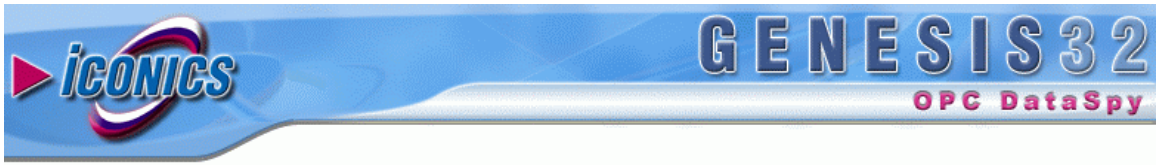

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Introduction to DataSpy

With the introduction of the OPC Foundation Plug and Play communications standard called OPC Data Access, and recently the OPC Alarm and Events Specifications, a universal diagnostics and analysis utility was needed by industry. GENESIS32 fills this need with OPC DataSpy.

Features of OPC DataSpy

OPC DataSpy includes the following key standard features:

- Support for GenBroker Internet communications technology.
- Internet OPC over TCP/IP tag browsing.
- GenBroker Monitor.
- Simple-to-use OPC test client inspection and diagnostics utility.
- Determination of whether OPC server compliance.
- Available as a stand-alone OPC test client.
- OPC Data Access (DA) test client.
- OPC Alarm and Events (AE) test client.
- OPC Data Access troubleshooting tool.
- OPC Alarm and Events troubleshooting tool.
- OPC-compliance testing of third-party servers.
- Determination of OPC standards for OPC servers.
- OPC loading and OPC traffic analysis.
- New support for NT Logger and AlarmWorX32 Logger.

Architecture

The main concept behind the OPC DataSpy is to provide an easy-to-use **OPC Test Client** to test, diagnose, and troubleshoot industrial applications using the OPC Foundations, OPC Data Access, and Alarm and Events specifications.

The OPC DataSpy tree control capability consists of three main parts:

1. OPC Item Browsing

2. OPC Data and Alarm Monitors

3. GenBroker Monitor

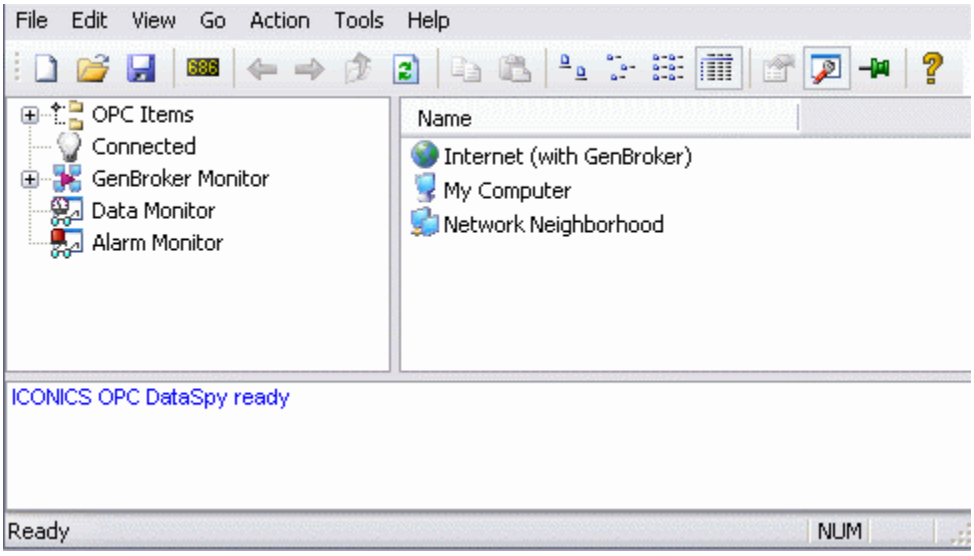
The OPC item browser mode allows you to browse for OPC-compliant Data Access and OPC Alarm and Event servers, as well as OPC Historical Data Access servers, and to provide basic information allowing users to view, test, and troubleshoot any OPC third-party servers. The OPC and GenBroker monitors provide real-time monitoring of OPC server data.

Starting OPC DataSpy

To start OPC DataSpy from the Windows **Start** menu, select **Programs > ICONICS Tools > OPC DataSpy.** The OPC DataSpy screen is displayed, as shown below.

The OPC DataSpy user interface consists of the following elements:

- OPC Item browser
- GenBroker Monitor
- OPC Data and Alarm Monitors
- Diagnostics and statistics and logging module (output window)



OPC DataSpy Screen

Toolbar

The toolbar, shown below, contains command buttons that enable you to modify the DataSpy screen. For more information about the functions of these commands, refer to the **Menus** section.

New: Creates a new document.

Open: Opens an existing document.

Save: Saves the active document.

Monitor Item: Adds an OPC Item to the Monitor.

Back: Moves the cursor back to the previously selected item in the tree control.

Next: Moves the cursor to the next item in the tree control.

Up One Level: Moves up one level in the tree control.

Refresh: Refreshes the current selection.

Copy: Copies the current selection to the clipboard.

Paste: Pastes the current contents of the clipboard.

Large Icons: Displays items as large icons.

Small Icons: Displays items as small icons.

List: Displays items as a list.

Details: Displays items as a list with details.

Properties: Shows the properties of the selected item.

Output: Shows or hides the output window (bottom pane).

Always on Top: Positions the DataSpy window in the foreground of your display.

About: Displays information about the application.

Menus

The OPC DataSpy menu bar contains the following menus:

- File
- Edit
- View
- Go
- Action
- Tools
- Help

Note: You can also access many of the menu commands by right-clicking items in the tree control and selecting command functions from the pop-up menus.

File Menu

The **File** menu commands are listed in the table below.

File Menu Commands

Command	Shortcut Key	Function
New	CTRL+N	Creates a new .spy document.
Open	CTRL+O	Opens an existing .spy document.
Save	CTRL+S	Saves the active document.
Save As		Saves the active document under a new name.
Exit		Closes the application.

Edit Menu

The **Edit** menu commands are listed in the table below.

Edit Menu Commands

Command	Shortcut Key	Function
Copy	CTRL+C	Copies the selected object to the clipboard.
Paste	CTRL+V	Pastes the last object placed on the clipboard.
Clear Output		Erases the output window.
Select All	CTRL+A	Selects all objects in a list.
Invert Selection		Unselects all selected items and selects all unselected items in a list.

View Menu

The **View** menu commands are listed in the table below.

View Menu Commands

Command	Function
Toolbar	Hides/shows the toolbar.
Status Bar	Hides/shows the status bar.
Large Icons	Displays items as large icons.
Small Icons	Displays items as small icons.
List	Displays items as a list.
Details	Displays items as a list along with detailed information about the configuration of each item.
Always on Top	Positions the DataSpy window in the foreground of your display.
Output	Shows or hides the output window (bottom pane).
Properties	Shows the properties of the selected item.

Select Language	Opens the **Select Language** dialog box (see below). Choose the language you wish to use for your system (Unicode version only) and click **OK.** For navigation purposes, use the buttons and check boxes in the **List** section.
Output Window Font	Opens the **Font** dialog box, which allows you to change the font, font style, and point size of the text in the output window.
Refresh	Refreshes the current selection.
Options	Opens the **Options** dialog box. For more information, see the **Options** section.

Go Menu

The **Go** menu commands are listed in the table below.

Go Menu Commands

Command	Shortcut Keys	Function
Back	ALT+Left Arrow	Moves the cursor back to the previously selected item in the tree control.
Forward	ALT+Right Arrow	Moves the cursor forward to the previously selected item in the tree control.
Up One Level	Backspace	Moves the cursor up one level in the tree control.

Action Menu

The commands on the **Action** menu vary according to which item is selected in the tree view. The **Action** menu matches the right-click pop-up menu for each selected item. For example, if you right-click **Data Monitor** in the tree view, the pop-up menu shows the commands **Add OPC Item, Add GenBroker Item, Remove All Items, Ping GenBroker,** and **Paste.** These same commands will also be available in the **Action** menu as long as **Data Monitor** is selected. If you select a different item in the tree view, the **Action** menu commands will change accordingly.

The various **Action** menu commands are described in greater detail throughout this document.

Tools Menu

The **Tools** menu commands are listed in the table below.

Tools Menu Commands

Command	Function
Ping	Pings the specified GenBroker node. You can see the results of the ping in the Output window.
ICMP Traceroute	Displays a network Internet Control Message Protocol (ICMP) route to a specified URL or IP address. You can see the results of the trace in the Output window.
GenBroker Statistics	Launches the GenStatistics Viewer. (See the GenStatistics Viewer help for more information.)

Help Menu

The **Help** menu commands are listed in the table below.

Help Menu Commands

Command	Shortcut Key	Function
Help Topics	F1	Launches the online help for the Configurator.
About Application		Launches the **About Box,** which contains information about the product version number, copyright, and available disk space. It also contains contact information.

OPC Local and Remote Browsing

The Browse Interface supports both the local computer and remote OPC servers through several different OPC connection methods. The OPC DataSpy client has built-in capabilities to browse the local registry of the computer as well as the WAN and LAN networks via DCOM. You can select from a list of all the OPC servers available on the local PC or across the network using a simple tree control.

OPC tag browsing of OPC servers can be performed using any of the following three methods:

- OPC ENUM Browsing
- GenAgent Browsing
- Registry Browsing

OPC ENUM Browsing

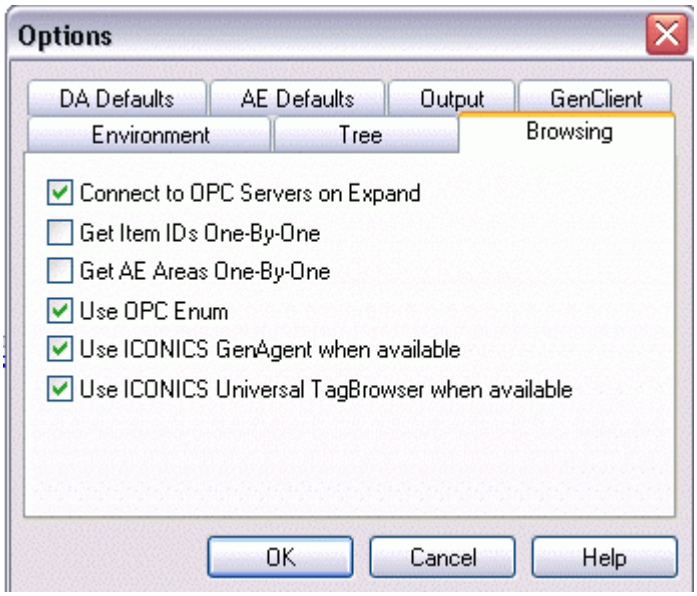
OPC ENUM was introduced with the OPC 2.0 Data Access (DA) specification, so it may not browse OPC DA 1.0 servers. It can be used for browsing OPC servers (except XML DA servers). The OPC ENUM is provided by the OPC Foundation, and is the most generally used approach for browsing OPC Data Access servers. Since the OPC ENUM was specified after the OPC DA 1.0 specification was released, some OPC DA 1.0 servers may not be accessible with the OPC ENUM browsing method.

GenAgent Browsing

GenAgent Browsing is an advanced tag browsing approach used for browsing servers located on Internet and intranet-based systems. GenAgent is provided as a standard part of GENESIS32 products, and is specifically used as part of the Internet-based WebHMI product. It is similar to OPC ENUM browsing, except GenAgent can browse OPC DA 1.0 servers. This is the preferred method of browsing OPC servers.

Registry Browsing

Registry-based tag browsing involves using the Windows Registry, and looking for registered OPC servers performs OPC tag browsing of these OPC servers. Unlike the other two browsing methods, this method involves scanning the remote PC's registry. This is why this method is used when the other methods fail. You can select browsing methods using the **Options** dialog box, shown below, which is opened by selecting **Options** from the **View** menu. For more information, refer to the **Browsing** section.



OPC DataSpy Browsing Options

OPC Data Monitoring

OPC DataSpy enables the following types of data monitoring:

- Callback Subscription Mechanism
- Connection to Multiple OPC Servers
- OPC Diagnostics and Analysis
- Options
- Using OPC DataSpy to View OPC Data Access
- Using OPC DataSpy to View OPC Alarms and Events
- GenBroker Monitor

Callback Subscription Mechanism

OPC DataSpy uses callbacks from the OPC server for getting data. The callback mechanism (IAdviseSink or connection points) depends on the DA server. You can select one of them if both are available. By default, the subscription is established when a new OPC group is created. The connection point mechanism is used to get the alarm updates. OPC DataSpy uses a synchronous write operation to write values to OPC servers.

OPC Data Access 1.0

OPC DataSpy provides the capability to get data using IAdviseSink.

OPC Data Access 2.0

OPC DataSpy provides the capability to get data using connection points.

OPC Alarm and Events 1.0

OPC DataSpy provides the capability to get alarms and events and acknowledge them from any OPC 1.0 Alarm and Events server.

Connection to Multiple OPC Servers

It is possible to connect to multiple OPC servers in the **Connected** tree.

Also, it is possible to create multiple OPC groups in an OPC DA server and multiple event subscriptions in an OPC AE server.

Data coming from all servers are displayed together in the **Monitor** subtrees. Particular OPC servers and OPC groups or event subscriptions are shown in the **Connected** subtree.

OPC Diagnostics and Analysis

The OPC DataSpy client performs many diagnoses and compliance testing of OPC servers:

- Versioning
- Server Properties
- Group/Item Properties
- OPC Call Logger

Versioning

OPC DataSpy detects whether servers were written according to OPC 1.0 or 2.0 specifications.

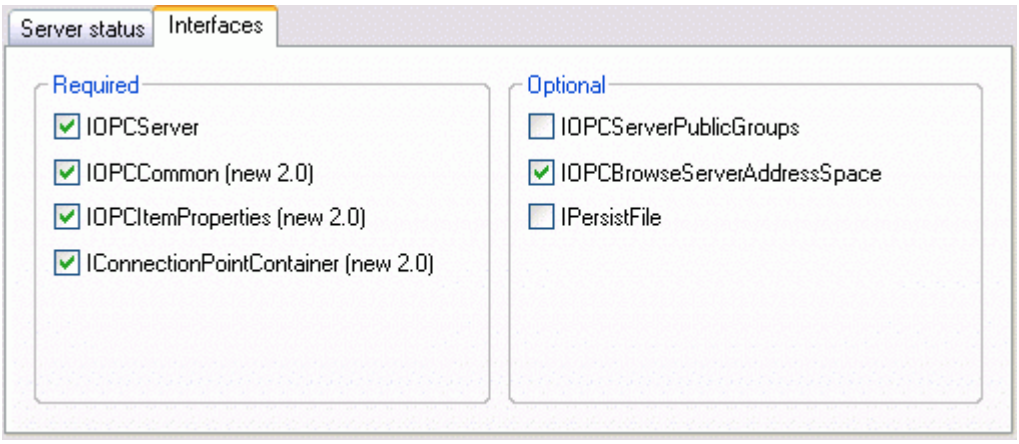
Server Properties

OPC DataSpy provides information about connected OPC DA and AE servers. To view the properties of a connected server, click on the server in the tree view and click the **Properties** button on the toolbar, or select **Properties** from the **View** menu. This opens the **Server Properties** dialog box, which contains the following tabs.

- Interfaces
- Server Status

Interfaces

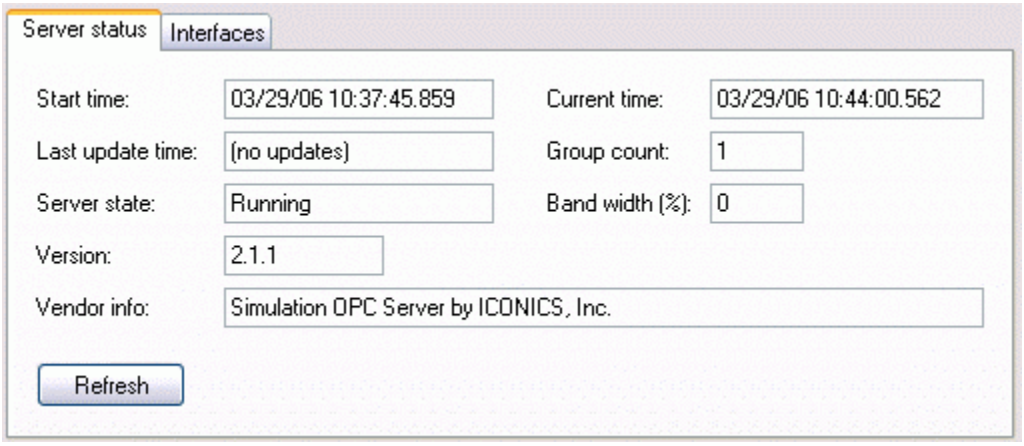
OPC DataSpy can display all supported and unsupported interfaces from the server. When you select a connected server in the tree view and then click the **Properties** button on the toolbar, or select **Properties** from the **View** menu, the **Properties** dialog box will open. The **Interfaces** tab of the **Properties** dialog box contains information about all interfaces from the server, as shown in the example below for an OPC DA server.



Server Properties Dialog Box: Interfaces Tab

Server Status

OPC DataSpy provides status information for all connected servers. When you select a connected server in the tree view and then click the **Properties** button on the toolbar, or select **Properties** from the **View** menu, the **Properties** dialog box will open. The **Properties** dialog box for servers contains a **Server Status** tab, which displays all information regarding the status of the server: start time, current time, last update time, number of groups, band width percentage, update rate, and current state of the server. Clicking the **Refresh** button refreshes the last update time.



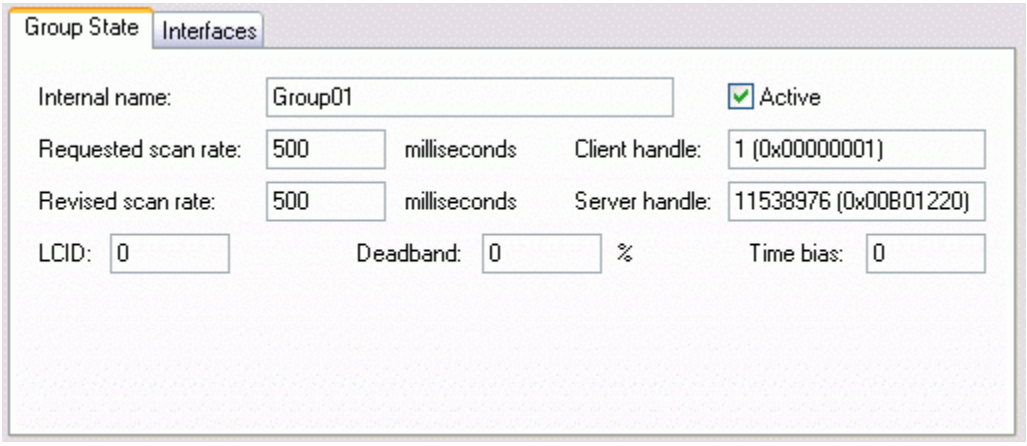
Server Properties Dialog Box: Server Status Tab

Group/Item Properties

OPC DataSpy not only provides information about the properties of connected servers, but it also displays the current status of both groups and items that are connected to those servers.

Group Properties

To view the group properties for an OPC DA server, select the group in the tree view and then click the **Properties** button on the toolbar, or select **Properties** from the **View** menu. This opens the **OPC DA Group Properties** dialog box, shown below. The **Group State** tab shows information about the group, including the group name, scan rate, and the deadband percentage.



Group Properties Dialog Box: Group State Tab

The **Interfaces** tab of the **OPC DA Group Properties** dialog box, shown below, contains information about all interfaces from the server.

Group Properties Dialog Box: Interfaces Tab

Item Properties

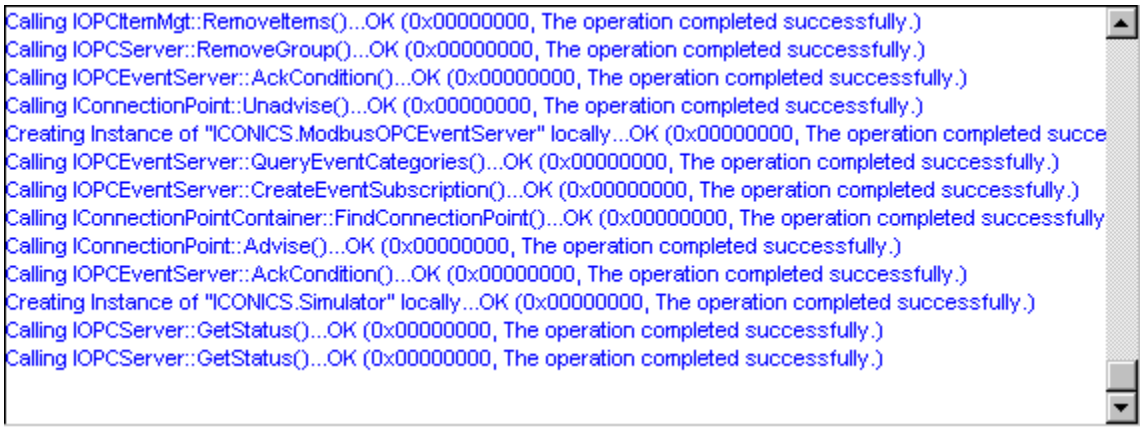
When you select an OPC item in an OPC DA group, the item's properties are displayed in the right-hand pane of the OPC DataSpy screen, as shown below.

Name	PropertyID	Data	Description
High EU	102	100	High EU
Item Access Rights	5	1	Item Access Rig…
Item Canonical Data Type	1	VT_R8	Item Canonical …
Item Quality	3	192	Item Quality
Item Timestamp	4	3/29/2006 10:5…	Item Timestamp
Item Value	2	38	Item Value
Low EU	103	0	Low EU
Server Scan Rate	6	10	Server Scan Rate

Item Properties

OPC Call Logger

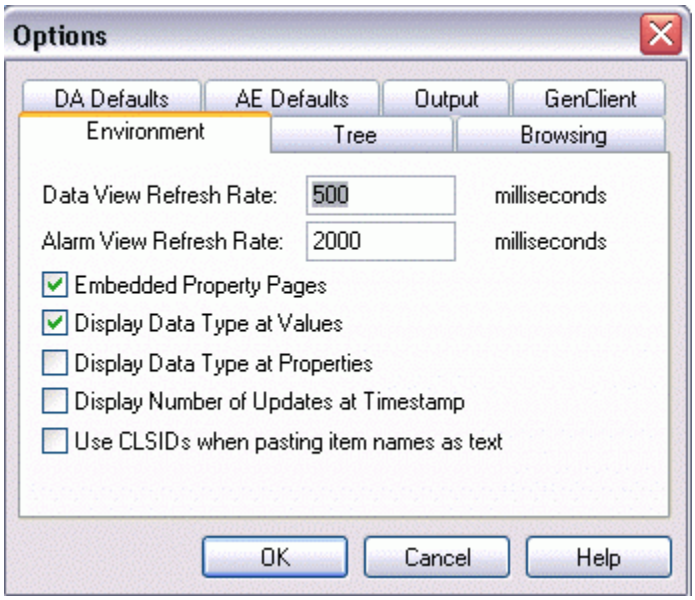
OPC DataSpy is capable of logging calls made to OPC servers and their results. OPC DataSpy traces and logs OPC calls. The output window (bottom pane) of the OPC DataSpy screen, shown below, indicates whether those calls were successful in communicating to the OPC server. To show or hide the output window, select **Output** from the **View** menu, or click the **Output** button on the toolbar.



OPC Call Log in the Output Window

Options

You can specify several display settings for data monitoring using the **Options** dialog box, shown below. To open the **Options** dialog box, select **Options** from the **View** menu.



Options Dialog Box

The **Options** dialog box contains the following tabs:

- Environment
- Tree
- Browsing
- DA Defaults
- AE Defaults
- Output
- GenClient

Environment

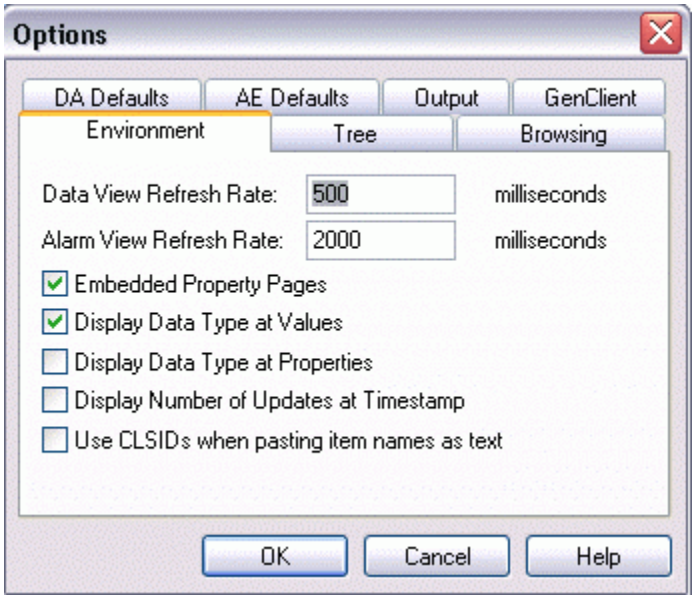
The **Environment** tab of the **Options** dialog box affects the DataSpy user interface in general.

Refresh rates. You can set the refresh rates for the values of both data and alarm items. These rates determine how often the list view in the right-hand pane of the display is refreshed.

Embedded property pages. If this option is checked, the **Properties** dialog box will be embedded in the right-hand pane of the display when **Properties** is selected from the **View** menu.

Displaying the data type. Data values and OPC item properties are represented by variants. They may be displayed with or without their data types (e.g. VT_R8). If **Display Data Type at Values** is checked, the value type for each item will be displayed next to the value under the **Value** column. If **Display Data Type at Properties** is checked, the data type for each OPC item will be displayed in the right-hand pane under the **Data** column. If **Display Number of Updates Timestamp** is checked, the number of updates for each OPC item will be displayed in the right-hand pane under the **Timestamp** column.

Use CLSIDs. When an item is copied and pasted elsewhere (e.g. Notepad) and the **Use CLSIDs when pasting item names as text** check box is checked, the server will be identified either by its CLSID or ProgID.



Options Dialog Box: Environment Tab

Tree

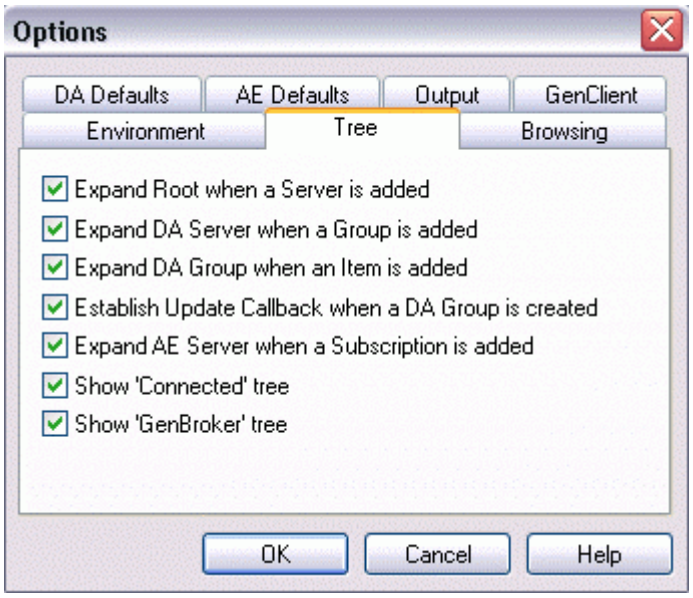
The **Tree** tab in the **Options** dialog box allows you to select settings for the **Connected** tree in the OPC DataSpy screen. All boxes are checked by default.

Expanding. If the **Expand...** options are checked, the root, DA servers, DA groups, or subscriptions in the tree will automatically expand when items are added to them.

Establish update callback when a DA group is selected. If a group is created in an OPC server and this option is checked, the update callback is established when the group is created. Otherwise you have to establish the callback connection manually to get updates.

Show the "Connected" tree. This option shows or hides the **Connected** tree in the left-hand pane of the screen. For example, if you are not interested in how the groups are structured in the OPC servers, you may want to hide the **Connected** tree.

Show the "GenBroker" tree. This option shows or hides the **GenBroker** tree in the left-hand pane of the screen.



Options Dialog Box: Tree Tab

Browsing

The **Browsing** tab in the **Options** dialog box allows you to select methods for local and remote browsing for OPC servers.

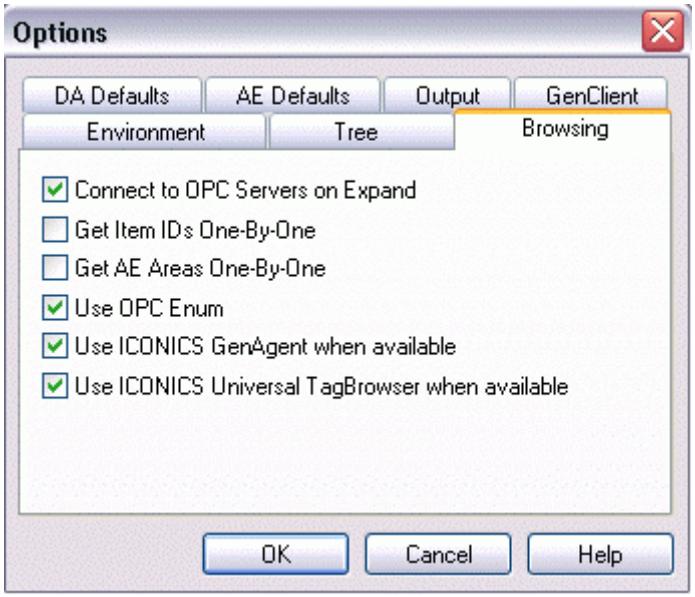
Connect to OPC servers on expand. When this option is checked, a connection to a server will be made when you click the "+" sign in the tree view next to the server. Otherwise you have to connect to the server manually by right-clicking the server.

Get item IDs/AE areas one by one. This option allows you to enumerate item IDs or areas either one by one or all at once. This would be useful if for example, if you experienced problems with servers when item IDs are gotten all at once.

Use OPC ENUM. This option specifies whether to use OPC ENUM to get a list of available servers from a node.

Use ICONICS GenAgent when available. This option determines whether to use GenAgent to get the list of available servers from a node .

Use ICONICS Universal Tag Browser. When this option is checked, you can use the Unified Data Browser to browse for OPC items.

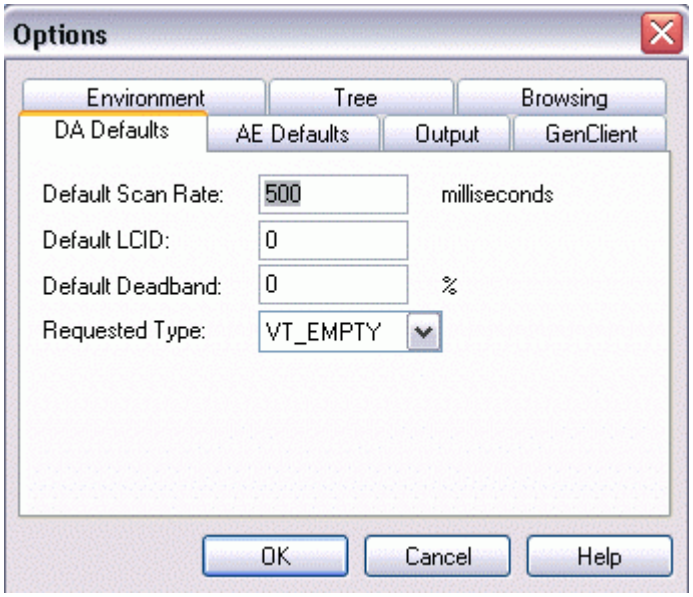


Options Dialog Box: Browsing Tab

DA Defaults

The **DA Defaults** tab of the **Options** dialog box allows you to specify the default settings for OPC Data Access groups. When you right-click on an OPC DA server and select **Add Group (default)** to create a default group, these settings will be displayed in the right-hand pane when that group is selected.

You can set the **Default Scan Rate** (in milliseconds), the **Default LCID,** and the **Default Deadband** percentage. The **Requested Type** is the default type when adding an item.

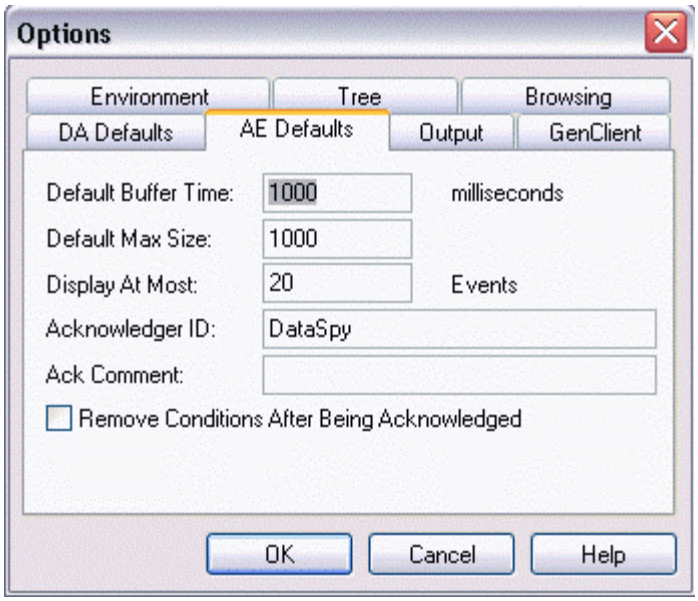


Options Dialog Box: DA Defaults Tab

AE Defaults

The **AE Defaults** tab of the **Options** dialog box allows you to specify the default settings for OPC Alarm and Events subscriptions. When you subscribe to a connected alarm or event server in the tree view, these settings will be displayed in the right-hand pane when that server's subscription is selected.

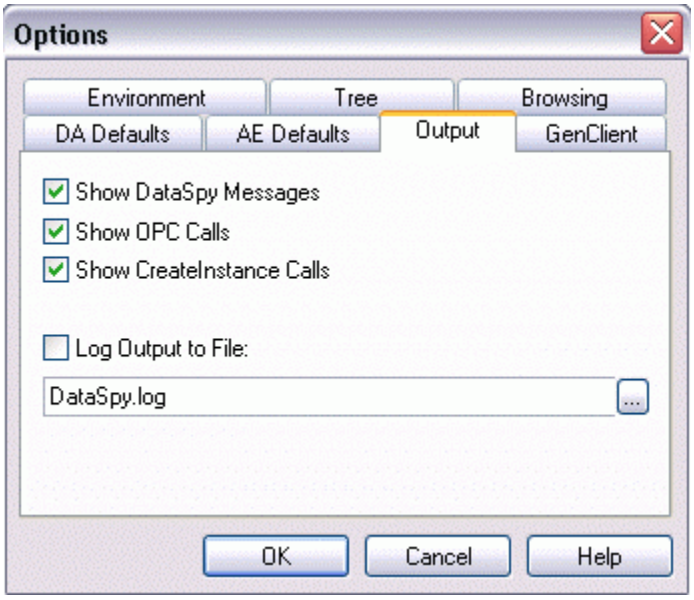
You can specify the **Default Buffer Time** (in msec) and the **Default Maximum Size** for subscriptions. The **Display at Most** field specifies the maximum number of alarms that may be displayed. The **Acknowledger ID** and **Acknowledger Comment** fields specify the default parameters for acknowledging alarms. If the **Remove Conditions After Being Acknowledged** option is checked, a condition will be removed from the display after it is acknowledged.



Options Dialog Box: AE Defaults Tab

Output

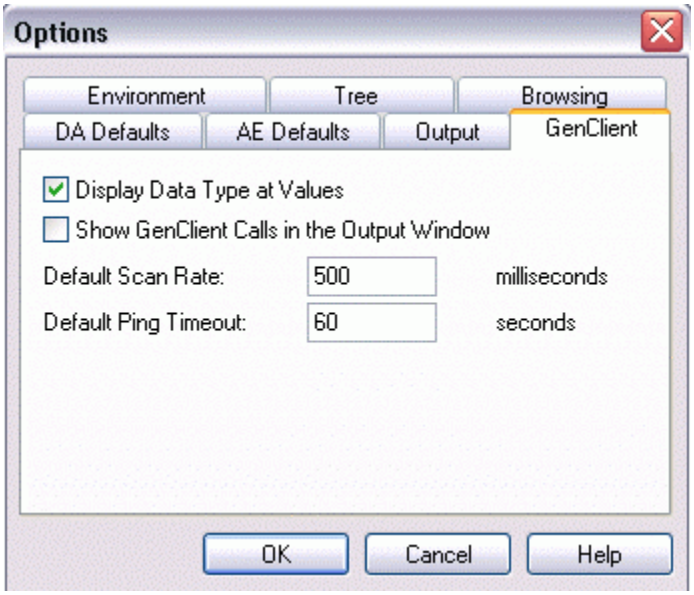
The **Output** tab of the **Options** dialog box allows you to configure settings for data in the output window (bottom pane). You can choose to show DataSpy messages, OPC calls, and "CreateInstance" calls. You can also choose to log the output data to a file. Clicking the **...** button to the right allows you to select a log file for output.



Options Dialog Box: Output Tab

GenClient

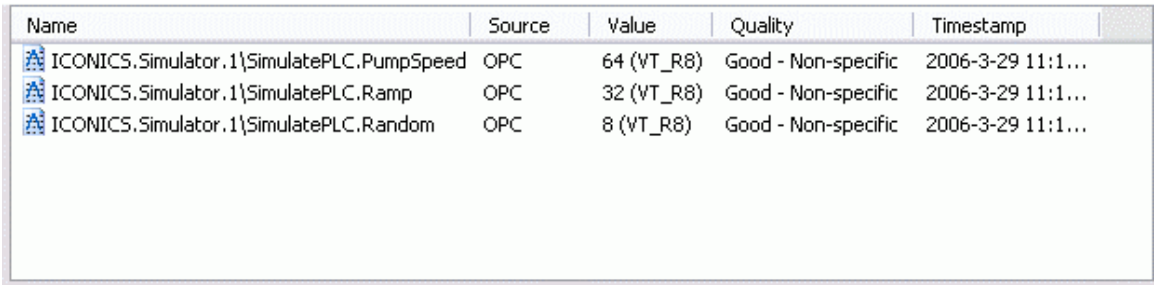
The **GenClient** tab of the **Options** dialog box allows you to select settings for the GenBroker monitor. If **Display Data Type at Values** is checked, the value type for each OPC item in the GenBroker monitor will be displayed next to the value under the **Value** column. You can choose to show GenClient calls in the output window (bottom pane). In addition, you can specify the **Default Scan Rate** (in milliseconds) for requesting points and the **Default Ping Rate** (in seconds) for pinging a GenBroker node.



Options Dialog Box: GenClient Tab

Using OPC DataSpy to View OPC Data Access

You can use OPC DataSpy to view data from OPC Data Access servers. The **OPC Data Monitor** tracks the status of items in connected OPC servers under the **My Computer** and **Network Neighborhood** subtrees of the **OPC Items** tree. When you select **Data Monitor** in the tree view, the name, value, quality, timestamp, and state of the OPC items are displayed in the right-hand pane of the OPC DataSpy screen, as shown below.



OPC Data Monitoring

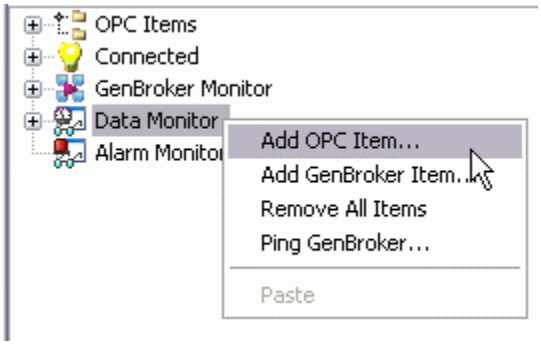
There are several ways to get an OPC item on scan:

- Adding an OPC Item With Default Parameters
- Adding an OPC Item to a Nondefault Group

Adding an OPC Item With Default Parameters

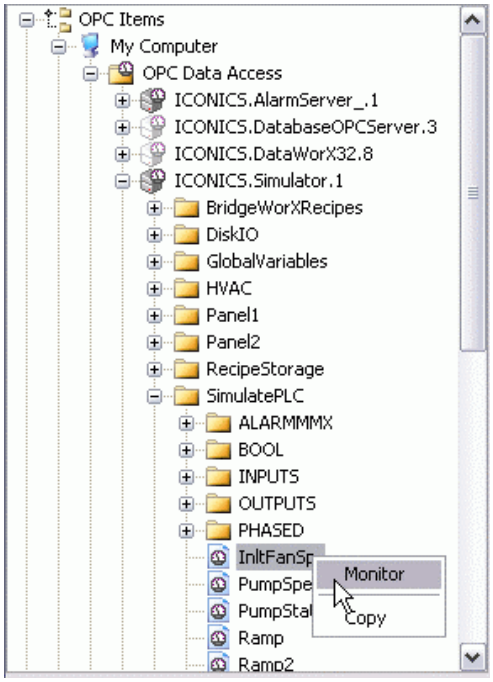
To add an OPC item with default parameters, do any one of the following:

- Right-click the **Data Monitor** in the tree view and select **Add OPC Item,** as shown below. (You can also select **Add Item** from the **Action** menu while the **Data Monitor** is selected.) This opens the Unified Browser, which enables you to select an item to add to the OPC server.



Adding an OPC Item From the Data Monitor

- Click the **Monitor Item** button on the toolbar and select the desired item from the Unified Browser.
- Right-click the desired item in the **OPC Items** tree and select **Monitor,** as shown below. If you wish to monitor all items for a particular server, right-click on the server name and select **Monitor All Items.**



Adding an OPC Item From the OPC Items Tree

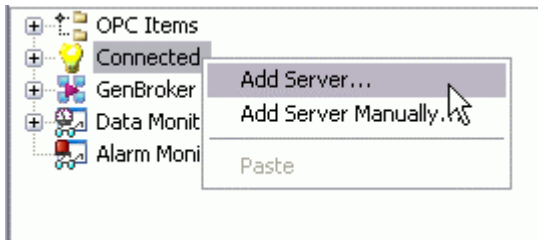
- Drag the item from the **OPC Items** tree and drop it on the **Data Monitor** or **Connected** icons.

OPC DataSpy then creates an **OPC Group** in the corresponding server, if necessary, and adds the item to it. Group parameters can be preset in the **DA Defaults** tab of the **Options** dialog box. You can also add a group manually by right-clicking a server name in the **Connected** tree and selecting **Add Group (default).**

Adding an OPC Item to a Nondefault Group

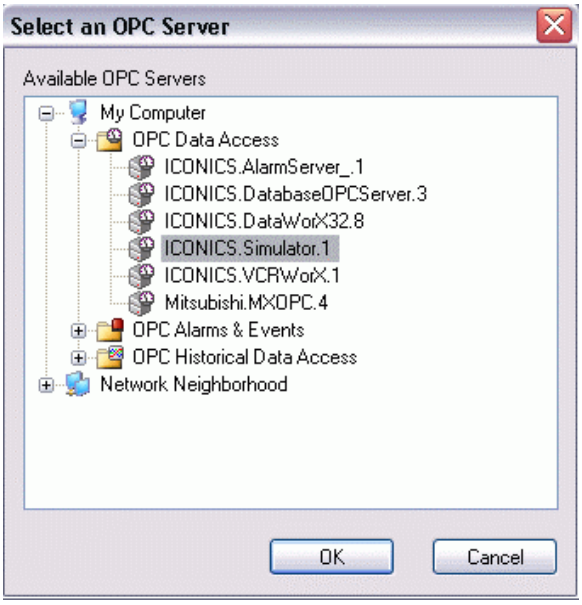
To add an OPC item to a nondefault group, do the following:

1. Right-click the **Connected** tree and click **Add Server** to add a server to the tree, as shown below.



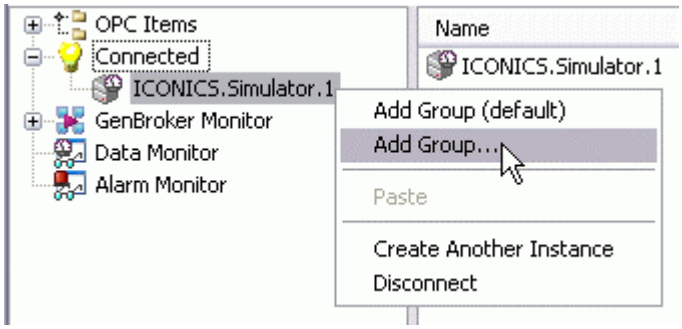
Adding a Server

2. This opens the **Select an OPC Server** dialog box, shown below. Choose a server and then click **OK.** The selected server will now appear under the **Connected** tree.



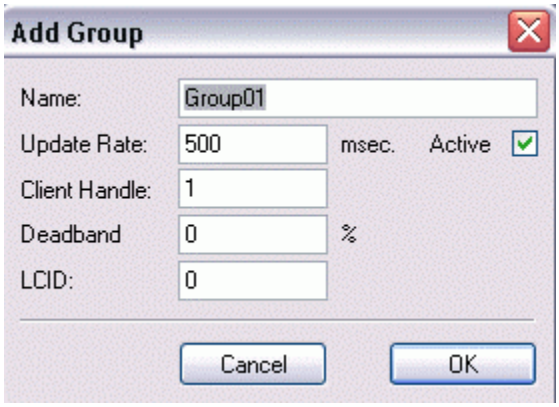
Selecting an OPC Server

3. Right-click the selected server and select **Add Group,** as shown below.



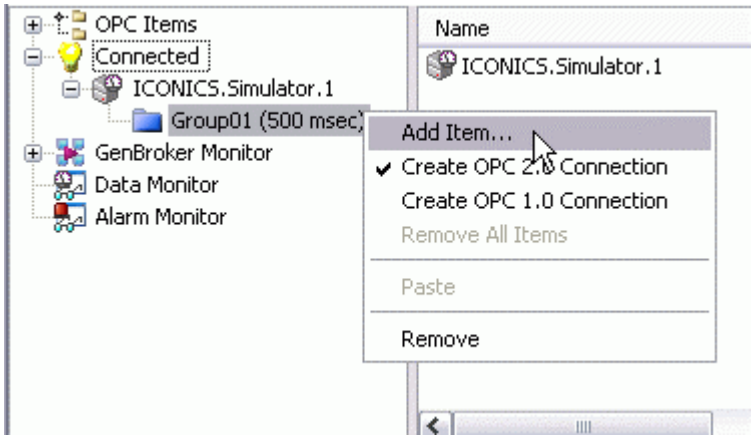
Adding a Group

4. This opens the **Add Group** dialog box, shown below, which allows you to specify parameters for the new OPC group.



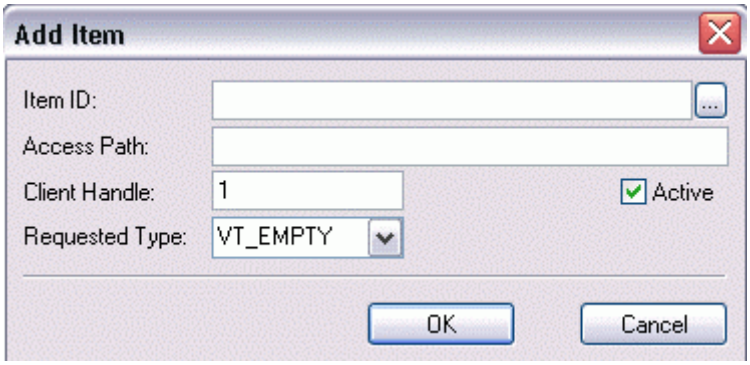
Add Group Dialog Box

5. Add items to the new group by right-clicking the group name in the tree view and selecting **Add Item,** as shown below.



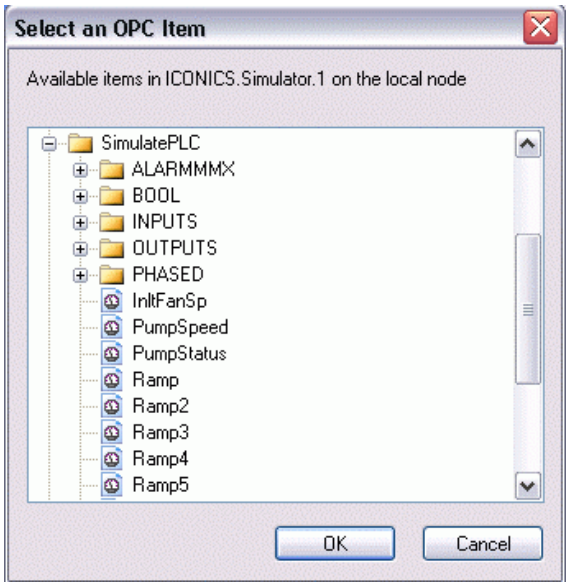
Adding an Item to Group

6. This opens the **Add Item** dialog box, as shown below. To select an item, click the **...** button to the right of the **Item ID** field.



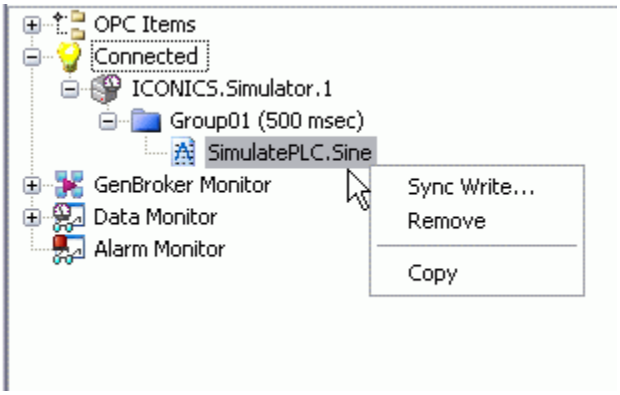
Add Item Dialog Box

7. This opens the **Select an OPC Item** dialog box, shown below, which enables you to select items from the server. Select an item and then click **OK.**

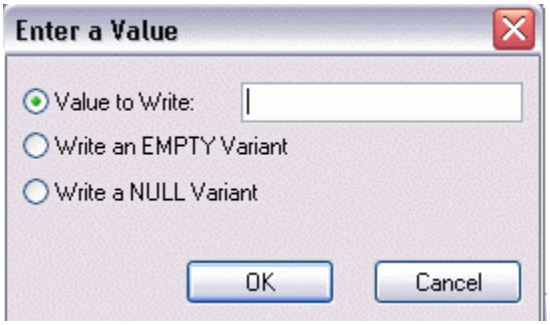


Select an OPC Item Dialog Box

8. The item now appears under the group. To write a value to the group, right-click the item and select **SyncWrite.** This opens the **Enter a Value** dialog box, shown below, which allows you to specify a value. You can also remove the item from the group or copy the item.



OPC Item Options



Entering a Value To Write

Using OPC DataSpy to View OPC Alarms and Events

You can use OPC DataSpy to view OPC alarms and events from OPC AE servers, as shown below.

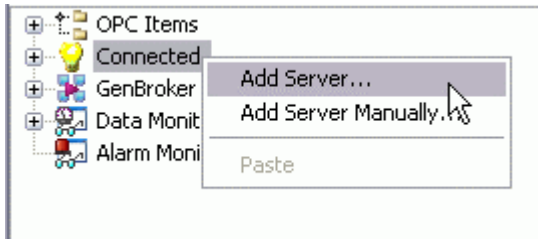
Alarm Source	Time	Message	Event Type	Category
/+Temperature+/	03/29/06 12:44...	/+Awx\Limit\T...	CONDITION	Limit
/+Pressure+/	03/29/06 12:44...	/+Awx\Deviati...	CONDITION	Deviation
/+Pressure+/	03/29/06 12:44...	/+Awx\Deviati...	CONDITION	Deviation
Humidity	03/29/06 12:44...	Core humidity is...	CONDITION	Limit
/+Temperature+/	03/29/06 12:44...	/+Awx\RateOf...	CONDITION	Rate of Change
/+Pressure+/	03/29/06 12:44...	/+Awx\Deviati...	CONDITION	Deviation
/+Temperature+/	03/29/06 12:44...	/+Awx\RateOf...	CONDITION	Rate of Change
/+Temperature+/	03/29/06 12:44...	/+Awx\Limit\T...	CONDITION	Limit
/+Pressure+/	03/29/06 12:44...	/+Awx\Deviati...	CONDITION	Deviation
Box Line	03/29/06 12:44...	Belt1 on the Bo...	CONDITION	Limit

Viewing Alarms and Events

Viewing Alarms and Events

To get alarms and events from an OPC AE server, do the following:

1. Right-click the **Connected** tree and click **Add Server,** as shown below.

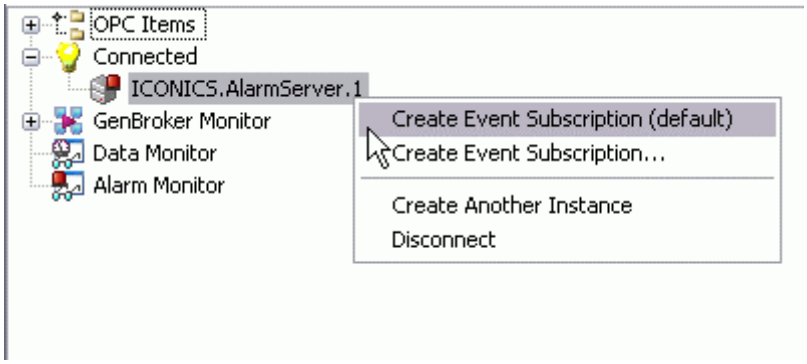


Adding a Server

2. This opens the **Select an OPC Server** dialog box, shown below. Select an OPC AE server, as shown below. The selected server now appears under the **Connected** tree.

Selecting an OPC Server

3. Create an event subscription in that server by right-clicking the server and selecting **Create Event Subscription,** as shown below.

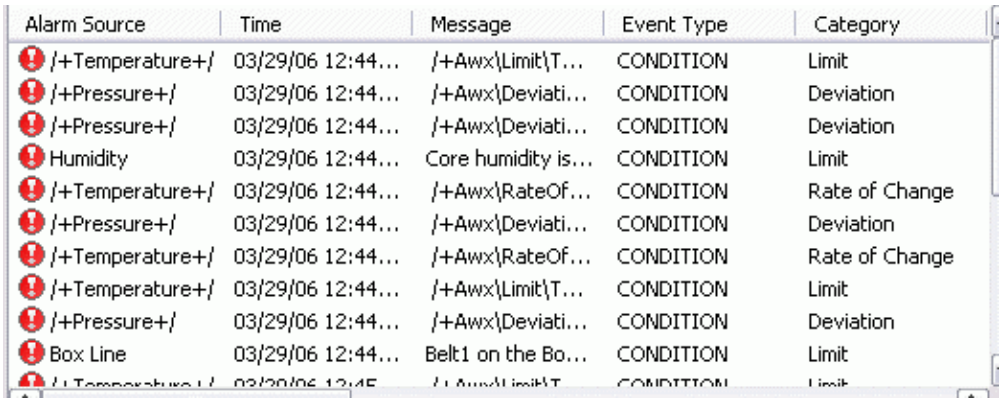


Creating an Event Subscription

4. You may create a subscription with default parameters, which can be preset in the **AE Defaults** tab of the **Options** dialog box. Or you can specify parameters in the **Create Subscription** dialog box, shown below. The new subscription appears under the OPC AE server under the **Connected** tree.

Create Subscription Dialog Box

5. When you click on the newly created subscription, you will see alarms coming from the selected subscription in the right pane of the OPC DataSpy screen under the **Alarm Monitor,** as shown below. This displays the source, time, message, event type, category, and severity of each alarm. To acknowledge an alarm, right-click the alarm and select **Acknowledge.** For more information about subscriptions, please see the section about **Subscriptions.**

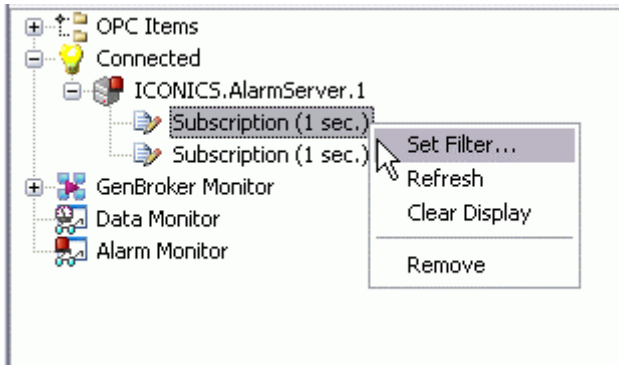


Alarm Subscription

Subscriptions

After you have created an alarm-and-event subscription, you may set filters on it by right-clicking the subscription and selecting **Set Filter,** as shown below. Alternatively, you can unsubscribe from the server by selecting **Remove.** In addition, you can refresh or clear the display.

Note: For more information about alarm filters and subscriptions, please see the AlarmWorX32 Help documentation.



Setting Subscription Filters

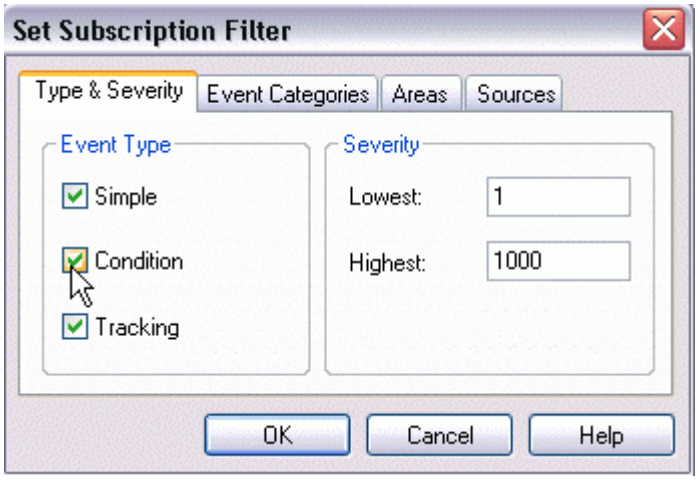
Selecting **Set Filter,** as shown above, opens the **Set Subscription Filter** dialog box, which contains the following tabs:

- Type and Severity
- Event Categories
- Areas
- Sources

Type and Severity

The **Type and Severity** tab in the **Set Subscription Filter** dialog box, shown below, allows you to choose which event types to display for the subscription: simple, condition, and tracking. It also enables you to specify a range for the severity.

A value of "0" represents the low severity value, and "1000" represents the high severity value. Please note that OPC Alarm and Event (AE) servers are required to scale severity values to the OPC ranges (i.e. an AE server that contained two severity ranges would convert these to "0" and "1000").



Set Subscription Filter Dialog Box: Type and Severity Tab

Simple (only produced by the GenEvent Server): These messages state information but do not have alarm status, nor do they contain information on what initiated the message. This includes the following information: Source, Time, Type, EventCategory, Severity, Message, Cookie, and server-specific items.

Example: "FIC101, 12:0:0 1/1/99, Simple, Category1, 100, 'Shift Change', 1"

Simple messages would be similar to an event.

Tracking (only produced by the GenEvent Server): These messages contain the additional information about the client that initiated the event. This includes the following information: Source, Time, Type, EventCategory, Severity, Message, Cookie, ActorID, and server-specific items.

Example: "FIC101, 12:0:1 1/1/99, Tracking, Category1, 300, 'Pump pressure Set to 10 psi', 1, Station 12"

Tracking messages are similar to event messages in that the cause of the event is important. An example would be an operator changing a setpoint value. This type of message does not include acknowledge capability. When a value is changed in GraphWorX, a "Tracking Event" is issued with the category "Operator Process Change." All other GENESIS32 apps report only "Simple" events which are always category "System." GenEvent Automation users are free to specify the other categories when they issue a "Tracking Event."

Note: Simple and tracking messages are removed from the alarm viewer via the acknowledge mechanism.

Condition (only produced by the AlarmWorX Server): These messages contain all of the above information but also include an acknowledgement portion. This includes the following information: Source, Time, Type, EventCategory, Severity, Message, Cookie, ConditionName, SubConditionName, ChangeMask, NewState, ConditionQuality, AckRequired, ActiveTime, ActorID and server-specific items.

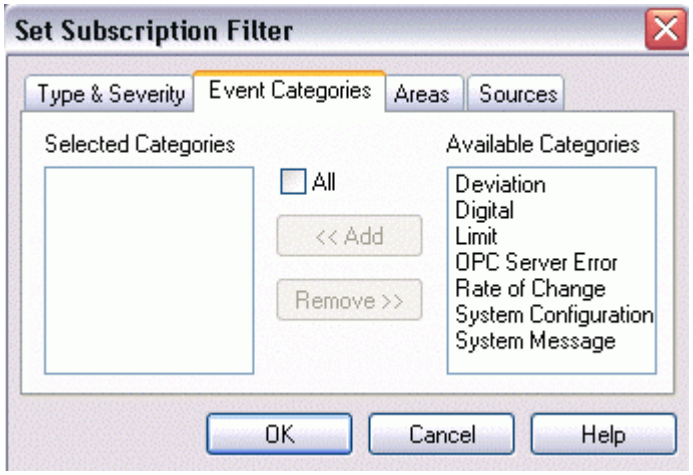
Example: "FIC101, 12:0:3 1/1/99, Condition, Category1, 700, 'Pump pressure to high', 1, Limit, HiHi, 1,Active Enabled, Good, TRUE, 12:0:2 1/1/99"

Condition messages would be considered a "typical" alarm message with acknowledge capability.

For more information, please refer to the OPC Alarm and Events specification at **www.opcfoundation.org.**

Event Categories

The **Event Categories** tab in the **Set Subscription Filter** dialog box, shown below, allows you choose which event categories to display for the subscription. Click the desired categories in the **Available Categories** list, and then click **Add** to add them to the **Selected Categories** list. Click **Remove** to remove categories from the list of selected categories.



Set Subscription Filter Dialog Box: Event Categories Tab

Alarm Server Categories

All events generated are of the OPC-defined Event Type **Condition.** The **AlarmWorX32 Server** defines the following **Event Categories** and uses the identical names for the **Condition Names:**

- **Deviation:** Triggers an alarm if the difference between two input values exceeds the high or low limits specified in the Alarm Server configuration.

- **Digital:** Triggers an alarm if the comparison between the **Alarm State Value** (specified in the Alarm Server configuration) and the input state is TRUE.
- **Limit:** Triggers an alarm if the input value exceeds the high or low limits specified in the Alarm Server configuration.
- **Rate of Change:** Triggers an alarm if an input value changes at a rate greater than or equal to the limit specified in the Alarm Server configuration.

The **Limit** and **Deviation** conditions have the following subconditions:

- **HiHi:** Triggers an alarm if the value is greater than or equal to the **HiHi** limit specified in the Alarm Server configuration.
- **Hi:** Triggers an alarm if the value is greater than or equal to the **Hi** limit specified in the Alarm Server configuration.
- **Lo:** Triggers an alarm if the value is less than or equal to the **Lo** limit specified in the Alarm Server configuration.
- **LoLo:** Triggers an alarm if the value is less than or equal to the **LoLo** limit specified in the Alarm Server configuration.

Note: The following categories are not used in the AlarmWorX32 Server:

- OPC Server Error
- System Configuration
- System Message

Event Server Categories

The **GenEvent Server** defines the following **Event Categories:**

- **Operator Process Change:** Sent by GenEvent when a value is changed in GraphWorX32.
- **Sysconfig:** Sent by GenEvent when a configuration change is made to a file or database.
- **System:** All other GenEvent messages.

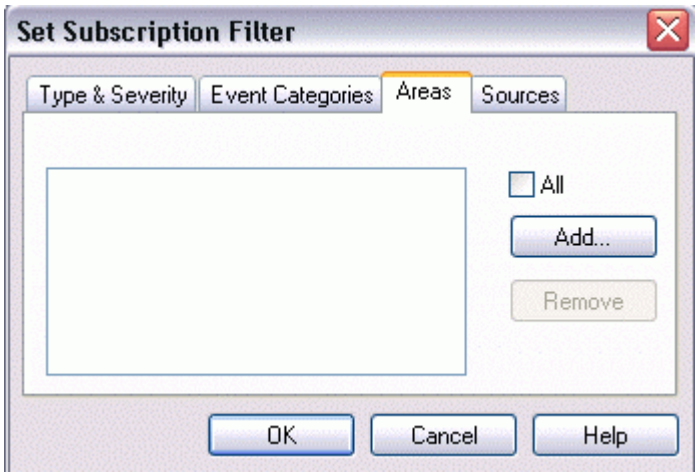
Note: The **Advanced** category is not used in the GenEvent Server:

For more information, please refer to the OPC Alarm and Events specification at **www.opcfoundation.org.**

Areas

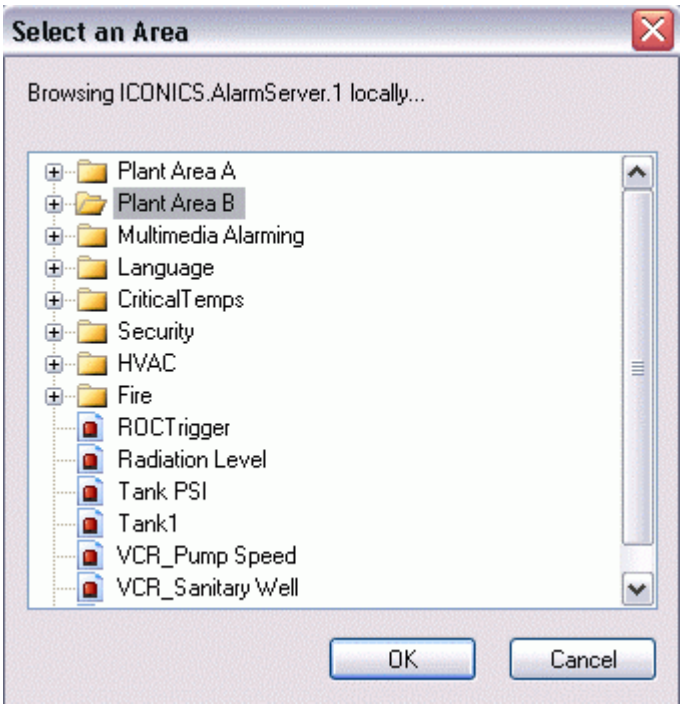
The **Areas** tab in the **Set Subscription Filter** dialog box, shown below, allows you choose which areas to display for the subscription. An **area** is used to group OPC alarm tags. This information can be used by clients for filtering purposes. A tag can exist under multiple areas, and an area can have a multiple levels. An area is defined by its name and the name of its parent

branches. For example, a branch called Area 1 under plant Area A is different from Area 1 under plant Area B. Areas can be configured in the AlarmWorX32 Server Configurator.



Set Subscription Filter Dialog Box: Areas Tab

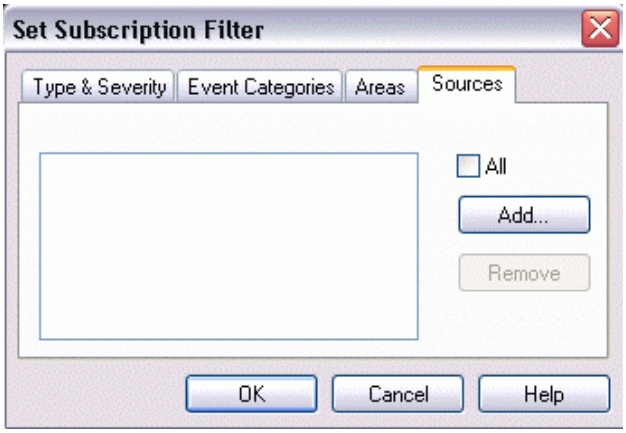
To add an area, click the **Add** button. This opens the **Select an Area** dialog box, shown below. Select an area from the list, and then click **OK.** The area (Plant Area B, in this case) now appears in the **Areas** tab of the **Set Subscription Filter** dialog box, as shown above. Now the subscription will display data for sources that are in the selected area. To remove an area, select the area and then click **Remove.**



Select an Area Dialog Box

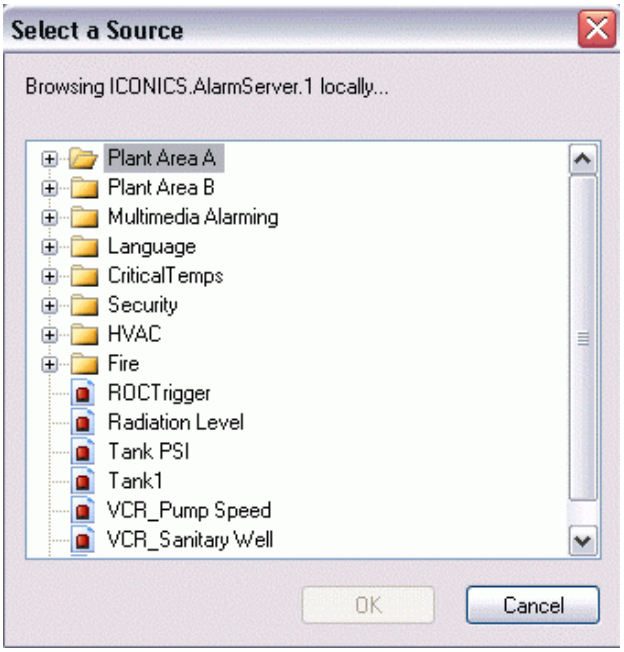
Sources

The **Sources** tab in the **Set Subscription Filter** dialog box, shown below, allows you choose specific sources to display for the subscription. A **source** is an OPC alarm tag in an alarm configuration. In the AlarmWorX32 Server Configurator, a source can be associated with a particular area (group of alarm tags). It is also possible to delete a source for a particular subscription. To delete a source, select it from the list of sources for this particular subscription and click the **Delete** button. Not all OPC Alarm and Event servers support source filtering as part of the subscription.



Set Subscription Filter Dialog Box: Sources Tab

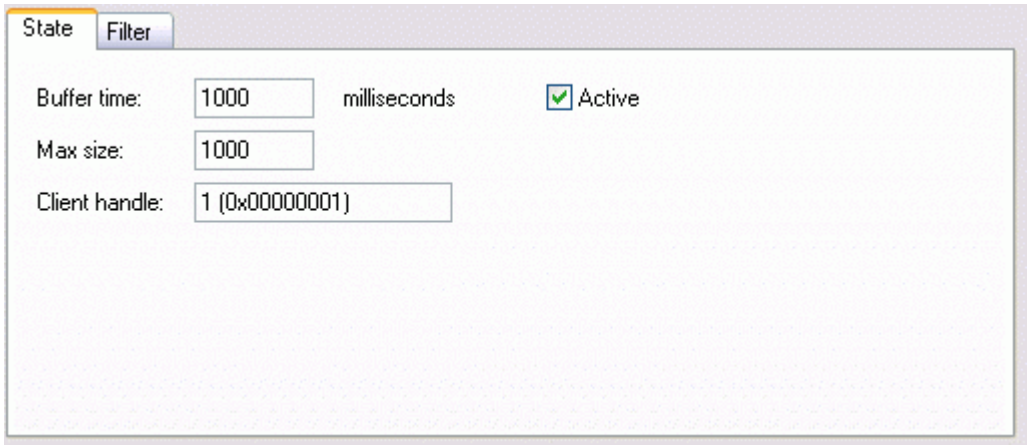
To add a source, click the **Add** button. This opens the **Select a Source** dialog box, shown below. Select a source from the list, and then click **OK.** The sources you have selected ("Humidity" and "Pump1" in this case) now appear in the **Sources** tab of the **Set Subscription Filter** dialog box, as shown above. Now the subscription will display data for the selected sources. To remove a source, select the source and then click **Remove.**



Select a Source Dialog Box

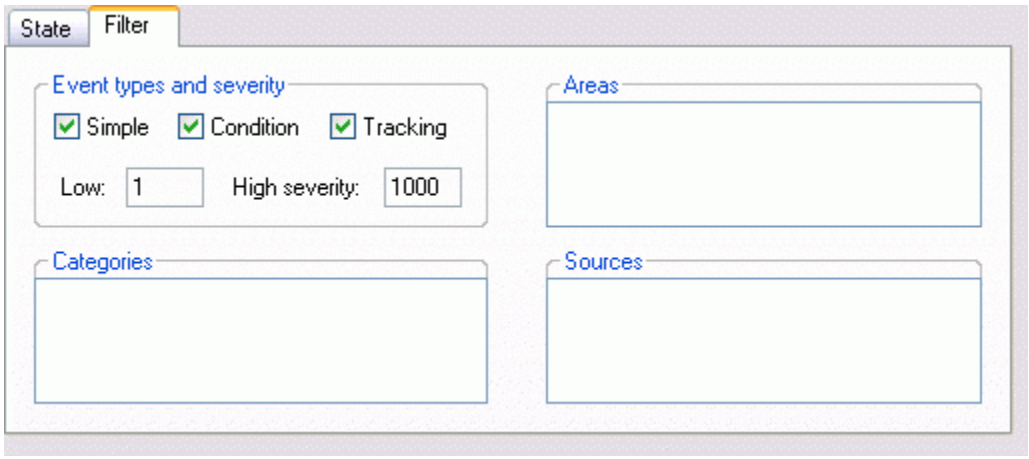
Subscription Properties

To view the properties of an AE subscription, select the subscription in the tree view and then select **Properties** from the **View** menu, or click the **Properties** button on the toolbar. This opens the **AE Subscription Properties** dialog box. The **State** tab, shown below, provides status information for the subscription.



AE Subscription Properties Dialog Box: State Tab

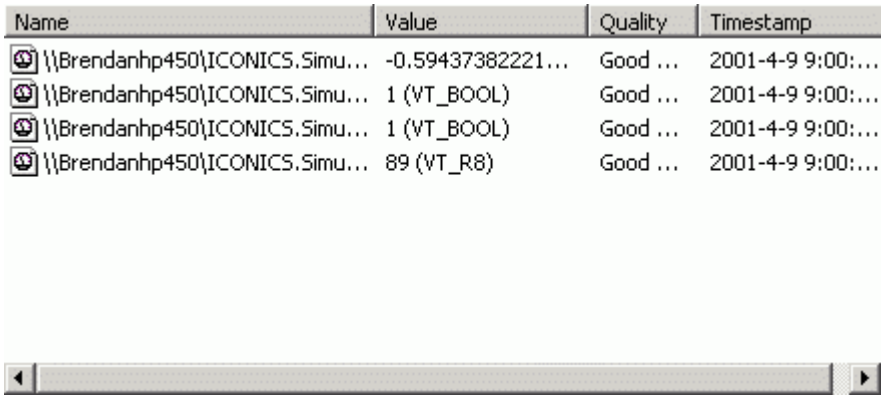
The **Filter** tab, shown below, contains information about the subscription filters that have been set in the **Set Subscription Filter** dialog box.



AE Subscription Properties Dialog Box: Filter Tab

GenBroker Monitor

Just as you use the OPC Monitor to view data from OPC servers, you can also use the **GenBroker Monitor** in the tree view of the OPC DataSpy screen to view data from OPC DA and AE servers. The difference is that the GenBroker Monitor uses GenClient/GenBroker communication to monitor data from connected OPC servers under the **Internet** subtree of the **OPC Items** tree. When you select **GenBroker Monitor** in the tree view, the name, value, quality, and timestamp of the OPC items are displayed in the right-hand pane of the OPC DataSpy screen, as shown below.

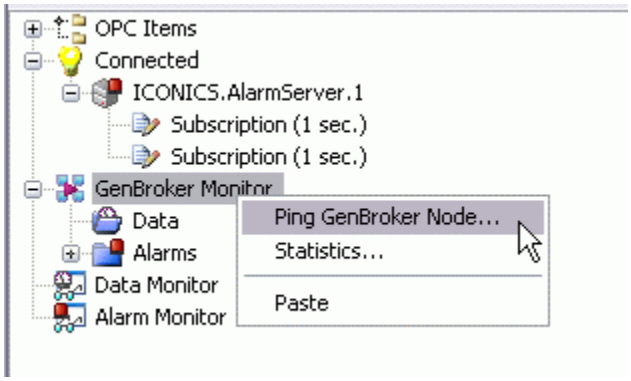


GenBroker Monitor

Pinging a GenBroker Node

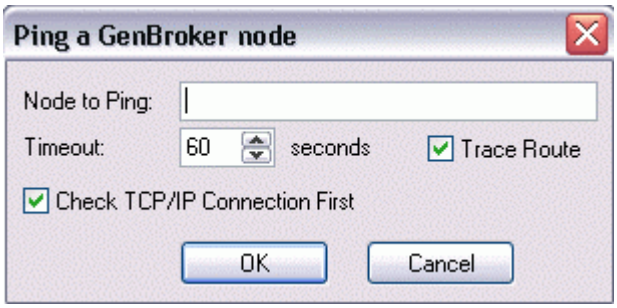
To ping a GenBroker node:

1. Right-click the **GenBroker Monitor** and select **Ping,** as shown below.



Pinging a GenBroker Node

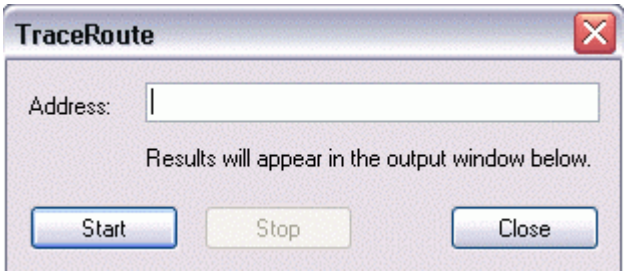
2. Type in a node name (URL or IP address) in the **Node to Ping** field, as shown below. To test the connection, check the **Check TCP/IP Connection First** check box. Click **OK.**



Specifying the Node Name

3. See the ping and Trace Route messages in the Output window.

Note: You can also ping for a trace route by selecting Internet Control Message Protocol (ICMP) **Trace Route** from the **Tools** menu. This displays a network route to a specified URL or IP address. Click the **Start** button to begin the trace. You can see the results of the trace in the Output window.



Pinging a Trace Route

Alternatively, you can:

1. Browse for the node you wish to ping under the **Internet** tree.

2. Right-click the node and select **Ping.**

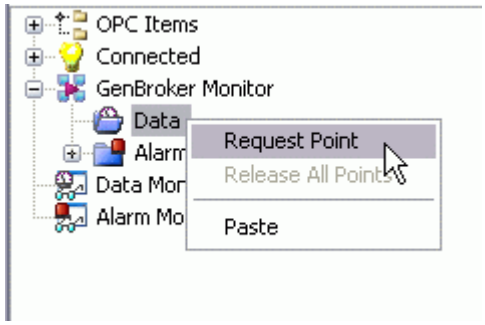
Pinging an OPC DA Server

To ping an OPC DA server, browse to the server under the **Internet** tree, right-click the server name, and select **Ping Server** from the pop-up menu. The latest version of GenBroker must be present on the server node.

Using the GenBroker Monitor to View OPC Data Access

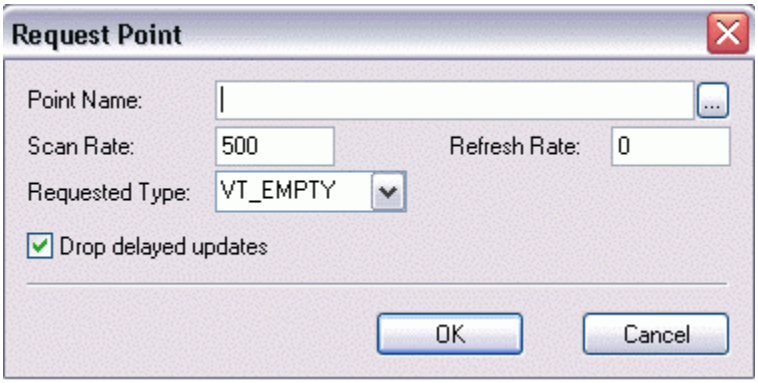
To view OPC DA servers using the GenBroker Monitor, do the following:

1. Under the **GenBroker Monitor,** right-click **Data** and select **Request Point,** as shown below.



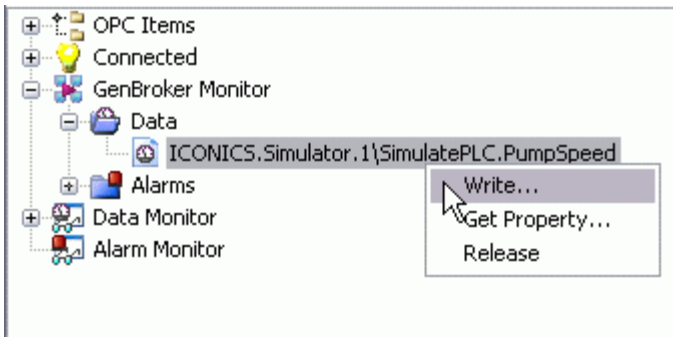
Requesting a Data Point

2. This opens the **Request Point** dialog box, shown below, which allows you to select an OPC item to monitor. The default settings are specified in the **GenClient** tab of the **Options** dialog box. To select an OPC item, click the **...** button to the right of the **Point Name** field. This opens the Unified Data Browser. Select an OPC Data Access tag from the **Internet** subtree in the Unified Browser. The tag name appears in the **Point Name** field, as shown below.

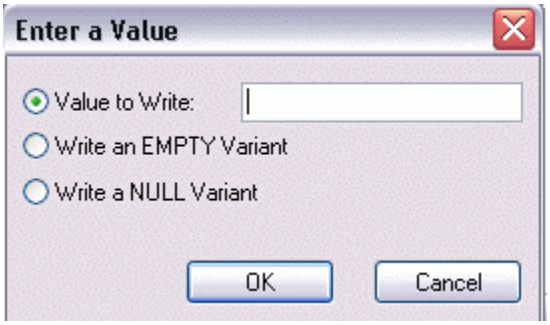


Request Point Dialog Box

3. Click **OK.** The tag now appears under **Data** under the GenBroker monitor**.** To write a value to the tag, right-click on the item and select **Write,** as shown below. This opens the **Enter a Value** dialog box, shown below, which allows you to specify a value. Alternatively, you can release the tag from the monitor.

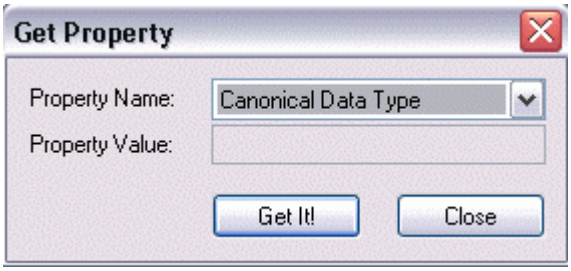


Writing a Value to the Tag



Enter a Value Dialog Box

4. To get a specified property for a tag, right-click the tag and select **Get Property.** This opens the **Get Property** dialog box, shown below. The properties are defined by the OPC 2.0 specifications. Select a **Property Name,** and then click **Get It!** The value will be displayed in the **Property Value** field. The property will also be displayed in the output window.

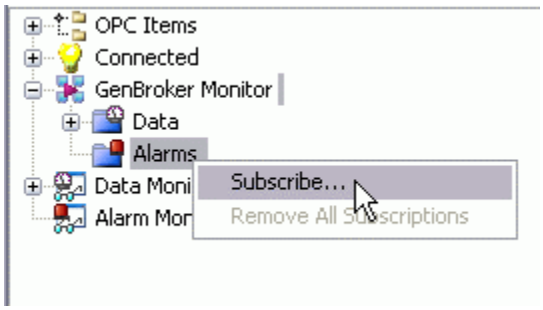


Get Property Dialog Box

Using the GenBroker Monitor to View OPC Alarms and Events

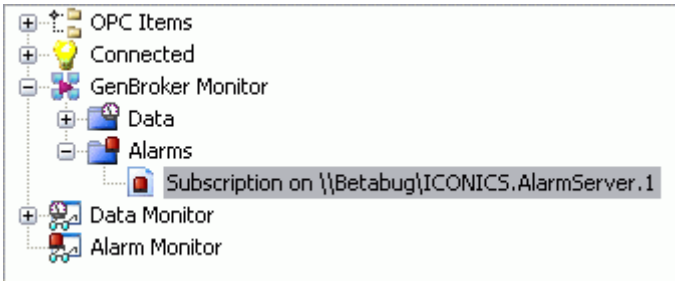
To view OPC AE servers using the GenBroker Monitor, do the following:

1. In the **GenBroker Monitor** tree, right-click **Alarms** and select select **Subscribe,** as shown below.



Subscribing to an OPC AE Server

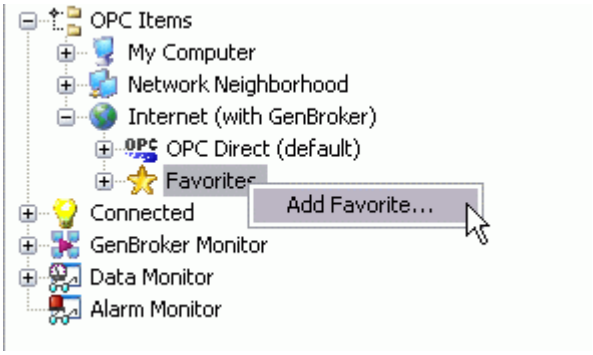
2. Select an OPC AE server, and then click **OK.** The subscription now appears under **Alarms** in the GenBroker Monitor, as shown below. Click on the subscription in the tree to view alarms in the right-hand pane.



Viewing an Alarm Subscription in GenBroker

Favorites

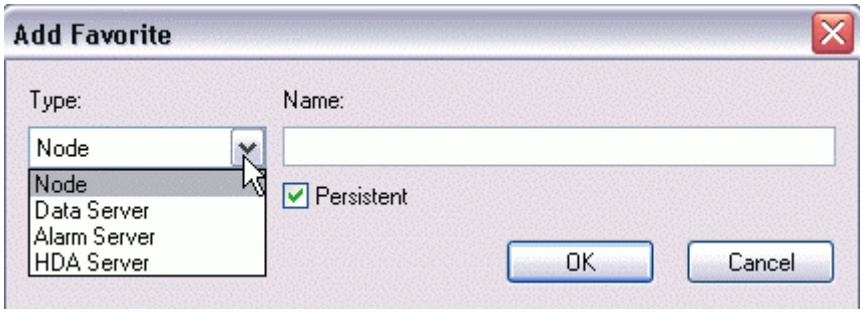
The **Favorites** item located under the Internet (with GenBroker) tree in the DataSpy tree control, shown in the figure below, enables you specify frequently connected network nodes and servers. Right-click the **Favorites** item and select **Add Favorite** from the pop-up menu, as shown in the figure below.



Adding a Favorite Item

In the **Add Favorite** dialog box, choose an item type from the drop-down list, as shown in the figure below:

- **Node:** Specify a computer name.
- **Data Server:** Specify a computer name or URL.
- **Alarm Server:** Specify the name of the alarm and events server.
- **HDA Server:** Specify the name of the historical data access server.



Selecting an Item Type To Add to Favorites

Advanced OPC DataSpy Capabilities

Advanced capabilities of OPC DataSpy include:

- Loading and Saving
- Drag-and-Drop
- Logging Data
- Embedded Property Pages
- Localization
- Array Data Type
- Select Language

Loading and Saving

OPC DataSpy is capable of loading and saving its configuration. When loading a DataSpy file, OPC DataSpy automatically connects to OPC servers, and appropriate objects are created on the server side. In addition, the callback subscription is set up. To load a DataSpy (.spy) file, select **Open** from the **File** menu. The resulting dialog box allows you to browse for a file. To save a document as a DataSpy file, select **Save As** from the **File** menu. Enter the file name in the resulting dialog box, and then click **OK.**

Drag-and-Drop

As mentioned above, it is possible to monitor an OPC item by simply dragging the item from the **OPC Item** tree to the **Connected** tree. One or more items can be dragged at the same time. You can add items to a specific group by simply dropping the items on that group. When items are dropped on the server, an existing group is used or a new one is created.

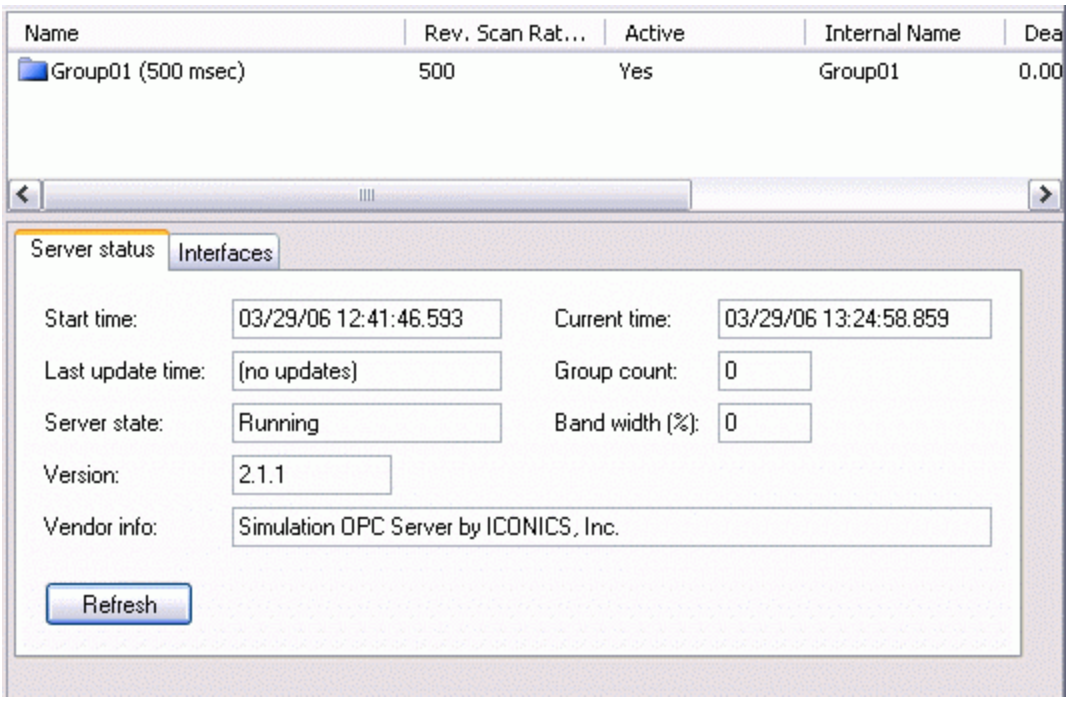
Logging Data

OPC DataSpy can display all OPC calls, CreateIinstance calls, and internal messages in the output window (bottom pane). You can choose to hide or display the output window by selecting **Output** from the **View** menu, or by clicking the **Output** button on the toolbar. The same information may be logged into a file. Specify the log file in the **Output** tab of the **Options** dialog.

Embedded Property Pages

The properties of a selected OPC server, group, item, or subscription can be displayed as a part of the right-hand pane, as shown below, or they can be shown in a separate dialog box. You can choose they way you want the properties to be shown by using the **Embedded Property Pages** option in the **Environment** tab of the **Options** dialog box.

Note: The embedded property pages are not available for Windows CE.



Embedded Properties Dialog Box

Localization

The OPC DataSpy is localized.

Array Data Type

OPC DataSpy supports array data types. When writing to an array item, use commas to separate the array entries.

Select Language

The **Select Language** function on the **View** menu allows you to choose which language to use in your display. Choosing **Select Language** from the **View** menu opens the **Select Language** dialog box, shown in the figure below.

Note: A language resource .dll is required for language switching.

Select Language Dialog Box

Define the parameters listed in the table below. Then click **OK** to return to the work area.

Select Language Parameters

Parameter	Description
List	Lists available languages. Depending on which item you have selected, the view on the left will change. If **English** is checked, the languages will appear as their English name. If **Localized** is checked, the languages will appear with the native country in parentheses (for languages with several dialects only). When **Native** is checked, the languages are displayed the way they would be written in that language.
Installed Locales Only	If this is checked, local languages appear in the box.
Available Language Translations Only	Checking this box allows you to choose from available language translations only.