslinks are contained in a crosslink group, which may contain many crosslinks. In this example, we will create just one.



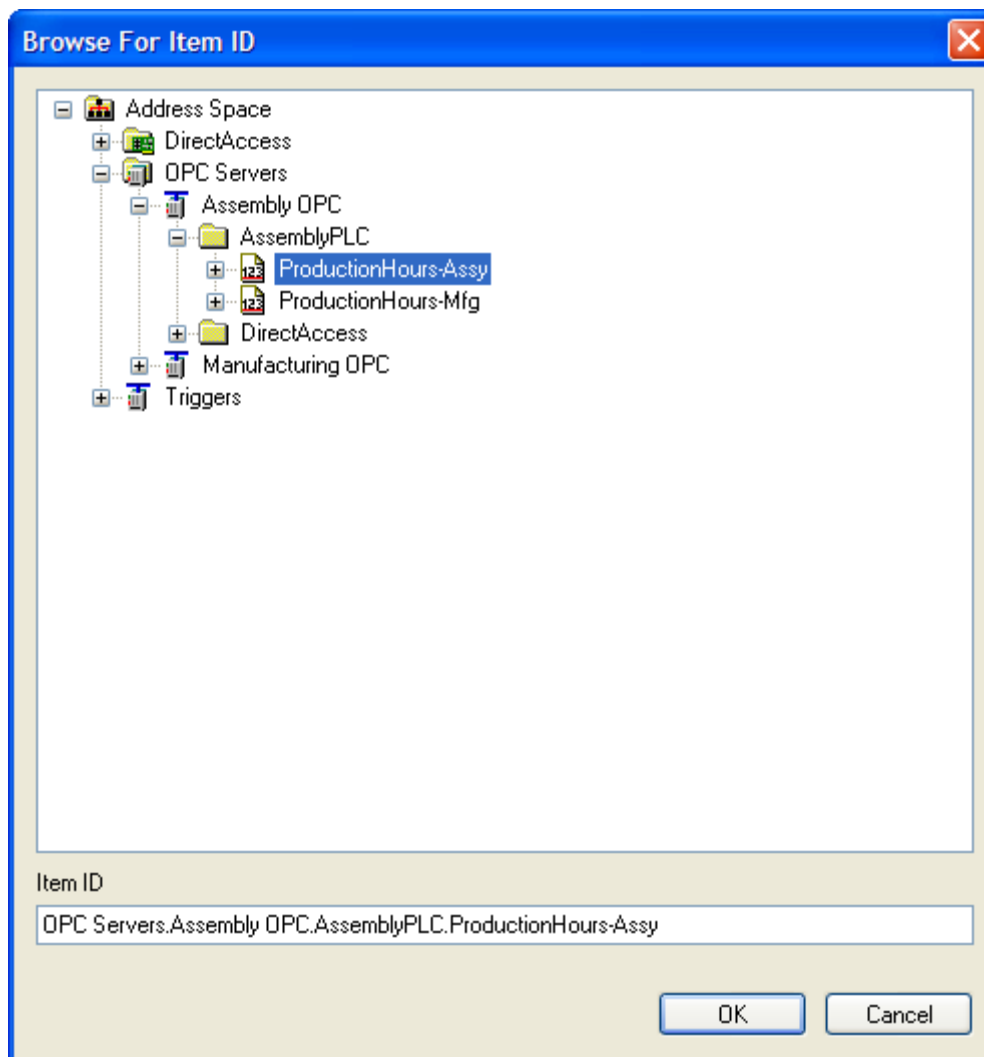
1. Right-click on the **Sample Crosslinks** group you just created, and select **New**.
2. Select **Crosslink**.



3. Enter **AssemblyProduction** in the **Name** field.
4. Select the **Input** tab.



5. Beside the ***Item ID*** field, click the ***browse button***.

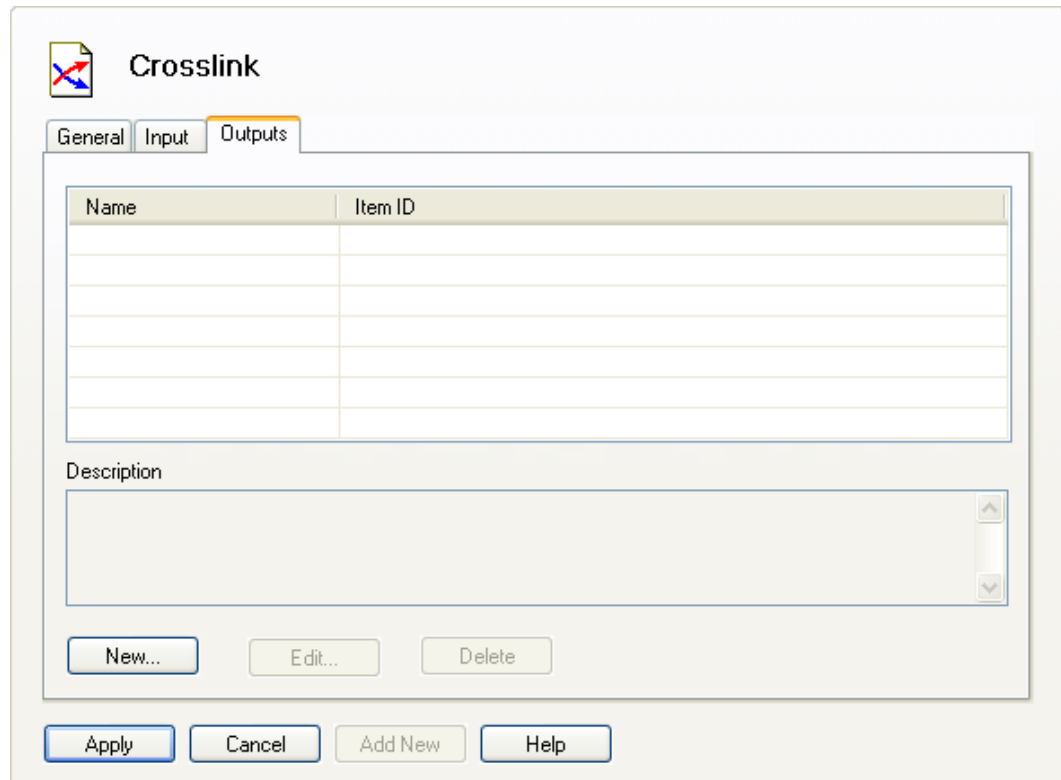


The Browse For Item ID window opens, showing you the data items as they are arranged in the address space. DirectAccess branches will be shown for all devices and network nodes that have DirectAccess enabled.

6. Browse through the tree to locate the OPC server and data item you want to read from. In this case, it is **ProductionHours-Assy** in the **Assembly OPC** server.
7. Click **OK**.

Note

Crosslinks can also be created by dragging data items from the address space and dropping them onto an existing crosslink group. The new crosslinks use the specified data items as crosslink inputs. Copying data items and pasting them to an existing crosslink group also creates new crosslinks.

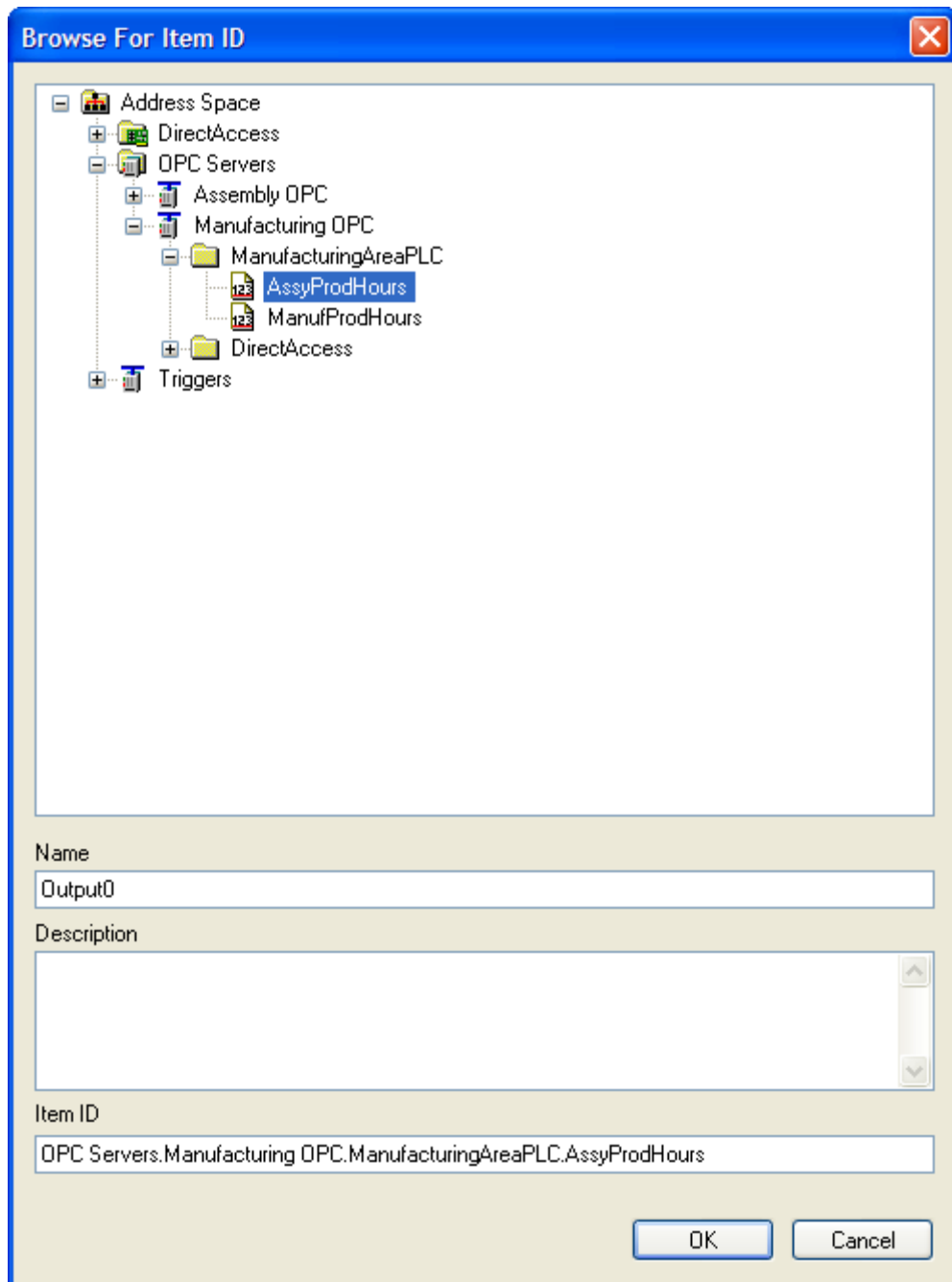


The screenshot shows the 'Crosslink' application window. At the top left is a logo with a red 'X' over a blue square. The title bar says 'Crosslink'. Below the title bar are three tabs: 'General', 'Input', and 'Outputs'. The 'Outputs' tab is selected and highlighted in orange. The main area of the 'Outputs' tab contains a table with two columns: 'Name' and 'Item ID'. The table has six empty rows. Below the table is a 'Description' label and a large text area with a vertical scrollbar. At the bottom of the table area are three buttons: 'New...', 'Edit...', and 'Delete'. At the very bottom of the window are four buttons: 'Apply', 'Cancel', 'Add New', and 'Help'.

Name	Item ID

Description

8. Select the **Outputs** tab.
9. Click the **New...** button.



10. Select the data item you want to write the data to. In this case, it is ***AssyProdHours*** in the ***Manufacturing OPC*** server.

11. Click ***OK***.

Crosslink

General Input **Outputs**

Name	Item ID
<input checked="" type="checkbox"/> Output0	OPC Servers.Manufacturing OPC.ManufacturingAreaPLC.AssyProdHours

Description

The selected data item is added to the list of output items. It is possible to add more output items to the list, but we will use only one for this example.

Note Crosslink outputs can also be added by dragging data items from the address space and dropping them onto an existing crosslink. Copying data items and pasting them onto an existing crosslink will also add the specified items as crosslink outputs.

12. Click **Apply**.

Note Another way to create and configure one or more crosslinks is to import them into the crosslink group. See [Creating and Deleting Crosslinks](#) for more information on exporting and importing crosslinks.

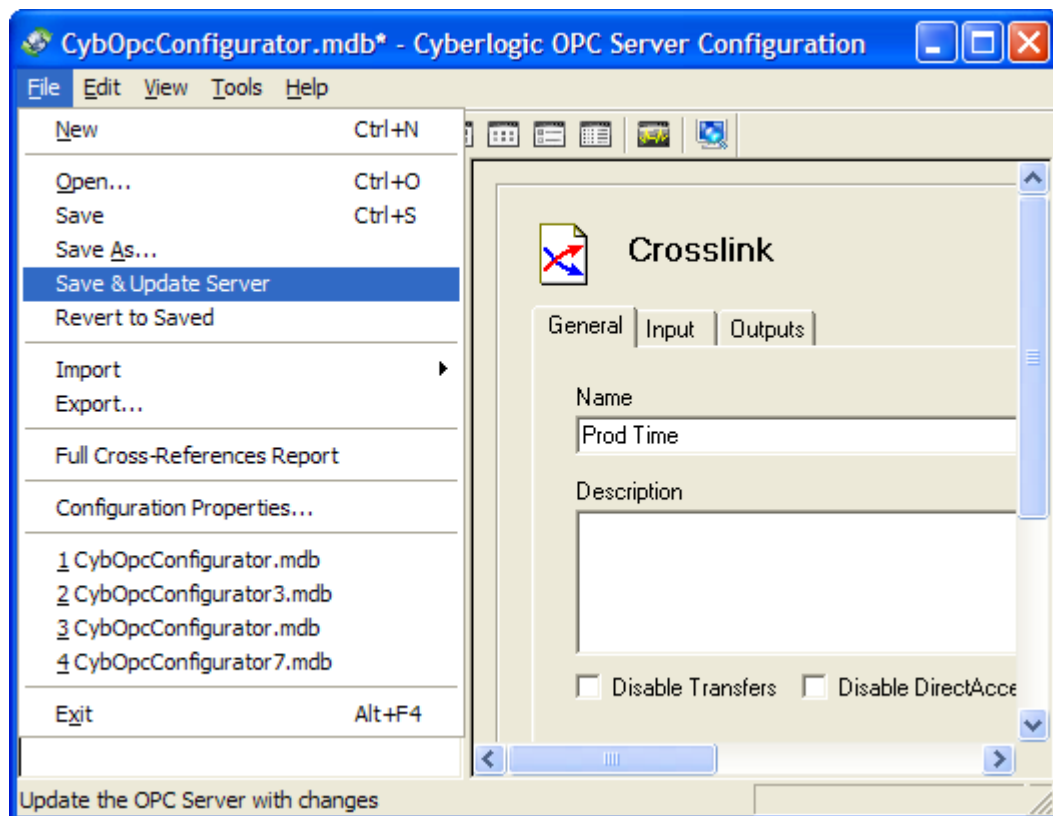
You have now completed the crosslink configuration. Each weekday between 8:00 a.m. and 5:00 p.m., on the hour, the value from ProductionHours-Assy in the Assembly OPC server will be transferred to AssyProdHours in the Manufacturing OPC server.

To save your work and update the server with the new configuration, go to the [Saving the Configuration and Updating the Server](#) section.

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.



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 and also a simple OPC Client application. With these, you can view the status and values for data items in your configuration, to confirm that it behaves as expected. Refer to the [Cyberlogic OPC Server Help](#) for information on how to use these tools.

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 that uses OPC Crosslink requires configuration of the Network Connections and OPC Crosslinks trees, and most users will want to configure the Address Space tree. The remaining trees (Conversions, Simulation Signals, Alarm Definitions and Database Operations) are optional features used by some systems.

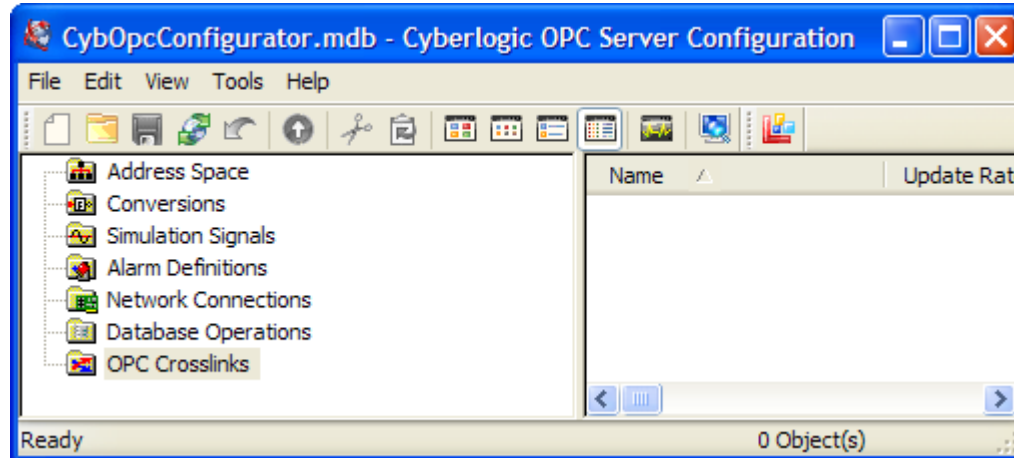
This section provides a detailed description of the configuration editor features that relate to the OPC Crosslinks tree. If you are a new user and want a procedure to guide you through a typical configuration session, refer to the [Quick-Start Guide](#).

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 or link to 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](#)
- [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, and you should refer to those files for help with the specific driver agent you want to configure:

- [MBX OPC Driver Agent Help](#)
- [DHX OPC Driver Agent Help](#)
- [OPC DA Driver Agent Help](#)
- [ControlLogix OPC Driver Agent Help](#)

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, and you should refer to those files for help with the specific driver agent you want to configure:

- [MBX OPC Driver Agent Help](#)
- [DHX OPC Driver Agent Help](#)
- [OPC DA Driver Agent Help](#)
- [ControlLogix OPC Driver Agent Help](#)

Conversions

The raw data associated with data items may be process values from instruments. 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 conversions. A number of data items can then use each conversion. As a result, the user need not define the same conversion many times over.

Refer to the [Cyberlogic OPC Server Help](#) for a full discussion.

Simulation Signals

The server can simulate the data for each of the data items according to a predefined formula. This makes it easy to perform client-side testing without the need for a physical device.

A user can define many different types of simulation signals. A number of data items can then use each such signal. As a result, the user need not define the same simulation signal many times over.

The Server can generate the following types of simulation signals:

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

Each signal has parameters that define properties such as amplitude, phase and number of steps.

Refer to the [Cyberlogic OPC Server Help](#) for a full discussion.

Alarm Definitions

The Cyberlogic OPC Server supports the OPC Alarms and Events specification, permitting it to generate alarms based on the value of data items.

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.

There are two categories of alarms: digital and limit. Digital alarms are normally used with Boolean data items and limit alarms are normally used with numeric data items, but both types of alarms may be used with either data type. Alarms cannot be used with string or array data items or with bit fields larger than 64 bits.

Refer to the [Cyberlogic OPC Server Help](#) for a full discussion.

Note

Configuring alarms is meaningful only if your client software also supports the OPC Alarms & Events specification. Consult your client software documentation to see what specifications it supports.

The OPC DA Driver Agent that is part of the OPC Crosslink feature allows the Cyberlogic OPC Server to act as an OPC client. However, this driver agent does not support Alarms & Events.

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

Crosslinks allow you to transfer data from one data item to another. The data item you read from is called the crosslink input. You may write this to any number of data items, and these are called crosslink outputs. For more information on crosslinks, refer to the [Theory of Operation](#) section.

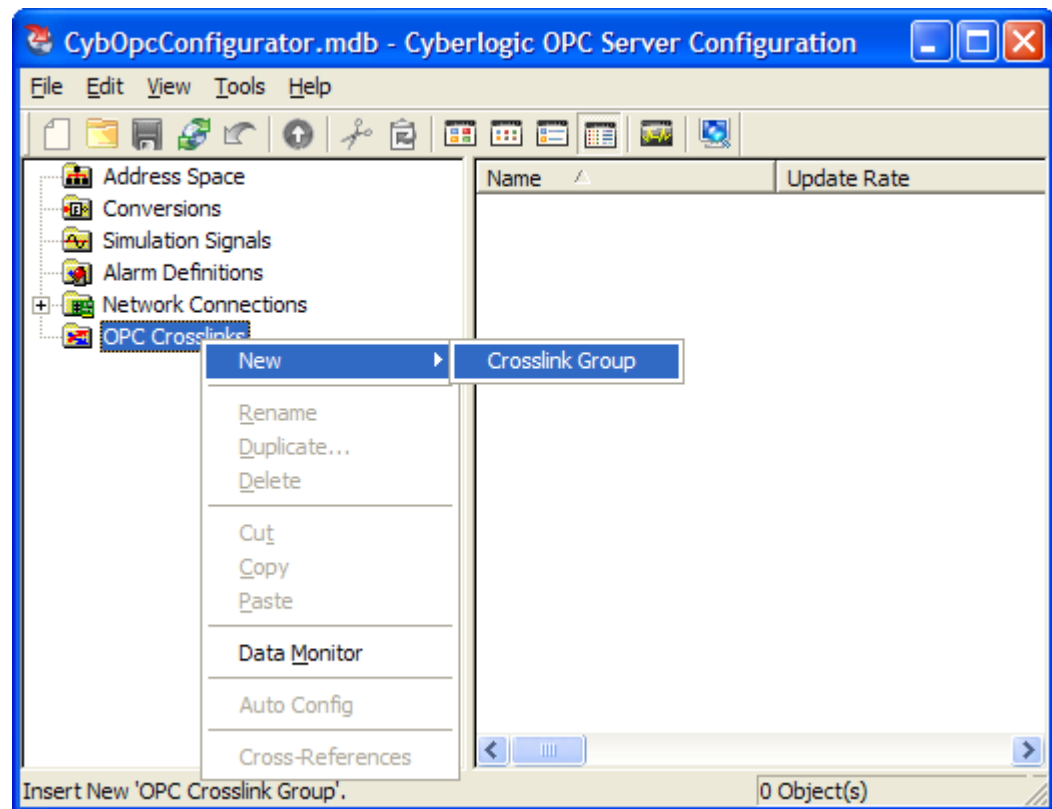
Creating and Deleting Crosslink Groups

Crosslinks are organized into crosslink groups. The criteria for enabling the crosslinks, disabling writes, scheduling the reads, and triggering the writes are specified for the group. This allows you to easily and efficiently set these criteria in an identical way for many crosslinks, all at once.

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.

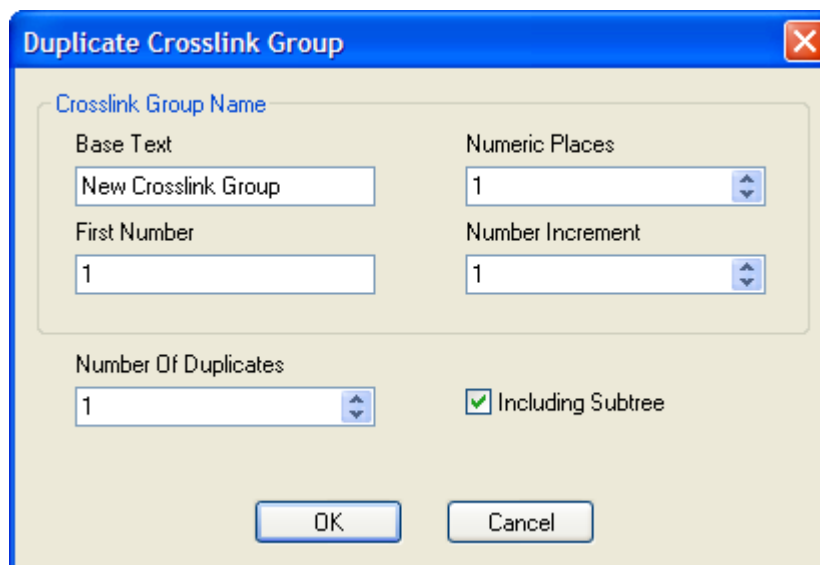
Creating a New Crosslink Group



To create a crosslink group, right-click on the OPC Crosslinks branch and select **New** from the context menu, and then select **Crosslink Group**.

Duplicating a Crosslink Group

To speed up the creation of similarly-configured crosslink groups, you can create multiple groups in a single operation by duplicating an existing one. To do this, right-click on an existing crosslink group and select **Duplicate...** from the context menu.



The above dialog box opens. You must specify how the duplicates are to be named by entering values for the **Base Text**, **First Number**, **Numeric Places** and **Number Increment** fields. To generate names for the duplicated crosslink groups, the editor begins with the base text and appends a number to it. The first duplicate uses the selected First Number value with the specified number of digits. This number is then incremented by the specified number for each of the remaining duplicates.

As an example, if Numeric Places is 3 and First Number is 2, the number 002 will be appended to the base text.

Use the **Number Of Duplicates** field to specify the number of crosslink groups you wish to create. If you want to duplicate all of the crosslinks within the original crosslink group, check the **Including Subtree** checkbox.

Deleting a Crosslink Group

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

Editing Crosslink Groups

The crosslink group editor consists of two tabs, General and Settings.

General Tab
Name

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

Description

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

Caution!

In configuring the following, it is important to distinguish between writes to a crosslink and writes that are performed by a crosslink. It is possible for a client application to write data to a crosslink. That data is then written to the crosslink input, and the crosslink will write the data to its output as part of the crosslink's normal operation.

The Disable DirectAccess Writes function disables writing to the crosslink itself, but does not affect the crosslink's ability to read data from its crosslink input and write that data to its crosslink output.

The items in the Crosslink Transfers group control whether or not the crosslink can write to its crosslink output.

Enable DirectAccess

Checking this box enables client applications to use DirectAccess to read data from the crosslink inputs and crosslink outputs for all crosslinks in the group. Clients can also read [Status Items](#) for the crosslink group. If the Disable DirectAccess Writes box is unchecked, the clients will also be able to write to the writable items, which include crosslink inputs, crosslink outputs and some status items.

By default, this box is checked and DirectAccess is enabled.

Disable DirectAccess Writes

When this box is checked, clients cannot use DirectAccess to write to the writable items (crosslink inputs, crosslink outputs and some [Status Items](#)) of the crosslinks in the group. When this box is unchecked and DirectAccess is enabled, writing is permitted.

The default state is checked, and DirectAccess Writes are disabled.

Crosslink Transfers

This radio selection allows you to control whether or not the crosslinks in the group will be enabled. When they are enabled, the input data item will be read and its data will be transferred to the output data items. When the crosslinks are disabled, the data is not read from the input data item, nor is it transferred to the output data items.

If you select **Enable**, the crosslink data transfers will be enabled.

If you select **Use Data Item To Enable**, you must specify a data item that will be used to control the crosslink data transfers in the group. You must also enter a value for **Interval**, which indicates how often the data item will be read to see if its value has changed. If the value of the specified data item is true, the crosslink transfers will be enabled, otherwise they will be disabled. You can click the **Browse...** button to open a window that will allow you to browse for the desired data item. You can specify a DirectAccess item or a Math & Logic item, if you wish.

If DirectAccess is enabled for the crosslink group, the TransferEnable data item will be available in the DirectAccess branch for that crosslink group. This is a read/write item.

Note

If the item you choose contains numeric data, a value of zero is taken as false and a nonzero value is true.

If you select **Disable**, the crosslink data transfers will be disabled.

Settings Tab

Crosslink Group

General Settings

Read Inputs

Interval: 100 msec Deadband: 0.000 % FS

Write Outputs

☒ On Data Change

☐ Use Fixed Interval: 100 msec

☐ Triggered

Item ID: ...

Interval: 100 msec Deadband: 0.000 % FS Mode: False to True

Apply Cancel Add New Help

Read Inputs

This section allows you to specify how the input data values for the crosslinks in the group will be updated. You do this by specifying an update interval and a deadband.

Interval

You may specify the interval, in milliseconds, at which you want the input data to be refreshed.

Deadband

Here you may specify the deadband in percent of full scale. This determines whether or not the input data will be refreshed when it changes by a small amount, allowing you to eliminate problems with values that jitter.

Caution!

In keeping with the OPC specifications, the deadband functions apply only to data items that have a `dwEType` 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.

Write Outputs

This section allows you to specify when the input data should be written to the output data items. There are three methods available, and you can choose any combination. If you choose more than one, the data will be written when any one of the conditions are met.

On Data Change

When this box is checked, the crosslinks in the group will write the data to the outputs whenever the input data value changes.

Use Fixed Interval

When this box is checked, the crosslinks in the group will write the data to the outputs at the interval you specify.

Triggered

When this box is checked, the crosslinks in the group will write the data to the outputs when the specified data item changes state.

If you choose this option, you must specify an Item ID, Mode and Interval. You may also specify a Deadband.

If DirectAccess is enabled for the crosslink group, the WriteTrigger data item will be available in the DirectAccess branch for that crosslink group. This is a read/write item.

Item ID

Here you must specify a data item to use as the trigger. When the value of that data item changes state as specified in the Mode selection, the write is triggered. You can click the **Browse...** button to open a window that will allow you to browse for the desired data item. You can specify a DirectAccess item or a Math & Logic item, if you wish.

Interval

You must specify an interval when using triggered writes. The value you enter specifies how often the trigger data item will be read to see if it has changed state.

Deadband

Here you may specify the deadband in percent of full scale. This determines whether or not the trigger input data will be refreshed when it changes by a small amount, allowing you to eliminate problems with values that jitter. For example, if you choose Any Change mode with a numeric trigger item, this value will be used to determine if the trigger value has changed.

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.

Mode

This box allows you to choose the type of change in the trigger item that will cause the write to occur.

- Choose **False to True** to trigger when the value changes from false to true.
- Choose **True to False** to trigger when the value changes from true to false.
- Choose **Any Change** to trigger when any change in the value occurs.

Note

In False to True or True to False mode:

If the item you choose contains numeric data, a value of zero is taken as false and a nonzero value is true.

In Any Change mode:

If the item you choose contains numeric or string data, any change in the value triggers the write.

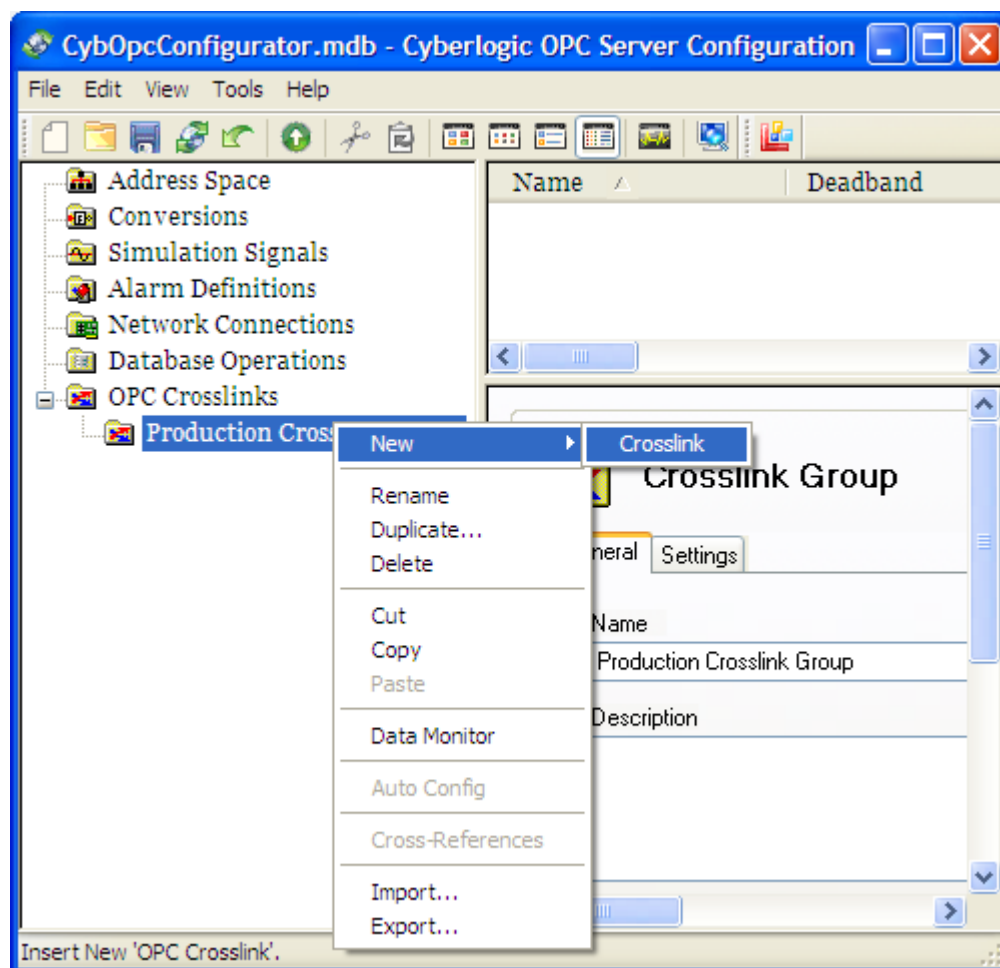
Creating and Deleting Crosslinks

A crosslink consists of a single crosslink input data item, which is read to obtain the desired data, and one or more crosslink output data items, to which the data will be written. Each of these data items may be from other OPC servers or may be directly associated with a PLC.

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 New Crosslink



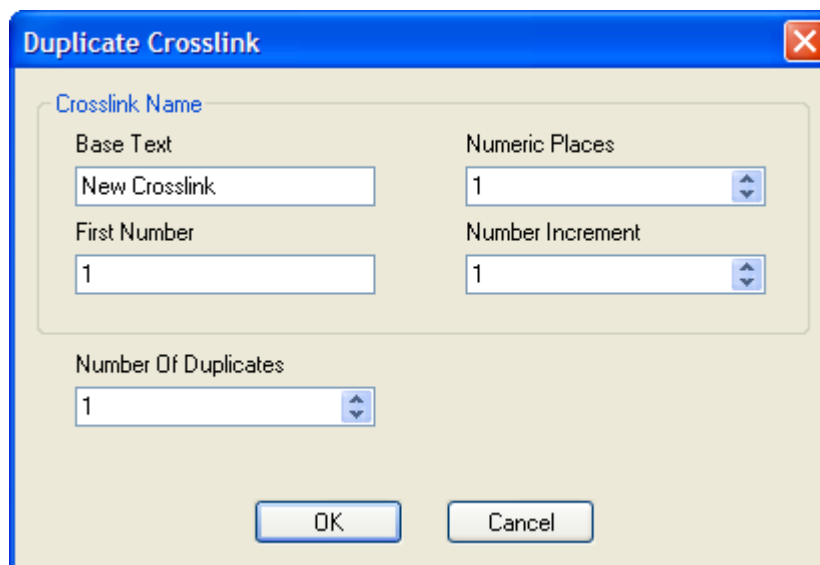
To create a crosslink within a crosslink group, right-click on the group and select ***New*** from the context menu, and then select ***Crosslink***.

Note

Crosslinks can also be created by dragging data items from the address space and dropping them onto an existing crosslink group. The new crosslinks use the specified data items as crosslink inputs. Copying data items and pasting them to an existing crosslink group also creates new crosslinks.

Duplicating a Crosslink

To speed up the creation of similarly-configured crosslinks, you can create multiple crosslinks in a single operation by duplicating an existing one. To do this, right-click on an existing crosslink and select ***Duplicate...*** from the context menu.



The above dialog box opens. You must specify how the duplicates are to be named by entering values for the **Base Text**, **First Number**, **Numeric Places** and **Number Increment** fields. To generate names for the duplicated crosslinks, the editor begins with the base text and appends a number to it. The first duplicate uses the selected First Number value with the specified number of digits. This number is then incremented by the specified number for each of the remaining duplicates.

As an example, if Numeric Places is 3 and First Number is 2, the number 002 will be appended to the base text.

Use the **Number Of Duplicates** field to specify the number of crosslinks you wish to create.

Exporting Crosslinks

The crosslinks in a crosslink group can be exported to a text file. To export, right-click on the current crosslink group and select **Export...** from the context menu. A dialog will open asking you to choose the export file that will be created. All the crosslinks in the crosslink group will be exported to that file.

Note

The crosslink export file can easily be modified in a text editor and reimported to quickly create or make changes to a number of crosslinks.

Importing Crosslinks

Importing crosslinks into a crosslink group is another method of speeding up the creation of crosslinks. To import, right-click on the current crosslink group and select **Import...** from the context menu. A dialog will open asking you to choose the file to import. The crosslinks in the file you select will be imported into the crosslink group. You will be notified of any crosslinks that failed to import.

Note

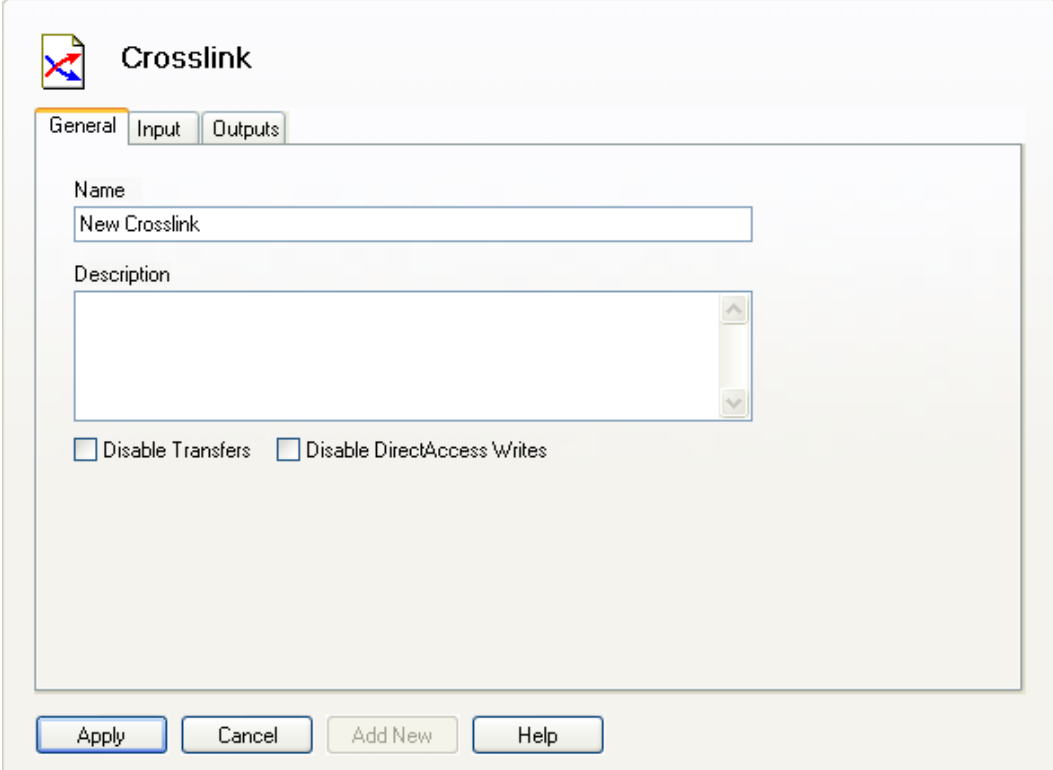
Importing can both create new crosslinks and update existing crosslinks. If the import file contains a configuration for a crosslink that already exists in the crosslink group, that crosslink's configuration will be updated. If the file contains a configuration for a non-existent crosslink, a new crosslink will be created in the crosslink group.

Deleting a Crosslink

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

Editing Crosslinks

The crosslink editor consists of three tabs, General, Input and Outputs.

General Tab

The screenshot shows a dialog box titled "Crosslink" with a document icon. It has three tabs: "General" (selected), "Input", and "Outputs". The "General" tab contains a "Name" text field with the value "New Crosslink", a "Description" text area, and two checkboxes: "Disable Transfers" and "Disable DirectAccess Writes", both of which are unchecked. At the bottom of the dialog are four buttons: "Apply", "Cancel", "Add New", and "Help".

Name

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

Description

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

Caution!

In configuring the following, it is important to distinguish between writes to a crosslink and writes that are performed by a crosslink. It is possible for a client application to write data to a crosslink. That data is then written to the crosslink's input data item, and the crosslink will write the data to its output data items as part of the crosslink's normal operation.

The Disable Writes function disables writing to the crosslink itself, but does not affect the crosslink's ability to read data from its input data item and write that data to its output data items.

The Disable Transfers function controls whether or not the crosslink can write to its output data items.

Disable Transfers

Checking this box disables the crosslink data transfers.

When this control is unchecked and the crosslink group is enabled, the data will be read and written according to the criteria set on the crosslink group's [Settings Tab](#).

If this control is grayed-out, it means that Disable Crosslink Transfers has been selected on the crosslink group's [General Tab](#).

Disable DirectAccess Writes

Checking this box disables write requests to the crosslink from the OPC client applications.

By default, this box is not checked and writes are enabled.

Note

If the Disable Writes box is grayed-out, it indicates that writes have been disabled at a higher level.

Input Tab

Crosslink

General Input Outputs

Item ID ...

☐ Override Deadband

% FS

Requested Data Type: Default

Apply Cancel Add New Help

Item ID

Enter here the data item you want to read data from. This may be any data item associated with any OPC server or PLC that is available in the address space tree or through DirectAccess.

Browse...

Click this button to open a window that will allow you to browse for the desired data item.

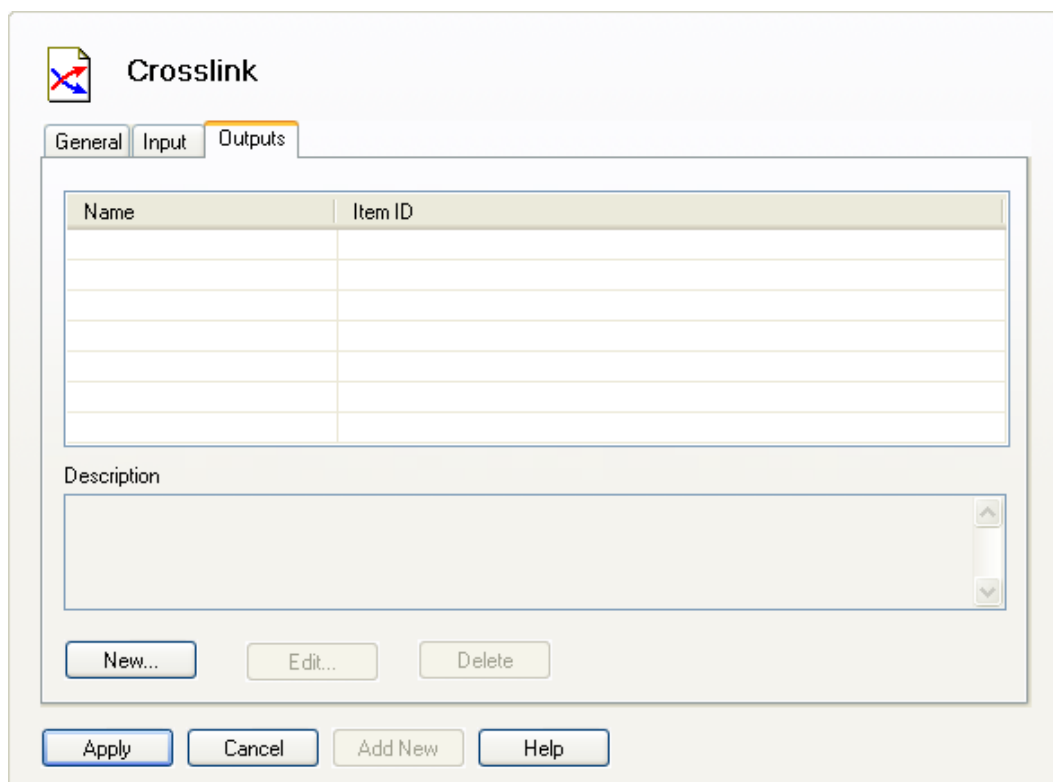
Override Deadband

When this box is checked, the value entered in the data field is used as the deadband for the input item. This overrides the group deadband that was set on the crosslink group's [Settings Tab](#).

Requested Data Type

You may select the desired data type to be used for the data that is read. Refer to the [Folders and Data Items](#) discussion in the Address Space Tree section for a table of available data types.

Outputs Tab



The screenshot shows the 'Crosslink' dialog box with the 'Outputs' tab selected. The dialog has three tabs: 'General', 'Input', and 'Outputs'. The 'Outputs' tab contains a table with two columns: 'Name' and 'Item ID'. Below the table is a 'Description' text area. At the bottom of the dialog are buttons for 'New...', 'Edit...', 'Delete', 'Apply', 'Cancel', 'Add New', and 'Help'.

Name	Item ID

Description

New... Edit... Delete

Apply Cancel Add New Help

Item ID

This is a list of the data items you want to write the data to. These may be any data items associated with any OPC server or PLC that is available in the address space tree or through DirectAccess. There is no specific limit to the number of data items you can specify here, but you must include at least one.

Caution!

DirectAccess writes are disabled by default. If you use DirectAccess to specify the Item ID, be sure that you enable DirectAccess writes for the device or network node containing the data item you specify.

Description

This is an optional field that you can use to describe the currently-selected output. To modify it, click the **Edit...** button.

New...

Click this button to open a window that will let you browse for the desired data item.

Note

Crosslink outputs can also be added by dragging data items from the address space and dropping them onto an existing crosslink. Copying data items and pasting them onto an existing crosslink will also add the specified items as crosslink outputs.

Edit...

Click this button to make changes to the currently-selected output.

Delete

Select an item and click this button to delete it.

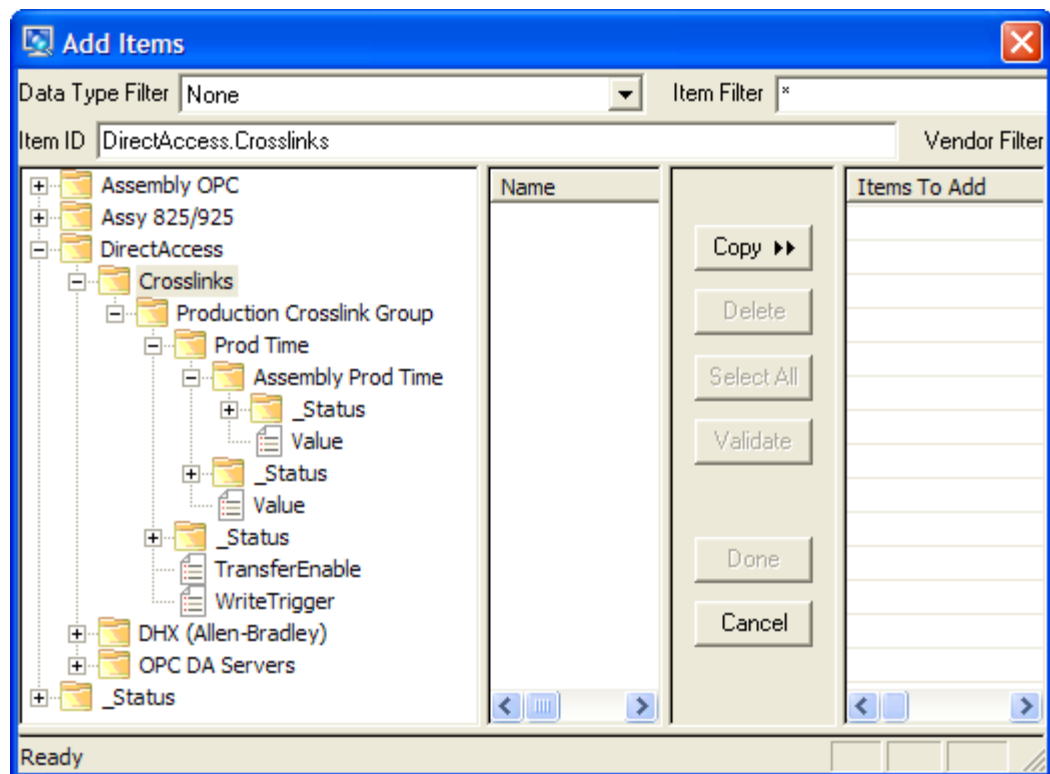
Accessing Crosslinks with OPC Clients

For systems that include OPC Crosslink, the Cyberlogic OPC Server can be enabled to dynamically create a folder called Crosslinks within the [DirectAccess](#) branch of its address space. You will see this branch when you use an OPC client to browse for data items. The Crosslinks folder acts like a device folder that contains all of the configured crosslink groups, displayed as folders. Each crosslink group folder contains its configured crosslinks.

DirectAccess provides read access to all of the data and status items available for the crosslinks. In addition, it provides write access to most of the data and status items. Write access can, however, be disabled for each crosslink group or for individual crosslinks.

Caution!

DirectAccess may be disabled as part of the configuration on the [General Tab](#) of a crosslink group. Only crosslink groups that have DirectAccess enabled will be shown. If no crosslink groups are configured, or if no configured crosslink groups have DirectAccess enabled, then the Crosslinks folder will not appear within the DirectAccess branch.



In the above example, the folder Production Crosslink Group is a crosslink group containing a crosslink called Prod Time. The Prod Time crosslink writes to a single crosslink output called Assembly Prod Time.

Accessing Crosslink Groups

Each crosslink group that has DirectAccess enabled will be represented by a crosslink group folder. A crosslink group folder contains one or more folders for the crosslinks in the group, and a _Status folder. It may also contain a TransferEnable item, a WriteTrigger item, or both.

The _Status folder provides access to the crosslink group status items. If the crosslink group is configured to use a data item to enable the crosslink transfers, that data item will be shown as the item called TransferEnable. If the crosslink group is configured to use a data item to trigger the crosslink transfers, that data item will be shown as the item called WriteTrigger.

Accessing Crosslink Inputs

Each crosslink in the crosslink group will be represented by a crosslink folder. A crosslink folder contains one or more folders for the crosslink outputs that are written to by the crosslink, a _Status folder and a Value item.

The _Status folder provides access to the crosslink input status items. The Value item provides access to the crosslink input.

Accessing Crosslink Outputs

Each crosslink output that the crosslink writes to will be represented by a crosslink output folder. A crosslink output folder contains a `_Status` folder and a Value item.

The `_Status` folder provides access to the crosslink output status items. The Value item provides access to the crosslink output.

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 Import/Export feature allows you to export the configuration data to text file format and import configuration data from these exported files and also from comma separated values files from other vendors' OPC servers and programming software.

For details on this important feature and instructions in its operation, refer to the [Cyberlogic OPC Server Help](#).

Editor Options

The editor has several options that may be set to adjust the operation of the editor to suit your preferences and to set security levels as needed for communication with client software. For a full discussion, refer to the [Cyberlogic OPC Server Help](#).

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. For a full discussion, refer to the [Cyberlogic OPC Server Help](#).

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 [OPC Crosslink Messages](#) to assist in your troubleshooting.

Data Monitor

The Data Monitor lets you monitor the values and status of the data items. Its use is described in detail in the [Cyberlogic OPC Server Help](#).

Cyberlogic OPC Client

The Cyberlogic OPC Client is a simple OPC Data Access client that lets you see how the server interacts with a client and lets you test its response to various loads. Its use is described in detail in the [Cyberlogic OPC Server Help](#).

Performance Monitor

The Performance Monitor is a Microsoft diagnostic tool that the Cyberlogic drivers support. Its use is described in detail in the [Cyberlogic OPC Server Help](#).

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 [Accessing Crosslinks with OPC Clients](#). Information on how you can use DirectAccess for other types of devices and for network nodes, refer to the [Cyberlogic OPC Server Help](#).

Status Items

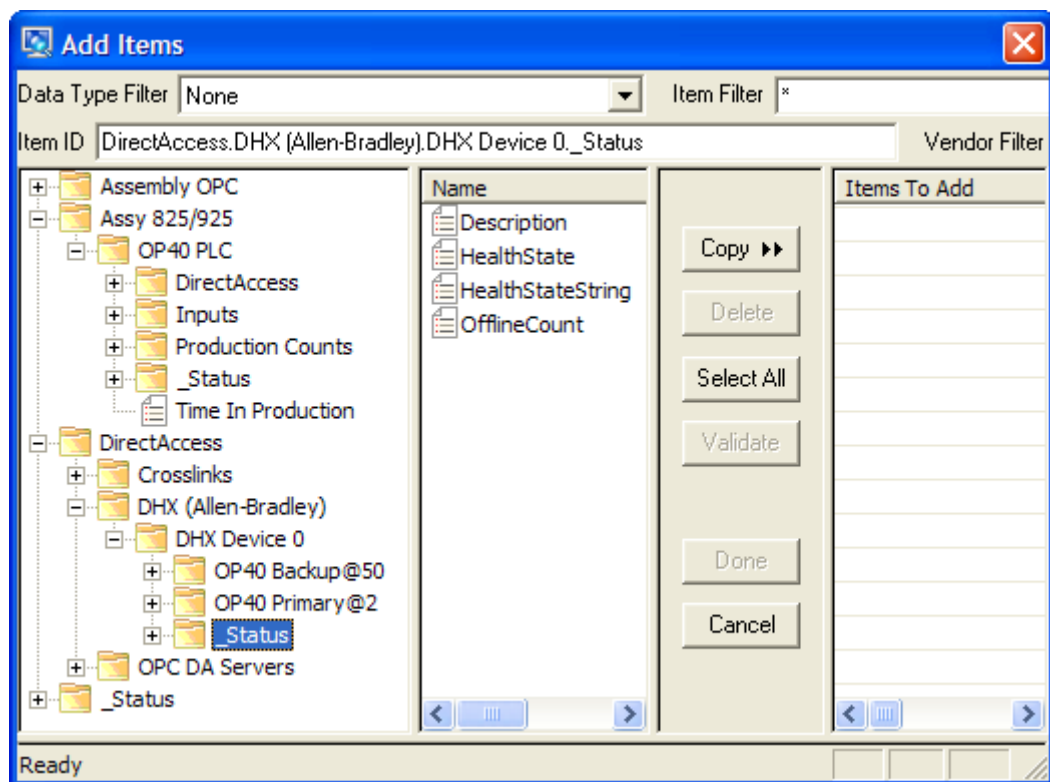
The Cyberlogic OPC Server provides status items that are accessible to any connected OPC client application. These items provide health and performance information about the server itself, as well as the network connections, network nodes, devices and crosslinks. The [Status Item Definitions](#) section provides details about the Crosslink status

items. For information about the status items that relate to the OPC server generally, refer to the [Cyberlogic OPC Server Help](#).

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. For detailed information about this application, refer to the [Cyberlogic OPC Server Help](#).

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*.



The contents of each folder will vary depending on the type of item that it is providing status for. This section covers:

- [Crosslink Group Status](#)
- [Crosslink Input Status](#)
- [Crosslink Output Status](#)

Crosslink Group Status

The following items are shown in folders called *_Status* located directly under the crosslink group branches in the DirectAccess tree of the address space root. These branches are present only when DirectAccess at a given crosslink group is enabled, which

is done on the crosslink group's [General Tab](#). For more information on using DirectAccess, refer to [Accessing Crosslinks with OPC Clients](#).

Description

This is the description text as configured in the Description field.

Inputs_ErrorCount

This is the total error count for all inputs associated with this crosslink group.

The counter is incremented each time bad quality data is received on any input in the crosslink group.

Inputs_UpdateCount

The total update count for all inputs associated with this crosslink group.

This counter is incremented each time an OnDataChange update callback is received for the inputs associated with this crosslink group.

IsEnabled

Indicates whether or not the crosslink group is enabled.

The valid values are:

- 0 = Disabled
- 1 = Enabled

Outputs_ErrorCount

The total error count for all outputs associated with this crosslink group.

This counter is incremented each time a write to an output in this crosslink group fails.

Outputs_WriteCount

The total write count to outputs associated with this crosslink group.

This counter is incremented each time outputs in this crosslink group are written to.

ResetAllErrorCounts

An Off to On transition of this item resets all crosslink 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.

TransferEnable_ErrorCount

This is the total error count associated with the TransferEnable control input.

The counter is incremented each time bad quality data is received for this input. This item is not present if the TransferEnable input is not configured.

TransferEnable_ItemID

This is the Item ID string associated with the TransferEnable control input.

This item is not present if the TransferEnable input is not configured.

TransferEnable_LastError

The last error code associated with the TransferEnable control input.

This item is not present if the TransferEnable input is not configured.

TransferEnable_LastErrorQuality

The last error quality associated with the TransferEnable control input.

This item is not present if the TransferEnable input is not configured.

TransferEnable_LastErrorString

The last error code string associated with the TransferEnable control input.

This item is not present if the TransferEnable input is not configured.

TransferEnable_UpdateCount

The total update count for the TransferEnable control input.

The counter is incremented each time an OnDataChange callback delivers a new value for the TransferEnable control input. This item is not present if the TransferEnable input is not configured.

WriteTrigger_ErrorCount

The total error count associated with the WriteTrigger control input.

The counter is incremented each time bad quality data is received for this input. This item is not present if the WriteTrigger input is not configured.

WriteTrigger_ItemID

This is the Item ID string associated with the WriteTrigger control input.

This item is not present if the WriteTrigger input is not configured.

WriteTrigger_LastError

The last error code associated with the WriteTrigger control input.

This item is not present if the WriteTrigger input is not configured.

WriteTrigger_LastErrorQuality

The last error quality associated with the WriteTrigger control input.

This item is not present if the WriteTrigger input is not configured.

WriteTrigger_LastErrorString

The last error code string associated with the WriteTrigger control input.

This item is not present if the WriteTrigger input is not configured.

WriteTrigger_LastValue

The last data value associated with the WriteTrigger control input.

This item is not present if the WriteTrigger input is not configured.

WriteTrigger_UpdateCount

The total update count for the WriteTrigger control input.

The counter is incremented each time an OnDataChange callback delivers a new value for the WriteTrigger control input. This item is not present if the WriteTrigger input is not configured.

Crosslink Input Status

The following items are shown in folders called *_Status* located directly under each crosslink branch in the DirectAccess tree of the address space root. These branches are present only when DirectAccess at the corresponding crosslink group is enabled, which is done on the crosslink group's [General Tab](#). For more information on using DirectAccess, refer to [Accessing Crosslinks with OPC Clients](#).

Description

This is the description text as configured in the Description field.

Input_ErrorCount

Total error count.

This counter is incremented each time bad quality data is received for this crosslink input.

Input_ItemID

This is the Item ID string associated with this crosslink input.

Input_LastError

The last error code associated with this crosslink input.

Input_LastErrorQuality

The last error quality associated with this crosslink input.

Input_LastErrorString

The last error code string associated with this crosslink input.

Input_LastValue

The last data value received for this crosslink input.

Unlike the Value item in the crosslink folder that provides full read and, if enabled, write access to the crosslink input, this value is read-only and is updated at the crosslink group's read inputs interval, but only when the item is enabled.

Input_UpdateCount

The total update count.

The counter is incremented each time an OnDataChange callback delivers a new value for this crosslink input.

IsEnabled

This indicates whether or not this crosslink input is enabled.

The valid values are:

- 0 = Disabled
- 1 = Enabled

Outputs_ErrorCount

The total error count for all crosslink outputs associated with this crosslink input.

The counter is incremented each time a write to an output for this crosslink input fails.

Outputs_WriteCount

The total write count to outputs associated with this crosslink input.

The counter is incremented each time crosslink outputs for this crosslink input are written to.

Crosslink Output Status

The following items are shown in folders called *_Status* located directly under the crosslink output branch in the DirectAccess tree of the address space root. These branches are present only when DirectAccess at the corresponding crosslink group is enabled, which is done on the crosslink group's [General Tab](#). For more information on using DirectAccess, refer to [Accessing Crosslinks with OPC Clients](#).

Description

This is the description text as configured in the Description field.

ErrorCount

The total error count.

This counter is incremented each time a write to this crosslink output fails.

IsEnabled

This indicates whether or not this crosslink output is enabled.

The valid values are:

- 0 = Disabled
- 1 = Enabled

ItemID

This is the Item ID string associated with this crosslink output.

LastError

The last error code associated with this crosslink output.

LastErrorString

The last error code string associated with this crosslink output.

LastStatus

The status code for the last write operation.

Zero indicates a successful write.

LastValue

The last data value written to this crosslink output.

Unlike the Value item in the crosslink output's folder that provides full read and, if enabled, write access to the crosslink output, this value is read-only and is updated only when crosslink writes data to this crosslink output.

WriteCount

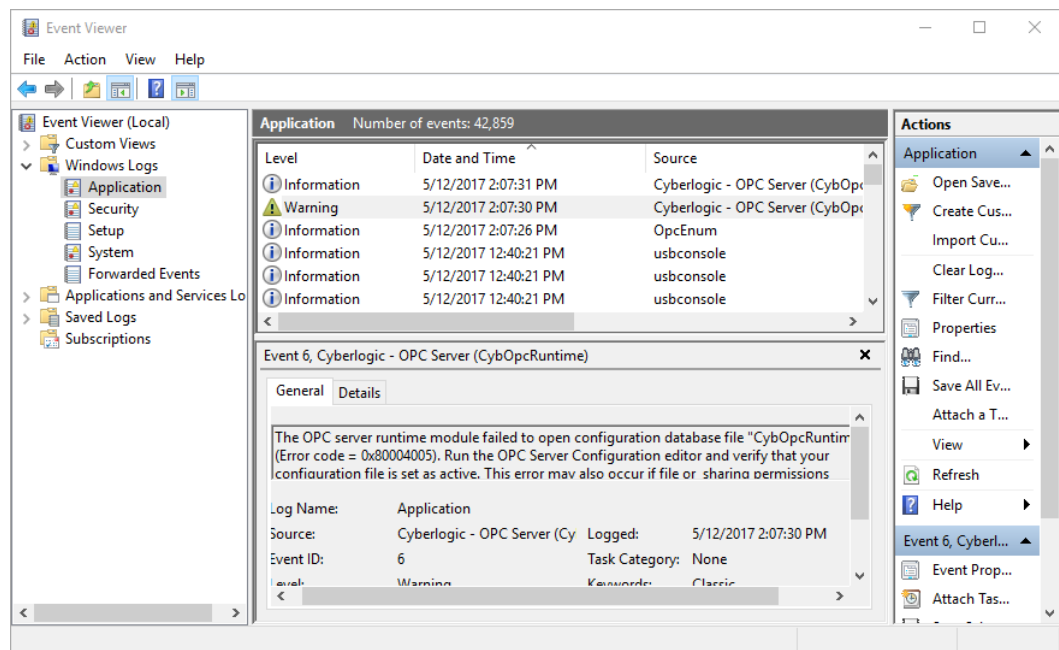
The total write count.

This counter is incremented each time this crosslink output is written to.

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 go to **Cyberlogic Suites**, then open the **Diagnostics** sub-menu and select **Event Viewer**.

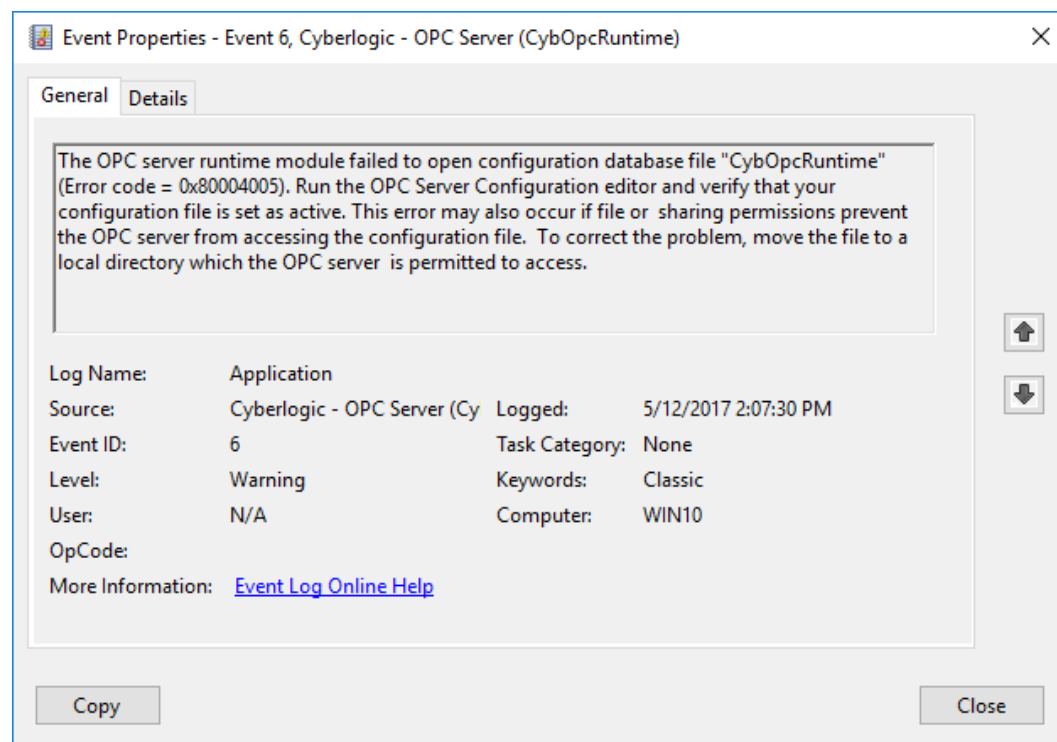


2. Select **Windows Logs | Application** from the Event Viewer tree.
3. Look for entries with **CybOpcRuntime** in the **Source** column.

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.



- For further descriptions of the event log messages, refer to the [OPC Crosslink Messages](#) section.

OPC Crosslink Messages

This section shows Error Log messages that relate to OPC Crosslink. For a list of messages that relate to the Cyberlogic OPC server, refer to the [Cyberlogic OPC Server Help](#). 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.

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 Suite, OPC Crosslink Premier Suite, OPC Crosslink Enterprise Suite, DHX OPC Enterprise Suite 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.