



# iFIX 6.1

OPC Client Driver

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# OPC Client Driver

Welcome to the OPC Client Driver Help. Click the following topics for information about using the OPC Driver.

- [OPC I/O Driver Overview](#)
- [General Installation Information](#)
- [Using the Power Tool](#)
- [Configure the I/O Driver](#)
- [Running the I/O Driver](#)
- [Optimizing the Driver](#)
- [Troubleshooting Your System](#)
- [Creating a Custom Client Application](#)
- [Glossary](#)
- [Where to Find Information](#)

## OPC I/O Driver Overview

Click the following links for more information about the OPC I/O Driver.

- [About the OPC I/O Driver](#)
- [How the I/O Driver Works](#)
- [Features](#)

## About the OPC Client Driver

The OPC Client is a GE version 7.x I/O driver that provides the interface and communications protocol between OLE for Process Control servers and your process control software. GE version 7.x drivers are designed with the following attributes to provide flexibility and ease-of-use:

- OLE Automation technology
- iFIX integration
- Event-driven architecture
- OLE for Process Control compliance

## OLE Automation Technology

Version 7.x drivers incorporate OLE Automation technology and can therefore expose their features to scripting tools and other applications. Because the drivers are OLE Automation applications, you can:

- Create and manipulate objects exposed in the I/O Server from another application.
- Create tools that access and manipulate driver objects. These tools can include embedded macro languages or external programming tools.

The I/O driver consists of the following OLE components:

- The I/O Server - The core executable program. The I/O Server maintains the OPC server, group, and item objects, performs all required functions for communicating with third-party OPC servers, and exposes the methods and properties to other applications.
- The I/O Driver Power Tool - A client application to the I/O Server with a graphical user interface. The Power Tool accesses the I/O Server and lets you view and modify OPC server, group, and item properties.

You can also view and modify driver properties with a custom client application developed specifically for your system. Refer to [Creating Custom Client Applications](#) to learn more about creating your own client application.

## Integration with iFIX

GE version 7.x drivers let you automatically add addresses to the driver configuration while you are configuring your iFIX database. When you add a block to the database that accesses a point in the OPC server that you have not configured, the point is automatically added to the I/O Server and polled for data. Refer to [Feature: Creating Items Automatically in iFIX Process Database](#).

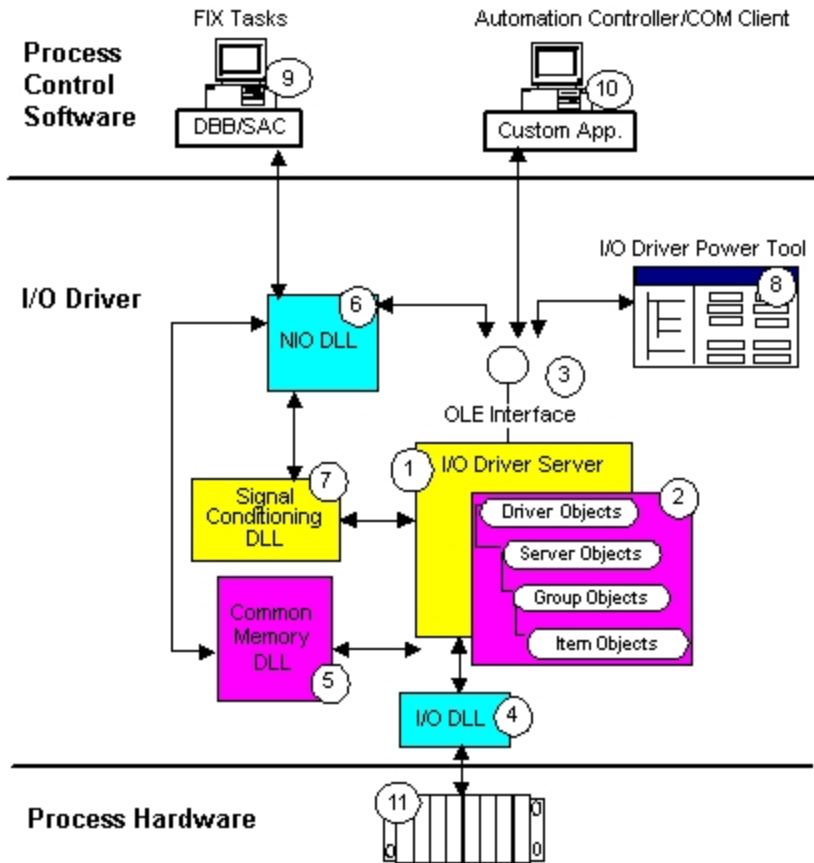
## Event-Driven Architecture

Version 7.x drivers are event-based rather than time-based, reducing CPU time and increasing performance.

## OPC Compliance

The OPC Client driver complies with the OLE for Process Control (OPC) v1.0a and v2.0 standards. The OPC Client provides the ability to bring data from any OPC v1.0a or v2.0 server to the GE iFIX Human-Machine Interface (HMI) software.

## How the I/O Driver Works



## 1. I/O Server

The I/O driver core. The I/O Server contains objects and interfaces that perform the following tasks:

- Maintain the I/O driver configuration.
- Read and write to third-party OPC v1.0a and v2.05 servers.
- Expose the driver functionality through OLE automation.

## 2. I/O Server Objects

The I/O Server consists of the following objects:

- **Driver Object** - Manages Server Objects and the overall state of the driver.
- **Server Object** - A server is the I/O driver's communication path to an OPC server. The Server Object contains the properties and methods that govern the behavior of a server and allow you to browse your OPC servers.
- **Group Object** - A group is a logical association of data, called items, in a server. The Group Object contains the properties and methods that govern the behavior of an OPC group including asynchronous and synchronous communications.
- **Item Object** - An item is a piece of data that can be read from an OPC server. The Item Object contains the properties and methods that manage the behavior of an item. Item Objects in the I/O Server's local memory correspond to data areas in the Common Memory DLL. When you add

new items to the I/O Server's local memory, you also add new data areas to the Common Memory DLL.

### **3. OLE Interfaces**

Exposes the data and functionality of the I/O Server to other applications.

### **4. I/O DLL**

Provides functions for sending and receiving data to and from the process hardware. In this driver, your hardware vendor's OPC server software provides these functions.

### **5. Common Memory DLL**

Builds common memory, exposes its functionality to the Server and the NIO DLL, and stores and maintains process data.

### **6. NIO DLL**

Contains the I/O driver's data access API. The NIO DLL has direct access to the Common Memory DLL, providing fast and efficient read/write capability.

### **7. Signal Conditioning DLL**

Contains the API that scales raw data to the specified engineering units.

### **8. I/O Driver Power Tool**

Serves as a high-performance client to the I/O Server with a graphical user interface for configuring and monitoring the driver.

### **9. iFIX Applications**

Communicates with the I/O driver through the NIO DLL. Because the NIO DLL accesses the Common Memory DLL directly, reading and writing data to iFIX applications is fast and efficient.

### **10. Automation Controller and COM Client Applications**

Communicates with the I/O driver through the OLE Interfaces. You can design custom applications with a COM/OLE Automation programming application such as Visual Basic, Power Builder, or Visual C++.

### **11. Process Hardware**

Includes any type of I/O device that controls a process.

## **The OPC Client Features**

The OPC Client driver:

- [Lets You Automatically Create Groups and Items from iFIX Process Database](#)
- [Lets You Add Items Automatically to the iFIX Process Database](#)
- [Lets You Add Existing Items to the iFIX Process Database](#)
- [Automatically Creates the iFIX Process Database Log File](#)

- [Lets You Add Multiple Items to a Group](#)
- [Lets You Configure Custom COM/OLE Automation Applications](#)
- [Supplies a New, Easy-to-Use Graphical User Interface](#)
- [Provides Remote Configuration and Control](#)
- [Provides Exception-Based Processing](#)
- [Lets you Enable or Disable Individual Servers, Groups, and Items](#)
- [Provides Latched Data](#)
- [Provides a Time/Date Stamp for Data and Alarms](#)
- [Can run as a Windows Service](#)
- [Supports Asynchronous and Synchronous I/O](#)
- [Supports Device and Cache Reads](#)
- [Lets you Browse OPC Servers](#)
- [Supports Data Arrays](#)
- [Supports Block Writes](#)
- [Support for Greater Precision](#)

## Creating Items Automatically in iFIX Process Database

By enabling the Auto Create option in the I/O Driver Power Tool, you can automatically create items from your HMI process control software by specifying an undefined item in the I/O address of a database block. After you enter the undefined item, the OPC Client I/O driver automatically adds the new item to your driver configuration. As a result, you do not have to start the I/O Driver Power Tool and create the OPC items before you design your process database; you only need to create the required servers and groups.

### Example 1: Creating Items Automatically

1. Start the I/O Driver Power Tool and choose Setup from the Options menu. The Setup dialog box appears.
2. Click the Advanced tab and select Auto Create On in the I/O Server area.
3. Close the Setup dialog box and choose Templates from the Options menu. The Templates dialog box appears.
4. Enter the default values you want to use for your server, group, and items in the Templates dialog box.
5. In the Power Tool, add Server1 and Group1, but do not create any items.
6. Save the Power Tool configuration as your default, exit from the Power Tool, and close all remote connections.
7. Open iFIX Process Database and create five database blocks with valid Item IDs using Group1



as the device name.

8. Open the Power Tool. The Tree Browser will display five new Items under Group1.

When automatically creating items, enter a valid item ID in Process Database.

You can also automatically create groups.

### **Example 2: Creating Groups Automatically**

1. Using the previous example, delete Group1 from the Power Tool.
2. Open iFIX Process Database and create five database blocks, all with valid Item IDs, and different group names.
3. Open the Power Tool. The Tree Browser will display five new Groups, each with its own new Item, under Server1.

When automatically creating groups, enter a unique group name. Duplicate group names are not allowed.

You can also automatically create servers from Process Database.

### **Example 3: Creating Servers Automatically**

1. Using the previous example, delete Server1 from the Power Tool.
2. Open iFIX Process Database and create one block with a valid prog id, a unique group name, and an item ID valid to the specified OPC server's prog id.
3. Open the Power Tool. The Tree Browser will display a new Server, Group, and Item.

When automatically creating servers, enter a valid OPC server prog id.

Keep in mind that all items and groups that you automatically create from the Process Database contain default values found in the Templates section of the Power Tool.

## **Add Items Automatically to the iFIX Process Database**

Click the following links for more information regarding auto-creation of items in the iFIX Database.

- [Auto-creating items in the iFIX Process Database from the Device Browser](#)
- [Auto-creating items in the iFix Process Database from the Datablock Browser](#)

By selecting the Enable iFix PDB Tag Auto-creation option in the I/O Driver Power Tool, you can create items that are automatically added to the Process Database. You can automatically create items in the Database Tag, Device Browser, and Datablock Browser dialog boxes.

**NOTE:** This feature is available only for iFIX version 3.0 or later. All tags added to the process database are put off scan. The initial value is displayed in the iFIX process database as ????, however, the actual value is displayed correctly after you have saved and reloaded the database.

The following conditions must be met to add existing items to the iFIX process database:

- iFIX must be running. If iFIX is not running, a message is displayed.
- The Enable iFix PDB tag auto-creation check box must be selected.

- The OPC Client driver must be on the SCU list.

► **To auto-create items in the iFIX Process Database from the Device Browser:**

1. In the Tree Browser, select the group in which you want to auto-create items.
2. From the Display Mode menu, choose Config Mode.
3. From the Edit menu, choose Add Multiple Items. The Device Browser dialog box appears.
4. Expand the Path tree and tag type that you want to auto-create items for.
5. Select an item from the Tag Type list. The item IDs for the selected item appear in the Items list.
6. From the Items list, select the number of item IDs you want to auto-create. For example, if you want to auto-create 10 items, select the first item ID in the Items list, hold down the Shift key and select the tenth item ID.
7. If required, select the Enable iFix PDB Tag Auto-creation check box.

**NOTE:** This check box can also be selected on the Database Tag and Datablock Browser dialog boxes. For more information, see [Adding and Modifying Item IDs](#).

8. From the iFIX Database Tag Type list, select the type of datablock you want to create items for.
9. In the Tag Desc Prefix box, enter a brief description of the item you are adding. By default, AG- is displayed.
10. In the Tag Name Prefix box, enter the prefix you want to have appear on the database blocks.

**NOTES:**

- You cannot duplicate tag names in the iFIX process database. When adding the same item with a different tag type to the iFIX process database, you must add a tag name prefix to the item name.
- Tag names must contain only alphanumeric characters. A tag name containing non-alphanumeric characters (e.g., \*, ~) will prevent the tag from being added to the iFIX process database.

11. Click OK. The auto-created items appear under the selected group in the Power Tool Tree Browser and in the iFIX Process Database.

**NOTE:** The displayed item ID for each of the auto-created items is the same as the corresponding item ID you selected in the Device Browser dialog box. To change the item IDs of the auto-created items, see [Adding and Modifying Item IDs](#).

► **To auto-create items in the iFix Process Database from the Datablock Browser:**

1. In the Tree Browser, select the item you want to auto-create a database block for in the Process Database.
2. From the Display Mode menu, choose Config Mode.
3. In the Properties Viewer, click the Browse Server button. The Datablock Browser dialog box appears.
4. In the Item IDs list, expand the server and select the tag type that you want to create an item for.
5. If required, select the Enable iFix PDB Tag Auto-creation check box.

**NOTE:** This check box can also be selected on the Database Tag and Device Browser dialog boxes.

6. From the iFIX Database Tag Type list, select the type of datablock you want to create an item for.
7. In the Tag Desc Prefix box, enter a brief description of the item you are adding. By default, AG- is displayed.

**NOTE:** "AG-" is an acronym for "Auto Generated" and indicates, in the iFix Process Database, that the tag has been automatically generated. Adding AG- to the description provides you with a way to search the iFIX Process Database for the tags you created in the OPC Client Power Tool.

8. In the Tag Name Prefix box, enter the prefix you want to appear on the database block.

**NOTES:**

- You cannot duplicate tag names in the iFIX process database. When adding the same item with a different tag type to the iFIX process database, you must add a tag name prefix to the item name.
  - Tag names must contain only alphanumeric characters. A tag name containing non-alphanumeric characters (e.g., \*, ~) will prevent the tag from being added to the iFIX process database.
9. Click OK. The auto-created item is added to the iFIX Process Database and appears in the Datablock Browser the next time it is opened.

## Add Existing Items to the iFIX Process Database

The OPC Client driver allows you to create and configure items in the Power Tool and then to add those items to the Process Database. For more information, see [Add Existing Items to the iFix Process Database](#).

## Use the iFIX Process Database Log File

With the OPC Client driver you can create new items that are added to both the Power Tool and the iFIX Process Database. You can also add existing items from the Power Tool to the Process Database.

When you add items to the iFIX Process Database a log file is created automatically to record all the actions that you performed.

The log file name can be changed using the Setup dialog box.

► **To use the iFIX Process Database log file:**

1. From the File menu, choose Open. The Open window browser appears.
2. From the Files of type list, select LogFiles (\*.TXT). All available log files are displayed.
3. Double-click the log file you want to view.

The log file is in .CSV format and has the following fields:

Field	Description
Date and Time	The date and time the action was performed.

Tag Information	Displays the tag name, the tag description, and the tag I/O address.
Status	Success or Failed. If the status is failed, the error code is recorded.

## Add Multiple Items to a Group

The OPC Client driver allows you to add multiple items to a group in the Power Tool. See Adding Multiple Items for the complete procedure.

The number of items you chose are added under the selected group in the Power Tool Tree Browser with the associated item IDs displayed in the Item ID and Access Path fields.

To change the item IDs of the added items, see Adding and Modifying Item IDs from the Datablock Browser.

## Configure the Driver from Custom COM/OLE Automation Applications

In concert with the growing trend towards using custom programs to access plant floor data, GE version 7.x drivers enable you to connect easily with custom applications. You do not have to use the OPC Client I/O Driver Power Tool to configure the driver. Instead, you can create your own COM or OLE application or use an existing OLE application (such as Microsoft's Excel) to configure the driver and access data.

Your driver may include a custom Visual Basic application. You can use this application in place of the Power Tool to configure your driver. You can also refer to it when creating your own custom application. Typically, custom Visual Basic applications are created for specific needs such as:

- Customizing the way you gather and view statistics.
- Automatically building a project.
- Creating applications that control the way the driver operates.

## Using the OPC Client I/O Driver Graphical User Interface

The OPC Client I/O Driver Power Tool is an OLE application that functions as a client to the [OPC I/O Server](#) and is your main graphical driver configuration tool. It provides a graphical user interface (GUI) and graphical aids for configuring the driver to communicate with your process hardware.

### Features of the Power Tool

- Runs as a stand-alone program or can be launched from iFIX.
- Lets you view servers, groups, and items graphically from the Tree Browser.
- Displays run-time statistical and diagnostic information for the driver and its servers, groups, and items.

- Provides templates for configuring default server, group, and item settings.
- Provides options for customizing the Power Tool's appearance.
- Supports remote configuration.

Refer to the following topics for a description of the Power Tool and how to use it to configure your driver:

- [About the I/O Driver Power Tool](#)
- [Set Up the OPC I/O Server Connection](#)
- [Add and Modifying Servers](#)
- [Add and Modifying Groups](#)
- [Add and Modifying Items](#)
- [Add Multiple Items](#)
- [Add Existing Items to iFIX Process Database](#)

## Remote Control and Configuration

You can control and configure the OPC I/O Server remotely using the Power Tool or any other client application. To set up remote control of the I/O Server, you can install the Power Tool or your client application on a computer that does not have the server software installed. However, you must install the I/O Server on the computer used to communicate with the process hardware.

### ► To install the Power Tool for remote communication:

1. Insert the I/O Drivers and OPC Server CD into the remote computer's CD-ROM drive.
2. When the start-up screen appears, click the Install Driver button.
3. Select the OPC Client from the list and click the Install Now button.
4. Click the I Agree button to accept the user license and continue with the installation.
5. Follow the instructions on the screen to complete the installation. When the Install program prompts you for the node type, select Client.
6. After installation is complete, open the Power Tool and connect to the I/O Server using the Network list box. Refer to [Set Up the OPC I/O Server Connection](#) to learn more about establishing a connection to the OPC I/O Server.

## Asynchronous vs. Synchronous I/O

The OPC I/O Server supports two different methods of obtaining data from an OPC server: synchronous and asynchronous I/O. Synchronous I/O enables the OPC Client to poll the OPC server at regular intervals, according to the specified poll rate. Synchronous I/O is a reliable means of getting data at a specified time interval.

Asynchronous I/O, by comparison, does not enable the OPC Client to poll the server; it provides data between the driver and the OPC server on an exception basis. Using Asynchronous I/O, the server notifies the OPC Client when data has exceeded the user-supplied percent deadband. This architecture offers low communications overhead because the driver does not repeatedly poll for the same data over and over again.

You can enable polling for asynchronous I/O by enabling the asynchronous watchdog. This feature enables the OPC Client to ask for data from the OPC server and ensures that no data is lost because the OPC server was too busy.

### Using Process Database Exception-Based Processing

You can use synchronous and asynchronous I/O with exception-based database blocks by entering a deadband. When incoming data exceeds the specified deadband, SAC updates all the exception-based database blocks.

For synchronous I/O, enter an exception deadband in each OPC item. For asynchronous I/O, enter a percent deadband in the item's group.

## Using Exception-Based Processing

GE version 7.x drivers support exception-based processing when used with iFIX products for process control. Exception-based processing means that the software application processes data only if there is a considerable deviation from normal values.

Exception-based processing also applies to database blocks. You can enable exception-based processing for any block in the process database. After you enable this feature, the I/O driver reports any data change that exceeds the I/O driver's deadband to the iFIX Scan, Alarm, and Control (SAC) program. This program resides in the background and works to maintain the process database continuously. Upon receiving notification of an exception, SAC polls for information on the affected database block and updates that block's value.

#### ► To configure a database for exception-based processing:

1. Start the Power Tool.
2. Add a server and a group, or modify an existing group by highlighting it in the Tree Browser window.
3. Depending on the group's I/O, enter a deadband value as follows:
  - For asynchronous I/O:
    - a. In the Group properties, select Asynchronous in the I/O Type field.
    - b. Enter a value in the % Deadband field.
  - For synchronous I/O:
    - a. In the Group properties, select Synchronous in the I/O Type field.
    - b. Add an Item.
    - c. In the Item properties, enter a value in the Exception Deadband field.

4. Start Process Database.
5. From the program's spreadsheet, double-click the block you want to modify or from the Blocks menu, choose Add and then select the type of block you want to create.
6. In the I/O Address box of the database block, enter an OPC address. Reference the group or item you configured in the Power Tool.
7. Enter **E** in the Scan Time field of the database block.

If you have many database blocks, using exceptions can help reduce the demand on SAC.

#### NOTES:

- Analog Register and Digital Register blocks in iFIX databases do not support exception-based processing. In addition, the OPC Client does not support using the Text block with exception-based processing.
- The OPC Client does not support exception-based processing for database blocks that reference items configured as data arrays.

## Enabling or Disabling Individual Servers, Groups, and Items

You can enable or disable messaging to servers, groups, or items at any time. This is a very useful feature for debugging, maintenance, and for making preliminary configurations.

Disabling a server also disables all of its groups and items because the server's Enable check box controls the driver's connection to the OPC server. After the driver and server are disconnected, all of the server's groups and items are removed as well.

The same logic applies to disabling groups; when you disable a group, all of its items are disabled.

Disable a server if:

- You are removing devices on a server for repair or maintenance and do not want to display errors.
- You want to disconnect from the OPC server.

Disable a group if:

- You are removing a device for repair or maintenance and do not want to display errors.
- You want to reduce the communications load when you do not need to collect data from that group.
- You want to isolate the group for debugging.
- You want to remove the group from the OPC server.

Disable an item if:

- You only want to intermittently view data for an item.
- You want to remove the item from the OPC server.
- You want to modify the Item ID or Access Path for the item.

**NOTE:** Enabling an object only affects the selected object by default. However, you can enable all of the objects below the one you are enabling with the Enable Children check box. Refer to Enable Children for more information.

## Using Latched Data

You can preserve an OPC item's last read by enabling the Latch Data option. Should a communication failure occur, Data links to unlatched items display a series of question marks (?????) while Data links to latched items display the last data polled. This feature is very useful when you need to create reports about your process and require data at all times. You can also use this option to preserve the last values on the screen after a communication failure occurs.

### Example

Your OPC server communicates with remote devices by radio transmission. You know that radio transmission is not always reliable (particularly during inclement weather); however, you must provide daily reports from your process hardware.

By enabling the Latch Data option for your items, you ensure data is always available for reports.

### NOTES:

- Latch data is also available from the OPC server. Since data quality is returned from the OPC server, the server can latch the item's quality. Enabling latched data in the driver forces the quality to reflect a latched state and changes the actual data quality returned by the OPC server.
- Analog Register and Digital Register blocks do not support latched data. Consequently, we do not recommend using these blocks with the Latch Data option.

## Time/Date Stamp for Data and Alarms

GE version 7.x I/O drivers record the time and date of the following events:

- The last update of data for an item by the OPC server
- The last time the driver sent data to the OPC server
- Any time an error occurs

The driver time stamps the data and errors at the item level.

### ► To view time and date stamps in the Power Tool:

1. From the Tree Browser, select an OPC item.
2. From the Display Mode menu, choose Stats Mode. The Power Tool displays statistics for the selected item.

You can also view the time stamp from iFIX Process Database. Refer to [Specify I/O Addresses in iFIX Process Database](#) for more information.



## Running as a Service

Version 7.x drivers can run as a Windows service. Running your driver as a service lets users log on and off the operating system without shutting down the driver.

**IMPORTANT:** When iFIX is running in Service mode, the OPC Client must also run in Service mode. When iFIX is not running in service mode, the client must run in non-service mode. GE strongly recommends that both applications run in the same context.

**NOTE:** If the OPC Client driver is added to the SCU, and you do not stop it, it will be stopped automatically when iFIX is shut down.

By default, an I/O Server does **NOT** run as a Windows service. To set up the I/O Server to run as a service, you must register it as a service. During installation, the Setup wizard automatically registers the server as a regular server process. To register it to run as a service, you must run the server on the command line, specifying that you wish to register it as a service. When the server is running as a service, you may need to re-register it in certain situations, such as when you need to change the logon account.

Before you register the I/O Server to run as a service, follow these steps to ensure that it is not currently running:

- If the driver is currently running as a regular server, you must stop the process by shutting down all clients to the server, such as the PowerTool or iFIX.
- If the driver is currently running as a service, you must stop the process by shutting down all clients to the server, and you must also perform these tasks on your operating system:
  - **Windows XP, Windows 2000, and Windows 2003** - from Control Panel, select Administrative Tools, then select Services. A list of all services configured on the machine displays. Locate OPCDrv Server. If the status is Started, right click and Stop the server.

After you stop the server from running, select the Process tab from the Task Manager and verify that the OPCDRV.exe process is no longer listed.

### Registering the I/O Server as a Service

► To register the I/O Server as a service:

1. From the Windows Start menu, select Run.
2. Enter the following command and click OK:

```
OPCDrv REGSERVICE
```

The Logon Account for Running As A Service dialog box appears, and the registration process now allows the user to specify a logon account. This provides flexibility with the user's choice of security settings. The dialog box allows the user to select one of these accounts when registering the OPC Client driver to run as a service:

- **System Account** - uses the local system account to log on the I/O Server. This pre-defined account is useful when your local IT department's security policy requires password expiration.

**NOTE:** The local system account cannot be used to access remote OPC servers. If this OPC Client accesses remote OPCDrv servers, you must select another account using This Account.

- **This Account** - uses an account specified by the user to log on the I/O Server. This account is useful if you need to specify a domain account. The account used here must be an existing account with both Administrator and Logon as a Service privileges to run the

server as a service. To determine if the account has Administrator privileges, refer to the manual provided with your operating system. For example, to determine Administrator privileges in Windows 2000, select Administrative Tools from Control panel, and then select Users and Passwords. Use the Local Security Policy Setting tool to grant the account Logon as a Service privilege.

3. After you register the driver, start the Power Tool and make sure the Auto Start option is enabled. Refer to [Start the I/O Driver from the Power Tool](#) to learn how.
4. Configure DCOM (Distributed Component Object Model). Refer to [How do I set up security for using the I/O Server remotely?](#) to learn more.
5. If your Human-Machine Interface (HMI) software is FIX or iFIX, start FIX or iFIX. When either program runs, it will start the OPC server as a service.

If your HMI is a third-party package, then complete the following steps instead:

- a. From Control Panel, select Administrative Tools/Services, and then change the OPCDrv server startup from Manual to Automatic.
- b. Start your HMI software.

You can reset the server to be a regular server process again by re-registering it as:

```
OPCDrv REGSERVER
```

**NOTE:** Before you register the I/O Server to run as a regular server, you must ensure that it is not currently running.

When registering the server this way, it will run, perform the necessary registration work, and then exit. You can then start the server by using more conventional methods such as starting iFIX, the Power Tool, or any client program capable of communicating with the server.

**NOTE:** You cannot display the OPCDrv Server window using ALT + SHIFT + S when running as a service.

## Device vs. Cache Reads

You can configure each group in the OPC Client to read data from the OPC server's internal cache or from an actual device. Reading from the cache returns the last value read by the OPC server. The server updates the cache based on the group's update rate.

Reading from an actual device returns the latest values from the process hardware. Although the latest value is obtained, reading from a device can cause undue stress on the system. For this reason, we recommend that you only use device reads for diagnostic and troubleshooting purposes.

## Browsing OPC Servers

The OPC I/O Server supports browsing of an OPC server's address space. By browsing your OPC servers, you can greatly simplify the addition of new items because you can quickly determine what item IDs and access paths are available to you.

To learn how to browse an OPC server, refer to [How do I browse an OPC server?](#)

## Data Arrays

The OPC Client can read multiple values from an OPC server if the server supports data arrays. A data array is a set of contiguous data of the same data type. By reading multiple values with a single item, you simplify the driver configuration and improve driver throughput.

### Example 1

Suppose you want to read 200 values of contiguous addresses from your OPC server. Without data arrays, you have to create 200 items, one for each value. Each value is read independently, resulting in 200 messages to the OPC server. Using data arrays, you can create one item to read all 200 values. All values are read at once, resulting in one message to the OPC server.

Using data arrays is best when the OPC Client communicates with the server using synchronous I/O because the OPC Client reads the entire array. When data arrays are used with asynchronous I/O, the driver throughput may not improve because the OPC server sends the entire array to the OPC Client even if only one value in the array changes. Consequently, it may be better to create individual items for specific values that change frequently and use data arrays for all other values.

### Example 2

Assume the values at addresses 100, 150, and 200 change frequently. All other values from addresses 1 to 200 do not change frequently. In this situation, instead of creating one data array for all 200 values, it would be better to create the following items:

- Item 1, address 100
- Item 2, address 150
- Item 3, address 200
- Item 4, data array reading addresses 1-99
- Item 5, data array reading addresses 101-149
- Item 6, data array reading address 151-199

### Data Array Syntax

The item ID syntax for data arrays depends on your OPC server. However, you can use the following general syntax:

*itemid*

- Or -

*itemid!subscript:length (Schneider Automation only)*

*itemid[subscript],Llength (RS-Linx only)*

Where:

- *itemid* is the OPC server's name for the item you want to access.
- *subscript* is the starting address of the array.
- *length* is the number of elements in the array.

## Examples

To configure an item in the Power Tool as a 100-element array for an RS-Linx OPC server, use syntax similar to the following:

```
Sign_Int_Array[0],L100
```

To configure an item in the Power Tool as a 100-element array for an S7 Siemens server, use syntax similar to the following:

```
S7:[S7_300|VFD1|CP5613_5614(PROFIBUS)]DB1,B0,100
```

To configure an item in the Power Tool as a 100-element array for a Schneider Automation OFS OPC server, use syntax similar to the following:

```
MBT:1.2.3.4!400001:100
```

Consult your OPC server documentation for the exact syntax required for your server.

## Access Data Arrays with a Database Block

You must enter an I/O address in a database block to access data from a data array. The exact syntax you must use is similar to the item ID syntax:

```
servername;groupname;itemid;accesspath;[element]
```

Where:

- *servername* is the name of your OPC server.
- *groupname* is the name of the group containing the item you want to access.
- *itemid* is the OPC server's name for the item you want to access. The item ID may also include a length. Item IDs for RS-Linx servers include brackets and should not be confused with the array element you want to access. For example, *Sign\_Int\_Array[0]* identifies an item starting at address 0.
- *accesspath* is the OPC server's name for the access path you want to use. If no access path is specified you can leave it blank.
- *element* is the element in the array you want to access. This value must be between the starting address and the sum of the starting address plus the length minus 1 (start + length-1).

## Examples

With an Item Start of 0 defined in the Power Tool, you can access the fifth element in a 100-element array located at address 2 on the RS-Linx OPC server RSLinxV22 using syntax similar to the following:

```
RSLINXV22;SignIntGroup1;Sign_Int_Array[2],L100;Clogix;[4]
```

To access the fifth element in a 100-element array on an S7 Siemens server, use syntax similar to the following:

```
Server1;Group1;S7:[S7_300|VFD1|CP5613_5614(PROFIBUS)]DB1,B0,100;No Access Path;  
[4]
```

To access the fifth element in a 100-element array at address 400001 on a Schneider Automation OPC server, use syntax similar to the following:

```
Server1;Group1;MBT:1.2.3.4!400001:100;No Access Path;[5]
```

## Using Analog Register and Digital Register Blocks

After you complete the I/O Address field of an Analog Register or Digital Register block, you can use offset in picture data sources to access different values in the array.

### Example

Suppose you create an Analog Register block, AR10, with the I/O address:

```
RSLINXV22;SignIntGroup1;Sign_Int_Array[5],L100;;[20]
```

Then the following data sources access the specified array elements:

The data source...	Accesses the array element...
AR10.F_0	Sign_Int_Array[5],L100;;[20]
AR10.F_1	Sign_Int_Array[5],L100;;[21]
AR10.F_2	Sign_Int_Array[5],L100;;[22]
AR10.F_3	Sign_Int_Array[5],L100;;[23]

Offsets with a Digital Register block work the same way.

### NOTES:

- You cannot use the Auto Create option with items configured as data arrays.
- Data arrays support boolean and numeric (integer and float) data types. Arrays of strings are not supported.
- The OPC Client does not support exception-based processing for database blocks that reference items configured as data arrays.

The OPC Client does not automatically resize items configured as data arrays. If you need to change the size of the array, disable the item, change the array's length, and re-enable the item. Make sure the length of the array in the OPC Client matches the length of the array defined in the OPC server. If the lengths do not match, the data quality is set to BAD.

## Block Writes

Block writes let you send data to various registers in the OPC server simultaneously by using a special "send" command. This command instructs the OPC Client to send all outstanding writes in a single protocol message.

When the OPC Client sends the array to the OPC server, it also sends any unmodified values in the array using the last known value. Consequently, reads from the array return old values until the new data is written.

### ► To send block writes through iFIX:

1. Enable block writes in the OPC item you want to use:
  - a. In the Tree Browser, select the OPC item you want to use.
  - b. In the Properties Viewer, select the Enable Block Writes check box.
2. Create a Digital Output block with the following address:

*!Send:ItemName*

Note that only item names are valid with the *!Send* control address. You cannot trigger block names using the following items:

- Server and group names in place of an item name.
- Analog Output blocks in place of a Digital Output block.

## Support for Greater Precision

The OPC Client driver now supports 15 digits of precision with analog data.

### IMPORTANT:

- If you are using this OPC Client driver (v7.41) in iFIX 4.5, 15-digit precision is supported for data values only, and not for signal conditioning. Therefore, in iFIX 4.5, signal conditioning calculations are limited to 7 digits of precision. In other words, if the range of your EGU limits exceeds 7 digits, a small amount of imprecision will be introduced into the calculated result for signal conditioning.
- If you are using iFIX 5.0 with this OPC Client driver (v7.41), 15-digit precision is supported for both data values *and* signal conditioning.
- Prior to iFIX 4.5, 15-digit precision was not supported. Instead, you are limited to the 7 digit limits imposed by the use of single precision values.

## General Installation Information

Click the following links for general installation information.

- [Overview: Setting Up the Driver](#)
- [Set Up DCOM for Remote OPC Servers](#)
- [Supported Protocols](#)
- [Supported Software](#)

## Overview: Setting Up the Driver

The following is a general overview of the steps necessary for setting up your I/O driver.

### 1. Know your process hardware

- What type of cable are you using?
- What is the station number for each device?
- What addresses do you want to access and what data do you want to retrieve?
- What is the method of communication: Direct Connection, Telephone Modem, or Radio Trans-

mission?

- What are the bandwidth limitations of your network and hardware?

## 2. Know your OPC server

- Item ID
- Access Path
- Requested Data Type
- [Asynchronous vs. Synchronous I/O](#)

## 3. Choose the configuration method

- Choosing a Method for Configuring Your Driver

## 4. Configure the I/O driver

- Configuring Servers
- [Configuring Items](#)
- [Configuring Groups](#)
- [Setting Default Values for Driver, Servers, Groups, and Items](#)

## 5. Check the I/O driver status

- [Using Statistics Mode](#)

## 6. Test driver communication with the process hardware

- [Getting Basic Communication](#)

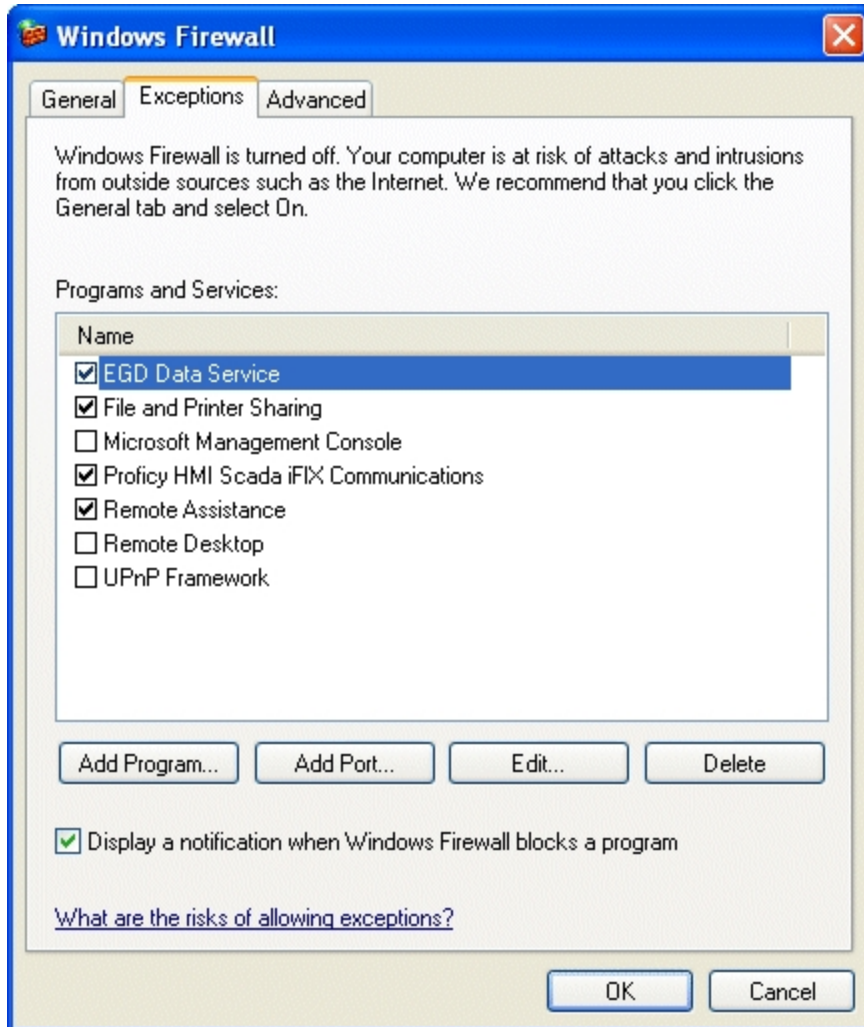
## Set Up Windows Firewall for Remote OPC Servers

If Firewall security is enabled on Windows you may need to modify or add items to the Exceptions list.

GE recommends that you enter these settings on the local machine running the OPC Client, as well as on the remote machine that has the OPC server you want to use.

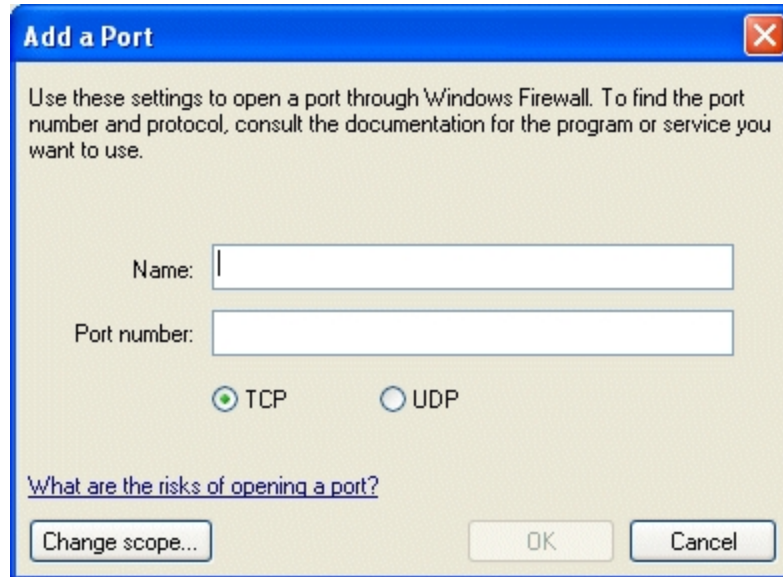
### ► To modify Windows Firewall settings:

1. Log into the Windows operating system with an Administrator account.
2. Open the Control Panel and double-click Windows Firewall. The Windows Firewall dialog box appears. You also need to click the "Allow a program through Windows firewall" option.
3. Click the Exceptions tab and make sure that the File and Printer Sharing check box is selected. The following figure shows an example of this dialog box in Microsoft Windows XP.



4. Click the Add Port button. The Add a Port dialog box appears. The following figure shows an example of this dialog box in Microsoft Windows XP.

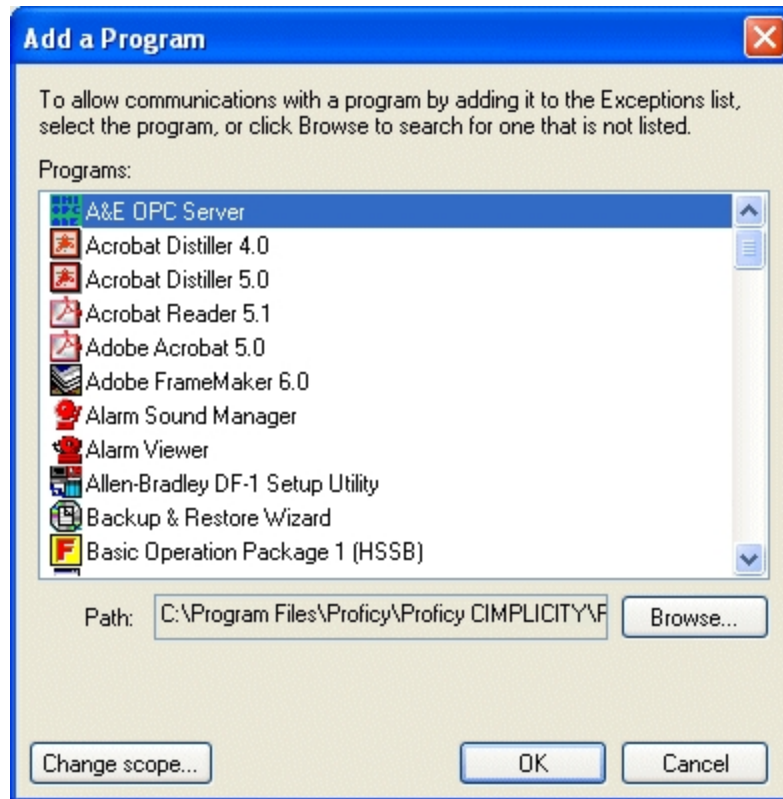




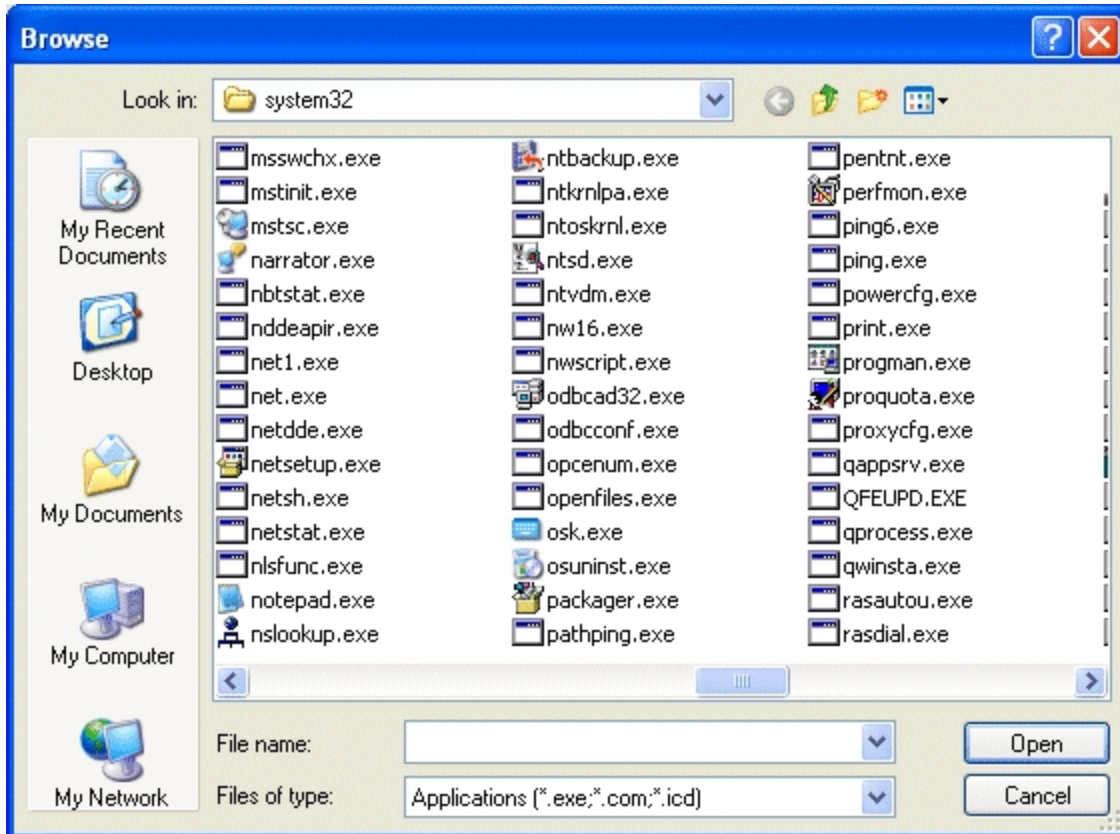
5. In the Name field, enter a name for the port.
6. In the Port Number field enter 135.
7. Select the TCP option.
8. Click OK to save your changes.

The port name you entered is now listed with its check box selected.

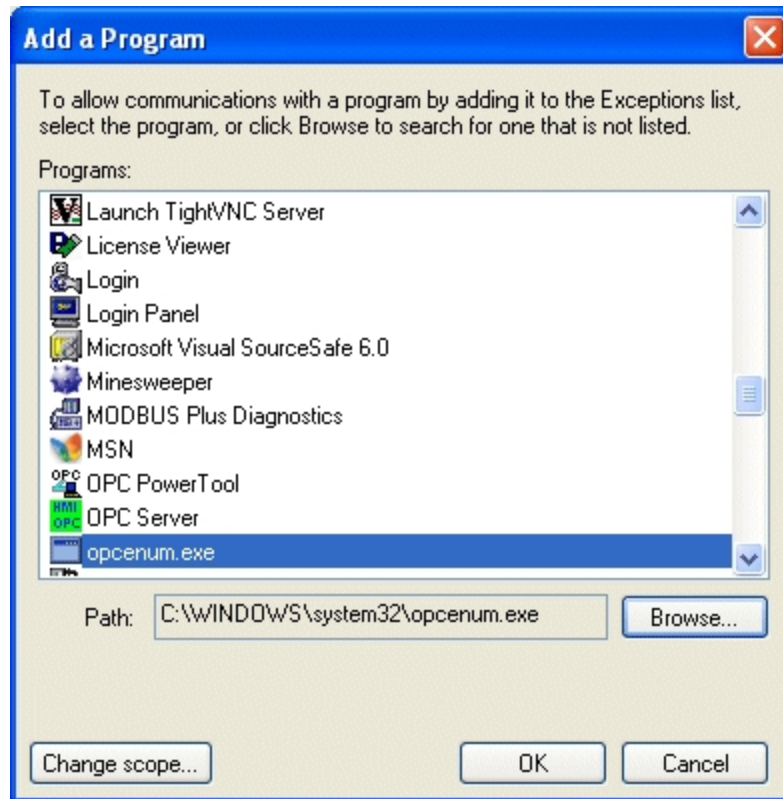
9. Select the Add Program button. The Add a Program dialog box appears. The following figure shows an example of this dialog box in Microsoft Windows XP.



10. Click the Browse button. A Browse dialog box appears.

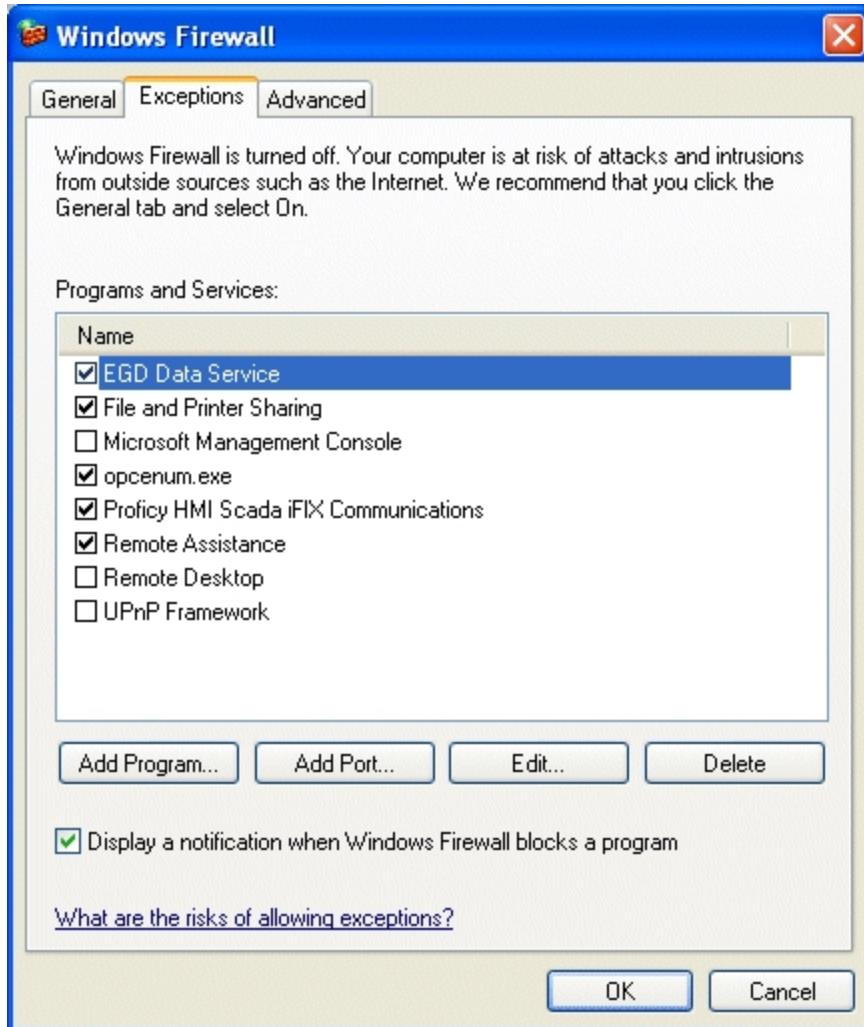


11. Navigate to the System32 folder. This folder is found under the operating system folder (usually Windows or WINNT).
12. In the System32 folder, select the OPCENUM.exe file, and then click the Open button.  
In the Add a Program dialog box the path field displays the full path to, and including, the OPCENUM.exe file.



13. Click OK.

OPCENUM.exe should now be listed in the Exceptions list with its check box selected.



14. Complete steps 9-13 for each OPC server that you want to access.

**NOTES:**

- You must also add the GE OPC Client driver by adding the file OPCDrv.exe into the Exceptions list.
- If any OPC server that you want to use is a dll surrogate (an in-process dll and not an .exe), you must add \system32\dlhost.exe into the Exceptions list.
- OPCENUM must reside on the remote machine with the OPC server. While most OPC Server applications install and register this file, some do not. You can download this file from [www.opcfoundation.org](http://www.opcfoundation.org). Currently it is contained within the OPC Core Components 2.00 Redistributable 2.30.msi file. After you download OPCENUM, run the .msi file.

### Set Up DCOM for Remote OPC Servers

The OPC Client supports DCOM (Distributed Component Object Model) to browse remote OPC Servers. If you want to grant only certain users permission to launch or access the remote OPC servers, you can use the Windows utility, DCOMCNFG.EXE for configuring DCOM applications. DCOMCNFG.EXE

is usually located in your operating system's \system32 folder.

When OPC Servers register, they set up initial custom DCOM security settings to enable users on the network to access and launch the Server. On large networks, it is recommended that you modify these settings to avoid confusion and inadvertent changes to a running OPC Server.

If Firewall security is enabled on Windows, you must also modify or add items to the Exceptions list. Refer to [Set Up Windows XP or Vista Firewall for Remote OPC Servers](#).

#### IMPORTANT NOTES:

- GE recommends that all OPC Client users be members of the Administrators group. To facilitate this, GE recommends creating a users group to contain individual users that need to access remote OPC servers.

For example, create a group named "DAC" and add those users who will log into the operating systems and access remote OPC servers. Add the users Tom, Denise, and Harry into the DAC group. Each of these users will also be added into the Administrators group. This DAC group should also contain the following built-in security principals: INTERACTIVE; NETWORK; SYSTEM.

- To make any OPC Client / OPC Server application work via DCOM, changes need to be made on both sides, especially if you intend to use Asynchronous I/O communications.
- OPCENUM must reside on the remote machine with the OPC server. While most OPC Server applications install and register this file, some do not. You can download this file from [www.opcfoundation.org](http://www.opcfoundation.org). Currently it is contained within the OPC Core Components 2.00 Redistributable 2.30.msi file. After you download OPCENUM, run the .msi file.
- This section applies to OPC servers that need to use DCOM communications, regardless of whether the OPC server uses Serial or Ethernet devices.
- If OPC communications is confined to a single machine (that is, using COM, but not DCOM), it continues to work properly without making changes to DCOM settings.
- If you do not plan to use the OPC Client to connect remotely to OPC servers, then you may not need to change your DCOM settings.
- If this is the first time you are connecting to (or allowing connections from) other machines on the network, you must run the Windows Network Wizard (from Start > Control Panel) to set up your computer to run on your network. This allows you to share resources on your computer with other computers on your network. It is recommended that you run the Network Setup Wizard before modifying the DCOM settings.

## DCOM Settings

The following procedures provide general guidelines for configuring DCOM settings.

#### ► To launch the DCOM configurator:

1. From the Start menu, select or type Run. The Run dialog box appears.
2. Type: dcomcnfg and click OK.

The Component Services dialog box appears.

## System-wide COM/DCOM Limits Settings

This procedure modifies the system-wide DCOM settings for the computer. When these steps are implemented, they apply to all programs that use COM/DCOM communications on the computer.

**IMPORTANT:** Be careful when making any system-wide security changes. Any inadvertent changes may affect the entire system and may cause some or all programs to stop working.

► **To update system-wide COM/DCOM limits settings:**

1. On the Component Services dialog box, expand Component Services, then expand the Computers item.
2. Right-click My Computer and choose Properties. The My Computer Properties dialog box appears.
3. Click the COM Security tab. There are four permissions on this dialog box.

You may need to make changes to the Edit Limits... for Access Permissions and Launch and Activation Permissions.

Do not change the Edit Default... settings, since this will change the default settings for all programs and applications running on the computer.

4. Click Access Permissions > Edit Limits... The Access Permission dialog box appears.
  - i. Select the user labeled ANONYMOUS LOGON, and then select the Allow check box for Remote Access.

**NOTE:** This setting is necessary for applications that use OPCenum.exe to function and also for some OPC Servers and OPC Clients that set their DCOM 'Authentication Level' to 'None' to allow anonymous connections. If you do not use such applications, you may not need to enable remote access for anonymous logon users.

- ii. Select the user labeled Everyone, and then select the Allow check box for Remote Access.

**IMPORTANT:** Since "Everyone" includes all authenticated users, it is recommended to add these permissions to a smaller subset of users. One way of doing this is to create a Group named "DAC" and add all user accounts to this Group that will access any OPC server. Then substitute "DAC" everywhere that "Everyone" appears in the entire DCOM configuration dialogs.

- iii. Click OK to close the Access Permissions dialog box and return to the My Computer Properties dialog box.
5. Click Launch and Activation Permissions > Edit Limits... The Launch Permission dialog box appears.

For each user or group (preferably add the "DAC" group) that needs to launch or activate the OPC server, or participates in OPC / DCOM communications, make sure that the Local Launch, Remote Launch, Local Activation, and Remote Activation check boxes are selected.

6. Click OK to save your changes, then click OK again to save and close the My Computer Properties dialog box.

## OPC Server-specific DCOM Settings

The following procedures detail the OPC server-specific COM/DCOM settings on all supported Windows operating systems. You must change the OPC server settings so remote users can access the OPC server as an OPC Data Access Server. This procedure is also necessary for the GE OPC Client driver to connect to, launch, configure, and start the remote OPC servers.

GE recommends that all OPC Client users be members of the Administrators group.

**IMPORTANT:** Since the “Everyone” group includes all authenticated users, it is recommended to add these permissions to a smaller subset of users.

GE recommends creating a group to contain individual users that need to access remote OPC servers. GE also recommends that all OPC Client users be members of the Administrators group.

For example, create a group named “DAC” and add those users who will log into the operating systems and access remote OPC servers. Add the users Tom, Denise, and Harry into the DAC group. Each of these users will also be added into the Administrators group. This DAC group should also contain the following built-in security principals: INTERACTIVE; NETWORK; SYSTEM. Then substitute “DAC” everywhere that “Everyone” appears in the entire DCOM configuration dialogs.

► **To modify driver-specific DCOM settings:**

1. Access the DCOM configurator (dcomcnfg.exe). The Component Services dialog box appears.
2. Expand the Component Services item, then expand the Computers item, and then expand the My Computer item.
3. Select the DCOM Config object. A list of applications displays.
4. Right-click the OPC server you want to modify and choose Properties. The <Selected OPC Server> Properties dialog box appears.
5. Click the General tab. The Authentication Level should be left as “Default”. This uses the default authentication rules that are set in the system-wide DCOM settings.
6. Click the Location tab and make sure that the Run Application on this computer check box is selected.
7. Click the Security tab and select the Customize option for each of the permissions in this dialog box and edit them as described in the following steps.
8. In the Launch Permissions area, click Edit. The Launch Permissions dialog box appears.
9. Click the Add button. The Select Users and Groups dialog box appears.
10. Click the Advanced Button. The Select Users and Groups dialog box appears.
11. Click the Find Now button. In the search results, select the DAC group and click OK. The Select Users and Groups dialog box displays the DAC group.
12. Click OK to return to the Launch Permission dialog box. The DAC group is displayed in the Group or user names list.
13. Select the DAC group and select the Allow check box for Launch Permission.
14. Click OK to return to the <Selected OPC Server> Properties dialog box.
15. In the Access Permissions area, click Edit. The Access Permission dialog box appears.
16. Click the Add button. The Select Users and Groups dialog box appears.
17. Click the Advanced Button. The Select Users and Groups dialog box appears.
18. Click the Find Now button. In the search results, select the DAC group and click OK. The Select Users and Groups dialog box displays the DAC group.
19. Click OK to return to the Access Permission dialog box. The DAC group is displayed in the Group or user names list.
20. Select the DAC group and select the Allow check box for Access Permission.



21. Click OK to return to the <Selected OPC Server> Properties dialog box.
22. In the Configuration Permissions area, click Edit. The Change Configuration Permission dialog box appears.
23. Click the Add button. The Select Users and Groups dialog box appears.
24. Click the Advanced Button. The Select Users and Groups dialog box appears.
25. Click the Find Now button. In the search results, select the DAC group and click OK. The Select Users and Groups dialog box displays the DAC group.
26. Click OK to return to the Change Configuration Permission dialog box.
27. Select the DAC group and select the Allow check boxes for Full Control and Read,
28. Click OK to return to the <Selected OPC Server> Properties dialog box.
29. Click OK.
30. Repeat steps 2 through 29 for each OPC server you need to access remotely.
31. When you are done, close the Component Services dialog box.

## Supported Protocols

Supported OLE for Process Control v1.0a and v2.05 Interfaces:

Interface	Function
IOPCServer	Adding groups and items. This is the main OPC server interface.
IOPCBrowseServer AddressSpace	Browsing. An OPC server must support this interface for the driver to be able to browse it.
IPersistFile	Saving server settings. An OPC server must support this interface for the driver to save its settings.
IOPCGroupStateMgt	Managing the state of groups in the server.
IOPCSyncIO	Performing synchronous reads and writes.
IOPCAsyncIO	Performing asynchronous reads and writes.
IOPCItemMgt	Maintaining the state of items in the server.
IdataObject/ IAdviseSink	Establishing asynchronous connections between the driver and the OPC server.

## Supported Software

### Operating System

- Microsoft® Windows® Server 2016 (runs in WOW64 when run on a 64 bit version of Windows)
- Microsoft® Windows® Server 2012 R2
- Microsoft® Windows® Server 2008

- Microsoft® Windows® Server 2003
- Microsoft® Windows® 10
- Microsoft® Windows® 8
- Microsoft® Windows® 7
- Microsoft® Windows® 2000
- Microsoft® Windows® XP
- Microsoft® Windows® Vista

## OPC Servers

Any OPC server that supports the OLE for Process Control specification v1.0a or v2.05.

**NOTE:** Using a Human-Machine Interface (HMI) software package is not required to use the OPC Client. However, if you choose to use an HMI software package, select one of the following:

- iFIX version 2.1 or greater.
- A third-party HMI software package.

## Using the Power Tool

Click the following links for more information regarding use of the Power Tool.

- [Overview: About the I/O Power Tool](#)
- [The Power Tool's Graphic Interface](#)
- [The Power Tool Environment](#)

## Overview: About the I/O Driver Power Tool

The OPC Client I/O Driver Power Tool is your main configuration utility for setting up and maintaining the OPC Client I/O driver. It provides a means to specify the properties of servers, groups, and items.

### Features

The Power Tool provides:

- The Templates dialog box for specifying server, group, and item defaults.
- The Setup dialog box for defining the default name and default path for configuration files.
- The Server Connection dialog box for connecting to a remote or local I/O Server.
- The Tree Browser for an overall view of your system configuration.
- The Device Browser dialog box for adding multiple items to a group.
- The Database Tag dialog box for adding existing items to the Process Database.

- The Find dialog box for searching for a server, group or item in the Tree Browser.
- The ability to alphabetically sort groups and items in the Tree Browser.
- A statistics mode for displaying the statistics of your I/O driver while it is running. Statistics are provided for all levels: driver, server, group, and item.
- A configuration mode for displaying and modifying driver, server, group, and item properties.

## Access Methods

From the iFIX Program Group:

1. Select Programs.
2. From the Programs menu, select Dynamics or iFIX.
3. Select OPC Power Tool from the menu that appears.

From the iFIX Process Database:

- From the Drivers menu, choose OPC.

From the iFIX System Configuration Utility (SCU):

1. From the Configure menu, choose SCADA.
2. From the Configured I/O Drivers list box, double-click your driver.

When you first start the Power Tool, the [Server Connection dialog box](#) appears. This dialog box is where you choose the server that the Power Tool communicates with. You can choose either the Local Server (on your computer) or a Remote Server (on the network).

When you choose a server, the I/O Driver Power Tool attempts to connect to the server. If the connection is successful, a message appears telling you that the connection is established. Then the main window of the Power Tool appears. This window comprises:

- [The Properties Viewer](#)
- [The Menu Bar](#)

By default, the following additional components also appear:

- [Tree Browser](#)
- [Main Toolbar](#)
- [Configuration Toolbar](#)
- [Run-time Toolbar](#)
- [Status Bar](#)
- [Search and Sort Toolbar](#)

You can show or hide any of the components by selecting a command from the View menu. You can also customize the Power Tool's appearance by dragging the toolbars or the Tree Browser to the location you want. For example, you can make the toolbars or the Tree Browser float above the Power Tool by dragging them to the center of the screen. Later, you can dock them or resize them, as needed.

## The Power Tool's Graphic Interface

Click the following links for more information about the Power Tool's Graphic Interface.

- [The Properties Viewer](#)
- [The Tree Browser](#)
- [Shortcut Keys](#)
- [The Status Bar](#)
- [The Main Toolbar](#)
- [The Run-time Toolbar](#)
- [The Search and Sort Toolbar](#)
- [The Configuration Toolbar](#)
- [The Menu Bar](#)
- [The File Menu](#)
- [The Edit Menu](#)
- [The View Menu](#)
- [The Display Mode Menu](#)
- [The Options Menu](#)
- [The Help Menu](#)

## The Properties Viewer

Click the following links for more information regarding the Properties Viewer:

- [Displaying an object's configuration properties](#)
- [Modifying an object's configuration](#)
- [Viewing an object's statistics](#)

The Properties Viewer displays the statistics or the configuration properties of the selected object in the Tree Browser.

► **To display the configuration properties for the driver, a server, a group, or an item:**

1. Select an object in the Tree Browser.
2. Choose Config Mode from the Display Mode menu.

► **To modify the configuration of a server, group, or item:**

1. In the Tree Browser, select the object you want to modify.
2. From the Display Mode menu, choose Config Mode.
3. Modify the object's properties in the fields provided.

► **To view statistics for the driver, a server, a group, or an item:**

1. Select an object in the Tree Browser.
2. Choose Stats Mode from the Display Mode menu.

## The Tree Browser

The Tree Browser displays a hierarchical list of the I/O driver and its servers, groups, and items. The I/O driver is displayed at the top of the tree.

When you select an object in the Tree Browser, its properties display in the [Properties Viewer](#). You can choose to view the object's configuration or statistics properties with commands from the [Display Mode menu](#).

### Adding Objects

When you add servers, groups, and items to a driver configuration, labels and icons representing the objects automatically add to the Tree Browser. You can add servers to the driver, groups to each server, and items to each group.

### Changing Objects

When you add or modify servers, groups, or items in the Power Tool or in iFIX Process Database, changes are made immediately to the I/O Server. Changes you make to the driver configuration while working with the I/O Driver Power Tool automatically display in the Tree Browser. For changes from Process Database to take effect, enable the Auto Create option first.

### Refreshing the Tree Browser

To view changes made from another client application (such as iFIX Process Database, another I/O Driver Power Tool accessing the server, or a custom client application accessing the server), refresh the Tree Browser display by selecting an object in the Tree Browser and pressing the F5 key.

### Collapsing and Expanding the Tree Browser

You can collapse or expand the tree under an object by double-clicking it. You can also use the right arrow key to expand an object and the left arrow key to collapse it, or click the plus and minus icons.

### Navigating

Navigating through the Tree Browser can be done by selecting an object with a mouse click or by using the keyboard. Use the up or left arrow keys to move up in the Tree Browser. Similarly, use the down or right arrow keys to move down in the Tree Browser. You can also press a letter key to jump to the nearest object that begins with that letter.

### Finding and Sorting

You can use the Find dialog box to locate a group or item in the Tree Browser, or you can sort the Tree Browser in ascending alphabetical order to make locating a group or item easier. If you have selected a server, you can search for or sort groups and items associated with that server. If you have selected a group, you can search for or sort items associated with that group.

### Right-clicking

You can right-click any object displayed in the Tree Browser to access run-time commands for the selected object. The following table describes the commands available for each object type and the behavior of each command.

If you	The action performed is...	Available for
--------	----------------------------	---------------

select...		
Start	The driver is started.	Driver, Server, Group, Item
Stop	The driver is stopped.	Driver, Server, Group, Item
Enable	The selected object is enabled.	Server, Group, Item
Disable	The selected object is disabled.	Server, Group, Item
Enable Children	The selected object and its associated sub-objects are enabled.	Server, Group
Disable Children	The selected object and its associated sub-objects are disabled.	Server, Group
Synchronous	The I/O data polling changes to synchronous communication.	Group
Asynchronous	The I/O data polling is changed to asynchronous communication.	Group

For more information about I/O data polling, see [Feature: Asynchronous vs. Synchronous I/O](#).

### Additional Features

Connection lines show the relationship between servers, groups, and items by displaying which groups are on a server and which items belong to a group. The plus and minus buttons indicate whether items are fully expanded or collapsed. The plus button shows the item is collapsed and the minus button indicates that the item is expanded. For example, a server with a plus sign next to it means that there are groups and possibly items configured on that server.

You can also display the driver's server window using the Tree Browser. To learn how to display this window, refer to [How do I view the driver's I/O Server Window?](#)

## The Status Bar

Displays Power Tool status messages. It is located under the Properties Viewer. The right hand side of the status bar indicates whether you are in Configuration mode (blue background) or Statistics mode (green background).

## Using Shortcut Keys

The following is a list of shortcut keys for working with the I/O Driver Power Tool:

Shortcut Function	
F5	Refreshes the Tree Browser.
Ctrl + N	Opens a new I/O driver configuration file.
Ctrl + O	Allows you to open an existing file.
Ctrl + S	Saves the current file.
Alt + Shift + S	Opens and closes the Event window when an object in the Tree Browser is selected. Use the Event window for troubleshooting. When you are not debugging a prob-






lem, leave the Event window closed.

## The Main Toolbar

The Power Tool's Main toolbar is shown below:



The Main toolbar buttons are shortcuts to some commonly-used menu items.



Toolbar Function button	
	<b>New</b> - Creates a new I/O driver configuration file.
	<b>Open</b> - Opens an existing I/O driver configuration file, or the iFIX Process Database log file
	<b>Save</b> - Saves the current I/O driver configuration file. If the current configuration is new, the Save As dialog box appears with fields for naming the file and choosing a file type.
	<b>Save As</b> - Saves the current configuration file:  With a different file name.  In a different path.  As a configuration file.  As a comma separated value (CSV) file.
	<b>Help Topics</b> - Displays the OPC Client I/O driver online help.








## The Run-time Toolbar

The Run-time toolbar is shown below:



The Run-time toolbar contains buttons that are shortcuts to dialog boxes for viewing driver configurations and statistics.

Toolbar Function button	
	<b>Start</b> - Starts the driver. Enabled only when the driver is not running.
	<b>Stop</b> - Stops the driver. Enabled only when the driver is running.

	<b>Configuration</b> - Displays the properties of the object selected in the Power Tool's browser. These properties appear in the Properties Viewer.
	<b>Statistics</b> - Displays the statistics of the object selected in the Power Tool's browser. The statistics appear in the Properties Viewer and are read-only.
	<b>Reset</b> - Resets the statistics of the object currently selected in the Tree Browser. This button is available only when the Power Tool is in Statistics Mode. Click the Statistics button shown above to enable Statistics Mode.
	<b>Template</b> - Lets you enter defaults for the driver and its servers, groups, and items.
	<b>Setup</b> - Lets you select the statistics refresh rates, enter defaults for the I/O driver configuration file name and path, and make advanced settings.
	<b>OLE I/O Server</b> - Lets you select an OLE server.
	<b>I/O Server Event Window</b> - Shows and hides the driver's server windows. Using the server event window, you can display the information that the driver logs during execution. This information includes operational messages from the OPC Client.

## The Search and Sort Toolbar



The Search and Sort toolbar is shown below:



The Search and Sort toolbar contains buttons that activate Find and Sort operations. With them you can find and sort groups and items when the focus is in the Tree Browser. If you have selected a server, you can search for groups or items associated with that server. If you have selected a group, you can search for items associated with that group.

If you have selected a server, you can sort the associated groups in ascending alphabetical order. If you have selected a group, you can sort the associated items.

**NOTE:** Searching and sorting is available only during driver configuration.







Toolbar Function button	
	<b>Find</b> - Opens the Find dialog box where you can enter the criteria for the object you want to search for. This is available at all levels of the tree browser.
	<b>Sort</b> - Sorts the groups and/or items associated with the object selected in the Tree Browser. This is available only at the server and group levels.

## The Configuration Toolbar

The Configuration toolbar buttons are shortcuts to the driver configuration dialog boxes.

Toolbar Function button	
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	<b>Add Server</b> - Displays the OPC servers available to the local computer. After you select a server, the driver adds a new server object and displays the fields for modifying the server's properties.
	<b>Add Group</b> - Adds a new group to the selected OPC server and displays the fields for modifying the group's properties.
	<b>Add Item</b> - Adds a new item to the selected group and displays fields for modifying the new item's properties.
	<b>Add Multiple Items</b> - Displays a server where you can select multiple items to add to the selected group, and to automatically create tags (items) that can be added to the group.
	<b>Add Item to iFix Database</b> - Opens the Database Tag dialog box where you can add the selected item to the iFIX Process Database.
	<b>Delete</b> - Deletes the server, group, or item currently selected in the Tree Browser.

## The Menu Bar

The Power Tool menu bar includes a title bar, a Minimize button, a Maximize button, a Control-menu box, and menus you can use to configure the OPC Client. The menu bar is displayed at the top of the screen.

The Power Tool has the following menus:

- [The File Menu](#)
- [The Edit Menu](#)
- [The View Menu](#)
- [The Display Mode Menu](#)
- [The Options Menu](#)
- [The Help Menu](#)

To open a menu and display its commands, click the menu name.

To choose a command, open the command's menu and click the command name or press the command's shortcut keys. You can find the shortcut keys for a command displayed next to the command on its menu. For example, click the File menu and note that the shortcut key for the New command is CTRL + N.

## The File Menu

The following commands appear on the File menu.

### New

Create a new driver configuration file.

Keyboard shortcut: CTRL + N.

## Open

Open an existing driver configuration file or log file. You can select .OPC or .CSV configuration file types, or .TXT log file types.

Keyboard shortcut: CTRL + O.

## Save

Saves the current driver configuration file to the default path for configuration files with the name you specify. The default path for configuration files is the same path where you installed the server. You can change the default path by entering a new location. Refer to [Set Defaults for I/O Driver Configuration File Name and Path](#) to learn how to configure the default path for the Power Tool.

If you save a new driver configuration file, the Save As dialog box prompts you to enter a name for your driver configuration file.

Keyboard shortcut: CTRL + S.

## Save As

Lets you enter a new name, path, and file type for the current driver configuration.

### Save As Dialog Box Options

- **Save In** - Select the directory that you want to store the file in.
- **File Name** - Enter a new name for the file. To save a file with an existing file name, select the name in the list or enter the current name. This will overwrite the existing file.
- **Save as Type** - Specify the type of file you want to save the configuration as:
  - A configuration file (\*.OPC) - Specify the type of file in the format that the driver uses to communicate with the process hardware. Configuration files use the three-letter acronym of the driver.
  - A comma separated value file (.CSV) - Save the file as a text file. You can open these files in a text editor and use them to document your driver configurations. You can also modify .CSV files in a text editor, open them in the Power Tool, and save them as configuration files. The delimiters for .CSV files conform to national standards. For example, in the United States, .CSV file delimiters are commas. In France, .CSV file delimiters are semi-colons. Saving a configuration as a .CSV file is sometimes referred to as exporting the driver configuration.
- Refer to [Use I/O Driver Report Files](#) for details on how to use the different file types most effectively.
- **Save button** - Saves the file with the specified name.
- **Cancel button** - Closes the dialog box without saving the file.

## Exit

Exits the Power Tool.

## The Edit Menu

The commands that appear in the Edit menu are for creating and modifying driver configuration files. These commands correspond with the buttons on the [Power Tool's Configuration Toolbar](#).

#### **Add Server**

Displays a dialog box that lists all valid OPC servers available to your computer. By selecting an OPC server from the list, you can add it to the driver. The Power Tool obtains the OPC server list from the registry where the I/O server is running. Consequently, if you are trying to connect to a remote server, you must register the I/O server on both the local and remote nodes.

#### **Add Group**

Adds a new group to the selected OPC server.

#### **Add Item**

Adds a new item to the selected group.

#### **Add Multiple Items**

Displays a server browser that allows you to select multiple items to add to the selected group.

#### **Add Item to iFix Database**

Opens the Database Tag dialog box that allows you to add the selected item to the iFIX Process Database.

#### **Delete**

Deletes the server, group, or item currently selected in the Tree Browser. When you delete an object, all of its associated objects are deleted. For example, If you delete a server, all groups and items are deleted for that server.

#### **Find**

Displays a dialog box that allows you to locate a server, group, or item listed in the Tree Browser.

#### **Sort**

Sorts the Tree Browser list in ascending alphabetical order.

## **The View Menu**

The commands in the View menu are for customizing the Power Tool's appearance. If a check mark appears next to a command, the item displays; otherwise, the item is hidden.

#### **Tree Browser**

Shows or hides the Tree Browser.

#### **Main Toolbar**

Shows or hides the [Main toolbar](#).

#### **Run-time Toolbar**

Shows or hides the [Run-time toolbar](#).

**Configuration Toolbar**

Shows or hides the [Configuration toolbar](#).

**Status Bar**

Shows or hides the [status bar](#).

**Search and Sort Toolbar**

Shows or hides the [Search and Sort toolbar](#).

**The Display Mode Menu**

The commands in the Display Mode menu are for displaying the driver's configuration or statistics in the Properties Viewer.

**Configuration Mode**

Displays the properties of the object selected from the Power Tool's browser. These properties appear in the Properties Viewer.

**Statistics Mode**

Displays the statistics of the object selected from the Power Tool's browser. The statistics appear in the Properties Viewer and are read-only.

**Start**

Starts the driver.

**Stop**

Stops the driver.

**The Options Menu**

The commands in the Options menu are for accessing specific Power Tool options.

**Reset Counters**

Resets the statistics of the object currently selected in the Tree Browser. This command is available only when the Power Tool is in Statistics Mode. To enable Statistics Mode, choose Stats Mode from the Display Mode menu.

**Templates**

Lets you enter defaults for the driver's servers, groups, and items.

**Setup**

Lets you set the statistics refresh rates, enter defaults for the I/O driver configuration file name and path, and make advanced settings.

### **OLE Server**

Lets you select a local or remote OPC Client I/O Server.

### **Event Window**

Displays the server Event window for this driver. By default, the driver logs information about the operation of the OPC Client.

## **The Help Menu**

The commands in the Help menu provide access to the Power Tool's online help and version number.

### **Help Topics**

Displays the OPC Client Power Tool online help.

### **About Power Tool**

Displays the Power Tool's version number.

## **The Power Tool Environment**

The Power Tool Environment can be configured through the following sources. Click the links for more information:

- [Templates Dialog Box](#)
- [Setup Dialog Box](#)
- [I/O Driver Server Connection Dialog Box](#)
- [Server Event Dialog Box](#)

You set up the Power Tool's environment by displaying the Setup dialog box and completing each tab. In the Setup dialog box you can do the following:

- [Set the statistics refresh rates.](#)
- [Set the default configuration file name and default path for the configuration file.](#)
- [Make advanced settings for your I/O driver.](#)

To display the Setup dialog box, choose Setup from the Options menu.

## **Templates Dialog Box**

The Templates dialog box contains three tabs, each of which contains a settings template for either a server, group, or item. The Server template (tab) is automatically displayed first when the dialog box is opened. Each template is described below

- [Server Properties](#)
- [Group Properties](#)
- [Item Properties](#)

## Setup Dialog Box

The Setup dialog box contains three tabs. The Display Setup tab is automatically displayed first when the dialog box is opened. Each tab is described below:

### Display Setup Tab

#### Server/Group Dialog

Specifies the primary refresh rate (in milliseconds) at which the I/O driver, server, and group statistics are updated.

#### Valid Entries

1000 ms to 60000 ms

#### Default Value

1 second (1000 ms).

**NOTE:** If you specify a very fast refresh rate (for example, every 100 milliseconds), other driver tasks slow down as the driver works to constantly refresh statistics.

#### Item Dialog

Specifies the primary refresh rate (in milliseconds) at which the item statistics are updated.

#### Valid Entries

1000 ms to 60000 ms

#### Default Value

1 second (1000 ms)

**NOTE:** If you specify a very fast refresh rate (for example, every 100 milliseconds), other driver tasks slow down as the driver works to constantly refresh statistics.

#### Secondary Rate

Specifies the refresh rate that will be used if an error is received from the server. The primary (server-/group or item) refresh rate is ignored and the refresh rate entered in this field is used. The refresh will continue at the secondary refresh rate until communication succeeds. The refresh will then automatically switch to the primary refresh rates.

#### Valid Entries

5000 ms to 360000 ms

## Default Value

60 seconds (60000 ms)

## Default Path Tab

### Default Configuration File Name

Specifies the default I/O driver configuration file. This is the file that the server loads on start-up.

### Default Path for Configuration File

Specifies the default path for the driver's configuration file. If the server does not find the default configuration file in this path, it creates a new, empty configuration file.

### Default iFIX PDB Tag Auto-creation File Name

Specifies the default name for the driver's log file. A log file will be created automatically with the name you specify, that records all actions that you perform to add tags to the iFIX Process Database from the OPC Client driver.

**NOTE:** Changes made to the Default iFIX PDB tag auto-creation log file name do not take effect until the OPC Client driver is restarted.

The log file contains the following fields and is in .CSV format:

Field	Description
Date and Time	The date and time the action was performed.
Tag Information	Displays the tag name, the tag description, and the tag I/O address.
Status	Success or Failed. If the status is failed, the error code is recorded.

### Stop SAC on File Open

Lets you stop SAC (the Scan, Alarm and Control program) when opening an OPC Client configuration. Typically, SAC continues running when you open or load an OPC Client configuration. However, we recommend stopping SAC prior to loading an OPC Client configuration if:

- You are loading a large OPC Client configuration.
- You are connecting to a slow OPC server.
- You are connecting to the OPC Client remotely.

## Advanced Tab

### Maximum Size

Specifies the maximum amount of memory that the OPC Client requires. The amount of memory specified is allocated and reserved but not committed until needed. The number is rounded up from the value you enter to the nearest value supported by your operating system.

Do not modify this field unless instructed to do so by GE Customer Services personnel.

### Valid Entries

Value in bytes

### Default Value

10000000 bytes

**Growth Increment**

Specifies the increment that I/O driver memory grows by when more memory is needed. The OPC Client rounds up the value you enter to the nearest value supported by your operating system.

Do not modify this field unless instructed to do so by GE Customer Services personnel.

**Default Value**

4095 bytes

**Overrun Buffer**

Specifies an area of memory that immediately follows driver main memory (defined by the Maximum Size field). The OPC Client rounds up the value you enter to the nearest value supported by your operating system. If you try to access memory in this area, an error is generated. You will also experience problems with your driver if your system attempts to use memory in the overrun buffer.

Do not modify this field unless instructed to do so by GE Customer Services personnel.

**Default Value**

4095 bytes

**Authentication Level**

Specifies the default authentication level for the connection between the Power Tool and I/O Server, and the connection between the I/O Server and OPC server.

**Valid Entries**

<b>Authentication Configures Level</b>	
None	No client authentication or verification.
Connect	The OPC server to prompt for a user name and password. After you enter this information, the remote server verifies it and establishes a connection with the OPC Client. If the server cannot verify the user name and password, no connection is made.

**Impersonation Level**

Specifies the impersonation level given to the remote server by the client. If the remote server does not require impersonation of the client, then this setting is ignored.

**Valid Entries**

<b>Impersonation Configures Level</b>	
Identify	The server application to verify the identity of the client.
Impersonate	The server application to impersonate the client application only by performing processing tasks as the client application. The server application can impersonate the client application only on the computer running the server application.



### **Path to Signal Conditioning DLL**

Specifies the path to the DLL that provides signal conditioning for the OPC Client. Do not make entries in this field unless you are having problems finding the signal conditionings.

### **Default Value**

OPCSIG.DLL

### **Path to Error Resource DLL**

Specifies the path to the DLL that provides all the error codes and text error messages for the OPC Client. Windows also uses this DLL to provide messages to the Event Viewer.

Do not modify this field unless instructed to do so by GE Customer Services personnel.

### **Default Value**

OPCERR.DLL

### **Auto Create**

#### **Off**

When selected, prohibits you from creating servers, groups, and items automatically from within iFIX. If this option is selected, you must use the Power Tool to create servers, groups, and items.

**NOTE:** Whenever you enable or disable the Auto Create option, close all remote connections and restart the Power Tool in order for your changes to take effect.

#### **On**

When selected, allows you to create servers, groups, and items automatically from a client application, such as Process Database. When the client application attempts to access a non-existent object, the OPC Client automatically creates a new server, group, or item.

### **Default Value**

On

### **NOTES:**

- Whenever you enable or disable the Auto Create option, close all remote connections and restart the Power Tool in order for your changes to take effect.
- You cannot auto create an item with data array support enabled.

### **Auto Enable**

#### **Off**

When selected, prohibits the OPC Client from enabling any server, group, or item that is automatically created. This feature allows you to import a database without enabling any objects. Later, you can go back and manually enable any objects you want.

#### **On**

When selected, the OPC Client automatically enables any server, group, or item that is created with the Auto Create option. Auto Create lets you create servers, groups, and items automatically from a client application, such as Process Database. When the client application attempts to access a non-existent

object, the OPC Client automatically creates a new server, group, or item. Using the Auto Enable option, the OPC Client enables the object when it is created.

#### **Auto Start**

##### **Off**

When selected, prohibits the OPC Client from collecting data automatically. As a result, you must start the driver yourself, or use iFIX to start it for you.

**NOTE:** Whenever you enable or disable the Auto Start option, close all remote connections and restart the Power Tool in order for your changes to take effect.

##### **On**

When selected, the OPC Client automatically polls the process hardware for data. When you set up the OPC Client to run as a service, this option lets the driver collect data immediately on start-up.

**NOTE:** Whenever you enable or disable the Auto Start option, close all remote connections and restart the Power Tool in order for your changes to take effect.

#### **Enable Children**

When selected, all the children of any object are enabled when you enable the parent object. The children are the objects under the parent object in the Tree Browser. For example, the groups of a server are the server's children. Using this check box, you can enable all of the server's groups and all of its items when you enable the server.

#### **Disable Floating Point Checks**

When selected, the driver does not check the format of floating point values returned from the OPC Server. This is a global setting, and remains set until you clear the check box, or the driver is re-installed.

By default, this check box is cleared. When cleared, the driver will check the format of the floating point values returned from the OPC Server and generate errors for invalid floating point values.

#### **Set the Statistics Refresh Rates**

##### **► To set the statistics refresh rates:**

1. From the Options menu, choose Setup. The Setup dialog box appears.
2. Select the Display Setup tab.
3. In the Server/Group Dialog field, enter the refresh rate for the server and group levels.
4. In the Item Dialog field, enter the refresh rate for the item level.

Valid refresh rates for the Item and Server/Group levels are between 1000 and 60000. Valid refresh rates for the Secondary rate are between 5000 and 360000.

5. In the Secondary Rate field, enter the secondary refresh rate.

The secondary refresh rate is used if an error is received from the server. The primary (server-/group or item) refresh rate is ignored and the refresh rate entered in this field is used.

**NOTE:** System and channel (Server) statistics have a different update rate than the datablock (Item) because the statistics at the server level do not change as often as at the item level.

### Set Defaults for I/O Driver Configuration File Name and Path

The default path for the configuration file is the same path where you installed the I/O server. The OPC Client requires you to specify the default path and file name when you automatically start the driver.

#### ► To set the default configuration file name and change the default path:

1. From the Options menu, choose Setup. The Setup dialog box appears.
2. Select the Default Path tab.
3. Enter the configuration file's default name and default path in the boxes provided.

#### NOTES:

- A default configuration file named nodename.OPC is saved in the root iFIX or Dynamics directory when you install the driver. Do not overwrite, rename, or modify this file. iFIX uses this file to load the driver.
- If you change the name of your SCADA server after installing the OPC Client, iFIX cannot automatically start the driver because the name of the node does not match the name of the configuration file. To correct this, rename the configuration file to match the name of the SCADA server. For example, if you change the name of the SCADA server from SCADA1 to SCADA9, rename the configuration file SCADA1.OPC to SCADA9.OPC.

### Make Advanced Settings

You can make more detailed settings for your driver using the Advanced tab in the Setup dialog box.

**CAUTION:** Advanced settings are for fine-tuning your driver and should not be changed unless you have an intimate knowledge of how the driver operates and know that you need to make some adjustments.

#### ► To make advanced driver settings:

1. From the Options menu, choose Setup. The Setup dialog box appears.
2. Select the Advanced tab.
3. Complete the Advanced setup by making selections for the following parameters:
  - Authentication Level
  - Impersonation Level
  - Auto Create
  - Auto Enable
  - Auto Start
  - Enable Children
  - Disable Floating Point Checks

## I/O Driver Server Connection Dialog Box

The I/O Driver Server Connection Dialog Box is where you can configure...

### Use Local OPC Client Driver

When selected, allows you to connect to the OPC I/O Server on the local node.

### Use Remote OPC Client Driver

When selected, allows you to connect to the OPC I/O Server on a remote node. You should know the name of the computer that the OPC I/O Server resides on.

► To connect to a remote machine, use one of the following three methods:

- Enter the remote server's name in the Remote Machine Name or TCP/IP Address box.
- Enter the remote server's TCP/IP address in the Remote Machine Name or TCP/IP Address box.
- Select a remote server from the Network list box. The server's name automatically appears in the Remote Machine Name or TCP/IP Address box.

The remote server name may not be the same as its iFIX node name.

**NOTE:** The remote server connection refers to the OPC Client Power Tool's connection to the OPC Client's I/O Server. It has nothing to do with connecting the OPC Client to remote, third-party OPC servers.

### Remote Machine Name or TCP/IP Address

Specifies the remote server's computer name or TCP/IP address. If you know the name or address of the remote server, you can enter it directly in the field. Otherwise, you can browse the network using the Network list box and select the appropriate computer.

### Network List Box

Displays all the computers on the local network. These nodes are not all servers. You should know which computer the OPC I/O Server that you want to connect to resides on.

### Show This Dialog On Startup

When selected, the I/O Driver Server Connection dialog box displays when you start the Power Tool. If you select this check box, the I/O Driver Server Connection dialog box displays every time you start the Power Tool, letting you make changes to your driver configuration.

If you clear the check box, the I/O Driver Server Connection dialog box does not display when you start the Power Tool. If you plan to always use the same I/O Server, clearing the check box spares you from having to click Connect every time you start the Power Tool.

If you clear the check box and then change your mind, you can configure the Power Tool display the I/O Driver Server Connection dialog box by editing its INI file. This file resides in your Windows folder and is called OPCDidw.INI.

► **To edit the INI file:**

1. Exit from the Power Tool.
2. Open the INI file with a text editor such as MS Notepad.
3. Change the line **ShowOnStartup=FALSE** to **ShowOnStartup=TRUE**
4. Save the file.

The next time you start the Power Tool, the dialog box appears.

## **Connect**

Connects you to the I/O Server you have selected. The server can be local or remote.

### **Set Up the OPC I/O Driver Server Connection**

Click the following links for detailed process information:

- [Connecting to the server on the local machine](#)
- [Connecting to the server on a remote machine](#)

The Power Tool is a client of the OPC I/O Server. The I/O Server maintains the driver's server, group, and item objects and performs all required functions for communicating with the process hardware. The Power Tool accesses the I/O Server and lets you view and modify OPC server, group, and item properties.

The I/O Driver Server Connection dialog box displays when you first start the Power Tool. This dialog box lets you choose whether to set up the Power Tool to communicate with a **Local** I/O Server (on your computer) or a **Remote** I/O Server (a computer on the network). If you choose a remote I/O Server, you must enter or select the remote machine name or address.

► **To connect to the server on the local machine:**

1. Start the Power Tool; or, if it is already running, choose OLE Server from the Options menu. The I/O Driver Server Connection dialog box appears.
2. Select the Use Local OPC Client Driver option and click Connect.

The Power Tool attempts to connect to the local server. If the connection is successful, the Connection dialog displays the message Connection Established and then the main window of the Power Tool displays. If the connection is not successful, the Connection dialog box displays the message Connection Not Established and you receive the following message:

Connection to the selected server has failed. Do you want to select another server?

3. Click Yes if you want to try connecting to a remote server. If you cannot connect to the local server, there is a problem with the server start-up. Refer to [Using Event Viewer](#) for details about how to display any errors that the server may have generated.

► **To connect to the server on a remote machine:**

1. Start the Power Tool; or, if it is already running, choose OLE Server from the Options menu. The I/O Driver Server Connection dialog box appears.

2. Select the Use Remote OPC Client Driver option and enter the remote machine name or TCP/IP address in the Remote Machine Name or TCP/IP Address box. You must enter the machine name or address exactly. If you do not know the exact machine name, select it using the Network list box.

If the connection is successful, the Connection dialog displays the message Connection Established and then the main window of the Power Tool displays. If the connection is not successful, the Connection dialog box displays the message Connection Not Established and you receive the following message:

Connection to the selected server has failed. Do you want to select another server?

3. Click Yes if you want to try another server. If you cannot connect to the machine that the server is on, you may not have an account to that machine or your DCOM settings may be incorrect. Refer to [How do I Set up Security for using the I/O Server Remotely](#) for more information.
4. Select the Show this Dialog on Startup check box to display the I/O Driver Server Connection dialog box every time you start the Power Tool.

► **To change the OPC I/O Server connection:**

1. From the Options menu, choose OLE Server. The I/O Driver Server Connection dialog box appears.
2. Change the settings.

**Set the I/O Server for Automatic Connection**

► **To set your I/O Driver Power Tool to connect automatically to the I/O Server on either a local or remote machine:**

1. From Windows Explorer, open your iFIX folder, typically C:\Program Files (x86)\GE\iFIX, and select OPCDIDW.EXE.
2. Create a shortcut by right-clicking the mouse and selecting Create Shortcut from the menu displayed.
3. Right-click the new shortcut and choose Properties.
4. Select the Shortcut tab.
5. In the Target box, append one of the following command line parameters after OPCDIDW.EXE, as shown in the following examples:

Connection Type	Command Line Parameters	Example
Remote	/N remote_machine_name	OPCDIDW.EXE /N Jake
Remote	/N remote_ip_address	OPCDIDW.EXE /N 199.103.251.114
Local	/L	OPCDIDW.EXE /L

This setup suppresses the I/O Driver Server Connection dialog box on Power Tool start-up. This is a good practice if you plan to always use the same server on the same computer.

**Server Event Log Dialog Box**

## Maximum Number of Messages

Lets you enter the maximum number of messages stored in the Server's event log. By default, the server stores 250 messages.

## Valid Entries

0 to 2147483647

# Configure the I/O Driver

Click the following links for more information about configuring the I/O Driver:

- [Configure the I/O Driver with the Power Tool](#)
- [Configuring from iFIX Applications](#)
- [Use I/O Driver Report Files](#)

## Configure the I/O Driver with the Power Tool

Click the appropriate link for more information regarding configuring the I/O Driver:

- [OPC Server Browse Methods](#)
- [Server Properties](#)
- [Group Properties](#)
- [Item Properties](#)
- [Datablock Browser Dialog Box](#)
- [Database Tag Dialog Box](#)
- [Device Browser Dialog Box](#)
- [Find Dialog Box](#)
- [Network Browser Dialog Box](#)
- [Select an OPC Server Dialog Box](#)

## OPC Server Browse Methods

The OPC Client uses various methods for browsing local and remote machines for OPC servers.

### Browsing OPC Servers on the Local Machine

When browsing for OPC servers on the local machine, three methods can be used:

- OPCEnum.exe - this is a tool provided by the OPC Foundation that helps clients browse local or remote machines. The OPC Client installs this utility on your local machine as part of the product installation.
- Browse the Windows Registry for OPC servers.
- By CategoryID - any OPC 1.0 and 2.0 server that is registered with the Windows StdComponentCategoriesMgr as an OPC 1.0 or OPC 2.0 CATID Server displays with this method. This method is not supported for use with remote machines.

### Browsing OPC Servers on a Remote Machine

When browsing for OPC servers on a remote machine, two methods can be used:

- OPCEnum.exe - this is a tool provided by the OPC Foundation that helps clients browse local or remote machines. The OPC Client installs this utility on your local machine as part of the product installation.
- Browse the Windows Registry for OPC servers. You must have Administrator rights to be able to do this on a remote machine.

All servers that are found using any of the above methods are displayed in this list.

### Browse Failure

If no servers were found on the machine, the message "No servers were found on the machine" displays. You must then verify that either the correct machine name/TCP/IP address was entered in the previous page or that the OPC server(s) are correctly installed on the given machine.

If one or more methods fail, a message box displays indicating the methods used and which ones succeeded or failed. It also displays an error message indicating the reason for failure, as returned by the system. Any server(s) found are listed. You can select a server from the list or remedy the reason for the failure and rerun the search.

One possible remedy includes modifying your DCOM settings, even if your OPC server is running locally. For information about modifying your DCOM settings, refer to [How do I Set up Security for using the I/O Server Remotely](#).

**IMPORTANT:** If you are browsing OPC servers on a local or remote machine, then OPCENUM must reside and be registered on that machine for browsing to work correctly. While most OPC server applications install and register this file, some may not. You can download this file from [www.opcfoundation.org](http://www.opcfoundation.org). Currently, it is contained within the OPC Core Components 2.00 Redistributable 2.30.msi file. After you download the file, run the .msi program and follow the instructions on screen to install it. You must do this on each of the local or remote machines you intend to browse.

## I/O Driver Properties

You can view the driver name and the number of servers, groups, and items configured for the driver by selecting the driver icon in the Tree Browser and then choosing Configuration Mode from the Display Mode menu. The following is a list of configuration properties that display for the driver:

### Name

Displays the name and version number of your OPC driver.



### **Number of Servers**

Displays the number of servers configured for the driver.

### **Number of Groups**

Displays the total number of groups configured on all servers for the driver.

### **Number of Items**

Displays the total number of items configured for all groups on all servers for the driver.

## **Server Properties**

**NOTE:** The following fields and descriptions are identical in both the Server template (in the Templates dialog box) and the Server information displayed in the Properties Viewer when in Config Mode.

### **Server Name**

Specifies the name of the selected server. You can use this name as a shortcut in place of the OPC server's Prog ID when adding a database block. Do not assign the same name to more than one server. The server name must be unique across all servers, groups, and items.

### **Valid Entries**

Up to 30 alphanumeric characters, including underscores ( \_ ) and hyphens ( - ).

### **Server Enable Check Box**

When selected, the driver is connected to the OPC server and the driver is enabled for polling. If you clear the check box, the driver is disconnected from the OPC server and all of the server's groups and items are disabled and are not polled.

### **Description**

Specifies user-defined comments about the selected server. Such descriptions can be very helpful when you go back to look at old configuration or report files, or when you need to modify an existing configuration. The more detailed and specific the information you enter in this field, the easier it is to identify the server.

### **Valid Entries**

Up to 40 alphanumeric characters and symbols.

### **ProgID**

Specifies the Programmatic ID for the selected OPC server. The Prog ID is a vendor-specific string used by the driver to connect to the OPC server. This field cannot be modified.

### **OPC Server Connection Setup**

#### **Server Location**

Specifies the connection method to the OPC server.

### **Valid Entries**

Select this connection method...	When the OPC server resides on...
Local	The local computer.
Remote	A remote node on your network.

If you choose Remote, the Machine Name field becomes available and the Browse Network button appears.

**Machine Name**

Specifies the machine name or TCP/IP address of a remote OPC server. This field is available only if you select Remote from the Server Location list.

**Browse Network**

Click to browse your local network for a remote server name.

**OPC Persist Settings**

**Save on Disconnect**

When selected, the current OPC server settings are saved to a file when the OPC Client shuts down. If you clear the check box, the server's settings are not saved. If you select this check box the File Name box appears and is available.

**NOTE:** The OPC server must support the IPersistFile interface if you select this check box.

**File Name**

Specifies the file name containing the OPC server settings. The driver saves this file when it shuts down. If you do not enter a file name, the driver saves the settings to the file currently loaded by the OPC Server. This parameter is available only if you select the Save on disconnect check box.

**Client Settings**

**Send Messages to Event Window**

When selected, asynchronous run-time messages are sent to the I/O Server's Event Window. For example, asynchronous updates (exceptions) and synchronous timeouts received from the OPC server are sent to the Event Window when you select the check box.

You can display the Event Window by selecting Event Window from the Options menu.

**FIX DBB I/O Address Delimiter**

Specifies the delimiter used by the I/O Server in order to parse I/O addresses entered in iFIX Process Database. Different OPC servers use different delimiters to parse the fields of their item IDs. For example, if the item ID uses a colon as a delimiter, then the Process Database delimiter must be something other than a colon. The default value is the semicolon (;)

**Valid Entries**

Colon	:
Comma	,
Semicolon	;
Forward slash	/
Back slash	\

**Group Properties**

**NOTE:** The following fields and descriptions apply to both the Group Properties Viewer and the Group template.

### Group Name

Specifies the name of the selected group. Any application requesting data from the I/O driver uses this name to access items in the group. Each group that the driver communicates with should have a unique name across all servers, groups, and items.

### Valid Entries

Up to 30 alphanumeric characters including underscores ( \_ ) and hyphens ( - ).

### Group Enable Check Box

When selected, the driver is enabled to poll the selected group. If you clear the check box, the selected group and its associated items are not polled.

You may want to disable one or more groups in the following situations:

- You are swapping hardware for repair or maintenance and do not want to display errors.
- You do not need to collect data from the items within a group and you want to reduce the communications load.
- You want to isolate a group for debugging.

### Description

Specifies user-defined comments about the selected group. Such descriptions can be very helpful when you go back to look at old configuration or report files, or when you need to modify an existing configuration that you did not create. The more detailed and specific the information you enter in this field, the easier it will be to identify the group at a later date.

### Valid Entries

Up to 40 alphanumeric characters and symbols.

### OPC Group Communications Settings

#### I/O Type

Specifies the communications method the driver uses to obtain data from the OPC server.

### Valid Entries

The I/O Type...	Enables the driver to...
Synchronous	Poll the OPC server at regular intervals, according to the specified poll rate.
Asynchronous	Update items at regular intervals (when the asynchronous watchdog is enabled) or on an exception basis when data has exceeded the user-supplied percent deadband. We recommend using asynchronous I/O with the asynchronous watchdog disabled whenever possible because it provides the least amount of communications overhead.

### Data Source

Specifies where the OPC server will obtain data from when the OPC Client issues a read request.

### Valid Entries

### The data Returns... source...

Cache	The last value read by the OPC server. The server updates the cache based on the group's update rate.
Device	The latest values from the process hardware. Reading directly from a device can cause undue stress on your system. We recommend this selection only for diagnostic and troubleshooting purposes.

#### Update Rate

Specifies the rate at which the OPC server polls for data from the process hardware and updates its internal cache. The rate you enter applies to all items in the current group.

#### Valid Entries

Accepts the time format: days:hours:minutes:seconds.milliseconds, within the range of 0.1 to 6:23:59:59.9. Entering 0 forces the OPC Server to run at its maximum rate and increases CPU usage.

In general, you need to balance CPU usage against an acceptable update rate. For example, if CPU usage is 90% and you never want the CPU usage to exceed 50%, enter a longer (larger) value here. However, if changing the update value causes updates to be too slow for your application, you will need to shorten the update rate to find the acceptable minimum value.

#### % Deadband

Specifies the maximum fluctuation in this group's items that can be tolerated before reporting the change (an exception) to the OPC Client. Enter this value as a percentage of the full EGU range of the group's items.

#### Valid Entries

0 to 100

#### Example

Assume the full EGU range is 0 to 100 and the maximum fluctuation (the deadband) is 5%. Using these values, if the current EGU value is 10, the new value must exceed 15 or fall below 5 before the OPC server reports an exception. However, if the full EGU range is 0 to 200, the new value must exceed 20 or fall below 0 before an exception is reported.

The OPC server uses the following formula to determine whether an exception has occurred:

$$\text{absolute value}(\text{last cached value} - \text{current}) > \text{Percent Deadband} * (\text{High EGU} - \text{Low EGU})$$

When this formula is true, the server reports an exception and updates its cache. When the formula is false, it takes no action.

**NOTE:** The exact implementation of this feature differs from server to server. Refer to your server's documentation to learn the EGU range used by the server.

### Client Communications Settings

#### Poll Rate

Specifies the rate at which the driver polls the OPC server for the selected group's items. The time range for poll rates is different for synchronous and asynchronous I/O types.

#### Valid Entries

Accepts the time format: days:hours:minutes:seconds:subseconds. For synchronous, the range is from 00:00:00:00.00 to 6:23:59:59.9. For asynchronous, the range is from 00:00:00:30.0 to 6:23:59:59.9. For more information, see [Zero and Subsecond Poll Rates](#).

#### **Enable Asynchronous Watchdog**

When selected, the OPC Client refreshes the selected group's items at the interval specified by the Poll Rate. This check box is available only when you select Asynchronous from the I/O Type list.

The asynchronous watchdog does not override the item's access time. Consequently, when the access time expires, the watchdog stops.

#### **Async Timeout**

Specifies how much time the OPC Client waits for an asynchronous update from the OPC server. When a timeout occurs, the OPC Client sets the quality of all items waiting for data to Uncertain, Last Usable because the quality of the data is no longer known. This setting is available only when you select Asynchronous from the I/O Type list.

By default, the driver waits 10 seconds (10000ms).

#### **Valid Entries**

250 to 2,147,483,647 milliseconds (over 24 days)

## **Item Properties**

**NOTE:** The following fields and descriptions apply to both the Item Properties Viewer and the Item template.

#### **Item Name**

Specifies the name of the selected item. You can use the name of the item interchangeably with its ID when entering I/O addresses in Process Database. However, item names must be unique across all servers, groups, and OPC items.

#### **Valid Entries**

Up to 30 alphanumeric characters including underscores ( \_ ) and hyphens ( - ).

#### **Item Enable Check Box**

Enables the OPC Client to poll the item when you select this check box and the driver is connected to the item's OPC server. If you clear the check box, the item is disabled and not polled.

You may want to disable one or more items in the following situations:

- You want to remove the item from the OPC server.
- You want to take the process hardware that the item is referencing off-line for servicing and you do not want to see any errors.
- You want to isolate the item for debugging.

#### **Description**

Specifies user-defined comments about the selected item. Such descriptions can be very helpful when you go back to look at old configuration or report files, or when you need to modify an existing

configuration that you did not create. The more detailed and specific the information you enter, the easier it will be to identify the item at a later date.

### Valid Entries

Up to 40 alphanumeric characters and symbols.

### OPC Item Settings

#### Item ID

Specifies the fully qualified ID for this item and describes the properties of the data point that you want to read. For example, an item ID can contain addressing parameters, engineering units, and scaling properties.

### Valid Entries

The format of the item ID is specific to each OPC server. Refer to your OPC server documentation for more information.

If your OPC server supports browsing, you can click the Browse Server button and select the item you want. The Power Tool updates the Item ID field with the item you select. For more information about browsing an OPC server, refer to [How do I browse an OPC server?](#)

You cannot modify this setting while the item is enabled.

#### Access Path

The access path is a vendor-specific method used to inform the OPC server of the path to use when retrieving data for the current item.

### Example

Suppose you have two devices connected to COM1. One device is connected by radio. The other is connected using TCP/IP. In this configuration, possible access paths might be RADIO and ETHERNET.

**NOTE:** Not all OPC servers support access paths. If your OPC server does not use access paths, you can leave this setting blank. Consult your OPC server documentation for more information.

#### Item Start

Specifies the starting address of the data array. This setting is available only if the Array check box is selected.

### Valid Entries

0 to 32767

### Example

*Item ID: Sign\_Int\_Array[10],L200*

This item id defines a 200-element array of integers at address 10.

You cannot modify this field while the item is enabled.

**NOTE:** The starting address plus the array length minus 1 (start + length-1) must be less than or equal to 32767 for Process Database to be able to access all elements of the array. For example, you cannot create

an array starting at 32700 with a length of 100 and have Process Database access all elements in the array. Instead the array must start at 32667 or must have a length of 67.

#### Item Length

Specifies the number of values stored by the data array. This setting is available only if the Array check box is selected.

#### Valid Entries

1 to 1000

#### Example

*Item ID: Sign\_Int\_Array[0],L200*

This item id defines a 200-element array of integers at address 0.

The length of the array defined in the OPC Client must match the length of the array defined in the OPC server. If the lengths of both arrays do not match, the OPC Client sets the data quality of the item to BAD.

You cannot modify this field while the item is enabled.

#### NOTES:

- The starting address plus the array length minus 1 (start + length-1) must be less than or equal to 32767 for Process Database to be able to access all elements of the array. For example, you cannot create an array starting at 32700 with a length of 100 and have Process Database access all elements in the array. Instead the array must start at 32667 or must have a length of 67.
- Your OPC server may not support arrays with 1000 elements. In this case, you may need to reduce the size of the data array for the item you are creating and break up the data into multiple items.

#### Array

When selected, the current item is configured as a data array. A data array is a set of contiguous data of the same data type. By configuring an item as a data array, you enable the OPC Client to read multiple values from an OPC server, if the server supports data arrays. Reading multiple values with a single item simplifies the driver configuration and improves driver throughput.

To configure the item to hold a single value only, clear this check box.

You cannot select or clear this check box while the item is enabled.

#### Requested Datatype

Specifies the item's default data type. The driver uses this data type for the item if you do not specify a database block hardware option. When a hardware option is specified, it overrides the data type. The hardware option can be changed only when the item is disabled.

#### Valid Entries

Data Type	Description
Byte	Unsigned 8-bit character.
Boolean	Digital value, 0 or 1.
Double	Double-precision 64-bit floating point value.

Float	Single-precision 32-bit floating point value.
Long	Signed 32-bit integer.
Server	OPC Server specific native (canonical) data type. Consult your OPC server vendor or documentation to determine the native data type for the specified item ID.
Signed	Signed 16-bit integer.
String	ASCII string.
Unsigned	Unsigned 16-bit integer.

**NOTES:**

- Your OPC server may not support all data types supported by the driver. Consult your OPC server documentation to determine supported data types.
- When data array support is enabled for an item, the data type is an array of the selected data type. For example, if the selected data type is Float and data array support is enabled, the data type is an array of floats. Data arrays support boolean and numeric (integer and float) data types. Arrays of strings are not supported.

**Browse Server**

Opens the Browse OPC Server dialog box where you can browse an OPC server to select an item ID and access path to assign to the selected item. You can also use this dialog box to auto-create iFIX process database tags.

**Client Settings**

**Disable Outputs**

Prevents output from the OPC Client to the selected item when you select this check box.

You may want to disable outputs:

- To prevent control outputs that may be hazardous to someone performing maintenance or repair on the process control hardware.
- To prevent erroneous writes to the item.
- To isolate a datablock for debugging.

**Latch Data**

Controls what an operator sees in a link when a communication error occurs.

When you...	The operator sees...
Select the check box	The last good value in the link.
Clear the check box	A series of question marks (?????)

In iFIX applications, the link's current alarm status changes always displays COMM to indicate a communication problem.

**NOTES:**

- FIX 6.15 does not support latched data. However, you can add support for latched data by downloading the SAC Software Improvement Module (SIM) from GE's web site.
- Analog Register and Digital Register blocks do not support latched data. Consequently, we do not recommend using these blocks with the Latch Data option.

**Enable Block Writes**

When selected, all outstanding writes for the current item are sent to the process hardware.



When the driver sends its outstanding writes for a data array, it also sends any unmodified values in the array using the last known value.

#### Exception Deadband

Specifies the maximum acceptable data fluctuation in an exception-based iFIX database block. Entering a deadband value prevents the database block's current value from changing when there is only a slight fluctuation in data.

**NOTE:** The exception dead band is used only for synchronous I/O.

#### Valid Entries

Any positive number for analog items. For digital items, set the deadband to 0.

#### Example

Suppose the current value of an item is 50 and you set a deadband of 20, SAC updates the exception-based database block when an incoming value is less than or equal to 30 or greater than or equal to 70.

#### ► To create an exception-based iFIX database block:

1. Start iFIX Process Database.
2. From the Blocks menu, choose Add.
3. Select the type of block you want to create.
4. Enter E in the Scan Time field.

#### Access Time

Specifies how long the OPC Client keeps an item active in the OPC server when your process control software no longer requests data from that item.

Whenever your process control software requests data from an item, the OPC Client resets the access time for that item and the item remains active in the OPC server. After data requests stop for the item and the access time expires, the OPC Client sets the item to inactive in the OPC server. When the item is inactive, the OPC server stops polling the process hardware for that data. Consequently, if the item has an asynchronous watchdog enabled, the watchdog also stops when the access time expires.

The actual implementation for setting an item to inactive is OPC server specific.

#### Valid Entries

Accepts the time format: *days:hours:minutes:seconds*, up to a maximum of 6:23:59:59

#### Example

To specify an access time of...	Enter...
1 second	1
1 minute	1:00
1 hour and 30 minutes	1:30:00
2 days	2:00:00:00

**NOTE:** You can force the OPC Client to never deactivate an item by entering DISABLED in this setting.

## Datablock Browser Dialog Box

The Datablock Browser Properties Viewer is where you can configure Datablock Browser properties.

## Item IDs and Access Paths

### Item IDs Browser

Displays the item IDs for every OPC server installed on the local computer. Use the plus and minus buttons to expand and collapse the list.

### Access Paths Browser

Displays all available access paths for the selected item ID. Use the plus and minus buttons to expand and collapse the list.

**NOTE:** Not all OPC servers support access paths.

### Item ID

Specifies the fully qualified item ID that you want to use. You can also complete the setting by browsing the OPC server. After you select an item ID and click OK, the Power Tool completes the item's Item ID field.

### Access Path

Specifies the access path that you want to use. You can also complete the setting by browsing the OPC server. After you select an access path and click OK, the Power Tool completes the item's Access Path field.

If you do not want to include an access path, you can leave this field blank.

## iFIX Process Database Tag

### Enable iFIX PDB Tag Auto-creation

Enables the Tag Desc Prefix, iFix Database Tag Type, and Tag Name Prefix settings to allow you to automatically create database blocks in, and to add existing items to, the iFIX Process Database.

If you select this check box on the Database Tag dialog box it will also be selected on the Device Browser and Datablock Browser dialog boxes.

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### iFIX Database Tag Type

Specifies the type of datablock you are creating. This setting is available on the Database Tag, Device Browser, and Datablock Browser dialog boxes. This setting is available only if the Enable iFix PDB Tag Auto-creation check box is selected.

### Valid Entries

- AI - Analog Input
- AO - Analog Output
- DI - Digital Input
- DO - Digital Output

### Tag Desc Prefix

Specifies the description of the datablocks you are creating. This setting is available on the Database Tag, Device Browser, and Datablock Browser dialog boxes. This setting is available only if the Enable iFix PDB Tag Auto-creation check box is selected.

By default, "AG-" is displayed. "AG-" is an acronym for "Auto Generated" and indicates, in the iFIX Process Database, that the tag has been automatically generated. Adding AG- to the description provides you with a way to search the iFIX Process Database for the tags you created in the OPC Client Power Tool.

### Valid Entries

Up to 40 characters.

### Tag Name Prefix

Specifies the prefix of the datablocks that you are creating. This setting is available on the Database Tag, Device Browser, and Datablock Browser dialog boxes. This setting is available only if the Enable iFix PDB Tag Auto-creation check box is selected.

### NOTES:

- You cannot duplicate tag names in the iFIX process database. When adding the same item with a different tag type to the iFIX process database, you must add a Tag Name Prefix to the item name.
- Tag names must contain only alphanumeric characters. A tag name containing non-alphanumeric characters (e.g., \*, ~) will prevent the tag from being added to the iFIX process database.

## Database Tag Dialog Box

The Database Tag Properties Viewer is where you can configure Database Tag properties.

### Enable iFIX PDB Tag Auto-creation

Enables the Tag Desc Prefix, iFix Database Tag Type, and Tag Name Prefix settings to allow you to automatically create database blocks in, and to add existing items to, the iFIX Process Database.

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By default, "AG-" is displayed. "AG-" is an acronym for "Auto Generated" and indicates, in the iFIX Process Database, that the tag has been automatically generated. Adding AG- to the description provides you with a way to search the iFIX Process Database for the tags you created in the OPC Client Power Tool.

### **Valid Entries**

Up to 40 characters.

### **Tag Name Prefix**

Specifies the prefix of the datablocks that you are creating. This setting is available on the Database Tag, Device Browser, and Datablock Browser dialog boxes. This setting is available only if the Enable iFix PDB Tag Auto-creation check box is selected.

### **NOTES:**

- You cannot duplicate tag names in the iFIX process database. When adding the same item with a different tag type to the iFIX process database, you must add a Tag Name Prefix to the item name.
- Tag names must contain only alphanumeric characters. A tag name containing non-alphanumeric characters (e.g., \*, ~) will prevent the tag from being added to the iFIX process database.

## **Device Browser Dialog Box**

The Device Browser Properties Viewer is where you can configure Device Browser properties.

### **Path**

Displays all available access paths for the selected group. Use the plus and minus buttons to expand and collapse the list. Select the path you want to display the associated items in the Items list.

**NOTE:** Not all OPC servers support access paths.

### **Items**

Displays ItemIDs for the selected path.

### **Number of Items Selected**

Displays the number of items you selected in the Items list.

### **Filter**

Specifies the information you want to use to filter the list of displayed items. You can edit the filter, or select from the list. You can also use wildcards (i.e., ? to represent a single character, or \* to represent two or more characters). The maximum number of items in the filter list is 10 and the list is cleared when you close the Power Tool.

**NOTE:** The filter is case sensitive. You must enter the item information exactly as it appears in the Items list.

### **Filter Button**

Use this button to filter the list of items based on the information you specified in the Filter field.

### **iFIX Process Database Tag**

#### **Enable iFIX PDB Tag Auto-creation**

Enables the Tag Desc Prefix, iFix Database Tag Type, and Tag Name Prefix settings to allow you to automatically create database blocks in, and to add existing items to, the iFIX Process Database.

If you select this check box on the Database Tag dialog box it will also be selected on the Device Browser and Datablock Browser dialog boxes.

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#### **iFIX Database Tag Type**

Specifies the type of datablock you are creating. This setting is available on the Database Tag, Device Browser, and Datablock Browser dialog boxes. This setting is available only if the Enable iFix PDB Tag Auto-creation check box is selected.

#### **Valid Entries**

- AI - Analog Input
- AO - Analog Output
- DI - Digital Input
- DO - Digital Output

#### **Tag Desc Prefix**

Specifies the description of the datablocks you are creating. This setting is available on the Database Tag, Device Browser, and Datablock Browser dialog boxes. This setting is available only if the Enable iFix PDB Tag Auto-creation check box is selected.

By default, "AG-" is displayed. "AG-" is an acronym for "Auto Generated" and indicates, in the iFIX Process Database, that the tag has been automatically generated. Adding AG- to the description provides you with a way to search the iFIX Process Database for the tags you created in the OPC Client Power Tool.

#### **Valid Entries**

Up to 40 characters.

#### **Tag Name Prefix**

Specifies the prefix of the datablocks that you are creating. This setting is available on the Database Tag, Device Browser, and Datablock Browser dialog boxes. This setting is available only if the Enable iFix PDB Tag Auto-creation check box is selected.

#### **NOTES:**

- You cannot duplicate tag names in the iFIX process database. When adding the same item with a different tag type to the iFIX process database, you must add a Tag Name Prefix to the item name.
- Tag names must contain only alphanumeric characters. A tag name containing non-alphanumeric characters (e.g., \*, ~) will prevent the tag from being added to the iFIX process database.

## Find Dialog Box

The Find Properties Viewer is where you can configure Find properties.

### Find What

Specifies the criteria you want to use to search the Tree Browser for a group or item.

You can use an asterisk (\*) as a wildcard character to assist in your search.

### Find Next

Click to search the tree browser for the group or item specified in the Find What box.

### Find Previous

Click to move backwards through the found objects.

**NOTE:** This button is available only at the Item level.

## Network Browser Dialog Box

The Network Browser Properties Viewer is where you can configure Network Browser properties.

### Network Tree Browser

Displays the computer names available on the local network. Use the plus and minus buttons to expand and collapse the list. When you locate the computer you want, select it and click OK.

### Remote Machine

Specifies the name of a remote computer that you want to connect to. You can also set this by browsing the network. After you select a remote computer and click OK, the Power Tool completes the OPC server's Remote Machine Name field.

## Select an OPC Server Dialog Box

The Select an OPC Server Properties Viewer is where you can configure OPC Server properties.

### Server List

Displays a list of all the OPC servers installed on the local computer.

### Selected Server's Description

Displays the vendor-specific description of the selected OPC server.

## Add and Modify Servers

Click the following links for detailed process information.

- [Add a local server](#)
- [Add a remote server](#)
- [Modify a server's properties](#)
- [Select a new server location](#)

► **To add a local server to your driver configuration:**

1. From the Display Mode menu, choose Config Mode.
2. From the Edit menu, choose Add Server. The Select an OPC Server dialog box appears, displaying a list of the OPC servers installed on the local machine.  
**NOTE:** If no servers are found, verify that the OPC server(s) you want to access are properly installed on the local machine.
3. Select the OPC server you want to connect to and click OK. The Power Tool adds the server to the Tree Browser.
4. In the Properties Viewer, enter the properties for the new server. Edits to a property do not take effect until you remove the focus (the cursor) from the field.
5. Select the Enable check box to enable communication for the server.

► **To add a remote server to your driver configuration:**

1. From the Display Mode menu, select Config Mode.
2. From the Options menu, choose OLE Server. The \IO Driver Server Connection dialog box appears.
3. Select Use Remote OPC Client Driver to choose an OPC server installed on a remote machine.
4. In the Remote machine name or TCP/IP address field, enter the name or TCP/IP address of the remote computer.  
  
- Or -  
  
Browse the Network list and select the name of the computer with the OPC server you want to use. The selected computer name appears in the Remote machine name or TCP/IP address field.
5. Click Connect. The OPC servers installed on the remote machine display in the Tree Browser.  
**NOTE:** If no servers are found, verify that the OPC server(s) you want to access are properly installed on the remote machine.
6. If applicable, enter or update the properties for the server. Edits to a property do not take effect until you remove the focus (the cursor) from the field.
7. Select the Enable check box to enable communication for the server.

► **To modify an existing server's properties:**

1. In the Tree Browser, select the server you want to modify.
2. In the Properties Viewer, edit the server's properties as needed. If the Enable check box is selected, clear and re-select the check box for the connection property change to take effect. Changes

to other properties take effect immediately after you remove focus (the cursor) from the current field.

► **To select a new server location:**

1. In the Tree Browser, select the server you want to change the location for.
2. Click the Select Location button. The Select the Host Machine dialog box appears.
3. Select Use Local OPC Server to change from a remote machine to the local machine.

- Or -

Select Use Remote OPC Server change from the local machine to a remote machine and either enter the machine name or TCP/IP address or choose the remote machine from the Network list, then click OK. The following message displays:

The change will not occur until the next time the driver connects to the OPC server. Would you like to disconnect from the current server and reconnect to the remote node now?

4. Click Yes to change the location of the server. The OPC Server Location and Remote Machine Name fields on the Server Properties Viewer are updated accordingly.

**NOTE:** Having the ability to change the server location is useful for configuring the server offline; that is, without having to connect to the remote machine, which may not be available. For example, you select the server on the local machine and configure it, and when you are ready to access the remote server, or when it becomes available, you change the server location to the appropriate remote machine.

**IMPORTANT:** When you change the machine location, the OPC Client Power Tool does not check to ensure that the configured server exists on that machine. For example, if the server does not exist at the new location, or you do not have access rights, you will receive runtime errors when you start or enable the server.

## Add and Modify Groups

Click the following links for detailed process information.

- [Add a new group](#)
- [Modify a group](#)

► **To add a new group to your driver configuration:**

1. In the Power Tool's Tree Browser, select the server that you want to add a group to.
2. From the Display Mode menu, choose Config Mode.
3. From the Edit menu, choose Add Group. The new group appears in the Tree Browser and the group properties appear in the Properties Viewer.
4. Enter the properties for the new group. Edits to a property do not take effect until you remove the focus (the cursor) from the field.
5. Select the Enable check box to enable communication for the new group.

► **To modify an existing group:**

1. In the Power Tool's Tree Browser, select the group you want to modify.
2. In the Properties View, edit the group's properties as needed. If the group is connected to the OPC server, it updates automatically after you remove the focus (the cursor) from the current field.



## Add and Modify Items

Click the following links for detailed process information.

- [Add a new item](#)
- [Modify an item](#)

### ► To add a new item to your driver configuration:

1. In the Power Tool's Tree Browser, select the group that you want to add an item to.
2. From the Display Mode menu, choose Config Mode.
3. From the Edit menu, choose Add Item. The new item appears in the Tree Browser and the fields for entering item properties appear in the Properties Viewer.
4. Enter the properties for the new item. Edits to a property do not take effect until you remove the focus (the cursor) from the field.
5. Select the Enable check box to enable communication for the new item.

### ► To modify an existing item:

1. In the Power Tool's Tree Browser, select the item you want to modify.
2. In the Properties Viewer, edit the item's fields as needed. If the Enable check box is selected and the OPC Client is connected to this item's OPC server, changes to the Item ID and Access Path fields are not allowed. Changes to other fields take place immediately.

## Add and Modify Item IDs from the Datablock Browser

### ► To add or modify an item ID for your driver configuration:

1. In the Power Tool's Tree Browser, select the item you want to add or change an item for.
2. If required, clear the Enabled check box or choose Stop from the Display Mode menu to stop the driver.

Changes to the Item ID and Access Path are not allowed if the item is enabled and the driver is connected to the selected item's server.

3. Click the Browse Server button. The Browse OPC Server (Datablock Browser) dialog box appears.
4. In the Item ID's tree browser, expand the list(s) and select the item ID you want to add to the group. The item ID appears in the Access Path tree browser.

- Or -

Enter the database block information in the ItemID and Access Path fields.

**NOTE:** The Access Path field can be left blank.

5. Click OK. The selected item ID and access path are displayed in the Properties Viewer.

## Add Multiple Items

► **To add multiple items to your driver configuration:**

1. In the Power Tool's Tree Browser, select the group to which you want to add multiple items.
2. From the Display Mode menu, choose Config Mode.
3. From the Edit menu, choose Add Multiple Items. The Device Browser dialog box appears.
4. In the Path list, use the plus buttons to expand the server and display the available server(s) and tag types.
5. Select the tag type you want to select multiple items from. The associated item IDs are displayed in the Items list.
6. If applicable, use the Filter to further limit the displayed item IDs.
7. From the Items list, select the first item you want to add to the group.
8. Hold down the Ctrl key and select the number of items you want to add to the group, or hold down the Shift key and select a consecutive group of items. The number of selected items is displayed in the Number of Items Selected box.
9. Click OK. The Device Browser closes and the number of items you chose are added under the selected group in the Power Tool Tree Browser with the associated item IDs displayed in the Item ID and Access Path boxes.
10. To change the item IDs of the added items, see [Add and Modify Item IDs from the Datablock Browser](#).

## **Add Existing Items to the iFIX Process Database**

**NOTE:** This feature is available only for iFIX version 3.0 or later. All tags added to the process database are set to OFF scan. The initial value is displayed in the iFIX Process Database as ????, however, the actual value is displayed correctly after you have saved and reloaded the database.

The following conditions must be met to add existing items to the iFIX process database:

- iFIX must be running. If iFIX is not running, a message is displayed.
- The Enable iFix PDB tag auto-creation check box must be selected.
- The OPC Client driver must be on the SCU list.

► **To add an existing item to the iFIX process database:**

1. From the Tree Browser, select the item you want to add to the iFIX process database.
2. Click the Add Item to iFIX Database button. The Database Tag dialog box appears.
3. Select the Enable iFix PDB Tag Auto-creation check box.
4. From the iFIX Database Tag Type list, choose the type of tag that indicates the item you are adding to the process database.
5. In the Tag Desc Prefix box, enter a brief description of the item you are adding. By default, AG- is displayed. The description you enter is displayed in the Description box.
6. In the Tag Name Prefix box, enter a prefix for the item you are adding. The prefix you enter is displayed in the Tag Name box, preceding the displayed item name.

**NOTE:** You cannot duplicate tag names in the iFIX process database. When adding the same item with a different tag type to the iFIX process database, you must add a Tag Name Prefix to the item name.

## Set Default Values for Server, Group, and Item Properties

You can enter defaults for driver, server, group, and item properties by choosing Templates from the Options menu and displaying the Templates dialog box.

The driver uses the defaults you enter when you:

- Add addresses to the driver configuration from iFIX Process Database or an OLE application
- Or -
- Configure the driver from the Power Tool.

The Power Tool stores the default driver, server, group, and item properties in the registry of the computer on which you installed the OPC I/O Server. For example, if you run the Power Tool and connect to a server on another computer, the default values you enter are written to the remote server.

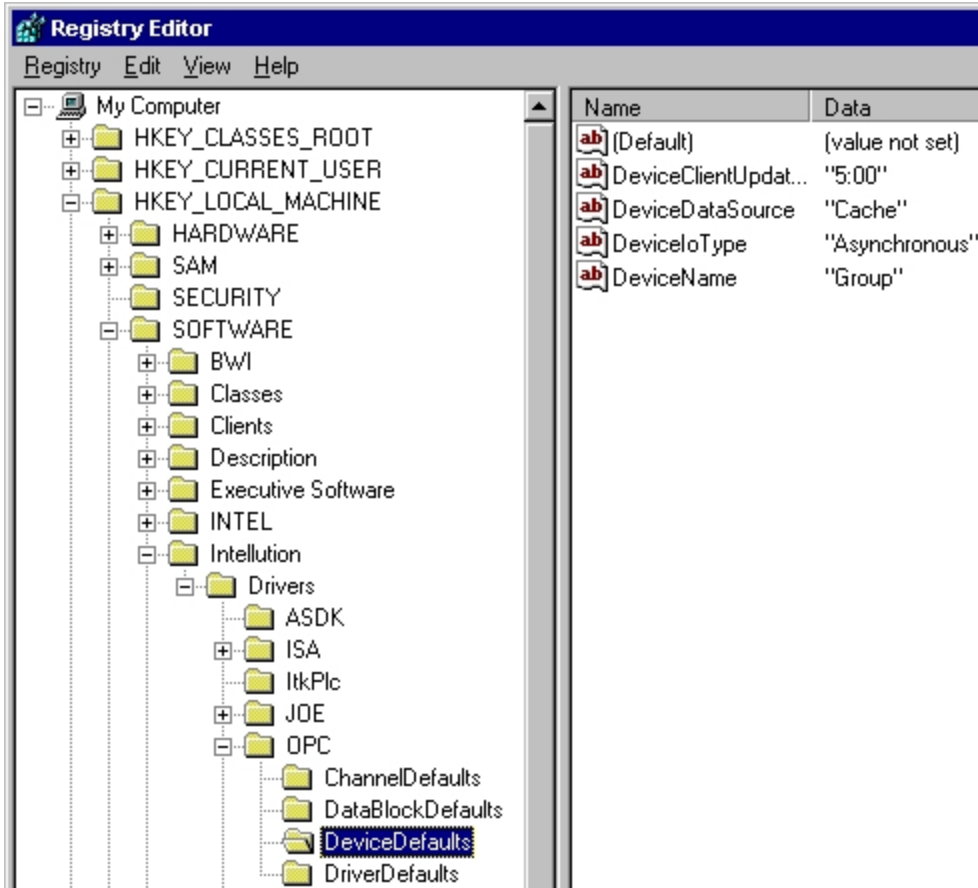
Setting default values can significantly decrease I/O driver configuration time. For example, if you have 100 groups that have the same property settings except for the group name, you can use the default settings for each group and modify the name field as needed.

### Example: Group Defaults

Entering the following as group default values:

- Group Name: Group
- I/O Type: Asynchronous
- Data Source: Cache
- Update Rate: 05:00

Sets the registry on the server as shown below:



**NOTE:** The Power Tool saves Server defaults under the ChannelDefaults key, group defaults under the DeviceDefaults key, and Item defaults under the DataBlockDefaults key.

## Configuring from iFIX Applications

Click the following links for more information regarding configuring iFIX Applications:

- [Overview: Create Items Inside iFIX Applications](#)
- [Specify the I/O Driver in iFIX Process Database](#)
- [Specify I/O Addresses in iFIX Process Database](#)
- [Specify Hardware Options in iFIX Process Database](#)
- [Set Up for Creating Items and Groups Automatically in iFIX Process Database](#)
- [Signal Conditioning in iFIX Process Database](#)

## Overview: Create Items Inside iFIX Applications

You do not have to use the OPC Client Power Tool to create all of the driver items. If you have the right information, you can add items while configuring your database in iFIX Process Database.

To configure the driver from iFIX Process Database, you must know the following information about the item that you want to add:

- The three-letter acronym for the driver. For the OPC Client, the acronym is OPC.
- The OPC server's name or Prog ID to which you will add the item.
- The group's name to which you will add the item. If you do not know the group name or you want to add the item to a new group, specify a group name that does not exist. The driver will automatically create the group.
- The item ID you want to create.
- The access path, if needed.

Items are only automatically created for groups that already exist in the Power Tool. Items and groups are automatically created for servers that already exist in the Power Tool. Remember that the Device setting in iFIX Process Database accepts the three-letter driver acronym. The I/O Address setting uses the server and group names assigned in the Power Tool followed by the item ID and access path.

Refer to [Enter Driver Information in iFIX Process Database](#) for details about entering driver data in Process Database for automatic item creation.

**IMPORTANT:** Always stop any 7.x driver you have running before you import a database, reload a database, or create multiple database blocks with the Generate command. If you leave the driver running while you complete any of these tasks, the database may not load or import properly, or you may have to restart iFIX or Process Database.

## Specify the I/O Driver in iFIX Process Database

The Driver setting in iFIX Process Database identifies the I/O driver that the database block accesses. That is, the driver's three-letter acronym. The default for this field is the first driver listed in the Configured I/O Driver list box in the SCADA Configuration dialog box of the System Configuration Utility (SCU). For the OPC Client, select OPC in this field.

## Specify I/O Addresses in iFIX Process Database

You can specify the item address that the database block accesses in the Process Database I/O Address setting. OPC I/O addresses typically consist of the server name or Prog ID, a group name, and the item ID or item name. The I/O address is specific to the driver. This setting is not case sensitive.

OPC I/O addresses to items configured as data arrays require the syntax:

```
servername;groupname;itemid,length;accesspath;[address]
```

For more information about using this syntax, refer to [Access Data Arrays with a Database Block](#).

OPC I/O addresses to single items use the following syntax:

```
SERVER_NAME;GROUP_NAME;ITEM_ID [;ACCESS_PATH]
```

Where:

- `SERVER_NAME` is the name of the OPC server defined in the Power Tool. You can enter the server's Prog ID in place of the server name. If you enter a Prog ID that does not exist in the driver's configuration, the driver adds the OPC server to its configuration.
- `GROUP_NAME` is the name of the group that the item belongs to. If you enter a group name that does not exist, the driver automatically adds the group to the server.
- `ITEM_ID` is a fully qualified Item ID. If you enter an item ID that does not exist, the driver automatically adds the item to the group. If you are creating a database block for an item that already exists, you can substitute the item name for the item ID.
- `ACCESS_PATH` is a fully qualified access path for the given item ID. Specifying an access path is optional because not all OPC servers require or support their use. Access paths are OPC-server specific. If no access path is required, you can omit this portion of the address.

If you enter an I/O address that is not defined by a group and item ID, the driver performs the following operations if you enabled the Auto Create option:

- Adds the group to the server if the group does not exist.
- Adds the item to the group.

If you have not enabled the Auto Create option, Process Database prompts you to start the Power Tool so that you can add the nonexistent group or item to your driver configuration. You can then continue configuring the database block.

Refer to **FIX DBB I/O Address Delimiter** to determine valid delimiters that can be used in Process Database.

### Event I/O Addresses

You can enter the following special addresses into the I/O Address field of a Digital Output or Analog Output block to perform certain events:

- `!SWITCH:NAME`
- `!MODE:NAME`
- `!POLL:NAME`
- `!SEND:ITEM`
- `!START`

Where *NAME* is the name of the server, group, or item you want to perform the event on.

### Special Address Events

<code>!SWITCH</code>	Toggles between Asynchronous and Synchronous I/O communications on groups. This address has no functionality for servers and items.
<code>!MODE</code>	Enables polling to the server, group, or item specified when a value of 1 is written to a Digital Output block. (Analog Output blocks are not supported.) Disabling a specified object occurs when a value of 0 is written to a Digital Output block.
<code>!POLL</code>	Triggers a demand (one-shot) poll of:  A server and all of its groups and items,

	A group and all its items, or
	A specified item
	when any value is written to the Digital Output or Analog Output block.
!SEND	Sends a special command to the specified item when any value is written to a Digital Output block. The command is sent only if the Block Writes option is enabled for the item and the item is configured as a data array. The command instructs the driver to send the entire data array in a single message to the OPC server.
	When the OPC Client sends the data array, it also sends any unmodified values in the array using the last known value.
	You cannot use an Analog Output block to trigger block writes.
!START	Starts and stops the drivers I/O server. Writing a value of 1 to a Digital Output or Analog Output block starts the driver. Writing a value of 0 stops the driver.

### Item Property I/O Addresses

In addition to event addresses, Text blocks also allow you to substitute the following address for any item in the driver:

- !QUALITY:NAME
- !TIME:NAME

Where *NAME* is the name of the item with the property you want to view.

### Property Address Functionality

!QUALITY	Displays the data quality for the selected item. This setting is latched. Consequently, if communication is lost to the item, the Text block will display the last value it received and not a series of question marks (?????).
!TIME	Displays the last read time and date stamp for the item. This setting is latched. Consequently, if communication is lost to the item, the Text block will display the last value it received and not a series of question marks (?????).

### Setting Up a Database Tag for Bit Read/Write Within an Analog Data (16-Bit Integer) Value

You can configure a database Digital tag (DI/DO) and address an item that has Analog data.

The following address formats allow you to access bits within an Analog data (16-bit integer) value, by adding a ";" (semi-colon and forward slash) and specifying the Bit Offset at the end of the I/O address string. The Bit Offset has a range of 0 to 15.

/0 = lowest significant bit within a 16-bit integer value

/15 = most significant bit within a 16-bit integer value

**NOTE:** All address formats shown must be entered without any spaces in between. Spaces are shown here for readability purposes only.

- Server ; Group ; ItemID ;; /BitOffset assumes that there is no access path defined, the item is not set up as an array, and you want to read a Bit Offset within a single Analog data.

- Server ; Group ; ItemID ; AccessPath ;;/BitOffset assumes that there is an access path defined, the item is not set up as an array, and you want to read a Bit Offset within a single Analog data.
- Server ; Group ; ItemID; AccessPath ; [ArraySubscript] ; /BitOffset assumes that there is an access path defined, the item is set up as an array, and you want to read a Bit Offset of the ArraySubscript element within an array of Analog data.
- Server ; Group ; ItemID ;; [ArraySubscript] ; /BitOffset assumes that there is no access path defined, the item is set up as an array, and you want to read a Bit Offset of the ArraySubscript element within an array of Analog data.

**NOTE:** The OPC Client driver attempts to resolve the address when an invalid syntax is used for a Digital database tag. This results in a 0 bit offset for the address. For example, entering **Server-1;Group1;Device1;40001** for a DI/DO block results in an address of **Server1;Group1;Device1;40001;No Access Path;;/0**.

## Examples

### Example 1: Using a Rockwell Software RSLinx Server

1. In the Power Tool, add an OPC Server connected to the RSLinx OPC Server and create a group with default parameters.
2. In the Power Tool, create an item with the following properties:

<b>Item Name:</b>	<i>Item1</i>
<b>ITEMID:</b>	<i>Sign_Int_Array[20],L100</i>
<b>Access Path:</b>	<i>CLogix 1</i>
<b>Item Start:</b>	<i>20</i>
<b>Item Length:</b>	<i>100</i>
<b>Array:</b>	<i>Yes</i>
<b>Requested Data Type:</b>	<i>Server</i>

This specifies that the client will read an item *Sign\_Int\_Array[20],L100* (with access path *CLogix 1*) defined as an array in the server with the starting array subscript as 20 and the length of the array as 100 elements of 16-bit integer data. This will read data from the server for *Sign\_Int\_Array*, elements 20 to 119.

3. In the iFIX Process Database, create an AI (Analog Input) tag with the following parameters:

<b>Tag Name:</b>	<i>AI1</i>
<b>Device:</b>	<i>OPC</i>
<b>Hardware Options:</b>	<i>Server</i>
<b>I/O Address:</b>	<i>RSLinxV22;SignIntGroup1;Sign_Int_Array[20],L100;CLogix1:[20]</i>

This specifies that the AI tag will read Analog data from the OPC Client Driver from Server *RSLinxV22*, Group *SignIntGroup1*, Item *Sign\_Int\_Array[20]*, Access Path *CLogix 1*, defined as an array in the client.

You can also create a DI (Digital Input) tag with the following parameters:

<b>Tag Name:</b>	<i>DI1</i>
<b>Device:</b>	<i>OPC</i>
<b>Hardware Options:</b>	<i>Server</i>
<b>I/O Address:</b>	<i>RSLinxV22;SignIntGroup1;Sign_Int_Array[20],L100;CLogix1:[20];/0</i>



This specifies that the DI tag will read Digital data from the OPC Client Driver from Server *RSLinxV22*, Group *SignIntGroup1*, Item *Sign\_Int\_Array[20]* / Bit Offset 0, access path *CLogix1*, defined as an array in the client.

**Example 2: Using a Siemens S7 SIMATIC NET OPC Server**

1. In the Power Tool, add an OPC Server connected to the Siemens S7 SIMATIC NET Server and create a group with default parameters.
2. In the Power Tool, create an item with:

**Item Name:** *Item2*  
**ITEMID:** *S7:[S7\_300|VFD1|CP5613\_5614(PROFIBUS)]DB1,INT10,3*  
**Access Path:** *No Access Path*  
**Item Start:** *10*  
**Item Length:** *3*  
**Array:** *Yes*  
**Requested Data Type:** *Server*

This specifies that the client will read an item *S7:[S7\_300|VFD1|CP5613\_5614 (PROFIBUS)]DB1,INT10,3* (with no Access Path) defined as an array in the server with the starting array subscript as 10 and the length of the array as 3 elements of 16-bit integer data. This will read data for elements 10 to 12 from the server.

You can specify the data type as *Server* so that the server returns the data with the correct data type for the array.

3. In the iFIX Process Database, create an AI (Analog Input) tag with the following parameters:

**Tag Name:** *AI2*  
**Device:** *OPC*  
**Hardware:** *Server*  
**Options:**  
**I/O Address:** *Server1;Group1;S7:[S7\_300|VFD1|CP5613\_5614 (PROFIBUS)]DB1,INT10,3;No Access Path;[10]*  
*- Or -*  
*Server1;Group1;S7:[S7\_300|VFD1|CP5613\_5614 (PROFIBUS)]DB1,INT10,3;:[10]*

This specifies that the AI tag will read data from the OPC Client Driver from Server1, Group1, Item *S7:[S7\_300|VFD1|CP5613\_5614(PROFIBUS)]DB1,INT10,3*, Element 10 of the array, with no Access Path.

You can also create a DI (Digital Input) tag with the following parameters:

**Tag Name:** *DI2*  
**Device:** *OPC*  
**Hardware:** *Server*  
**Options:**  
**I/O Address:** *Server1;Group1;S7:[S7\_300|VFD1|CP5613\_5614 (PROFIBUS)]DB1,INT10,3;No Access Path;[10];/2*  
*- Or -*

```
Server1;Group1;S7:[S7_300|VFD1|CP5613_5614  
(PROFIBUS)]DB1,INT10,3;:[10];/2
```

This specifies that the DI tag will read Digital Data from the OPC Client Driver from Server1, Group1, Item *S7:[S7\_300|VFD1|CP5613\_5614(PROFIBUS)]DB1,INT10,3; Element 10 Bit Offset 2* of the array, with no Access Path.

### Example 3: Using a Schneider Automation OFS OPC Server

1. In the Power Tool, add an OPC Server connected to the OFS Server and create a group with default parameters.
2. In the Power Tool, create an item with the following parameters:

<b>Item Name:</b>	<i>Item1</i>
<b>ITEMID:</b>	<i>MBT:1.2.3.4!400001</i>
<b>Access Path:</b>	<i>No Access Path</i>
<b>Item Start:</b>	<i>N/A</i>
<b>Item Length:</b>	<i>N/A</i>
<b>Array:</b>	<i>No</i>
<b>Requested Data Type:</b>	<i>Server</i>

This specifies that the client will read an item *MBT:1.2.3.4!400001* (with no Access Path), defined as a single item in the server. This will read data for element 1 for 4x-based holding registers (i.e., 400001 from the PLC).

**NOTE:** In the Schneider Documentation for the current version of the server, the ItemID uses the 6-digit notation regardless of the settings in the PLC. Therefore, if you are reading 40001 (5-digit notation) from the PLC, you must enter it as 400001 in the ItemID configuration.

3. In the iFIX Process Database, create an AI (Analog Input) tag with the following parameters:

<b>Tag Name:</b>	<i>AI4</i>
<b>Device:</b>	<i>OPC</i>
<b>Hardware Options:</b>	<i>Server</i>
<b>I/O Address:</b>	<i>Server1;Group1;MBT:1.2.3.4!400001</i>

This specifies that the AI tag will read data from the OPC Client Driver from Server1, Group1, Item *MBT:1.2.3.4!400001* (which will be 400001 from the PLC), with no Access Path.

You can also create a DI (Digital Input) tag with the following parameters:

<b>Tag Name:</b>	<i>DI4</i>
<b>Device:</b>	<i>OPC</i>
<b>Hardware Options:</b>	<i>Server</i>
<b>I/O Address:</b>	<i>Server1;Group1;MBT:1.2.3.4!400001;;;/15</i>

This specifies that the DI tag will read Digital data from the OPC Client Driver from Server1, Group1, Item *MBT:1.2.3.4!400001 Bit Offset 15* (which will be 400001:15 from the PLC), no Access Path, defined as a single item in the client.

**NOTE:** The OPC Client supports iFIX Digital Register Block (DR) offsets for accessing digital bit data for items defined as single items, or items defined as arrays, if used in the above mentioned formats for Bit Offsets for 16-bit integer data values only.

#### Example 4: Using a DR tag to access digital offsets with an RSLinx Server

**NOTE:** Refer to Example 1 above for the syntax for entering the I/O address for a database point for accessing bit-offsets to Analog 16-bit Integer Data.

1. In the Power Tool, create an item with:

<b>Item Name:</b>	<i>DR0</i>
<b>ITEMID:</b>	<i>Integer_Array[0],L20</i>
<b>Access Path:</b>	<i>CLogix1</i>
<b>Requested Data Type:</b>	<i>Server</i>

2. In the Process Database, create a Digital Register (DR) tag with the following parameters:

<b>Tag Name:</b>	<i>DR0</i>
<b>Device:</b>	<i>OPC</i>
<b>Hardware Options:</b>	<i>Server</i>
<b>I/O Address:</b>	<i>RSLinxV22;IntegerGroup1;Integer_Array[0],L20;CLogix1;[0];/0</i>

This specifies that the DR0 tag will read data from the OPC Client Driver from Server *RSLinxV22,IntegerGroup1*, Item *Integer\_Array [0]*, Bit Offset 0, and Access Path *CLogix1*, defined as an array of integers in the server.

In iFIX Pictures, you can create a link to the tag DR0 and specify the offset to the tag to read the corresponding data values, as follows:

DR0.F\_0 will read data from *Integer\_Array[0];Bit Offset 0*

DR0.F\_1 will read data from *Integer\_Array[0];Bit Offset 1*

DR0.F\_2 will read data from *Integer\_Array[0];Bit Offset 2*

&

DR0.F\_15 will read data from *Integer\_Array[0];Bit Offset 15*

DR0.F\_16 will read data from *Integer\_Array[1];Bit Offset 0*

DR0.F\_17 will read data from *Integer\_Array[1];Bit Offset 1*

&

DR0.F\_303 will read data from *Integer\_Array[18];Bit Offset 15*

DR0.F\_304 will read data from *Integer\_Array[19];Bit Offset 0*

DR0.F\_305 will read data from *Integer\_Array[19];Bit Offset 1*

&

DR0.F\_318 will read data from *Integer\_Array[19];Bit Offset 14*

DR0.F\_319 will read data from *Integer\_Array[19];Bit Offset 15*

Any digital offset greater than 319 will return an error because the item is defined as an array of 20 elements each of which is a 16-bit integer.

## Specify Hardware Options in iFIX Process Database

You can select a data type for the process data stored by iFIX from the Hardware Options field in Process Database. The data type you select overrides the requested data type of the associated OPC item.

If you do not select a data type, iFIX uses the item's data type. For example, if you configure an item with a Long data type and then select Float as the hardware option in Process Database, the data type for the item is Float because iFIX overrides the item's setting. For this reason, make sure the data type you select in Process Database is correct for the information that you are requesting.

Refer to the following table for a list of valid data types.

### Supported Data Types

Data type	Description	Process Database Shortcut
Boolean	Digital value, 0 or 1.	BOOL
Byte	Unsigned 8-bit character.	BYTE
Double	Double-precision IEEE floating point value.	DBL
Float	Single-precision IEEE floating point value.	FLT
Long	Signed 32-bit integer.	LONG
Server	OPC Server's native (or canonical) data type. Consult your OPC Server vendor or documentation on determining the native data type.	SRV
Signed	Signed 16-bit integer.	SINT
Unsigned	Unsigned 16-bit integer.	UINT
String	Unsigned 16-bit integer.	STR

Only Signed and Unsigned data types support the use of signal conditioning.

**NOTE:** When completing this field, enter either the complete data type string or the Process Database shortcut. We recommend using the Process Database shortcut only when creating new items from Process Database. When creating a database block to an OPC item that already exists, we recommend that you don't change the requested data type because it will affect every reference to the OPC item. Additionally, the OPC specification recommends that requested data types not be changed after you add them because the OPC server may perform special initialization for a particular data type and may then not be able to service the item if you change the data type.

## Set Up for Creating Items and Groups Automatically in iFIX Process Database

iFIX Process Database uses the default settings for groups and items when you add a new database block that refers to an undefined address. Default values may already be set for your application. To find out what the default values are, open the OPC Client Power Tool and choose Templates from the Options menu. When the Templates dialog box appears, you can display the default server, group, and item values by selecting a tab. To change a value, refer to [Setting Default Values for Server, Groups, and Item Properties](#).

## Specifying Signal Conditioning in iFIX Process Database

In the Process Database Signal Conditioning field, you can specify the method for converting raw data to a value that iFIX applications can use. When you select a signal conditioning, the OPC Client scales (converts) the data to a value within the specified range.

Unsigned data types support many types of signal conditioning; signed values only support LIN signal conditioning. The type of signal conditioning you select must match the range of incoming values from the process hardware. By matching the range of values in the process hardware, you ensure the driver can properly convert the raw data values to the database block's EGU range. For example, if the incoming values are between 0 and 255, you would select 8BN signal conditioning.

**IMPORTANT:**

- Prior to iFIX 4.5, 15-digit precision was not supported. Instead, you are limited to the 7 digit limits imposed by the use of single precision values.
- If you are using this OPC Client driver (v7.41) in iFIX 4.5, 15-digit precision is supported for data values only, and not for signal conditioning. Therefore, in iFIX 4.5, signal conditioning calculations are limited to 7 digits of precision. In other words, if the range of your EGU limits exceeds 7 digits, a small amount of imprecision will be introduced into the calculated result for signal conditioning.
- If you are using iFIX 5.0 with this OPC Client driver (v7.41), 15-digit precision is supported for both data values *and* signal conditioning.

**OPC Supported Signal Conditioning Types**

- [NONE](#)
- [12BN Signal Conditioning](#)
- [12AL Signal Conditioning \(with alarming\)](#)
- [15BN Signal Conditioning](#)
- [15AL Signal Conditioning \(with alarming\)](#)
- [LIN Signal Conditioning](#)
- [3BCD Signal Conditioning](#)
- [4BCD Signal Conditioning](#)
- [13BN Signal Conditioning](#)
- [13AL Signal Conditioning \(with alarming\)](#)
- [8BN Signal Conditioning](#)
- [8AL Signal Conditioning \(with alarming\)](#)

**IMPORTANT:**

- Most signal conditioning types with alarming return values with all 16 bits and generate an OVER or UNDER range alarm if the value is outside the EGU range of the database block. For example, if a database block using 8AL signal conditioning receives a value of 300, an OVER range alarm is generated and the value 300 is displayed.
- When 3BCD or 4BCD signal conditioning is used, out of range values are not displayed. For example, if a database block using 3BCD signal conditioning receives a value of 1000, an OVER range alarm is generated and question marks are displayed instead of the out of range value.

**12AL Signal Conditioning**

### Parameters for 12AL Signal Conditioning

Parameter	Description
Description	12-bit binary number.
Input Range	0 - 4095
Scaling	Scales 12-bit binary values to the database block's EGU range.
Read Algorithm	Reads from a 16-bit register using the same algorithm as 12BN, and returns a status indicating whether the value is out of range and in an alarm state, or OK.
Read Algorithm Variables	$\text{Result} = ((\text{Raw\_value}/4095) * \text{Span\_egu}) + \text{Lo\_egu}$ <p>Lo_egu - the database block's low engineering value.</p> <p>Span_egu - the span of the engineering values.</p> <p>Raw_value - the value stored in the field device's register.</p>
Write Algorithm	Writes to a 16-bit register using the same algorithm as 12BN, and returns a status indicating whether the value is out of range and in an alarm state, or OK.
Write Algorithm Variables	$\text{Result} = (((\text{InputData} - \text{Lo\_egu})/\text{Span\_egu}) * 4095) + .5$ <p>Lo_egu - the low engineering value.</p> <p>Span_egu - the span of the engineering values.</p> <p>InputData - the database block's current value.</p> <p>Result - the value sent to the process hardware.</p>

### 12BN Signal Conditioning

#### Parameters for 12BN Signal Conditioning

Parameter	Description
Description	12-bit binary number.
Input Range	0 - 4095
Scaling	Scales 12-bit binary values to the database block's EGU range. Ignores the most significant nibble (4-bits).
Read Algorithm	Reads from a 16-bit register using the following algorithm:
Read Algorithm Variables	$\text{Result} = ((\text{Raw\_value}/4095) * \text{Span\_egu}) + \text{Lo\_egu}$ <p>Lo_egu - the database block's low engineering value.</p> <p>Span_egu - the span of the engineering values.</p> <p>Raw_value - the value stored in the field device's register.</p>
Write Algorithm	Writes to a 16-bit register using the following algorithm:
Write Algorithm Variables	$\text{Result} = (((\text{InputData} - \text{Lo\_egu})/\text{Span\_egu}) * 4095) + .5$ <p>Lo_egu - the low engineering value.</p> <p>Span_egu - the span of the engineering values.</p>

InputData - the database block's current value.

Result - the value sent to the process hardware.

## 13AL Signal Conditioning

### Parameters for 13AL Signal Conditioning

Parameter	Description
Description	13-bit binary number.
Input Range	0 - 8191
Scaling	Scales 13-bit binary values to the database block's EGU range.
Read Algorithm	Reads from a 16-bit register using the same algorithm as 13BN, and returns a status indicating whether the value is out of range and in an alarm state, or OK.
Read Algorithm Variables	$Result = ((Raw\_value/8191) * Span\_egu) + Lo\_egu$ Lo_egu - the database block's low engineering value. Span_egu - the span of the engineering values. Raw_value - the value stored in the field device's register.
Write Algorithm	Writes to a 16-bit register using the same algorithm as 13BN, and returns a status indicating whether the value is out of range and in an alarm state, or OK.
Write Algorithm Variables	$Result = (((InputData - Lo\_egu)/Span\_egu) * 8191) + .5$ Lo_egu - the low engineering value. Span_egu - the span of the engineering values. InputData - the database block's current value. Result - the value sent to the process hardware.

## 13BN Signal Conditioning

### Parameters for 13BN Signal Conditioning

Parameter	Description
Description	13-bit binary number.
Input Range	0 - 8191
Scaling	Scales 13-bit binary values to the database block's EGU range. Ignores the most significant 3 bits.
Read Algorithm	Reads from a 16-bit register using the following algorithm: $Result = ((Raw\_value/8191) * Span\_egu) + Lo\_egu$
Read Algorithm Variables	Lo_egu - the database block's low engineering value. Span_egu - the span of the engineering values.

	Raw_value - the value stored in the field device's register.
	Result - the scaled value stored in the database block.
Write Algorithm	Writes to a 16-bit register using the following algorithm:
	$Result = (((InputData - Lo\_egu)/Span\_egu) * 8191) + .5$
Write Algorithm Variables	Lo_egu - the low engineering value.
	Span_egu - the span of the engineering values.
	InputData - the database block's current value.
	Result - the value sent to the process hardware.

## 15AL Signal Conditioning

### Parameters for 15AL Signal Conditioning

Parameter	Description
Description	15-bit binary number.
Input	0 - 32767
Range	
Scaling	Scales 15-bit binary values to the database block's EGU range.
Read Algorithm	Reads from a 16-bit register with alarming using the same algorithm as 15BN, and returns a status indicating whether the value is out of range and in an alarm state, or OK.
Read Algorithm Variables	$Result = ((Raw\_value/32767) * Span\_egu) + Lo\_egu$ Lo_egu - the database block's low engineering value. Span_egu - the span of the engineering values. Raw_value - the value stored in the field device's register.
Write Algorithm	Writes to a 16-bit register with alarming using the same algorithm as 15BN, and returns a status indicating whether the value is out of range and in an alarm state, or OK.
Write Algorithm Variables	$Result = (((InputData - Lo\_egu)/Span\_egu) * 32767) + .5$ Lo_egu - the low engineering value. Span_egu - the span of the engineering values. InputData - the database block's current value. Result - the value sent to the process hardware.

## 15BN Signal Conditioning



### Parameters for 15BN Signal Conditioning

Parameter	Description
Description	15-bit binary number.
Input Range	0 - 32767
Scaling	Scales 15-bit binary values to the database block's EGU range. Ignores the most significant bit.
Read Algorithm	Reads from a 16-bit register using the following algorithm:  $\text{Result} = ((\text{Raw\_value}/32767) * \text{Span\_egu}) + \text{Lo\_egu}$
Read Algorithm Variables	Lo_egu - the database block's low engineering value.  Span_egu - the span of the engineering values.  Raw_value - the value stored in the field device's register.
Write Algorithm	Writes to a 16-bit register using the following algorithm:  $\text{Result} = (((\text{InputData} - \text{Lo\_egu})/\text{Span\_egu}) * 32767) + .5$
Write Algorithm Variables	Lo_egu - the low engineering value.  Span_egu - the span of the engineering values.  InputData - the database block's current value.  Result - the value sent to the process hardware.

### 3BCD Signal Conditioning

#### Parameters for 3BCD Signal Conditioning

Parameter	Description
Description	3-digit Binary Coded Decimal value.
Input Range	0 - 999
Scaling	Scales 3-digit Binary Coded Decimal values to the database block's EGU range.
Read Algorithm	Reads from a 3-digit BCD register. The Raw_value is then separated into three nibbles (4 bits) prior to scaling the value. Each nibble is examined for a value greater than 9 (A-F hex). If a hexadecimal value between A and F is found, a range alarm is generated, indicating the value is not within BCD range. Otherwise, the value is scaled with the following algorithm:  $\text{Result} = ((\text{Raw\_value}/999) * \text{Span\_egu}) + \text{Lo\_egu}$
Read Algorithm Variables	Lo_egu - the database block's low engineering value.  Span_egu - the span of the engineering values.  Raw_value - the value stored in the field device's register.
Write Algorithm	Writes to a 3-digit BCD register using the following algorithm:  $\text{Result} = (((\text{InputData} - \text{Lo\_egu}) / \text{Span\_egu}) * 999 + .5$

Write Algorithm Variables	Lo_egu - the low engineering value.
	Span_egu - the span of the engineering values.
	InputData - the database block's current value.
	Result - the value sent to the process hardware.

## 8AL Signal Conditioning

### Parameters for 8AL Signal Conditioning

Parameter	Description
Description	8-bit binary number.
Input Range	0 - 255
Scaling	Scales 8-bit binary values to the database block's EGU range.
Read Algorithm	Reads from a 16-bit register using the same algorithm as 8BN, and returns a status indicating whether the value is out of range and in an alarm state, or OK.
	$Result = ((Raw\_value/255) * Span\_egu) + Lo\_egu$
Read Algorithm Variables	Lo_egu - the database block's low engineering value.
	Span_egu - the span of the engineering values.
	Raw_value - the value stored in the field device's register.
	Result - the scaled value stored in the database block.
Write Algorithm	Writes to a 16-bit register using the same algorithm as 8BN, and returns a status indicating whether the value is out of range and in an alarm state, or OK.
	$Result = (((InputData - Lo\_egu)/Span\_egu) * 255) + .5$
Write Algorithm Variables	Lo_egu - the low engineering value.
	Span_egu - the span of the engineering values.
	InputData - the database block's current value.
	Result - the value sent to the process hardware.

## 4BCD Signal Conditioning

### Parameters for 4BCD Signal Conditioning

Parameter	Description
Description	4-digit Binary Coded Decimal value.
Input Range	0 - 9999
Scaling	Scales 4-digit Binary Coded Decimal values to the database block's EGU range.
Read Algorithm	Reads from a 4-digit BCD register. The Raw_value is then separated into four nibbles (4 bits) prior to scaling the value. Each nibble is examined for a value greater than 9 (A-F hex). If a hexadecimal value between A and F is found, a

	range alarm is generated, indicating the value is not within BCD range. Otherwise, the value is scaled with the following algorithm:
	$Result = ((Raw\_value/9999) * Span\_egu) + Lo\_egu$
Read Algorithm Variables	Lo_egu - the database block's low engineering value.
	Span_egu - the span of the engineering values.
	Raw_value - the value stored in the field device's register.
	Result - the scaled value stored in the database block.
Write Algorithm	Writes to a 4-digit BCD register using the following algorithm:
	$Result = (((InputData - Lo\_egu) / Span\_egu) * 9999 + .5$
Write Algorithm Variables	Lo_egu - the low engineering value.
	Span_egu - the span of the engineering values.
	InputData - the database block's current value.
	Result - the value sent to the process hardware.

## 8BN Signal Conditioning

### Parameters for 8BN Signal Conditioning

Parameter	Description
Description	8-bit binary number.
Input Range	0 - 255
Scaling	Scales 8-bit binary values to the database block's EGU range. Ignores the most significant byte.
Read Algorithm	Reads from a 16-bit register using the following algorithm:
	$Result = ((Raw\_value/255) * Span\_egu) + Lo\_egu$
Read Algorithm Variables	Lo_egu - the database block's low engineering value.
	Span_egu - the span of the engineering values.
	Raw_value - the value stored in the field device's register.
	Result - the scaled value stored in the database block.
Write Algorithm	Writes to an 8-bit register using the following algorithm:
	$Result = (((InputData - Lo\_egu)/Span\_egu) * 255) + .5$
Write Algorithm Variables	Lo_egu - the low engineering value.
	Span_egu - the span of the engineering values.
	InputData - the database block's current value.
	Result - the value sent to the process hardware.

## Enter Driver Information in iFIX Process Database

► **To enter driver specifications for a database block in iFIX Process Database**

1. Open iFIX Process Database (PDB).
2. From the Blocks menu, choose Add. Process Database prompts you to select the type of database block you want to add.
3. Select the type of block you want to add and click OK. The block's dialog box appears.
4. Enter a name in the Tag Name box.
5. Complete the driver settings with the appropriate information for your driver.

**I/O Driver Fields**

Refer to the following topics for valid entries for each setting:

- [Specifying I/O Drivers in iFIX Process Database](#)
- [Specifying Hardware Options](#)
- [Specifying I/O Addresses](#)
- [Specifying Signal Conditioning](#)

**Open the Power Tool from iFIX Process Database**

► **To open the OPC Client Power Tool from iFIX Process Database**

1. From the Drivers menu, choose OPC. Any servers, groups, or items that you added appear in the Tree Browser.
2. Modify and add servers, groups, and items as needed.

**Verify New Items Created in iFIX Process Database**

When you create an item in iFIX Process Database, it automatically adds to the driver server.

► **To verify that the item or group was added to the run-time configuration:**

1. Open the OPC Client's Power Tool and select an object in the Tree Browser.
2. Press the F5 key to refresh the Tree Browser.
3. Expand the server containing the group you added. To view the item, expand the group.

Use the following I/O driver-specific fields in iFIX Process Database to set up the OPC Client:

- [Device](#)
- [Hardware Options](#)
- [I/O Address](#)
- [Signal Conditioning](#)

## Save Groups and Items Created in iFIX Process Database to the Configuration File

Creating a group or item with Process Database adds the group or item only to the run-time configuration, not the driver configuration file.

► To save the group or item to the configuration file:

- Save the configuration file in the Power Tool at any time while iFIX is running by choosing Save from the File menu.
- Or -
- Save the group or item automatically to the configuration file when you shut down iFIX by clicking an object in the Tree Browser and pressing ALT + SHIFT + S. When the server window appears, choose Save on FIX Exit from the Server menu.

## Find Groups and Items in the Tree Browser

**NOTE:** Searching for servers, groups, and items is available only when the driver is in configuration mode. The search feature is available at all levels in the tree browser.

► To find groups and items in the Tree Browser

1. In the Power Tool's Tree Browser, select a server or group with an object you want to search for.
2. From the Edit menu, choose Find. The Find dialog box appears.
3. In the Find What box, enter the name of the group or item you want to search for, or select a previous search criterion from the list. You can use an asterisk (\*) as a wildcard character to assist in your search.
4. Click the Find Next button to perform the search. The group or item you searched for is selected in the Tree Browser.

**NOTE:** You can use the Find Previous button to move backwards through the found objects at the Item level only.

## Sort Servers, Groups, and Items in the Tree Browser

**NOTE:** Sorting servers, groups, and items is available only during configuration of the OPC Client driver.

► To sort servers, groups, and items in the Tree Browser:

1. In the Power Tool's Tree Browser, select the driver, server, or group with the objects that you want to sort. If you select the driver, the associated servers are sorted; if you select a server, the associated groups are sorted; if you select a group, the associated items are sorted.
2. From the Edit menu, choose Sort. The objects associated with the selected driver, server, or group are sorted in ascending alphabetical order.

## Use I/O Driver Report Files

You can use I/O driver report files (.CSV) to document, create, or upgrade I/O driver configuration binary files. All files with the CSV extension are Comma Separated Value files that you can view and edit in a text editor or Microsoft Excel.

Driver .CSV files have the following sections:

- Report header
- Server header
- Server data
- Group header
- Group data
- Item header
- Item data

**Report Header** - is for information and contains the driver name and the date of the report.

**Server Header** - contains a list of all the server properties. The server header must start with an exclamation point (!).

**Server Data** - contains the values of the server properties for your driver configuration. The number of data values must match the number of server properties listed in the server header. If you do not specify a value for a property, it uses the default value for that property.

**Group Header** - contains a list of all the group properties. The group header must start with an at-sign (@).

**Group Data** - contains the values of the group properties for your driver configuration. The number of data values must match the number of group properties listed in the group header. If you do not specify a value for a property, it uses the default value for that property.

**Item Header** - contains a list of all the item properties. The item header must start with a pound sign (#).

**Item Data** - contains the values of the item properties for your driver configuration. The number of data values must match the number of item properties listed in the item header. If you do not specify a value for a property, it uses the default value for that property.

### Example .CSV file displayed in a text editor

```
#Device, Name, Description, Enabled, ItemID, AccessPath, DeadBand, RequestedDataType, LatchData, OutputDisabled, AccessTime, IsDataArray, ItemLength, ItemStartAddr, Block-WritesEnabled
```

<b>Report Header</b>	[OPC I/O Driver Configuration Report, Wednesday, November 10 1999, 09:00 PM]
<b>Server Header</b>	!Name,Description,Enabled,ProgID,PrimaryConnectionType,PrimaryRemoteMachineName,BackupConnectionType,BackupRemoteMachineName,PersistOnShutdown,PersistFileName,SendMessageToWindow,IoAddressDelimiter
<b>Server Data</b>	Server0,,1,Intellution.OPCNIO,Local,,,,0,,1 Server3,,0,OPC.DVTest.1,Sample OPC Server,Local,,0,,1,;
<b>Group Header</b>	@Channel,Name,Description,Enabled,Deadband,IoType,DataSource,ClientUpdateRate,ServerUpdateRate,AsyncTimeout,AsyncWatchDogEnable,UseConnectionPoints
<b>Group Data</b>	Server0,Group20,,0,0,Synchronous,Cache,01,01,10000,1,1 Server0,Group1,,1,0,Synchronous,Cache,01,01,10000,1,1 Server1,Group2,,1,0,Asynchronous,Cache,01,01,10000,1,1
<b>Item Header</b>	#Device,Name,Description,Enabled,ItemID,AccessPath,DeadBand,RequestedDataType,LatchData,OutputDisabled,AccessTime,IsDataArray,ItemLength,ItemStartAddr,BlockWritesEnabled
<b>Item Data</b>	Group1,Item1,,1,ISA:D1:1,No Access Path,0,Signed,0,0,Disabled,0,,0 Group1,Item2,,1,ISA:D1:2,No Access Path,0,Unsigned,0,0,Disabled,0,,1 Group2,Item5,,1,ISA:D1:1:1,No Access Path,0,Boolean,0,0,Disabled,0,,0

You can import a .CSV file from the Power Tool or the I/O Server. Regardless of the method you select, any errors in the .CSV file appear in the I/O Server window when you import it. To view the errors, click an item in the Tree Browser and press ALT + SHIFT + S.

## Running the I/O Driver Overview

Click the following links for more information regarding methods on running the driver.

- [Statistics](#)
- [The Data Monitor](#)

- [Starting and Stopping the I/O Driver](#)
- [Checking Communication](#)

## Statistics Overview

Click the following links for more information regarding statistics.

- [I/O Driver Statistics](#)
- [Server Statistics](#)
- [Group Statistics](#)
- [Item Statistics](#)

## I/O Driver Statistics

The I/O Driver Statistics display shows statistics for the I/O driver. This is the highest level of driver statistics and provides information about the entire system. The number of transmits, receives, and errors are displayed for all servers, groups, and items in the current configuration. To display the driver's statistics, select the I/O driver icon in the Tree Browser and then choose Stats Mode from the Display Mode menu.

The following describes the fields and buttons that are visible in the I/O Driver Properties Viewer in Stats Mode:

### Transmits

Displays the number of messages sent to all OPC servers.

Example:

- Number of servers configured for the driver = 2
- Number of messages sent on Server1 = 560
- Number of messages sent on Server2 = 220
- Total number of messages sent = 780
- Transmit Count field displays: 780

### Receives

Displays the total number of messages received from all OPC servers, including both synchronous and asynchronous callbacks.

### Errors

Displays the total number of errors sent from all OPC servers.

Errors occur when:



- The OPC server rejects a read or write request.
- An exception occurs in the OPC server.
- The driver is unable to make an asynchronous connection to an OPC server.

For more information about the cause of the error, examine the Last Error field in the OPC item statistics.

### **Troubleshooting**

When clicked, this button displays the Troubleshooting help page.

## **Server Statistics**

The Server Statistics display shows statistics for the selected server. The number of transmits, receives and errors displayed are for all groups and items configured for the server. You can also see the number groups and items on the server, the server's connection status, the server's start time and current time, the time of the last update sent to the driver, and the version number of the server's software.

To display a server's statistics, select the server in the Tree Browser and then choose Stats Mode from the Display Mode menu.

The following table lists and describes the fields and buttons that are visible in the Server Properties Viewer in Stats Mode:

### **Transmits**

Displays the number of messages sent from all items on all the groups configured for the selected server.

Example:

- Number of groups configured for the driver = 4
- Number of messages sent on Group1 = 30
- Number of messages sent on Group2 = 15
- Number of messages sent on Group3 = 20
- Number of messages sent on Group4 = 10
- Total number of messages sent = 75
- Transmits field displays: 75

### **Receives**

Displays the total number of messages received from the OPC server, including both synchronous and asynchronous callbacks.

### **Errors**

Displays the total number of errors sent from the selected server.

Errors occur when:

- The OPC server rejects a read or write request.
- You specify an invalid Item ID or access path from the OPC server.

For more information about the cause of the error, examine the Last Error field in the OPC item statistics.

### **Number of Groups**

Displays the number of groups configured for the selected server.

### **Number of Items**

Displays the number of items configured on all the groups for the selected server.

### **Write Queue Count**

Displays the number of write requests that are pending for the server.

### **Vendor Info**

Displays a vendor-supplied string describing the OPC server. Typically, this information includes the vendor's name and software version number.

### **Server Status**

Displays the current status of the OPC server. Possible values include:

- Not Connected
- Suspended, No Data
- Running

### **Bandwidth**

Displays OPC server specific information. One possible, and the suggested, use is to show the approximate percent of bandwidth currently in use by the OPC server.

### **Start Time**

Displays the time and date that the OPC server started. The time is displayed in universal time (Greenwich Mean Time).

### **Current Time**

Displays the server's current time and date. The time is displayed in universal time (Greenwich Mean Time).

### **Last Update**

Displays the time and date that the server sent its last data update to the driver. The time is displayed in universal time (Greenwich Mean Time).

### **Major Version**

Displays the major version of the OPC server software.

### **Minor Version**

Displays the minor version of the OPC server software.

**Build Number**

Displays the build number of the OPC server software.

**Connection In Use**

Displays the current connection in use by the server.

**Troubleshooting**

When clicked, this button displays the Troubleshooting help page.

**Server Dialog Refresh Status**

Displays the primary refresh rate and the refresh status for the selected server.

## Group Statistics

The Group Statistics display shows the statistics for the selected group. The number of transmits, receives, and errors are displayed for all items configured for the group.

To display a group's statistics, select the group in the Tree Browser and then choose Stats Mode from the Display Mode menu.

The following fields and buttons are visible in the Group Properties Viewer in Stats Mode:

**Transmits**

Displays the number of reads and writes sent to the OPC server for all the items configured for the selected group.

Example:

- Number of items configured for the driver = 2
- Number of messages sent from Item1 = 30
- Number of messages sent from Item2 = 30
- Total number of messages sent = 60
- Transmits field displays: 60

**Receives**

Displays the total number of messages the group received from the OPC server, including both synchronous and asynchronous callbacks.

**Errors**

Displays the total number of errors that were sent from the OPC server and received by the selected group.

Errors occur when:

- You specify an invalid item ID or access path from the OPC server.
- The OPC server rejects a read or write request.

- The group is unable to establish an asynchronous connection with the OPC server.

For more information about the cause of the error, examine the Last Error field in the OPC item statistics.

### **Number of Items**

Displays the total number of items configured for the selected group.

### **Actual Update Rate**

Displays the actual update rate that the server uses to refresh this group's data cache. This value may be different from the requested update rate if the requested rate is too small and the server cannot update the group at that frequency.

### **Pending Asynchronous Transactions**

Displays the number of asynchronous read and write messages that are pending with the OPC server for the selected group. When the group uses synchronous I/O, the number of pending asynchronous message is always 0.

### **Troubleshooting**

When clicked, this button displays the Troubleshooting help page.

### **Group Dialog Refresh Status**

Displays the primary refresh rate and the refresh status for the selected group.

## **Item Statistics**

The Item Statistics display shows statistics for the selected OPC item. The number of transmits, receives, and errors are displayed for the selected item. Other available statistics include the last time the driver successfully read data from and wrote data to the item, the OPC quality of the item, the server's native data type, and the access rights for the item.

To display an item's statistics, select the item in the Tree Browser and then choose Stats Mode from the Display Mode menu.

The following describes the fields and buttons that are visible in the Item Properties Viewer in Stats Mode:

### **Item ID**

Specifies the fully qualified ID for this item and describes the properties of the data point that you want to read. For example, an item ID can contain addressing parameters, engineering units, and scaling properties.

### **Valid Entries**

The format of the item ID is specific to each OPC server. Refer to your OPC server documentation for more information.

If your OPC server supports browsing, you can click the Browse Server button and select the item you want. The Power Tool updates the Item ID field with the item you select. For more information about browsing an OPC server, refer to [How do I browse an OPC server?](#)

You cannot modify this setting while the item is enabled.

### **Transmits**

Displays the number of messages sent to the OPC server from the selected item.

### **Receives**

Displays the total number of messages the item received from the OPC server, including both synchronous and asynchronous callbacks.

### **Errors**

Displays the total number of errors that were sent from the OPC server and received by the selected item.

Errors occur when:

- You specify an invalid item ID or access path.
- You select a requested data type that the server cannot handle.
- The OPC quality is bad.
- A read or write call fails.

For more information about the cause of the error, examine the Last Error field for the item.

### **Number of Items**

Displays the total number of items configured for the selected group.

### **Access Rights**

Displays the rights of the selected item in the OPC server.

**Valid Entries:**

- *Read only*: Allows you to read only from the item.
- *Write only*: Allows you to write only to the item.
- *Read/Write*: Allows you to read and write data to the item.
- *Unknown*: Indicates the item's attributes are unknown at the current time. The driver is not connected to the server, the item is not active, the item ID is invalid, or the OPC server returned an invalid parameter.

### **Data Quality**

Displays the quality of the data in the selected item. When the item is a data array, the quality applies to all values in the array. Consequently, if even one value of the array is bad, the quality of the entire array is bad.

## Server Datatype

Displays the format of the data that the OPC server returns to the driver. This format does not need to be the same as the requested data type. For example, if the requested data type is Unsigned, the server may obtain an unsigned value, but return it to the driver in the form of a Float.

## Read Data

Displays the last known data value read from the selected item.

## Write Data

Displays the last good write value sent to the selected item.

## Last Error

Displays the last error received by the item from the OPC server. For a list of errors, refer to [Error Codes](#).

## Last Read Time

Displays the last date and time that the OPC server successfully read data from the selected item.

## Last Write Time

Displays the last date and time that the driver successfully wrote data to the selected item.

## Last Error Time

Displays the last date and time that an error occurred for the selected item.

## Block Writes Queue Count

Displays the number of items that are waiting to be written to a data array. Block writes send data to various registers in the OPC server simultaneously by using a special "send" command. This command instructs the OPC Client to send all outstanding writes in a single protocol message. Block writes are useful in batch situations where multiple setup parameters are required by the hardware at one time.

When the OPC Client sends a data array, it also sends any unmodified values in the array using the last known value.

To send block writes through iFIX, you must enable block writes in the item you want to use and then create a Digital Output block with the following address:

```
!Send:DataBlockName
```

Note that only item names are valid with the !Send control address. Server and group names do not cause any block writes to be sent to the OPC server. Analog Output blocks are not supported.

## Data Monitor Button

Displays the Data Monitor for the selected item. The Data Monitor displays the data received for the item, the data's quality, and the last time data was read and written. The Data Monitor also displays the time the last error occurred for the item.

## Troubleshooting

When clicked, this button displays the Troubleshooting help page.

## Item Dialog Refresh Status

Displays the primary refresh rate and the refresh status for the selected item.

## Example

Click the following links for more information regarding the Data Monitor.

- [Data Monitor Dialog Box](#)
- [Understanding Data Quality](#)

## Data Monitor Dialog Box

### Starting Address

Displays the data received for the selected item in the format selected in the Format setting.

### Quality

Displays the quality of the data in the selected item.

If the data quality is bad, the links in your operator displays show question marks by default. To save the last good value, enable the Latch data option. For more information about data quality, refer to [Understanding Data Quality](#).

### Format

Specifies the format or data type to use when displaying an item's data. Possible formats include:

Format/Data Type	Displays
Byte	Unsigned 8-bit values
Char	Signed 8-bit values
Hex	8-bit hexadecimal values
Short	Signed 16-bit integers
Word	Unsigned 16-bit integers
Float	32-bit floating-point values (IEEE)
Long	Signed 32-bit integers
DWord	Unsigned 32-bit integers
Octal	Octal (unsigned integer) data
ASCII	ASCII text
Digital	Binary values
DbFloat	64-bit floating point values (IEEE)

### Last Time Read

Displays the last time and date the I/O driver successfully read data from the process hardware for the selected item.

### Last Time Written

Displays the last time and date the driver successfully wrote data to the process hardware for the selected item.

### Time of Last Error

Displays the last date and time the driver failed to access the selected item in the process hardware.

### Refresh

Click to refresh the data display with updated data from the driver.

## Understanding Data Quality

The OPC Client driver displays the quality of the data in the selected item as part of its statistics. Data quality can be good, bad, or uncertain. Each quality type can also have the following additional text (substring) to further explain the quality:

Data Quality	Additional Text (Substrings)
Good	Local Override
Bad	Config Error
	Input not Connected
	Device Failure
	Sensor Failure
	Data Latched
	Communication Failure
Uncertain	Out of Service
	Last Usable Value
	Sensor not Accurate
	EGU units exceeded
	Sub-normal

The OPC Foundation defines each quality type and substring. For more information on the definition of each item, visit the [OPC Foundation website](#).

## Use Poll Rates with Access Time

The following are practical examples for combining your primary poll rates and access times to help you configure your items.



### Example 1

- PollRec1
- Poll Rate = 10 seconds
- Access Time = 5 minutes

In this item, the OPC Client polls every 10 seconds for five minutes. If no requests are made within five minutes, the item is disabled and the OPC Client stops polling PollRec1.

### Example 2

- PollRec3
- Poll Rate = 10 seconds
- Access Time = Disabled

The driver always polls PollRec3 at 10 seconds with this configuration because the access time is disabled.

### Example 3

- PollRec4
- Poll Rate = Disabled
- Access Time = Disabled

The driver does not read messages from PollRec4 on the device. Instead, the OPC Client updates the item when it receives data from the OPC server.

## Use the Data Monitor

The Data Monitor displays the data received for the item, the data's quality, and the last time data was read and written. It also provides the time of the last error for the item.

### ► To use the Data Monitor:

1. Confirm the driver is running, and that the selected item is polling. You may have to enable the item's server and group to ensure the item is polling.
2. Select the item you want to examine and click the Data Monitor button. The Data Monitor dialog box appears.
3. From the Format list, select the format you want to use to display the values stored in the item. If required, use the Refresh button to refresh the data display.

## Starting and Stopping the I/O Driver

Click the following links for more information regarding Starting and Stopping the I/O Driver.

- [Start the I/O Driver from the Power Tool](#)
- [Start the I/O Driver from the iFIX SCU](#)
- [Set the I/O Driver for Automatic Startup in iFIX](#)

- [Start the I/O Driver Manually from Mission Control](#)
- [Stop the I/O Driver](#)

## Start the I/O Driver from the Power Tool

Click the following links for detailed process information.

- [Start the I/O Driver from the Power Tool](#)
- [Turn on the Auto Start option](#)

### ► To start the I/O driver from the Power Tool:

1. Specify a default path and configuration file name for the driver:
  - a. From the Options menu, choose Setup. The Setup dialog box appears.
  - b. Select the Default Path tab.
  - c. Enter the configuration file's default name and default path in the boxes provided.
2. Configure your servers, groups, and items. Select the Enable check box for each server, group, and item you want to start.
3. From the Display Mode menu, choose Start to start the driver. The driver processes all enabled servers, groups, and items.

If you want to start the driver automatically, you should also turn on the Auto Start option.

### ► To turn on the Auto Start option:

1. From the Options menu, choose Setup. The Setup dialog box appears.
2. Select the Advanced tab in the Setup dialog box.
3. Click the Auto Start On option button from the Server area.

## Start the I/O Driver from the iFIX SCU

**IMPORTANT:** You must install the OPC Client in your root iFIX or Dynamics directory to start it from the SCU. If you have not installed the driver in this directory, uninstall it and then re-install it in the proper path.

### ► To start the OPC Client from iFIX SCU:

1. Start the System Configuration Utility (SCU):
  - a. From the Start menu, select Programs.
  - b. From the Programs menu, select Dynamics or iFIX.
  - c. Choose System Configuration from the menu that appears.
2. From the Configure menu, choose SCADA.

3. Click the ? button next to the I/O Driver Name field for a list of available drivers.
4. Select the OPC Client.
5. Click Add, then click Configure.
6. On the Power Tool, click the Start button.

**NOTES:**

- You must have an OPC Client configuration file in your root iFIX or Dynamics directory with a name of nodename.OPC. This file is necessary for iFIX to load the driver and is created by the installation program when you install the OPC Client driver. You also need a configuration file with a different name that defines your servers, groups, and items.
- If you are using iFIX, nodename.OPC resides in your Database path (C:\FIX32\IPDB, by default). Do not move or delete this file. iFIX uses the file to load the driver. Use nodename.OPC to define your servers, groups, and items.

## Set the I/O Driver for Automatic Startup in FIX

Click the following links for detailed process information:

- [Set the I/O driver for automatic startup](#)
- [Add the OPC Client to the SCADA Configuration dialog box](#)

You can configure a driver to start automatically by adding the I/O Control program to the list of programs that are defined in the System Configuration Utility (SCU) to start automatically. FIX or iFIX may have already added this program to the list if you had one or more drivers installed when you installed iFIX. However, if you do not have any drivers installed, or I/O Control is not listed, add the program to the Configured Tasks list in the SCU.

**IMPORTANT:** You must install the OPC Client in your root iFIX or Dynamics directory to start it automatically from the SCU. If you have not installed the driver in this directory, uninstall it and then re-install it in the proper path.

► **To set the I/O driver for automatic startup:**

1. Start the System Configuration Utility (SCU):
  - a. From the Start menu, choose Programs.
  - b. From the Programs menu, choose Dynamics or iFIX.
  - c. Choose System Configuration from the menu that appears.
2. From the Configure menu, choose Tasks.
3. In the Filename box, enter the Base path and IOCNTL.EXE.
4. Enter the following command lines as needed, separated by a space:

Parameter	Description
/A	Starts all I/O drivers identified in the SCADA configuration.
/Sxxx	Starts one I/O driver where xxx is the three-letter I/O driver acronym.

5. Select Background and click Add.

If you are connecting items to one or more database blocks and need to access data with SAC, add the OPC Client to the SCADA Configuration dialog box as follows.

► **To add the OPC Client to the SCADA Configuration dialog box:**

1. From the Configure menu, choose SCADA.
2. Click the ? button next to the I/O Driver Name box.
3. Select the OPC Client from the dialog box and click OK. The following text appears in the I/O Driver Name box:  

```
OPC - OLE for Process Control Client 7.x
```
4. Click Add to add the selected I/O driver to the Configured I/O Drivers list box.

**NOTES:**

- You must have an OPC Client configuration file in your root iFIX or Dynamics directory with the name nodename.OPC. This file is necessary for iFIX to load the driver and is created by the installation program when you install the OPC Client driver. You also need a configuration file with a different name that defines your servers, groups, and items.
- If you are using iFIX, nodename.OPC resides in your Database path (C:\FIX32\IPDB, by default). Do not move, rename, or delete this file. iFIX uses the file to load the driver. Use nodename.OPC to define your servers, groups, and items.
- If you subsequently change the name of your SCADA server after installing the OPC Client driver, iFIX cannot automatically start the driver because the name of the node does not match the name of the configuration file. To correct this, rename the configuration file to match the name of your SCADA server. For example, if you change the name of the SCADA server from SCADA1 to SCADA9, rename the configuration file from SCADA1.OPC to SCADA9.OPC.

## Start the I/O Driver Manually from Mission Control

► **To start the I/O driver manually from Mission Control:**

1. Start Mission Control.
2. Click the I/O Control tab. This tab displays a list of the drivers installed on your system, along with the driver's status (ACTIVE or STOPPED).
3. From the Drivers list box, select the driver you want to start.
4. Click Start. If the selected I/O driver is already running, the Start button becomes a Stop button.

**NOTES:**

- You must have an OPC Client configuration file in your root iFIX or Dynamics directory with the name nodename.OPC. This file is necessary for iFIX to load the driver and is created by the installation program when you install the OPC Client driver. You also need a configuration file with a different name that defines your servers, groups, and items.
- If you are using iFIX, nodename.OPC resides in your Database path (C:\FIX32\IPDB, by default). Do not move, rename, or delete this file. iFIX uses the file to load the driver. Use nodename.OPC to define your servers, groups, and items.

## Stop the I/O Driver

Click the following links for detailed process information:

- [Stop the I/O driver manually from Mission Control](#)
- [Stop the I/O Driver from the Power Tool](#)
- [Stop the I/O driver from the iFIX Process Database](#)

**NOTE:** If the OPC Client driver is added to the SCU, and you do not stop it, it will be stopped automatically when iFIX is shut down.

► **To stop the I/O driver manually from Mission Control:**

1. Start Mission Control.
2. Click the I/O Control tab. This tab displays a list of the drivers installed on your computer, along with the driver's status (ACTIVE or STOPPED).
3. From the Drivers list box, select the driver you want to stop.
4. Click Stop.

► **To stop the I/O driver from the OPC Client Power Tool:**

From the Display Mode menu, choose Stop.

► **To stop the driver from iFIX Process Database**

1. From the Drivers menu, choose OPC.
2. When the Power Tool opens, choose Stop from the Display Mode menu.

## Check Communication

Click the following links for detailed process information:

- [Add the OPC Client to a SCADA configuration and launching the Power Tool](#)
- [Configure a group with the Power Tool](#)
- [Add a link to a picture that accesses the group](#)

You can set up a single Data link and enable communications between iFIX and the process hardware with the OPC Client.

You must configure a group in the I/O Driver Power Tool first, then open a picture in the iFIX WorkSpace and set up a data link that accesses process hardware using the OPC Client. When you enter the I/O address, the item is automatically be created and the I/O Server starts polling for data.

► **To add the OPC Client to a SCADA configuration and launch the Power Tool:**

1. Start the System Configuration Utility (SCU):  
From the Start menu, point to Programs, then iFIX and click System Configuration from the menu that appears.

2. From the Configure menu, choose SCADA.
3. Click the question mark (?) next to the I/O Driver Name box. A list of drivers installed on the local node appears.
4. Select the OPC Client and click Add. The SCU adds the OPC Client to the Configured I/O Drivers list.
5. Save and exit the SCU.
6. Start or restart iFIX.
7. Start the OPC Power Tool:

From the Start menu, point to Programs, then iFIX and click OPC Power Tool.

► **To configure a group with the Power Tool:**

1. [Add a Server](#) to the Power Tool.
2. On the Server Properties Viewer, select the Enable check box.
3. From the Display Mode menu, choose Stats Mode to verify that the driver is connected to the OPC server. The Power Tool displays statistics for the selected server.
4. From the Display Mode menu, choose Config Mode to display the server's properties.
5. From the Edit menu, choose Add Group. The Power Tool adds a group to the Tree Browser, under the selected server.
6. In the Properties Viewer, enter the appropriate information for the group and a unique name for the group.

► **To add an iFIX picture that accesses the configured group:**

1. From the OPC Client Power Tool Options menu, choose Setup. The Setup dialog box appears.
2. Click the Advanced tab and choose Auto Create On from the Server area.
3. Start the iFIX WorkSpace.
4. For detailed information on adding a datalink in an iFIX Picture, see the *Adding DataLinks* topic in the *Creating Pictures* e-book.
5. From the iFIX WorkSpace:
  - In Ribbon view, on the Home tab, in the WorkSpace group, click Switch to Run.
  - Or -
  - In Classic view, on the WorkSpace menu, choose Switch to Run.

This action activates the run-time environment. Data from the hardware appears in the link. If it does not, refer to the Troubleshooting section.

# Optimizing Your System

Select from the following topics for tips on optimizing your process.

- [Adding items to maximize performance.](#)
- [Cleaning up items while using the Auto Create option in iFIX applications.](#)
- [Decreasing unnecessary stress on your system.](#)
- [Determining the most efficient poll and update rates.](#)
- [Understanding the differences between using Asynchronous vs. Synchronous I/O.](#)
- [Understanding the differences between using Cache vs. Device reads.](#)

## How do I add items to maximize performance?

The best way to add items in order to maximize performance in the OPC Client is by combining groups. This technique reduces the number of groups and minimizes communications overhead. Since the poll rate is a property of the group, the driver updates all items in the group at the same time.

### Example 1

#### Configuration 1

- Number of groups: 100
- Number of Items per group: 1
- Number of total items = 100
- Total calls from the driver to the OPC server = 100 (each group constitutes one call)

#### Configuration 2

- Number of groups: 1
- Number of items per group: 100
- Total items: 100
- Total calls from the driver to the OPC server = 1

As you can see, placing multiple items in a single group significantly decreases the communications overhead between the driver and the OPC server. However, you don't want to arbitrarily place every item in a single group because this may cause unneeded stress on the system. Instead, group your items by their poll rate.

### Example 2

You need to add 100 items to your driver configuration. You need to update the items as follows:

Number of items	Poll Rate
-----------------	-----------

20	1 second
15	1 minute
25	1 hour
40	By exception

To configure the driver correctly with these requirements, create 4 groups with the following properties:

Group	Properties
Group 1	I/O Type: Synchronous Update Rate: 1s Poll Rate: 1s
Group 2	I/O Type: Synchronous Update Rate: 30s Poll Rate: 1:00
Group 3	I/O Type: Synchronous Update Rate: 30:00 Poll Rate: 1:00:00
Group 4	I/O Type: Asynchronous Update Rate: 1s Poll Rate: 5:00 Asynchronous Watchdog: Enabled

## NOTES

- When using synchronous communications, we recommend that the update rate be twice as fast as the poll rate. If the client is obtaining the value once an hour from the server, there is no reason for the server to obtain the data once a second.
- We recommend that you enable the Asynchronous Watchdog with a large poll rate to ensure that the client holds the latest data in the OPC server. However, you can disable the watchdog and not affect asynchronous updates from the server to the client.
- Also, keep the number of items in each group to 1000 or fewer for optimum performance. For example, if you have a group with 1500 items, divide it into two groups of 750.

## How do I eliminate excess items?

Click the following links for detailed process information:

- [Eliminate excess items](#)
- [Eliminate excess items for specialized configuration files](#)

Use the following procedure to eliminate items if you enabled the Auto Create option in your I/O driver configuration and you created iFIX database blocks that required items. This procedure removes any incorrectly configured items or unused items.



Using the Auto Create option also adds items with default values. If you have modified the data type of one or more items, use the procedure at the end of this topic.

**NOTE:** You may not be able to delete items from the driver configuration because another computer may start accessing them.

► **To eliminate excess items:**

1. With iFIX running, open Mission Control, click the SAC tab, and click Stop, to stop SAC.
2. Open the I/O Driver Power Tool and delete all the items. Do not delete servers and groups.
3. Return to Mission Control and the SAC tab. Click Start. The driver automatically adds the necessary items with the default settings defined in the Power Tool.

This procedure guarantees that the I/O driver configuration in the Power Tool matches what you are accessing in your iFIX database.

If you made specific modifications to one or more items, such as a different requested data type for each item in a group, use the following procedure.

► **To eliminate excess items for specialized configuration files:**

1. Save the current driver configuration as .CSV file.
2. Perform the three steps above for removing excess items.
3. Compare the .CSV file to the new configuration. Note any differences.
4. Modify the .CSV file as needed.
5. Open the modified .CSV file and save it as a driver configuration file.

## Decreasing Unnecessary Stress On Your System

- Do not configure unneeded poll and update rates. Also, configure poll rates you do need based on the requirements of your application. For example, if your data changes once a minute, set your poll rate to 1 minute, not 1 second. For more information, refer to [How do I choose poll and update rates?](#)
- Whenever possible, clean up items that you are not using for your process control system. Refer to [How do I eliminate excess items?](#) to learn how.
- Use asynchronous I/O instead of synchronous I/O. Let the OPC server inform the driver when data has changed instead of polling for the same data once a second. For more information about the differences between asynchronous and synchronous I/O, refer to [Feature: Asynchronous vs. Synchronous I/O.](#)
- Set the current group's data source to Cache, not Device. This configuration causes the driver to read data from its cache instead of directly from a device and eliminates a great deal of overhead. For more information about the differences between Cache and Device data sources, refer to [Feature: Device vs. Cache Reads](#)
- Use exception based processing in iFIX applications to save SAC processing time. For more information, refer to [Feature: Using Exception-Based Processing.](#)

## How do I choose poll and update rates?

The poll rate determines how often the OPC Client polls for data from the OPC server's data cache for the specified group's items. All items in the group are polled at the same time. The update rate sets how often the OPC server polls the process hardware to update the server's internal data cache for all the items in the specified group.

### Setting the Poll Rate

Selecting a poll rate to use depends on whether you are using asynchronous or synchronous I/O.

#### Poll Rate and Asynchronous I/O

If you are using asynchronous I/O, we recommend setting the poll rate to 5 minutes (5:00). Also select the Enable Asynchronous Watchdog check box so that the client can periodically request data from the server. If you do not select this check box, the client must rely on asynchronous callbacks from the OPC server in order to refresh its data cache.

#### Poll Rate and Synchronous I/O

If you are using synchronous I/O, set the item's poll rate shorter than your scan time. For example, if you have a database block with a scan time of 10 seconds, set the poll rate for the item it accesses to 5 seconds. Likewise, set the update rate to be shorter than the scan time and the poll rate.

Keep in mind that if you set poll and update rates for groups to values that are shorter than needed, you impose unnecessary stress on your system.

### Example

- Database block scan time: 10 seconds
- Poll Rate: 5 seconds
- Update Rate: 2 seconds

### Using a Zero Poll or Update Rate

Setting the poll rate to zero forces the driver to run at its maximum rate.

Setting the update rate to zero requests the OPC server to update its group at its maximum rate. The OPC server will return the actual, or revised, rate that it can run at. This revised rate is displayed in the Actual Rate field on the group's statistics display in the OPC Client's Power Tool.

## Troubleshooting Your System

Click the following links for information about troubleshooting your system.

- [How Do I?](#)
- [Frequently Asked Questions](#)
- [Troubleshooting](#)
- [The Most Common I/O Driver Problems](#)
- [Tools for Troubleshooting the OPC Client](#)
- [Using the Windows Event Viewer](#)
- [Using the Data Monitor](#)
- [Error Codes](#)
- [Getting Technical Support](#)

## How Do I?

- [Add items to maximize performance?](#)
- [Choose poll and update rates?](#)
- [Eliminate excess items?](#)
- [Set up for remote configuration and control?](#)
- [Prevent the driver from writing to the hardware?](#)
- [Create reports of my driver configuration files?](#)
- [Save items created in iFIX Process Database to the I/O driver configuration file?](#)
- [Open the OPC Client Power Tool in iFIX Process Database?](#)
- [Configure my driver for demand polling?](#)
- [Poll the group only when data is being accessed?](#)
- [Set up security for using the I/O Server remotely?](#)
- [Set up security when the driver runs as a service?](#)
- [Enable or disable servers, groups or items using iFIX?](#)
- [Write data to an item using the Block Writes option?](#)
- [View my driver statistics?](#)
- [Browse an OPC server?](#)
- [View the driver's I/O Server Event Window?](#)

## Frequently Asked Questions

Consult the frequently asked questions below to find out how to correct common problems with your I/O driver:

- [How do I avoid Asynchronous timeouts when the timeout is set?](#)
- [What is causing the error "Databasemanager !Unable to locate Driver Image Table"?](#)
- [How do I upgrade a GE OPC Server from one version to another?](#)
- [Why do I have to install/register my OPC Server on the Client machine?](#)
- [How does the new array support in the OPC Client work with Register tag offsets?](#)
- [Why are simultaneous writes to an array in the OPC Client failing?](#)
- [What are the RSLinx array size limitations with OPC topics when using ControlLogix processors?](#)
- [Why won't the OPC Client automatically enable items upon startup?](#)
- [Where can I find information about DCOM configuration and security?](#)

## Troubleshooting

Select from the Troubleshooting tips below to find out how to correct problems with your I/O driver.

- [What program or tools can I use to troubleshoot my driver when I am experiencing problems?](#)
- [My driver doesn't load.](#)
- [I receive a message that the server is busy.](#)
- [My driver loads but does not start polling.](#)
- [The OPC Client does not connect to a local OPC server after restarting my HMI software.](#)
- [My driver doesn't communicate with any group or I receive ????? in my operator display links.](#)
- [The driver is not transmitting or receiving messages.](#)
- [The driver is transmitting messages but not receiving any messages.](#)
- [The driver is receiving messages, but not transmitting messages.](#)
- [The driver communicates to some but not all of the items in a group.](#)
- [I can't connect to a remote server.](#)
- [I can't see the driver in iFIX Process Database.](#)
- [I am receiving old data in my HMI display.](#)
- [What do the numbers in the Errors field of the Power Tool's statistics display mean?](#)
- [My message rate is slow.](#)
- [My driver stops running after a period of time.](#)
- [I do not receive driver messages in Alarm History.](#)
- [Automatic driver startup does not work.](#)

- [CPU usage is high.](#)
- [Floating Point errors appear after an upgrade.](#)

## The Most Common I/O Driver Problems

Some of the most common problems encountered when setting up and using I/O drivers are caused by one or more of the following:

- Failing to match the communication parameters of the process hardware in the OPC server. For information about appropriate values for these fields, consult your OPC server's documentation.
- Failing to run SAC. You cannot access data from your I/O driver in the Event Viewer or the iFIX WorkSpace until SAC is running.
- Attempting to communicate to areas of memory not defined in the controller. Verify that each item's address is valid.
- Setting an item's access time to be larger than its poll time so that OPC Client never polls for data.
- Not enabling the server, group or item in the OPC Client.
- Leaving the item ID blank.

## Tools for Troubleshooting the OPC Client

Click the following links for more information regarding the OPC Client:

- [View the I/O Server program in the I/O Server](#)
- [Close the I/O Server program](#)

### Statistics View in the OPC Client Power Tool

The Power Tool displays communication statistics for each item, group, server, and the entire driver. Displaying these statistics is useful for narrowing down which part of the driver is not functioning. To view the statistics, select an item, group, or server from the Tree Browser and then select Stats Mode from the Display Mode menu.

### Statistics in iFIX Mission Control

Mission Control is the main iFIX tool for monitoring background tasks, such as SAC, Historical Collect, and I/O drivers. Using Mission Control, you can start and stop a driver, and view driver error numbers. This is useful for quickly determining if the driver is having a problem.

Mission Control also provides a summary of driver-level statistics. To see the statistics for each server, use the OPC Power Tool.

## Windows Event Viewer

The driver reports any major errors to Windows Event Viewer. To learn more about using this application, refer to [Using the Event Viewer](#).

## Alarm History in iFIX

Because the I/O driver reports event messages to the Alarm History application in iFIX, you can use this program for debugging your driver. The events reported include when the driver:

- Starts and stops.
- Connects and disconnects.
- Fails to connect with the OPC Server and subsequently recovers.

Refer to the iFIX documentation for details about enabling alarm services.

## Message Log in the I/O Server Program

The message log in the I/O Server program tracks the following events:

- The date and time a configuration file loads.
- Which configuration file loads. If the driver is not loading the configuration file you want, you can change the default file name and location in the Power Tool's Setup dialog box.
- The date and time other applications attach to the server. This data can help you determine if someone is attached and making changes to the server you are working on.
- CSV import errors.

### ► To view the I/O Server program in the I/O Server:

1. Open the Power Tool.
2. Select an object from the Tree Browser.
3. Press ALT + SHIFT + S.

The options in the Server's View menu let you choose the types of messages to display. The message priority is as follows:

Server View	Displays...
Errors	Connection errors, run-time errors, and any exceptions caused by the driver or OPC server.
Warnings	General warnings.
Information	General information such as loading files or .CSV activity.
Debug1	The connection status of the driver to an OPC server when the server is enabled. Debug1 messages also contain information about any OPC interface that was not obtained when the driver connected to the OPC server.
Debug2	Information about asynchronous transactions between the driver and the OPC server.
Debug3	Information about failed writes to the OPC server.

The default setting for the Server is to display errors, warnings, and informational messages. However, you can also enable any debug message you want more information about.

► **To close the I/O Server program:**

1. Select an item from the Tree Browser.
2. Press Alt + Shift + S.

## iFIX Process Database Log File

The driver reports all actions performed to add items and database blocks to the iFIX process database. For more information, see [Use the iFIX Process Database Log File](#).

## Use the Windows Event Viewer

GE's Version 7.x drivers take advantage of a Windows feature known as the Event Viewer. This feature allows software to write messages and data to the Windows Event Log. These messages can then be viewed using the Windows Event Viewer application. Version 7.x drivers use this ability primarily to log information about problems that arise during execution, particularly in the lowest layers of the driver where reporting the problem to users is more difficult. It also allows the messages logged to include specific information about the error. For instance, if the memory object encounters a problem while mapping an area of global memory via the "CreateFileMapping()" Win32 function, it not only reports that the error happened, but it can also translate the error code returned by Windows and include that text as well.

The Windows Event Viewer contains three different categories of messages: System, Security, and Application. The OPC Client writes its messages to the Application log.

► **To view messages that might be generated by the driver:**

1. Start the Windows Event Viewer.
2. Select the Application log from the Log menu. All the log messages associated with the Application log appear. Any message specific to your driver contains the driver's acronym (OPC) in the Source column.
3. Select a message and press the Enter key;  
- Or -  
Highlight a message and choose Detail from the View menu;  
- Or -  
Double-click the message.

Information that may be helpful for troubleshooting your I/O driver includes:

- **Time** - The time that the message was logged.
- **Computer** - The name of the computer that the message was logged on.
- **Type** - The severity of the message. Options include: Error, Information, and Warning.
- **Description** - The actual message logged.

- **Data** - The specific data associated with the message. The OPC Client rarely uses this information.

## Error Codes

Error codes display in the Power Tool's statistics display and in Mission Control's DRVST fields. The following table lists the errors that appear in the statistics display. To view an error, select an item from the Tree Browser and select Stats Mode from the Display Mode menu. The error appears in the Last Error field of the selected item. To learn more about Mission Control errors, refer to one of the following:

- [DRVSTA Error Codes](#)
- [DRVSTB Error Codes](#)
- [DRVSTC Error Codes](#)

### Item Last Error Field

Error	Description	Possible Cause
0x0000	No error	N/A
0x0001	Generic error	Any error that does not fall into any other category.
0x0002	Unable to copy to common memory	The item cannot copy its data, timestamp, or quality to memory for copy to common-access for iFIX NIO applications. Process Database and your operator displays may show old data.
0x0003	Unable to set active state	The driver cannot change the active state of the item in the OPC server. Typically, this error occurs when you select the item's Enable check box and the server rejects the request.
0x0004	Unable to set client handle	The server cannot change the client handle for the item.
0x0005	Unable to set data type	The server cannot handle or does not support the requested data type.
0x0006	Unable to read	The OPC server for this item's group rejected a read request. Typically, this error occurs when you attempt to read data from a write-only OPC item.
0x0007	Unable to write	The OPC server rejected a write request for this item. Typically, this error occurs when you attempt to write data to a read-only OPC item.
0x0008	Bad handle	The OPC server sent an asynchronous callback containing a bad or unknown handle.
0x0009	Unable to advise	The driver attempted to establish an asynchronous connection with the OPC server, but the request failed. Verify that your server supports asynchronous communications.
0x000A	Unable to unadvise	The driver attempted to break an asynchronous connection with the OPC server, but the request failed.



0x000B	Exception generated	An exception was generated based on a call to the OPC server. Refer to the driver's Event window for a more detailed explanation.
0x000C	Invalid Item ID	The specified item ID is invalid or unknown by the OPC server.
0x000D	Invalid Access Path	The specified access path is invalid or unknown by the OPC server.
0x000E	Bad Item Quality	The quality of the item is no longer Good.
0x000F	Advise not received	The driver made an asynchronous connection to the OPC server; however, server did not return data for the item. Examine the item to ensure the item ID and the access path are valid. Also verify that the item is enabled and communicating.
0x0010	Write clamped	The OPC server accepted the data you are writing, but then clamped its value.
0x0011	Write value out of range	The data you are writing is out of range.
0x0012	Bad type for write value	The OPC server cannot accept the data type of the item you are writing to.
0x0013	Insufficient access rights	The item does not have sufficient access rights. Typically, this error occurs when you write to a read-only item.
0x0014	Unable to block write	The OPC Client could not process the block write.
0x0015	Block writes disabled	Block writes are disabled; however, a database block attempted to execute a !SEND command.
0x0016	No data to read for block write	The block write failed because there was no data to read in common memory.
0x0017	Duplicate block write	A duplicate block write was detected. The previous block write request will be discarded.
0x0018	Error reading data	The OPC Client could not read the necessary data.
0x0019	Unknown Item ID	While adding or validating an Item, the server returned an error indicating that the requested Item ID does not exist in its address space. This error may also indicate that the Item is defined in the server as read-only or write-only.

The following errors are combined with the errors listed above. For example, if you receive error 1516, this is a combination of error 1500, Error reading from common memory, and Error 16, No data to read for block write. From this error, you can determine that the OPC Client was reading from common memory when it found no data for the pending block write.

Error	Description	Possible Cause
0x1000	Driver not running	The Start button on the Run-time toolbar has not been selected. Select the Start button to start the OPC Client.
0x1100	Not connected to the server	The OPC Client is not connected to the OPC server. Make sure all servers, groups, and items in the OPC Client are enabled.
0x1200	Common	The OPC Client failed to allocate common memory.

	memory allocation failed	
0x1300	Local memory allocation failed	The OPC Client failed to allocate a temporary local memory buffer.
0x1400	Error accessing common memory	The OPC Client could not access common memory.
0x1500	Error reading data from common memory	The OPC Client could not read data from common memory.
0x1600	Error adjusting common memory data size	The OPC Client could not resize the memory needed for an item.
0x1700	Out of local memory	The temporary local memory buffer allocated by the OPC Client is full; consequently, the operation in progress cannot be completed.
0x1800	Queue Empty	One of the queues used by the OPC Client is empty; consequently, the driver found nothing to process.
0x1900	Error accessing data	The OPC Client cannot access the data it needs.
0x2000	Item not added to server	The item being processed does not exist on the OPC server because it was never added to the server's configuration.
0x2100	Outputs disabled	Outputs for the item being processed are disabled; however, a write from the item was attempted using a database block.
0x2200	Not setup as array	The item being processed uses data array syntax in its item ID; however, the item is not configured as an array. To configure the item as a data array, select the Array check box.
0x2300	Setup as an array	The item being processed does not use data array syntax in its item ID; however, the item is configured as an array. To correct the error, clear the Array check box.
0x2400	Address out of bounds	The specified item ID does not exist on the OPC server.
0x2500	Data size out of bounds	The specified array length is larger than is supported on the OPC server or the size of the data returned by the OPC server does not match the size of the array configured in the Power Tool.
0x2600	Data type mismatch	The item's specified data type does not match the data type specified by the OPC server.
0x2700	Data type invalid	The OPC server or OPC Client does not support the item's specified data type.
0x2800	Database block type invalid	The database block you configured cannot be used with the command entered in the I/O Address field. Refer to <a href="#">Specifying I/O Addresses in iFIX Process Database</a> to determine the correct block to use.
0x2900	Data type is empty	No data type has been selected for the item being processed.
0x2A00	Invalid floating point value	The server processed an IEEE floating point value that was found to have an invalid format.

## Mission Control DRVST Errors

Field	Contains the...
DRVSTA	Number of the last error caused by an item. Refer to the previous tables for information on the error.
DRVSTB	Group number contains the erroneous OPC item.
DRVSTC	Item number causing the error.

## Getting Technical Support

### By World Wide Web

<https://digitalsupport.ge.com>

# Creating a Custom Client Application

The OPC I/O Server is an OLE application that you can control programmatically. It exposes its functionality to other OLE applications through its interfaces, which means you can create custom OLE applications to access or control the driver.

For example:

- You can use Visual Basic to programmatically enable servers, groups, or items depending on user input.
- You can use VBA in Excel to create a program that generates reports comparing group statistics within a driver.
- You can write programs that control the driver with higher performance using C or C++.

Refer to the following topics for steps on getting started with creating custom applications:

- [Creating a Custom Application Using Microsoft Visual Basic](#)
- [Creating a Custom Application Using C or C++](#)

## Create a Custom Application Using Microsoft Visual Basic

Microsoft Visual Basic is one of many applications that you can use to develop custom OLE applications for use with the OPC Client.

### ► To start designing a Visual Basic application that accesses the OPC Client objects:

1. Start Visual Basic and from the Projects menu, choose References. The GE OPC Client 7.10 Library should display in the Available References list box. If it does not, browse your directories for .TLB files and add OPCDRV.TLB to the Available References list box.
2. From the View menu, choose Object Browser and then from the Libraries/Projects list at the top of the browser, select OPCDRV.
3. Select a property or method and press F1 to learn how to use it.

The type library, OPCDRV.TLB, is installed in the same path that you installed the OPC Client.

**NOTE:** To use Visual Basic for Applications (VBA) instead of the VB Compiler, select References from the Tools menu in step 1 and follow steps 2 and 3 above.

## Create a Custom Application Using C or C++

You can create a custom client application for use with the I/O Server using Microsoft Visual C or C++.

► **To get started creating a client application with C or C++:**

1. Add a call to CoCreateInstance to load the server and get a pointer to the driver interface.
2. Include InterfaceDef.h in the source from your driver.
3. Add Interfacedef\_i.obj to the project.

You can obtain copies of InterfaceDef.h and Interfacedef\_i.obj from GE. Contact your local sales representative for more information.

## The OPC Client as a Data Source in iFIX

Click the following links for more information regarding Data Sources in iFIX:

- [Access the OPC Client as a Data Source in iFIX](#)
- [Access String Data with the OPC Client](#)

## Access the OPC Client as a Data Source from iFIX

You can access any item in the OPC Client as a data source in iFIX. Using this method, the values from your OPC server can be displayed directly to an operator without the overhead of using the process database. Typically, this approach is best when you only want to display the data and do not need to alarm or historically trend the information.

► **To access an item in the OPC Client as a data source:**

1. Configure the OPC Client as needed. For more information about configuring the client, refer to Choosing a Method for Configuring Your Driver.
2. Register the OPC Client as a data server with the Data Server Installer.
  - a. From the Base path (C:\Dynamics, by default), double-click the icon for the Data Server Installer (DataServerInstaller.exe).
  - b. Click Add or double-click the data server you want to modify.
  - c. In the Data Server box, enter a name. Make sure the name is not already in use.
  - d. From the OPC server list, select an OPC driver.
  - e. Select the Set as Default Server check box to make the server the default.
3. Start iFIX and add a Data link to any picture you have in your Pictures folder. The Data link dialog box appears.
4. Click the Browse button to the left of the Source field. The Expression Builder dialog box appears.
5. Click the Data Servers tab.
6. Select the OPC Client and navigate to the item you want to use.

7. Click OK to accept your selection and close the Expression Builder.
8. Click OK to close the Data link dialog box.

## Access String Data with the OPC Client

You can read string values in the OPC client by using the following syntax as your data source:

*server;group;itemid/bytes (ASCII values)*

Where:

- *server* is the name of the OPC server you want to access.
- *group* is the name of the group that you want to read data from.
- *itemid* is a itemID of the string data to read.
- *bytes* is the number of bytes (characters) you want to read. Specifying the number of bytes is optional. When omitted, the client reads 20 bytes. You can specify a maximum of 256 bytes.

Using this feature, you can read the string values you need. However, you cannot read past the boundary of an itemID. For example, if you create an item that contains a string of 10 characters and you specify to read 20 bytes, only the first 10 characters are read.

**NOTE:** This syntax is not supported with data arrays since arrays do not support string data.

## Glossary

The following terms are used in the I/O Driver Power Tool.

**CSV File** - A comma separated file that the I/O Driver Power Tool creates when it exports a configuration file. Comma separated files can be edited in any third-party application that supports CSV files, such as Microsoft® Excel™ or a text editor. Comma separated value files can also be created in a third-party application and read by the I/O Driver Power Tool.

**Exception-Based Processing** - SAC can perform exception-based processing on the following events:

- The item's data changes in common memory.
- Asynchronous updates from the OPC server.
- Operator actions.
- Instructions from software applications.

**I/O Address** - A location in the process hardware (for example, a register, address, or point) that the driver reads from and writes data to. An I/O address is a portion of an OPC item.

**I/O Driver** - The software interface responsible for sending data to and acquiring data from the process hardware. When discussing OPC drivers the term I/O Server is sometimes used as well.

**NODE:TAG.FIELD** - A tagname in iFIX applications. It provides the information needed to access database data.

- **NODE:** defines the computer where the data you require is located. This can be the computer you are working on or a remote computer.
- **TAG:** is the name of a database block. Block names can be up to 30 characters long.
- **FIELD:** defines the data type.

**Process Database Block** - Individual units of instructions that receive, verify, manipulate, and output process values. Process database blocks can also compare a process value against an alarm limit and perform calculations based on a specific process value.

**Primary Database Blocks** - Primary database blocks are blocks in the process database that communicate with field devices.

**Prog ID** - A vendor-specific string used to identify the OPC server.

**Run-Time Configuration File** - The process control software uses run-time configuration files (.OPC files) to communicate with the process hardware during run-time.

**SAC** - The Scan, Alarm, and Control program (SAC) is a iFIX system task that runs on a SCADA server. SAC transmits and receives data back and forth between the process database and the I/O driver's common memory.

SAC performs the following tasks:

- Fetches data from the I/O driver's common memory.
- Translates the data into the format expected by the process database.
- Checks the data against the alarm limits and generates alarm messages.
- Executes the control logic.
- Detects exceptions.
- Makes requested writes to the driver's common memory.

**Signal Conditioning** - The method by which a raw process data value is scaled.

**SIM Driver** - An I/O driver used to simulate input and output of the process database for iFIX applications. SIM values are saved in the process database itself but are cleared when SAC is started or when you reload the process database. SIM registers range from 0 to 2000 for analog values and 0:0 to 2000:15 for digital values.

**Time-Based Scan Time** - With a time-based scan time, SAC retrieves data at set time intervals. Use time-based scanning when your data changes frequently.

# Where to Find the Information You Need

Welcome to OPC Client I/O driver online help. This help system provides all the information you need to use the OPC Client I/O driver. Refer to the following topics to learn more about the features of the OPC Client online help:

- [Using Help](#)
- [Accessing Information](#)
- [Navigating in the Online Help](#)
- [Using F1 Help](#)
- [Using the Help Table of Contents](#)
- [Using the Help Index](#)
- [Using the Help Full-Text Search](#)
- [Printing the Online Help](#)

## Use Help

The OPC Client Help appears in a browser consisting of three panes: the help button bar, the navigation pane, and the viewer.

### Help Button Bar



Each menu contains a list of commands. To display the commands, click the menu name. The following table explains the function of each command.

Command	Function
Hide/Show	Hides or shows the navigation pane. The Hide button is displayed by default.
Locate	Finds and highlights the current help topic in the Contents tab.
Back	Displays the previously viewed help topic.
Forward	Displays the next help topic in a previously viewed sequence of topics.
Print	From the Contents tab, prints pages, headings and subtopics, or the entire table of contents. From the Index or Search tab, opens the Print dialog for printing the current topic.
Options	Opens a menu that provides access to:  Hide/Show tabs; Locate; Back/Forward; Home; Stop; Refresh; Print; Search Highlight Off
Web Support	Opens the GE Support web site, if an Internet connection is available.



## Navigation Pane

The Navigation pane consists of the following three tabs. For information on each tab, click the link.

- [Contents](#)
- [Index](#)
- [Search](#)

## Viewer Pane

The Viewer pane displays the selected help topic. Topics that refer you to additional information have a See Also button below the topic title.

## Access Information

The OPC Client I/O driver online help consists of independent topics with specific information on I/O driver concepts and procedures. You can access these topics using one of the following methods:

- [Use F1 Help](#)
- [Use the Help Index](#)
- [Use the Help Full-Text Search](#)
- [Use the Help Table of Contents](#)

The index, full-text search, and table of contents are all located in the Help Topics dialog box. You can display this dialog box by using one of the following methods:

- Choose Help Topics from the Power Tool's Help menu;
- Or -
- Choose OPC Help from the Start menu as follows:
  1. From the Start menu, point to Programs, and then FIX Dynamics or iFIX.
  2. From the menu that pops up, choose OPC Help.

## Navigate the Online Help

When you access a topic in the OPC Client online help, it may not provide all the information you need. To learn more about a topic, you can:

- Use help links.
- Click the See Also button and select another topic.

## Using Help Links

Blue words or phrases are links. Clicking a link either displays another topic or a pop-up window on top of the current topic. If you are using the keyboard, press Tab to move to the next link in the topic and press Enter to activate the link.

Links to other topics are blue with a solid underline and are called jumps. Jumps take you out of the current topic to a new topic. Links that display pop-up windows are blue italics with a solid underline. Pop-up windows display over the current window and are usually definitions of terms.

## Using the See Also List

Most topics have a See Also button located directly under the topic title. Click the See Also button to display a list of topics related to the current topic. If you select one of the topics from the list, that topic displays. To get back to your original topic, click the Back button on the button bar.

## Use F1 Help

The fastest way to get help on the Power Tool controls is to press the F1 key. To display F1 help, select the control you want information on and press the F1 key. The topic that appears is specific to the selected control and usually explains the effect of the control, which entries are valid, and provides examples of valid entries when applicable.

## Use the Help Table of Contents

The table of contents provides an overview of what's available in the OPC Client online help. It displays the titles of the books and the topics within each book.

### ► To use the Table of Contents:

1. On the Help Topics dialog box, select the Contents tab.
2. Double-click a book to open or close it.
3. Double-click the topic you want to read.

## Use the Help Index

The online help provides an index to all its topics. This index is similar to the index in a printed book.

### ► To search the index:

1. On the Help Topics browser, select the Index tab.
2. Type or select the word you want information on.

3. Double-click the indexed item in the lower part of the Index tab to display the associated topic. If the word you entered is associated with more than one topic, a Topics Found list box appears displaying all the topics indexed under that word.
4. If applicable, in the Topics Found list box, double-click the topic you want to display.

## Use the Help Full-Text Search

If you can't find the information you're looking for in the index, you can use the full-text search capability. A full-text search finds every occurrence of a selected word or phrase anywhere within the online help.

### ► To use the full-text search:

1. On the Help Topics browser, select the Search tab.
2. Enter the word or phrase you want to locate.
3. Click the right arrow button next to the Search field to perform a boolean search; that is, to use AND, OR, NEAR, or NOT to create a boolean search expression.
4. Click List Topics. A list of topics appears in the Select topic box.
5. From the Select topic box, double-click the topic you want to display.

## Print the Online Help

### ► To print one OPC Client Help topic at a time:

1. Display the help topic you want to print.
2. On the Help button bar, click Print. The Print Topics dialog box appears.
3. Select Print the selected topic and then click OK. The Print dialog box appears.
4. Click Print. The displayed topic prints.

### ► To print the entire online help as a book:

1. Display a topic in the book you want to print.
2. On the Help button bar, click Print. The Print Topics dialog box appears.
3. Select Print the selected heading and all subtopics and then click OK. The Print dialog box appears.
4. Click Print. All of the topics under the selected heading print.

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