

Opendiem Training

Addendum DDE Driver

Opendiem-TRN-000-DDE

Revision	5.0.0		
Status	Initials	Date	Comment
Released	RAC	11/12/2010	Updated format and content



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OPENDIEM TRAINING ADDENDUM DDE

Introduction

This exercise covers the installation, configuration and use of the Dynamic Data Exchange (DDE) driver within the Opendiem Engine.

The DDE driver is a service running within the Opendiem Engine and is used to provide communications with any DDE server.

DDE is a mechanism for two applications on the same computer to pass data back and forth, an extension of DDE called NetDDE allows data to be shared over a network. There are three basic components to a DDE conversation, the application, topic, and item(s). Some sources may call the topic and item(s) by different names. A DDE tagname is made up of these three components in the form ``application.item.topic'`, each is described below.

Application

The Application part of a DDE tag is typically the executable name (but not always, as they can be configured). For instance, when working with Excel, the application name is EXCEL and the executable name is EXCEL.EXE.

Topic

There may be multiple topics in an application. Topics are a method of organizing the items that correlate with the functionality of a program. In Excel 4.0, a topic corresponds with an open sheet. If you have 4 spreadsheets open, you have a topic for each one and designated by the name of each open sheet. In Excel 5.0, several workbooks may be open with several sheets inside, each sheet is a topic designated by both the workbook and the sheet name.

Item

The item is actually the piece of data, or the first piece of data within a block of data. In Excel, the item is the cell that contains the data, denoted by row & column position such as R1C1.

Clients and Servers

A DDE application can be a DDE Server, a DDE Client or it can be both a DDE Server and a DDE Client. A DDE Server serves data to DDE clients. A DDE Client requests data from a DDE Server. Opendiem is a DDE client and Excel is an example of both a client and a server. Excel can get data from DDE Servers and serve data to other DDE clients.



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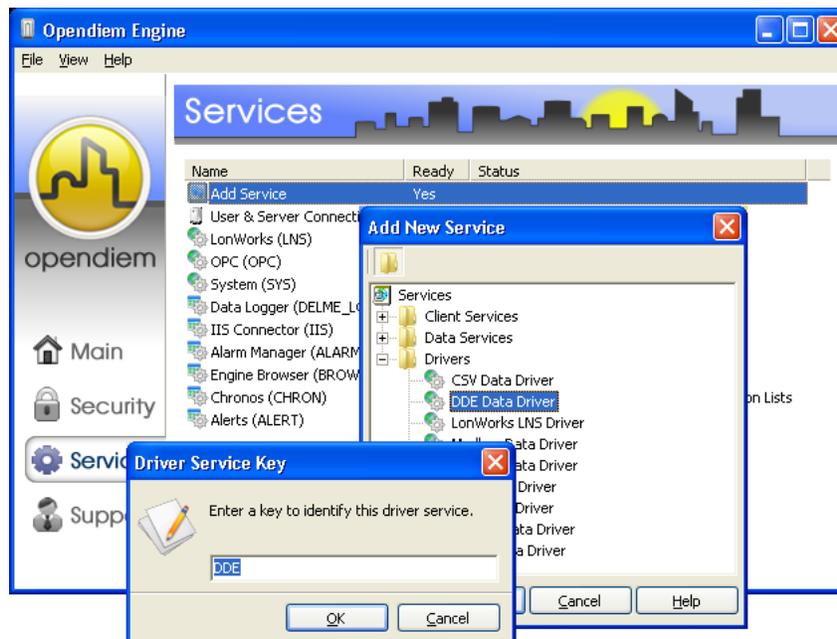
Objective

In this tutorial you will create an instance of the DDE driver and configure it, allowing data from any DDE server to be used within Opendiem. The data can be used within any suitable Opendiem Service, such as Alarming, Trending, Scheduling and web-based graphics. You will also see how the Opendiem DDE service may be used with NetDDE. Finally you will see how to add new items to the Opendiem Project tree and how to 'drag & drop' enable them.

Adding the Opendiem DDE Driver to Opendiem Engine

From the Opendiem Engine, select the *Services* page and double-click on the 'Add Service' entry. Expand the 'Drivers' folder to display the available driver services and select the 'DDE Data Driver'.

At the prompt, enter the name you want to use for identifying DDE data within Opendiem – the default is DDE.





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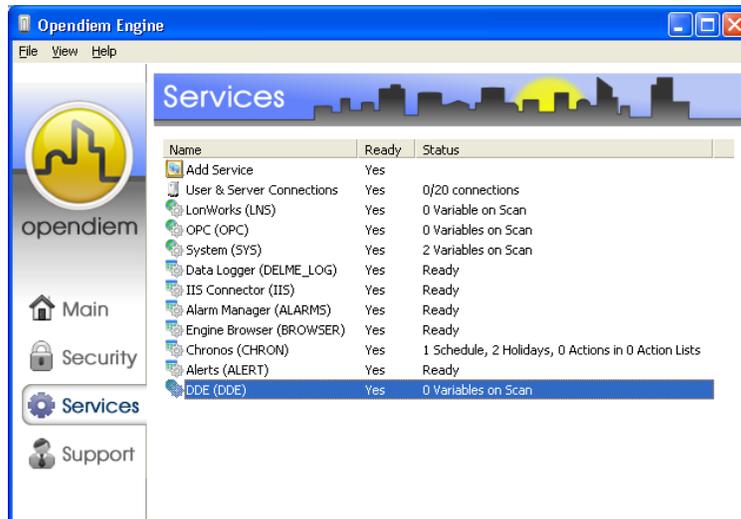


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The driver will then initiate and start running as an Opendiem service.



Once running, DDE tag names can be entered into any Opendiem tagname and the point will automatically be added to the Opendiem scan list, it is also possible to add DDE tagnames to the project to allow 'drag & drop' functionality for DDE tags.



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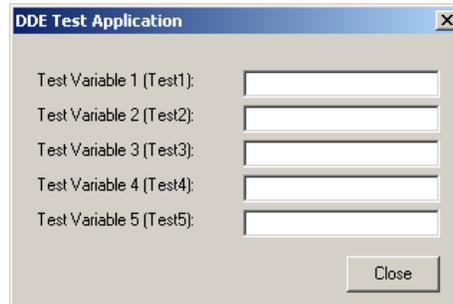


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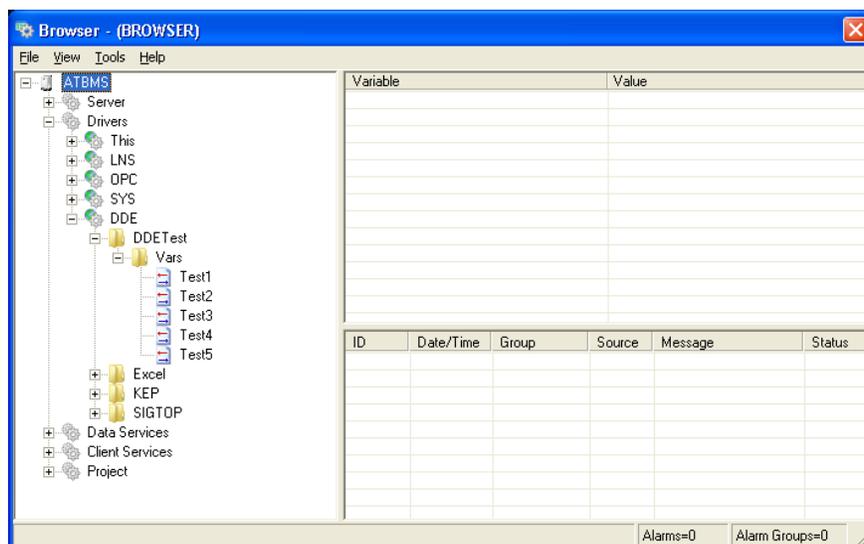
Using the Opendiem DDE driver with the DdeTest application

For the first example we will use the Opendiem DdeTest application that is included as part of the Opendiem DDE driver install. The DdeTest application is a simple DDE server application that will illustrate how DDE tagnames are formed in Opendiem.

The DdeTest application is located in the Opendiem services folder, typically 'C:\Program Files\Building Clouds\Opendiem\Engine\Services'. Locate the program DdeTest.exe and start it by double clicking on the file. A screen similar to the one below will show:



Start the Opendiem Browser and expand the 'Drivers | DDE | DDETest | Vars' branch as shown below:





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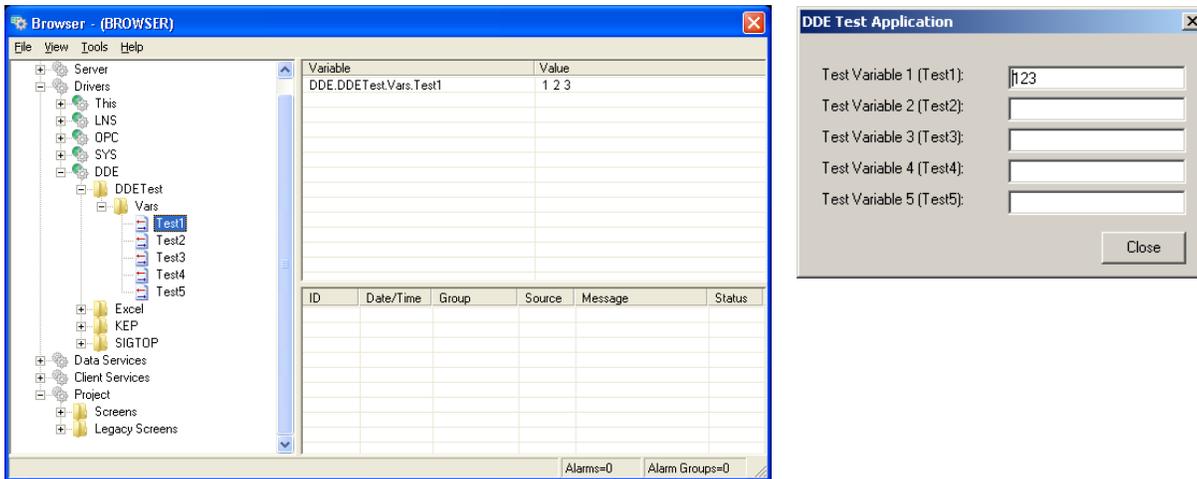
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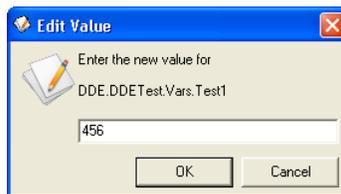
Drag the variable 'Test1' into the view pane of the browser, note that the variable appears in the Opendiem Browser view pane with the DDE tagname 'DDE.DDETEST.VARS.TEST1'. This is the DDE tagname in Opendiem format and is made up of the following component parts:

- DDE : The Opendiem service Key name.
- DDETEST : The DDE server application name.
- VARS : The DDE topic name.
- TEST1 : The DDE item name.

Arrange the Opendiem Browser and the DdeTest application side by side as shown below. Enter a value into the 'Test Variable 1 (Test1)' box of the DdeTest application; you will see the Opendiem Browser show the value as the value is sent via DDE to Opendiem.



The DDE connection is bidirectional, double click on the variable 'DDE.DDETEST.VARS.TEST1', a dialogue will appear prompting you for a value as shown:



When you click on 'OK' the value will be sent from Opendiem to the DdeTest application as shown below.



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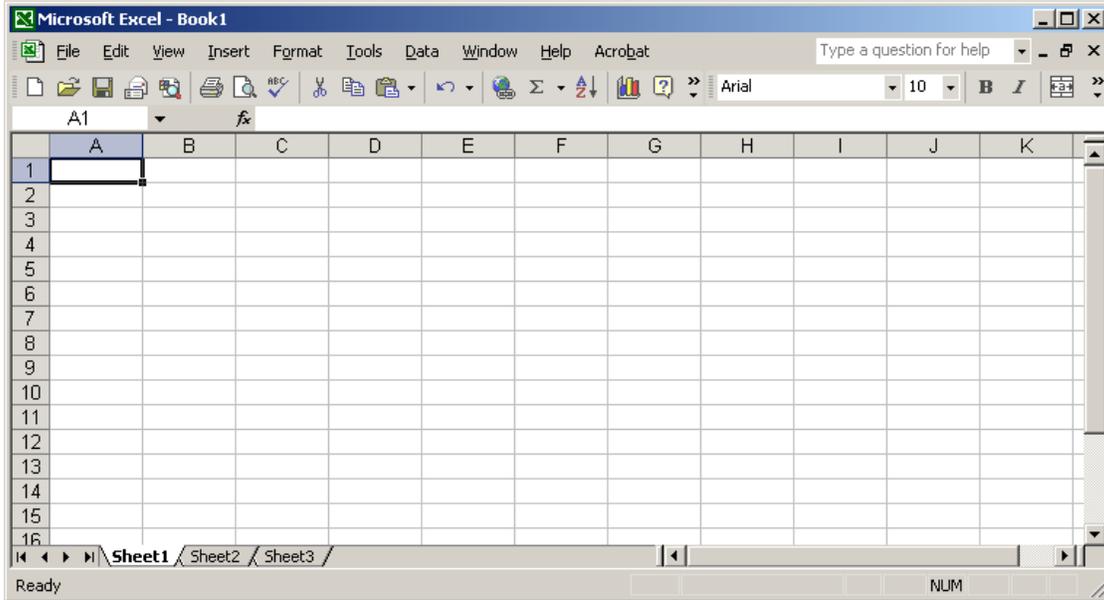


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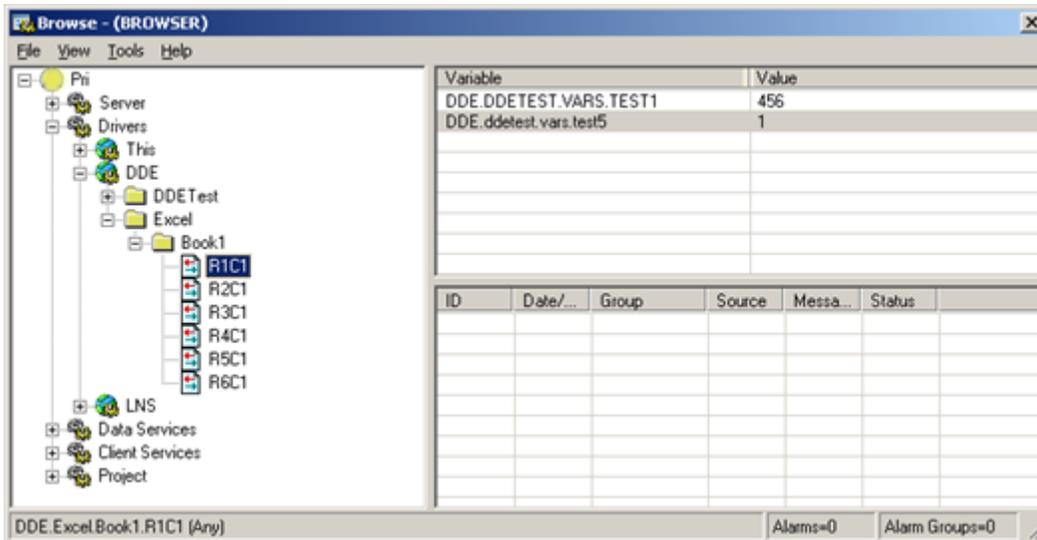


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Start Excel, the program will open with Book1 as a default.



Using the Opendiem Browser expand the project tree to show 'Drivers | DDE | Excel | Book1' branch as shown below:





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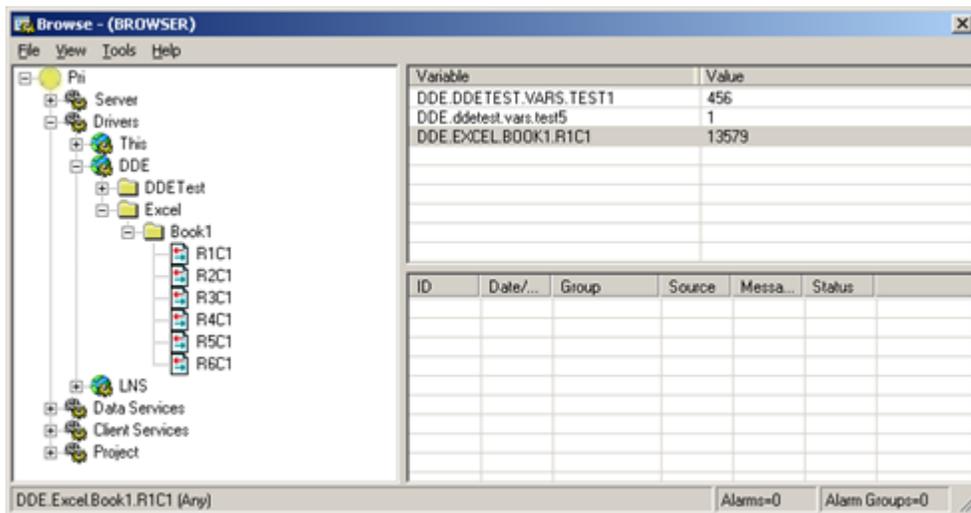
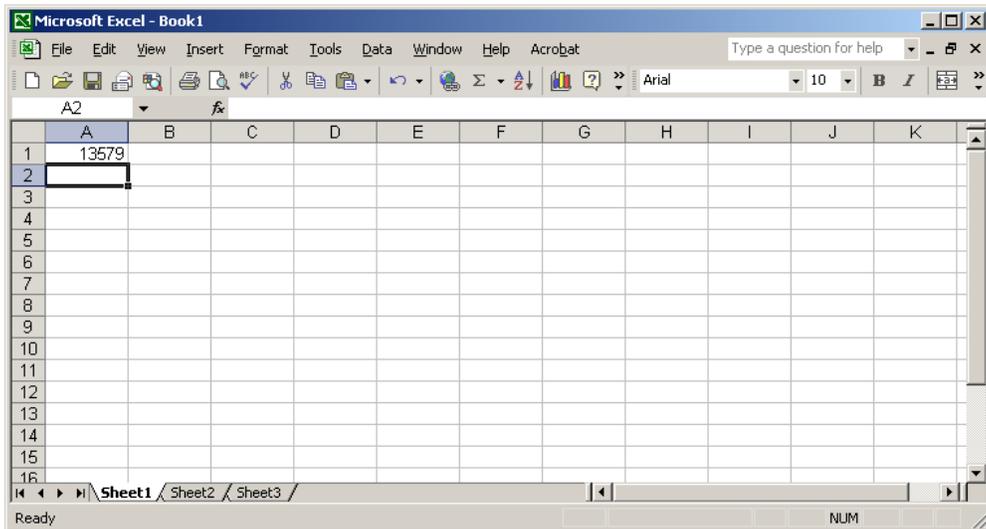


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Drag the variable 'R1C1' into the view pane of the browser, note that the variable appears in the Opendiem Browser view pane with the DDE tagname 'DDE.EXCEL.BOOK1.R1C1'. This is the DDE tagname for Excel cell column A, row 1 in Opendiem format.

Enter a value into Excel cell A1 and it will appear in the Opendiem Browser as shown below.



Changing the value in the Opendiem Browser updates the variable in Excel cell A1.



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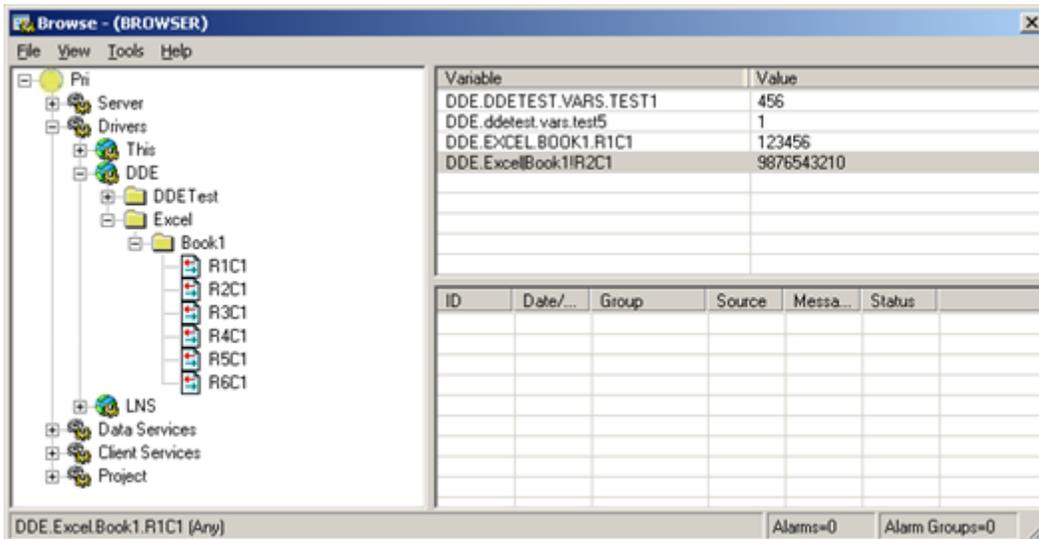
Some users may be used to the DDE Syntax used by Excel, for Excel 5 this is: "Excel|[FILENAME.XLS]Sales!'cell_ref'" where the application and the topic are separated by the pipe symbol '|' and the topic and the item are separated by the '!' symbol. For convenience, Opendiem will accept standard Opendiem syntax of 'Application.topic.item' or 'Application|topic!item' we will now reference an Excel spreadsheet cell from Opendiem using the Excel DDE syntax.

Right click the mouse in the Opendiem Browser view pane and select 'Add Variable...'

In the dialogue box enter the tagname 'DDE.Excel|Book1!R2C1' as shown below, remember to add the DDE driver keyname as a prefix to the DDE tag:



Click on OK to accept the tagname and then double click on the tagname in the Opendiem Browser to edit it's value as shown.



In the Excel spreadsheet cell A2 will contain the value that you entered in Opendiem Browser. Change the value in Excel and it will be updated in the Opendiem Browser.



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Using Opendiem DDE Driver with NetDDE

NetDDE is a standard built in utility of Windows, which allows applications such as Opendiem DDE and Microsoft Excel to access data from remote servers. NetDDE allows DDE client applications such as Opendiem DDE and DDE server applications such as KEPWare® DDE Server and Echelon® DDE Server to communicate over a TCP/IP network just as if the two applications were running on the same computer. This section explains how to set-up two PCs to communicate using NetDDE.

NetDDE uses NetBIOS and since this can be run over TCP/IP, NetDDE can use the Internet. Given a fast connection, network DDE is faster than running between two programs on one machine, because the server and client can process in parallel. In order to operate DDE over a network the following steps are necessary.

1. On both machines, a DDE agent called NETDDE.EXE must be running, its job is to transmit the data across the network. Under Windows 2003 & XP it is a service which is started when required.
2. On the server side only, DDE shares must be created. These bind an application/topic name pair to a share name. For example, the pair WinChat/Chat has the share name Chat\$. All the share information is stored in the registry.

The Windows API NDde makes the registry entries, it has calls such as NDdeShareAdd(). Application programs can use the API to share their DDE services automatically, DDE servers such as KEPWare® create the shares automatically and no user intervention is required. Shares can be created manually with the program DDESHARE.EXE, which makes the necessary API calls. Discussion of DDE share creation is beyond the scope of this document, refer to <http://msdn.microsoft.com/> and search for DDEShare for further details.

The DDE server has no knowledge of the share and does not know if its clients are local or remote.

3. The client program must be changed to use the special application/topic pair \\computer-name\NDDE\$/Share-name, for example service "\\Servername\NDDE\$" and topic "Chat\$". NDDE\$ is used by the DDE agent to indicate that this is a NetDDE conversation. The client and server both hold a DDE conversation with NETDDE.EXE on the local machine. To make a connection, the client NETDDE sends the requested share name to the remote computer. The remote NETDDE agent looks in the registry for the share name. If it exists the permissions are checked. At the server end NETDDE then attempts to connect to the real service and topic names specified in the registry. The server may be started automatically. Once the conversation has been established all DDE transactions are the same as between two programs on the same machine.



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When connecting to Windows 2003/XP the user may be prompted for the password and the number of sessions is limited. Before initiating a NetDDE session verify that the Client has access rights to the server by attempting to browse resources on the server.

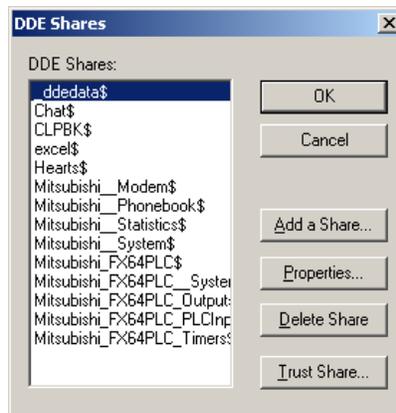
The following example shows the Opendiem DDE Client accessing data via NetDDE from a remote machine using the KEPSWare® KEPServerEx® DDE Server.

Start the KEPServerEx® Application on the remote machine.

The KepServerEx® application automatically creates a DDE share. Verify the share by starting DDEShare on the DDE server machine. Type DDEShare.exe at the Windows command prompt and the following dialogue will show:



From the menu select 'Shares | DDE Shares...'. A list of all declared shares will appear similar to the screen shown below:



The KEPServerEx® DDE share is called '_ddedata\$', click on the properties for this share and a form similar to the one below will appear. The key parameters here are the Application Name and Topic Name, these are the application/topic pair that are substituted by the share name _ddedata\$ when NetDDE is used. Close the DDEShare application.



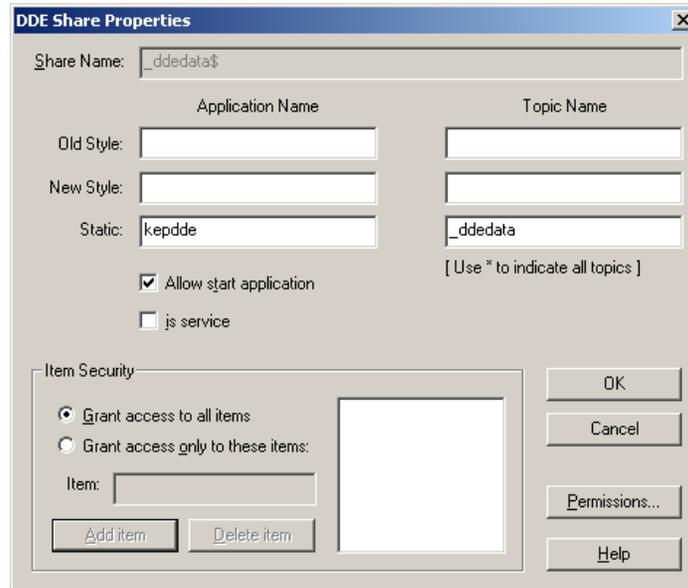
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On the Opendiem Server, start Opendiem if necessary and ensure that the DDE Client driver is loaded into the project. Open the Opendiem Browser and in the top right view pane right click the mouse and select 'Add Variable...'. In the dialogue box that appears enter the NetDDE tagname to show, for example:

```
'dde.\\ServerPC\ndde$|_ddedata$!Mitsubishi.FX64PLC.Timers.Timer2'
```

Note that using Opendiem syntax this could be entered as:

```
'dde.\\ServerPC\ndde$. _ddedata$.Mitsubishi.FX64PLC.Timers.Timer2'
```

with the same result. The screen below shows NetDDE data being accessed using both versions of syntax.



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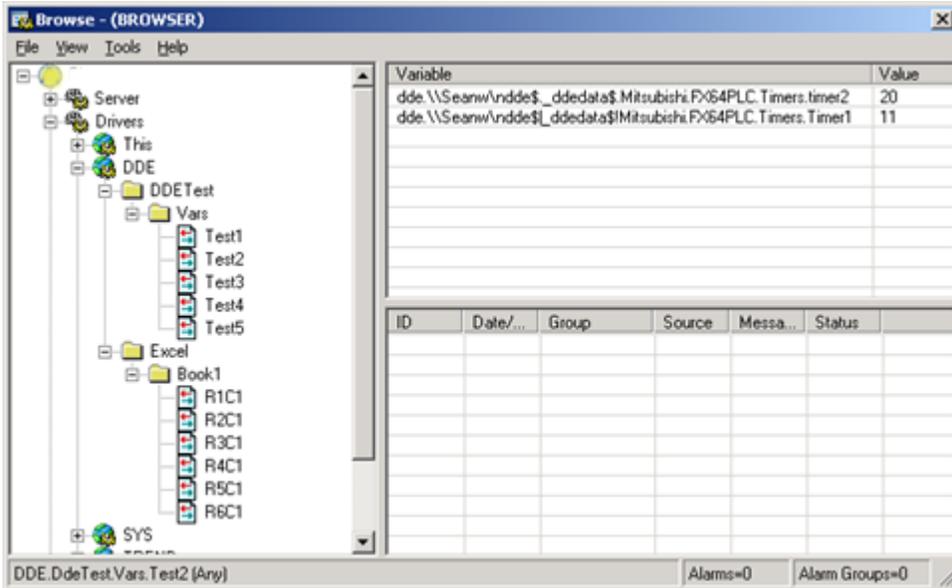


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Adding DDE variables to the Opendiem Project Tree

In the Opendiem Project tree there are two examples of DDE server applications with pre-configured tagnames. Additional DDE applications and tagnames may be added by editing the file 'dde.cfg' located in the Opendiem services folder, typically

'C:\Program Files\Building Clouds\Opendiem\Engine\Services\dde.cfg'

Open the dde.cfg file in Notepad and you will see a text file similar to the following:



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```
[DDE]
ID|Description|Icon
DDETest|DDE Test Utility|8
Excel|Microsoft Excel|8
```



This section headed by [DDE] lists each of the DDE servers. In this example there are two applications, DDETest and Excel.

The next line contains ID|Description|Icon this is a descriptive header for the section, ID is the application name, Description is a label and Icon indicates if this level should be shown as a folder icon (8) or by a tag icon (9).

```
[Excel]
ID|Description|Icon
Book1|Book 1|8
```



This section headed by [Excel] breaks down further the tree hierarchy for the application Excel.exe , when Excel is expanded in the tree it will reveal this level.

The next line contains ID|Description|Icon this is a descriptive header for the section, ID is the DDE Topic name, Description is a label and Icon indicates if this level should be shown as a folder icon (8) or by a tag icon (9).

```
[Excel.Book1]
ID|Description|Variable|Type|Children|Icon
R1C1|Row 1, Col 1|Excel.Book1.R1C1|Any|False|9
R2C1|Row 2, Col 1|Excel.Book1.R2C1|Any|False|9
R3C1|Row 3, Col 1|Excel.Book1.R3C1|Any|False|9
R4C1|Row 4, Col 1|Excel.Book1.R4C1|Any|False|9
R5C1|Row 5, Col 1|Excel.Book1.R5C1|Any|False|9
R6C1|Row 6, Col 1|Excel.Book1.R6C1|Any|False|9
```



This section headed by [Excel.Book1] contains the details of the DDE tagname and how the tag should appear in the Opendiem Project tree.

The second line of the section above contains a descriptive header for the section as shown:

```
ID|Description|Variable|Type|Children|Icon
```

ID is the DDE Item name, Description is a label for the DDE Item, Variable is the actual DDE variable tagname that will be inserted during a drag & drop operation, Type is the variable type and can be used to match SmartComponents to the DDE tagname, Children indicates if there are any sub elements for the variable which will show a '+' sign in the project tree and Icon indicates if this level should be shown as a folder icon (8) or by a tag icon (9). If a value is set for the 'Variable' field then the item will be 'draggable' in the project tree.



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Adding a DDE Item to the project tree:

Open the file 'dde.cfg' located in the Opendiem services folder at 'C:\Program Files\Building Clouds\Opendiem\Engine\Services'. Add the sections shown in **Bold** below to construct the project tree.

```
[DDE]
ID|Description|Icon
DDETest|DDE Test Utility|8
Excel|Microsoft Excel|8
KEP|KEPServerEx|8
```

```
[DdeTest]
ID|Description|Icon
Vars|Test Variables|8
```

```
[DdeTest.Vars]
ID|Description|Variable|Type|Children|Icon
Test1|DDE Test Variable 1|DdeTest.Vars.Test1|Any|False|9
Test2|DDE Test Variable 2|DdeTest.Vars.Test2|Any|False|9
Test3|DDE Test Variable 3|DdeTest.Vars.Test3|Any|False|9
Test4|DDE Test Variable 4|DdeTest.Vars.Test4|Any|False|9
Test5|DDE Test Variable 5|DdeTest.Vars.Test5|Any|False|9
```

```
[Excel]
ID|Description|Icon
Book1|Book 1|8
```

```
[Excel.Book1]
ID|Description|Variable|Type|Children|Icon
R1C1|Row 1, Col 1|Excel.Book1.R1C1|Any|False|9
R2C1|Row 2, Col 1|Excel.Book1.R2C1|Any|False|9
R3C1|Row 3, Col 1|Excel.Book1.R3C1|Any|False|9
R4C1|Row 4, Col 1|Excel.Book1.R4C1|Any|False|9
R5C1|Row 5, Col 1|Excel.Book1.R5C1|Any|False|9
R6C1|Row 6, Col 1|Excel.Book1.R6C1|Any|False|9
```

```
[KEP]
ID|Description|Icon
Channel|Mitsubishi.FX64PLC|8
```

```
[KEP.Channel]
ID|Description|Variable|Type|Children|Icon
T1|Timer 1|KEPDDE._DDEDATA.MITSUBISHI.FX64PLC.TIMERS.TIMER1|Any|False|9
T2|Timer 1|KEPDDE._DDEDATA.MITSUBISHI.FX64PLC.TIMERS.TIMER2|Any|False|9
```




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How to Reference DDE Data within Opendiem

Opendiem Standard Syntax for DDE Variables

`DDE.Application.Topic.Item`

where:

DDE	: DDE driver service name (Default Dde).
Application	: Application name of the DDE server.
Topic	: Topic name for the DDE conversation.
Item	: The DDE Item.

Example `Dde.Excel.Book1.R1C1`

Alternative Syntax for DDE Variables

`DDE.Application|Topic!Item`

where:

DDE	: DDE driver service name (Default Dde).
Application	: Application name of the DDE server.
Topic	: Topic name for the DDE conversation.
Item	: The DDE Item.

Example `Dde.Excel|Book1!R1C1`



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Notes:

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