

Description: Guide to using the Data Mining OPC Server and the Data Mining Grid.

OS Requirement: Win 2000, XP Pro, Server 2003, Vista, Server 2008, Windows 7

General Requirement: General understanding of GENESIS32 and basic knowledge of ICONICS Data Mining.

Introduction

The Data Mining OPC Server was developed in order to visualize database data in the form of OPC-DA. You can configure basic read and write actions, along with stored procedures for connected databases. Enhanced data visualization can be performed with using Data Mining Grid. Please refer to the application note *GENESIS32 - Data Mining Quick Start* to learn the principal use of Data Mining.

We will be referring to the sample Data Mining Configuration to explain some advanced details. You can locate the default configuration database in C:\Documents and Settings\All Users\ICONICS\Examples32. We will also be using data in the Northwind Access database, which you can find also find in C:\Documents and Settings\All Users\ICONICS\Examples32.

This document will explain the steps of configuring a data source with parameters and viewing it with the preconfigured value in Data Mining Configurator or view dynamic values using Extended Tag syntax, as well as incorporating Global Alias for simple display of value switching. We will also cover how to dynamically write to a data manipulator and viewing that data in the Data Mining Grid.

Data Sources

1. Browse to C:\Program Files\ICONICS\GENESIS32\Examples\GEN32DEMO and open the file called DynamicDataMining.gdf. Explore the display as we will walk you through the steps of how to create those tags.
2. Launch the Data Mining Configurator by going to Start → Programs → ICONICS Tools → Data Mining Configurator
3. If you are not currently connected to the default Data Mining configuration, please open it now.
4. Expand Databases → AccessConnection → DataSource01
5. Noticed that the data source has one parameter called “CustomerID” and one data item called “Tag1”.
6. Click on Tag1. Noticed that the value for the “CustomerID” parameter and the specific column name. Tag1 will return the CompanyName of the record that has a CustomerID with the value of “ANTON”.

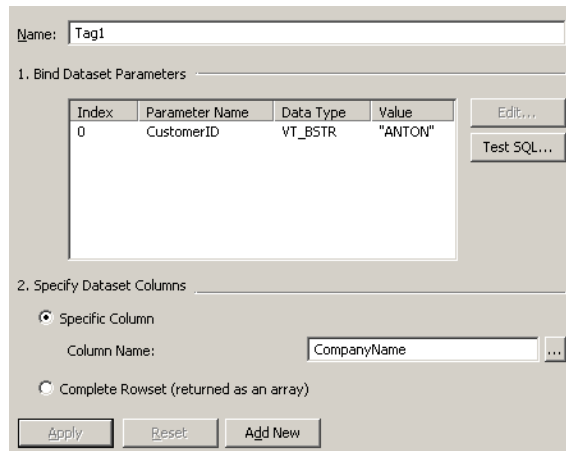


Figure 1 - Data Item - Tag1

7. To view the value of Tag1, open an instance of GraphWorX32, insert a process point, and browse to Tag1. Your OPC tag should have the path:
ICONICS.DatabaseOPCServer.3\AccessConnection.DataSource01.Tag1

Extended Tag Syntax

1. In the previous section, we configured a static tag using a Data Item. In this section, we will be using Extended Tag Syntax to modify the Data Source to display the same information.
2. In a GraphWorX32 display, insert process point and browse to your DataSource01.
3. Select @@Column on the right-hand pane. You should get a tag path of
ICONICS.DatabaseOPCServer.3\AccessConnection.DataSource01<CustomerID>.<Column> in the textbox.
4. Replace CustomerID with “ANTON” and Column with CompanyName. Your tag should look similar to Figure 2.

ICONICS.DatabaseOPCServer.3\AccessConnection.DataSource01<"ANTON">.<CompanyName>

Figure 2 - Extended Tag Syntax Path

5. Go into runtime and you should see the tag displaying the same information as Tag1.
6. There are other extended tag syntax parameters, Table 1 lists and describes them.

Table 1 - Data Item @@ Parameters

Data Item Name	Access Rights	Description
@@Column	R/W	Returns a specific column that matches the parameter
@@Recordset	R/W	Returns the entire row that matches the parameter.
@@Refresh	W	Any writes that forces the Datasource to re-read data from the connected data source

@@LastScanTime	R	Returns the time of the last data source update
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Global Aliasing

1. You also use global alias for the parameters. Insert a process point in a GraphWorX32 display using steps 2-3 in the Extended Tag Syntax section
2. Replace CustomerID with “<#Customer#>” and Column with CompanyName. Your tag should look like Figure 3.

ICONICS.DatabaseOPCServer.3\AccessConnection.DataSource01<"<#Customer#>">.<CompanyName>

Figure 3 - Global Aliased Tag Path

3. Insert a button, choose Select GAS Theme as the action and insert A:Customer="ANTON"/0; as the GAS Theme text.
4. Repeat the above step three more times, replacing “ANTON” with “BLAUS”, “ANATR”, and “FISSA”

NOTE: Using “A:Customer="ANTON"/0;” in the Select GAS Theme pick action dynamically creates a GAS without any need to configure this in the Global Aliasing Configurator. This also sets the theme to machine level.

5. Go into runtime, click on each button and you should see the different Companies for the customers with the different CustomerID.

Data Manipulators

Data Manipulator objects were designed to manipulate database data and structure using stored procedures or simple SQL commands when database server or engine does not support stored procedures. Data manipulation actions are executed only on a user request (there is no polling mechanism). The Data Manipulator ActiveX was developed for an easy use of the data manipulation actions called from client such as GraphWorX32. You will need a simple script in order to use the ActiveX. For more details, please refer to the application note *Data Mining – Data Manipulators with Parameters*.

1. A Data Manipulator has already been created in the default Data Mining Configurator. You can Expand Database → AccessConnection. In the right-hand pane, scroll down to the bottom to select the DataManipulator. We will use this manipulator to insert a new CategoryName and Description into the Category Table. You can click on the Edit button to view the actual SQL query. The “?” represents the parameter values in the query.
2. In a GraphWorX32 display, insert two process points connected to a local variable “~~var1~~” and “~~var2~~” configured to allow data entry as Strings.

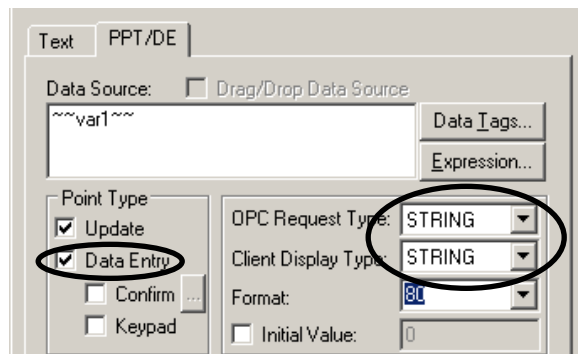


Figure 4 - Local Variable configuration

3. Insert an ICONICS DBOPCManipulator ActiveX and name the object “MyDataManipulator”.

NOTE: You can refer to the application note *Data Mining – Data Mining Manipulators with Parameters* for information on how to insert the ActiveX, name it, and link it to the proper tag Data Mining tag.

4. Link the manipulator to the DataManipulator @@Execute tag. The tag path should be ICONICS.DatabaseOPCServer.3\AccessConnection.DataManipulator.@@Execute
5. Insert a button and select Run Script as the pick action. Create a VBA Script and insert the code below.

```
Dim DataManipulator As DBOPCManipulatorActiveX
Dim out As Variant
Dim param1 As String
Dim param2 As String
Dim OPCSource1 As GwxPoint
Dim OPCSource2 As GwxPoint

Set DataManipulator =
ThisDisplay.GetVisibleObjectFromName("MyDataManipulator").Get
OLEObject()

Set OPCSource1 =
ThisDisplay.GetPointObjectFromName("~~var1~~")
Set OPCSource2 =
ThisDisplay.GetPointObjectFromName("~~var2~~")

param1 = OPCSource1.Value
param2 = OPCSource2.Value

out = DataManipulator.Execute(Array(param1, param2))
```

6. Save the display. You can close the VBA editor.
7. Go into runtime and enter a category name (i.e. Candy) and a description (i.e. Lolli-pop) in ~~var1~~ and ~~var2~~ respectively.

NOTE: Make sure that the value is written to the process point.

8. Execute the script by clicking on the button. You can view the added record by either opening the table in Access or viewing the table in the Data Mining Grid.

Data Mining Grid

We developed the ICONICS Data Mining ActiveX to display the results of simple queries that return rows, columns or whole tables (one or two dimensional arrays). In this section, you will see how to use this ActiveX to visualize queries coming through direct ActiveX Data Object (ADO) database connections and how to visualize data through ICONICS Data Mining OPC Server.

1. In a GraphWorX32 display, insert the ICONICS Data Mining ActiveX object by clicking on the “Data Mining Control”  button in the ActiveX toolbar.
2. Double-click on the ICONICS Data Mining ActiveX, noticed that ADO is the default Data Source Type.

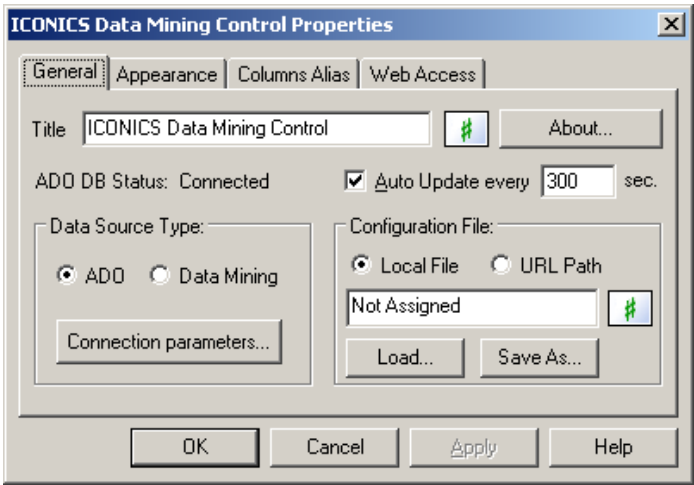


Figure 5 - Data Mining Control Properties

ADO Connection

- 3a. Click on the “Connection Parameters...” button to bring up the Data Source Connection window.
- 4a. Select MS Access as the Data Provider.
- 5a. Click on thte “Build Connction String...” button and browse to the Northwind.mdb file. Test the connection and click on “OK” to return to the Data Source Connection window.
- 6a. Click on the “Simple SQL Wizard...” button to bring up the SQL Query Builder.
- 7a. Select the Categories Table by clicking on the browse button and expanding Tables → Categories. Click “OK” to return to the SQL Query Builder.
- 8a. Select all of the available columns and click on “OK”
- 9a. Click on “Connect” in the Data Source Connection window and click on “OK”.
- 10a. Go into run time and you should see the record you have added previously as the last record.

ICONICS Data Mining Control				
	CategoryID	CategoryName	Description	Picture
1	1	Beverages	Soft drinks, c	
2	2	Condiments	Sweet and s	
3	3	Confections	Desserts, ca	
4	4	Dairy Products	Cheeses	
5	5	Grains/Cereals	Breads, crac	
6	6	Meat/Poultry	Prepared me	
7	7	Produce	Dried fruit an	
8	8	Seafood	Seaweed an	
9	9	Candy	Lollipop	

Figure 6 - Categories Table

Data Mining Connection

- 3b. Select Data Mining as your Data Source Type and click on the “Connection Parameters...” button to bring up the Data Mining Properties window.
- 4b. Click on “Add Tag...” button to bring up the Unified Data Browser.
- 5b. Select the Database Access Tab and expand Databases → AccessConnection → DataSource04.
- 6b. In the right-hand pane, select Tag4.

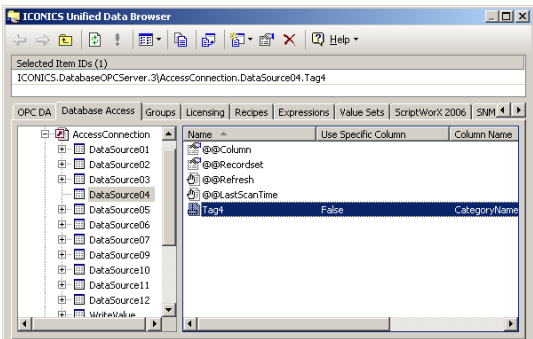


Figure 7 - Selecting a Tag for the Data Mining Control

- NOTE:** Tag4 connections to the Customers table and would return the values in the entire table.
- 7b. Click on “OK” until you are back in GraphWorX32 work space.
 - 8b. Enter runtime and you would see data for the Customers table.

ICONICS Data Mining Control			
	CustomerID	CompanyName	ContactName
1	ALFKI	Alfreds Futterkiste	Maria Anders
2	ANATR	Ana Trujillo Emparedados y helad	Ana Trujillo
3	ANTON	Antonio Moreno Taquería	Antonio Moren
4	AROUT	Around the Horn	Thomas Hardy
5	BERGS	Berglunds snabbköp	Christina Bergl
6	BLAUS	Blauer See Delikatessen	Hanna Moos
7	BLONP	Blondel père et fils	Frédérique Cit
8	BOLID	Bólido Comidas preparadas	Martin Somme
9	BONAP	Bon app'	Laurence Lebi
10	BOTTM	Bottom-Dollar Markets	Elizabeth Linc
11	BSBEV	B's Beverages	Victoria Ashwo
12	CACTU	Cactus Comidas para llevar	Patricio Simps

Figure 8 - Customers Table