



Description: A guide demonstrating how to configure GridWorX64 to read from and write to a database

OS Requirement: Vista x64/ Windows 7 x64/ Windows 8 x64/ Windows Server 2008 x64/ Windows Server 2008 R2 x64/ Windows Server 2012.

General Requirement: General knowledge of SQL Server and common SQL queries; familiarity with GraphWorX64.

Introduction

The GridWorX64 Server has the ability retrieve, update, insert, and delete data from various database types. You can configure basic read and write actions along with stored procedures for the configured databases. How it works is similar to how Data Mining OPC Server works in GENESIS32. This application note provides an example of how to create data source, data item and data manipulator in GridWorX64. It should be used in tandem with the application note on *GENESIS64 – GridWorX64 Viewer*. For this example, the classic Microsoft Northwind database is used which can be downloaded from their website.

Connecting to a Database

1. Open up workbench by going to **Start → All Programs → ICONICS → Workbench**
2. In Project Explorer, choose **GridWorX64 Server** provider from the list at the bottom
3. Under GridWorX64 configuration database, right click on SQL Server Connections and click on **New Database Connection**
4. Provide a name for the connection such as "Northwind" and click on **Change Connection**

NOTE: The sample GridWorX64 Server configuration database may already contain a "Northwind" SQL Connection. You can either export it, delete it, or create a new configuration database for this Application Note.

5. Double click on SQL Server connections and click on button to open up SQL Connection String dialog box
6. Enter your SQL Server name, log in information and select the **Northwind** database to connect to. Click OK
7. Back on the Connection Strings, click on name of connection you created and click OK

Create a Data Source

A data source is effectively a handle available in the Unified Data Browser that is used to connect to a database. It can store SQL commands to select, insert, update and delete entries in the

database. The SELECT configuration is required. Insert, Update and Delete configurations are optional. To create a data source:

1. Right-click on the database connection you created and choose **New Data Source**.
2. Name this data source **Products**
3. In SELECT command tab, click on the pencil icon and choose **Simple SQL Designer**
4. In Selection Fields tab, click on ellipsis button to choose **TABLE→dbo→Products**. Click OK.
5. Check the following columns: **ProductID, ProductName, CategoryID, UnitPrice**
6. On Records Filtering type, click on to add a new filter. Choose relational filter, set the **CategoryID** column to be **equal to** a parameter
7. Click on **parameter** button below to set the name of the parameter. In our example, we set it as @CategoryID. Click OK twice to return to SQL Command Designer.
8. You can use the sorting tab to set customized sorting
9. Exit the select command configuration. Check **Updates** checkbox and choose SQL Text in the newly added tab "UPDATE Command" as the command Type
10. Click on the ellipsis button, choose Browse Table and select the Products table we have been using under **TABLE → dbo→Products**. The four command parameters should be automatically populated as in Figure 1

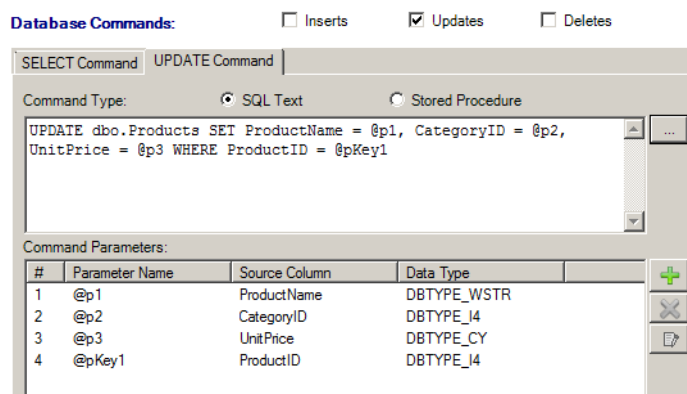


Figure 1 – Database Command

11. Click Apply to complete the configuration of this data source

Create a Data Item

A data item is an instance of data source with parameters already set. This gives users easy handle to choose customized data source easily without having to remember the parameter values to choose. To add a data item:



1. Right click on Products data source, click on **New Data Item**
2. Name the data item **CategoryID**
3. Assign a value for the parameter. You can click on the magnifying glass icon to preview the query result
4. Pick **CategoryID** to be the column to expose
5. Click **Apply** to save your changes

Please refer to the *GENESIS64 – GridWorX64 Viewer Application Note* on how to display this data in the GridWorX64 Viewer control.

Create a Data Manipulator

Data Manipulator objects were designed to manipulate database data and structure using stored procedures or SQL commands when database server or engine does not support stored procedures. Data manipulation actions are executed only on a per-request basis. To create a data manipulator:

1. Right click on the database connection we created (NorthWind) and click Add **Data Manipulator**
2. Name the data manipulator **DeleteProduct**
3. Choose SQL Text as the command type for this example. Click on ellipsis button to choose Browse Table for **DELETE**
4. Browse to the **Products** Table in the database and click OK
5. Click apply to save the changes

Now you should see all command parameters pre-populated. You can add/remove parameters and modify Data Type, length and direction. Here we will leave them as they are. The DeleteProduct Manipulator automatically creates a parameter @pKey1 that identifies the primary key – ProductID.

Using Process Points to Interact with the Database

Reading/Writing to a Cell

With the data source, data item and data manipulators that we created, we can use them either with the GridWorX64 Viewer or process points. In this Application Note, we will demonstrate how to use process point to read and write to the database. To read a cell value from a database table:

1. Add a **Process Point** onto a GraphWorX64 display
2. In Unified Data Browser, pick **Home → Databases → SQL Server → Northwind → Data Sources → Products**
3. Modify the path in the address bar and define parameter @CategoryID to:

db:Northwind.Products<@CategoryID=1>

or
db:Northwind.Products<1>

Note: if you use a data item instead, you do not need to set the parameters as they are already set in a data item.

4. Select the column by appending index number of name of column like below, 0 being the first column
db:Northwind.Products<1>[0]
or
db:Northwind.Products<1>[ProductName]
5. Select the row by appending index number of the row like below, 0 being the first row
db:Northwind.Products<1>[ProductName][0]
6. Click OK to close Unified Data Browser and go into runtime. Now you should see the value of that cell in the table
7. If you set the **data-entry** property of this process point as **True**, you can now write value to that cell as well

Make a call to the Data Manipulator

With process point, you can also execute a data manipulator. To use the Data Manipulator:

1. Add a **Process Point** onto a GraphWorX64 display
2. Make sure **data entry** property of this point is set to **True**
3. In Unified Data Browser, pick **Home → Databases → SQL Server → Northwind → Data Manipulators → DeleteProduct**
8. Modify the path in the address bar and define parameter @pKey1 to be 1 like below:
db:Northwind.DeleteProduct<@pKey1=1>.@@Execute
9. Close the data browser, go into runtime and set the value to be 1 to trigger the SQL query execution.
10. Check your table using a tool like SQL Server Management Studio. You should see that the row with ProductID as 1 is now deleted. You can also use GridWorX64 Viewer to verify it as well.

Other Extended Tag Syntax

GridWorX64 also offers you the following three additional metatags for any data source or data item.

Set **<data source path>.@@Refresh** as true will refresh the datasource.

<data source path>.@@LastRefreshed gives you the time this data source was last refreshed.



`<data source path>.@@LastRefreshedUTC` gives you the UTC time this data source was last refreshed.

Conclusion

In this example, we have created a data source, a data item and a data manipulator in GraphWorX64 Server. GridWorX64 Server also supports Generic OLE DB Connections, ODBC Connections, SAP Connections and Oracle Connections. You can choose the appropriate option depending on what type of database you want to interact with. The configuration will differ when creating a database connection but will be similar in creating data source, data item and data manipulator.