System Platform and OPC DataHub

Basic OPC Connectivity
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Introduction

The purpose of this guide is to demonstrate how to make a basic OPC connection to the OPC DataHub with Wonderware’s System Platform 3 (Archeatra). We will use System Platform to refer to version 3 and all prior versions (formerly known as IAS/Industrial Application Server). There are a number of different ways System Platform can connect to I/O tags. This basic example uses an Application Integration (AI) Object connecting to an OPC Device Integration (DI) Object which connects to the OPC DataHub.

The OPC DataHub in this example will use the DataSim simulator included with the OPC DataHub install. The assumption of the document is that you have a fully configured OPC, DDE or ODBC data source connected to the OPC DataHub. Therefore we will only show how to connect System Platform to the OPC DataHub. If you do not already have the OPC DataHub installed, the free one-hour demonstration version can be downloaded at http://www.softwaretoolbox.com/opcdatalhub. This version functions the same as a fully licensed version within the one-hour demo mode. Stop the OPC DataHub and restart it for another hour of runtime.

This guide will also demonstrate how to connect System Platform tags to OPC DataHub points and thus to points in your data source. For more detailed information on OPC DataHub configuration, refer to the help file or the training resources on the website link above.

The information provided here is not a substitute for your System Platform documentation. This procedure is being demonstrated in order to show a complete connection, not to provide comprehensive training on how to build System Platform projects.

Intended Audience

This guide is intended for Wonderware System Platform users who are new to OPC DataHub. This document makes the assumption that you have some familiarity with System Platform and have fully configured your data source so that the OPC DataHub is successfully connected to the data source.

**OPC DataHub Setup**

When connecting an OPC client through the OPC DataHub to your data source the OPC Settings are the only essential settings to the client, and therefore, are all that will be covered here. With the OPC DataHub, you can connect a variety of data sources: OPC Server, DDE Server, ODBC databases, or any other data source that can accept a TCP Socket connection. For this example, you will need to open both the OPC DataHub (Start | Programs | Cogent | OPC DataHub | OPC DataHub) and the DataSim (Start | Programs | Cogent | Simulated Data | DataSim).

![Figure 1: Launching OPC DataHub](image)

When the Data Simulator opens, you will see the interface below and you will notice a status of Connected if you have a successful connection.

![Figure 2: Data Simulator Interface](image)
When the OPC DataHub opens you will see the User Interface as shown in Error! Reference source not found. on page 5.

As you can see in Error! Reference source not found., OPC DataHub opens to the general settings and has a number of different settings. The settings we are concerned with are the OPC settings.

![OPC DataHub Properties](image)

**Figure 3: OPC DataHub Interface**

In this case because we are using the DataSim, which uses a TCP connection, we also must go to the Tunnel/Mirror settings and select one setting.
Because the Data Simulator uses a TCP connection, we must make sure that "Accept plain-text connections on service/port" is checked and that the port matches that of the port in DataSim.

![Figure 4: Tunnel/Mirror Options](image)

We have assumed that the user has previously configured a connection to the data source (if you are not using the data simulator shown in this example). We now need the OPC DataHub to act as an OPC Server. This is so that System Platform can connect to OPC DataHub using the OPCClient DI object. This is done by checking the “Act as an OPC Server” check box below.

![Figure 5: OPC DataHub OPC Settings](image)
Configuring System Platform

System Objects Configuration

This example starts with the ArchestrA IDE open using a new Galaxy. Refer to your Wonderware documentation for instruction on how to create a new System Platform Galaxy. For the purposes of this tutorial, we will be using the Deployment View in our sample Galaxy, SWTB1, as seen in Figure 6 below.

![Deployment View](image)

**Figure 6: Deployment View**

The first step in configuring a new project begins with the System Object in the Template Toolbox. Expand the System Object and highlight the $WinPlatform template object, as shown in Figure 7 below.

![$WinPlatform](image)

**Figure 7: $WinPlatform**
Drag and drop the $WinPlatform template object under the Galaxy in the Deployment View as shown in Figure 8 below. This example will use the default names, but you can name these objects as needed for your project.

![Figure 8: Adding $WinPlatform](image)

The AppEngine is the next System Object we need to create for this project. Drag and drop the $AppEngine template object under the Unassigned Host folder to create your AppEngine_001 object as shown in Figure 9 below.

![Figure 9: Adding $AppEngine](image)
The final System Object required is the Area Object. Drag and drop the $Area template System Object to the Unassigned Host folder under the Deployment View to create the Area_001 object as shown in Figure 10 below.

Refer to your Wonderware documentation for a better understanding of how these logical objects work and how to best name them for your system.

The AppEngine_001 object can now be assigned under the WinPlatform_001 object and the Area_001 object can be assigned under the AppEngine_001 object, as shown in Figure 11 below. There is no configuration of these objects required for this example.

Now that our System Objects are created and in place we can configure our DI or Device Integration object.
Device Integration Object Configuration

We start by selecting our template object from the Device Integration section of the Template Toolbox as shown in Figure 12 below. The $OPCClient object template is selected because this example demonstrates an OPC connection to the OPC DataHub.

![Figure 12: $OPCClient DI Object](image)

Drag and drop the $OPCClient template object to the Unassigned Host folder in the Deployment View as shown in Figure 13 below to create our OPCClient_001 DI Object.

![Figure 13: Adding OPCClient DI Object](image)
Double-clicking the OPCClient_001 object under the Unassigned Host will open the object properties to the right of the Template Toolbox as shown in Figure 14 below.

![Figure 14: OPCClient Object Properties](image)

Click on the Ellipses Button (…) to the right of the “Server node” text field, as shown in Figure 15 below.

![Figure 15: Selecting a Server Node](image)

The Browse Node dialog box will open. You can select the Domain of the computer node where The OPC DataHub is installed. This will then display a list of available computer node names that are available in that
domain. The name of the node for this example is "KMR-IAS-TEST", so we will highlight that node name and select OK, as shown in Figure 16 below.

![Figure 16: Browsing Nodes](image)

**Remote OPC Connections and DCOM**

For this example, the node "KMR-IAS-TEST" is the local machine where both System Platform and OPC DataHub are installed. Connecting to a node with OPC DataHub installed that is not the same node where System Platform is installed will involve a remote OPC connection. This means Windows DCOM Security Settings will play a factor in the success of your connection to OPC DataHub. The tunneling abilities of the OPC DataHub can be used to avoid the need for DCOM configuration across a network.

If you want to use DCOM, please refer to our DCOM Tutorial Videos and Guides, available at: [http://www.softwaretoolbox.com/dcom](http://www.softwaretoolbox.com/dcom).
Browsing the OPC DataHub Address Space

Once the Server node is selected, you will be able to browse for the available OPC Servers (the OPC DataHub is acting as an OPC Server in this case) on the node selected by expanding the dropdown menu beside the Server name field as shown in Figure 17 below.

![Image of server selection interface]

**Figure 17: Browsing for OPC Servers**

The options you have in your OPC Server list will depend on the number of OPC Servers installed on that machine. For connections to OPC DataHub, you will always select “Cogent.OPCDataHub.1” from the list. Problems browsing for OPC Servers typically indicate DCOM issues; please refer to the section of this document entitled Remote OPC Connections and DCOM for details on how to address this problem. If you are using the OPC DataHub in demo, please make sure the demo period had not ended. You can stop the DataHub and restart it and try the connection again.

Once OPC DataHub has been selected, we can now proceed to the Scan Group tab of the OPCClient_001 object as shown in Figure 18 below.
Figure 18: Scan Group Configuration

System Platform requires that at least one Scan Group be configured. If all of your items will need the same Update Interval, you would only need one Scan Group, unless you wanted to group your items in a certain way. The Scan Group Update Interval will only effect how often data is returned to the System Platform. The OPC DataHub does not pass update rates from OPC Clients to the OPC Server. The rate the Data Source is requested to provide data is set in the OPC DataHub. Please see the information in the help file for the specific data source you are requesting data from to determine how this is set.

If different items need different Update Intervals, you would configure multiple Scan Groups using a different Update Interval for each. For the purposes of this example, we will only be configuring one Scan Group.

To add a new Scan Group, click the blue “+” symbol above the “Available scan groups” section, as displayed in Figure 19 below.
This will allow you to give your Scan Group a meaningful name and define the rate at which System Platform will request updates for the items in this Scan Group, as seen in Figure 20 below.

For the purposes of this example, the Scan Group has been named “Group1” and uses the default Update Interval of 500 milliseconds (which is automatically used if you do not specify an Update Interval).

With a Scan Group configured, there are now two options for adding items to the group.

1. We can browse the OPC Server tag database for items to add.
2. We can import a .CSV file containing the tag information.

The following sections will demonstrate both methods.

Adding Scan Group Items via OPC Browsing

First, we will add an item by browsing the OPC DataHub tag database. Highlight the scan group you have just created, and then click the blue “+” symbol above the “Associated attributes” section, as shown in Figure 21 below.
Figure 21: Adding Group Attributes

This will add a new “Attribute” to the scan group we have created. You are given the option of defining a name for this attribute or you can skip this step, in which case the full address including the Domain and Tag Name from OPC DataHub will be used once an item is selected.

To browse the tag database of OPC DataHub, click the Ellipses Button (…) to the far right of the Item Reference column for the Attribute you are adding and this will open the OPC Item Browser, shown in Figure 22 below.

![OPC Item Browser](image)

Figure 22: OPC Item Browser

The branch we are interested in is the “DataSim” branch, which you will notice is the name of the domain that is configured in OPC DataHub as you can see in Figure 23 below.
Figure 23: Browsing Branches

Highlighting the “DataSim”, we are able to view and select the tags in the DataSim domain of the OPC DataHub, as you can see in Figure 24 below.

Figure 24: Browsing OPC Tags

To add an item to the scan group, we must first add the desired item or items to the Basket area of the OPC Item Browser. The easiest way to do this is by selecting the item and dragging and dropping the desired item into the Basket area, as shown in Figure 24 above.

Once the desired item or items are added to the Basket area, clicking OK will add the basket items to the Associated Attributes for the scan group, as seen in Figure 25 below.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Item Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>DataSim:Ramp</td>
<td>DataSim:Ramp</td>
</tr>
</tbody>
</table>

Figure 25: Attribute List

For the purpose of this example, we will change the attribute name to “Ramp” to match the tag name in OPC DataHub. This name can be any meaningful name you would like, though. To change the attribute
name, simply highlight the Attribute and click the current attribute name, then enter the desired name, as shown in Figure 26 below.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Item Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramp</td>
<td>DataSim:Ramp</td>
</tr>
</tbody>
</table>

**Figure 26: Changing Item Names**

Since we are only adding one item for this example, we are finished configuring the OPCClient object. Save the changes made to the OPCClient object and close the configuration screen by clicking the Save icon at the top, as shown in Figure 27 below.

**Figure 27: Save OPCClient Object**

You will then be prompted to “Check In” the changes that have just been made. You can enter an optional comment here as well. Check in the changes by clicking the “OK” button, as shown in Figure 28 below.

**Figure 28: Check-In Object Changes**
Assigning the OPCClient Object

Now that the OPCClient Device Integration Object has been configured, it needs to be assigned. The OPCClient Object needs to be assigned underneath the AppEngine_001 System Object that was configured earlier. Assign the object by dragging OPCClient_001 from the Unassigned Host folder to AppEngine_001, as shown in Figure 29 below.

Figure 29: Assigning DI Object
Application Object Configuration

The final object needed in order to connect to the OPC DataHub is the $Integer Application Template, shown in Figure 30 below. We are using this object because the tag in the OPC DataHub we will be connecting to in this example is an Integer. See your Wonderware documentation for more information on Application Objects.

Drag and drop the $Integer Application Object under the Unassigned Host folder, as shown in Figure 31 below, to create the Integer_001 Application Object.
Open the Integer_001 Application Object properties, as shown in Figure 32 below, by double-clicking the Integer_001 Object.

![Figure 32: Integer_001 Properties](image)

In the properties of our Integer object, we need to assign an item from our scan group in the OPCClient object. This assignment is made in the “PV Input Source” field, shown in Figure 33 below.

![Figure 33: PV Input Source](image)
Items added to the Scan Group under the OPCClient Object can be browsed and selected. To browse those items, click the Ellipses (…) Button next to the “PV Input Source” field. This will open the Galaxy Browser as shown in Figure 34 below.

![Figure 34: System Platform Galaxy Browser](image)

To browse the item in the scan group in the OPCClient Object, we will simply highlight the OPCClient_001 object, as shown in Figure 35 below.

![Figure 35: Browsing Scan Group Items](image)

As you can see, the item in the scan group we configured earlier shows up in the list to the right of the “Instances” view. If multiple items had been added to the scan group, they would all show up here. To associate the item with our Integer_001 object, simply highlight the item and click OK.
This will populate the "PV Input Source" field with the tag, as shown in Figure 36 below.

![Figure 36: PV Input Source Selected](image)

Now that the “PV Input Source” has been assigned, the Integer_001 object needs to be saved. Click the Save/Close button at the top right of the Integer_001 Properties, as shown in Figure 37 below.

![Figure 37: Saving Integer_001 Properties](image)

You will be prompted to “Check In” the changes and need to do so by clicking OK. The Integer_001 object now needs to be assigned to the Area_001 System Object in the Deployment View. This is accomplished by dragging and dropping the Integer_001 object from the Unassigned Host folder onto the Area_001 object, as shown in Figure 38 below.

![Figure 38: Assigned Integer_001 Object](image)

All objects have now been configured and assigned, so the next step is to deploy the galaxy.
Deploying the Configured Galaxy Objects

To collect live data from OPC DataHub, the configured objects must now be deployed. To do so, right-click on the WinPlatform_001 object in the Deployment View and select Deploy, as shown in Figure 39 below.

![Figure 39: Deploying Objects](image)

This will open the Deploy dialog box, as shown in Figure 40 below.

![Figure 40: Deploy Window](image)

You will want to use the default settings, which will deploy all of the objects we have configured. To do so, click the OK button at the bottom of the dialog box. The deploy status window will open and you will see the status bar as the various deployment steps are taken.
Once the deployment is completed at 100%, click the Close button, as shown in Figure 41 below.

![Deployment Complete](image)

**Figure 41: Deployment Complete**

**Viewing Data**

You can now view data updates for the item we have configured by opening the System Platform Object Viewer. Highlight the Integer_001 object in the Deployment View and go to the Object menu of the ArchestrA IDE interface. Select “View in Object Viewer” as shown in Figure 42 below.

![Opening Object Viewer](image)

**Figure 42: Opening Object Viewer**
This opens the Object Viewer where you can view the value and quality of the item we have configured, as shown in Figure 43 below.

![Object Viewer](image)

Figure 43: Viewing Data

As you can see, the quality for the item “Ramp” is “Good” and the value is “0”. This shows the present value. To subscribe to changing values for this item, right-click on the attribute and select “Add to Watch”, as shown in Figure 44 below.

![Add Attribute to Watch](image)

Figure 44: Add Attribute to Watch
This adds the attribute to the watch window at the bottom of the interface where it will receive value updates for the item at the update rate configured for the scan group, if the value changes, as shown in Figure 45 below.

![Figure 45: Viewing Live Data Values](image)

If the item is not added to the watched list, the item will not receive updates unless the Value field is specifically clicked.

You can also write values to Read/Write eligible items from System Platform. This is accomplished by selecting the “PV” attribute, right-clicking and selecting “Modify”, as shown in Figure 46 below.

![Figure 46: Open Modify Numeric Value Window](image)
This opens the "Modify Numeric Value" window, where a value can be entered and written to the item by clicking Apply and then OK, as shown in Figure 47 below.

![Modify Numeric Value Window](image)

**Figure 47: Writing a Value**

After the write to the item has succeeded, you will see the value in the Watch List change for the item, as shown in Figure 48 below.

<table>
<thead>
<tr>
<th>Attribute Reference</th>
<th>Value</th>
<th>Quality</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integer_001.PV.Input.Value</td>
<td>5</td>
<td>GOOD</td>
<td>OK</td>
</tr>
</tbody>
</table>

**Figure 48: Successful Write**
Summary

This guide has demonstrated the basic steps for configuring an OPC Client connection from System Platform to the OPC Data Hub. If you do not have the OPC DataHub but, would like to evaluate what it can offer as a robust, reliable, and diverse OPC tool, you can download a free one hour demonstration of OPC DataHub at http://www.softwaretoolbox.com/opcdatahub. This demonstration version is fully functional, only requiring that you restart it at the end of the one hour demonstration period.

The OPC DataHub also fully supports DDE client connections in addition to OPC. If you have further questions or need assistance, our experienced staff is here to assist you. We can be contacted in the methods outlined below.

Contact Us

If you have any questions or are seeking further information and help:

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