Creating DDE and NetDDE Connections

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Table of Contents

INTRODUCTION 4

CREATING A DDE CONNECTION AND READING 5

Application Name 6

Topic Name 6

Item Name 7

DDE Examples 8

WRITING USING A DDE CONNECTION 10

Macro Example 10

Creating a Macro in Excel 12

Running a Macro in Excel 13

CONFIGURING YOUR CLIENT AND SERVER PC'S TO USE NETDDE 14

Enabling NetDDE on the TOP Server 14

Enabling NetDDE on Windows 14

CREATING A NETDDE CONNECTION AND READING 16

Application Name 16

Topic Name 17

Item Name 18

NetDDE Examples 19

UPDATE RATES **21**

Device Scan Rates **21**

Client Update Rates **22**

Introduction

The purpose of this document is to explain how to create a DDE and NetDDE connections to a TOP Server using Microsoft Excel. The underlying architecture will apply to any DDE/NetDDE client connection to a DDE/NetDDE server. For the purposes of this guide, we will be demonstrating this communication by connecting to a Toolbox OPC Power Server or TOP Server, which is a product of Software Toolbox, Inc.. This document will also cover how to change both *Device Scan Rates* and *Client Update Rates*.

The document makes the assumptions that:

1. You are using the most current version of TOP Server. You can download the free demo of TOP Server at http://www.toolboxopc.com/Features/Demo/demo.html.

2. You are using Microsoft Excel 2003 or newer.

Creating a DDE Connection and Reading

DDE, Dynamic Data Exchange, provides a way of transferring data between client and server applications running on the same machine. The first step is to make sure DDE is enabled on your TOP Server. Open the TOP Server application, select **Tools | Options…** from the main menu. In the DDE tab you will see the option **Enable DDE connections to the server**, make sure this box is checked and select **OK**. Refer to **Figure 1** below.

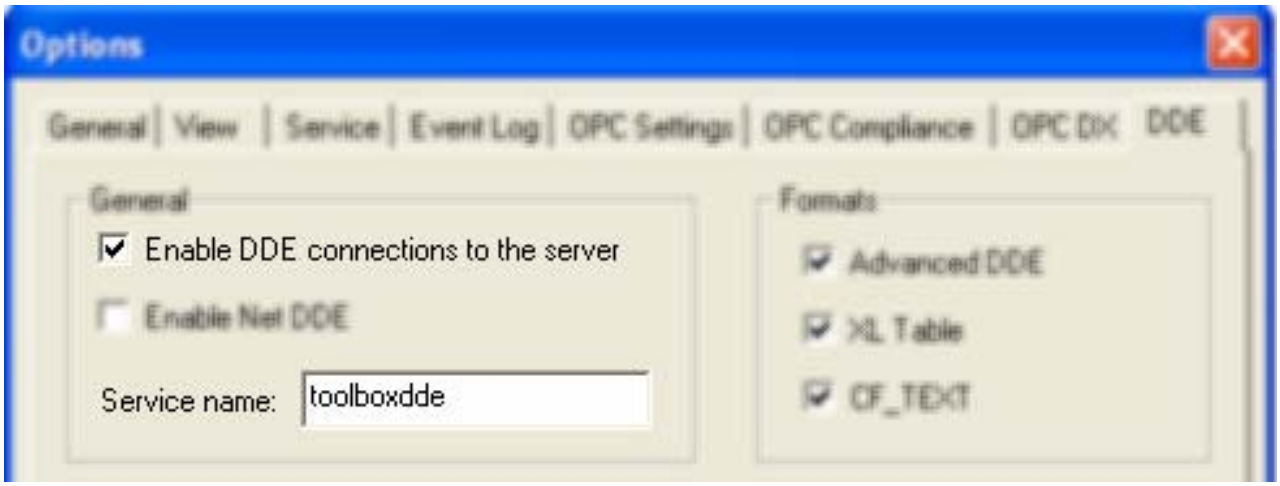

Figure 1: TOP Server DDE Options - Enable DDE Connection

The DDE client, Excel in this case, needs three parts of information to open a connection to the DDE server:

1. Application name or Service name
2. Topic name
3. Item name

The syntax for Excel looks as follows: =<*application*>|<*topic*>!<*item*>

Application Name

Application or Service name can be found in the TOP Server by selecting **Tools | Options…** in the DDE tab of these options you will see the Service name. This value defaults to toolboxdde, but can be customized.

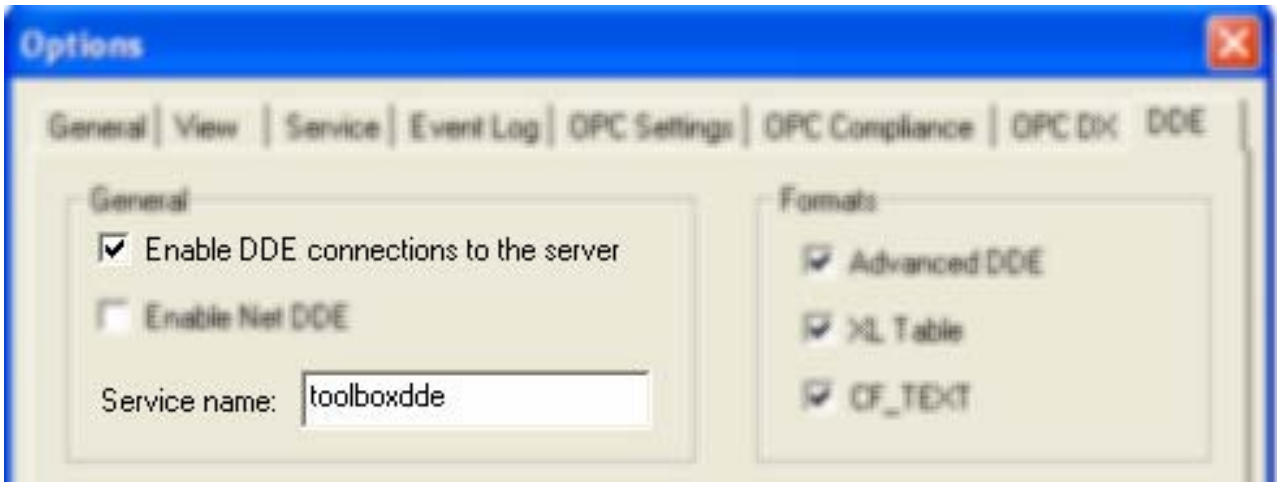

Figure 2: TOP Server DDE Options – Service Name

Topic Name

The default Topic name is _ddedata. You may also use the alias name as your Topic. We recommend you use the alias topics instead of the default topic if you are connecting to more then 50 tags. To find the alias name in your TOP Server application, select **Edit | Alias Map…**. All items under Alias are valid Topic names.

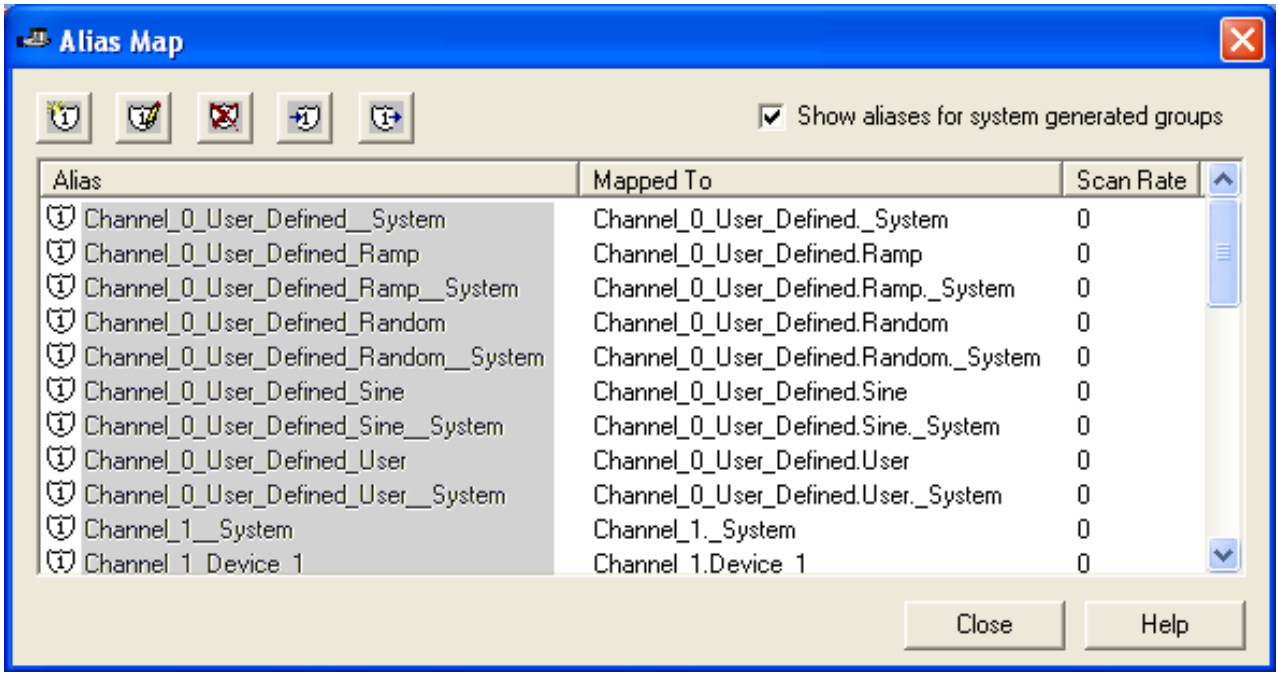

Figure 3: Alias Map

Notes:

1. Each separate Topic name used creates a separate client connection to the server.

2. Using an Alias as the Topic allows the user to control Scan Rate. Refer to *Update Rates* section.

Item Name

The Item name depends on what you have used for your Topic name. If you have used the default Topic name then your Item name must include the Alias. If you have used the Alias as your topic the Item name will only be the Tag Name or Address of that tag.

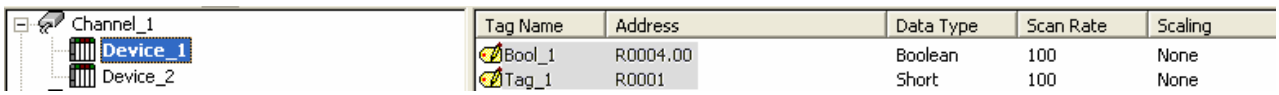

Figure 4: Tag Name or Address

DDE Examples

These are some examples from what we have covered above.

The syntax for excel looks as follows: =<*application*>|<*topic*>!<*item*>

Example 1: Using default Topic Name.

These two lines connect to the same Tag using the default Topic name, _ddedata. One uses the Tag Name and the other uses the Address of the Tag. The following example formulas should be placed inside the *Formula Bar* of the cell you would like the data to update.

=toolboxdde|_ddedata!Channel_1_Device_1.Tag_1

=toolboxdde|_ddedata!Channel_1_Device_1.R0001

where:
application = toolboxdde
topic = _ddedata
item = Channel_1_Device_1.Tag_1 **or**
item = Channel_1_Device_1.R0001

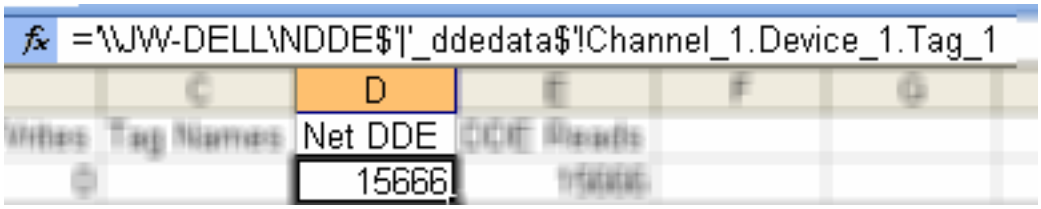

Figure 5: DDE Excel Example – Using default Topic Name

Example 2: Using Alias as Topic Name

Connecting to Channel_1.Device_1.Tag_1 using an Alias as your Topic.

=toolboxdde|Channel_1_Device_1!Tag_1

where:

application = toolboxdde

topic = Channel_1_Device_1

item = Tag_1

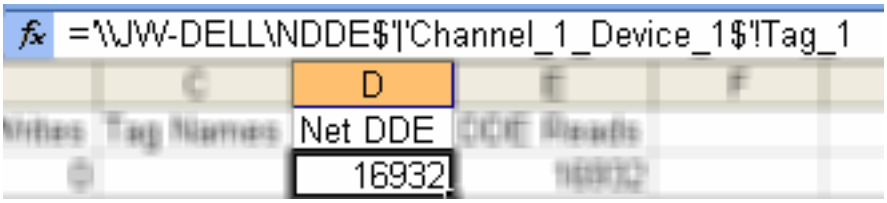

Figure 6: DDE Excel Example – Using Alias as Topic Name

Writing using a DDE Connection

Writing using a DDE connection is also known as a 'poke'. This will show you how to create a simple macro in Excel using VB code. Comments in the macro will be green to help distinguish between actual code and commented code. Comments will appear before the actual code describing what each piece means.

Macro Example

```
'creating a function called Poke

Sub Poke()

    'This first example will write to Channel_1_Device_1.Tag_1.  The Value we are writing will be stored 'in the Excel worksheet.  All other values will be coded into the macro.

    'the DDEInitiate function takes two arguments: the Application Name and the full Alias name excluding 'the Tag name.  This variable will be named 'channel'.

    channel = DDEInitiate("toolboxdde", "Channel_1_Device_1")

    'this sets the value we will be writing to the device.  To get a value from an Excel worksheet we must specify two things:  the sheet we are working from and cell information, (Row, Column).

    Set Value = Worksheets("Sheet1").Cells(2, 1)

    ' this function will write the Value to the specified channel and tag name.  The DDEpoke function takes 3 arguments: Channel, Tag name, and Value.  The channel and value variables have been set above.  The tag variable must be set below.

    Application.DDEPoke channel, "Tag_1", Value


    'This second example will write to Channel_1_Device_1.Tag_2.  For this Example both the Value and 'the Tag Name will be stored in the Excel worksheet.  We will use the same 'channel' variable from the 'first example.
```

```
'we will again assign the Value variable from the Excel worksheet.  The Value information is stored in
'sheet1 at (row2, column1).

Set Value = Worksheets("Sheet1").Cells(2, 1)

'we will also assign the Tag variable from the Excel worksheet.  The Tag information is stored in sheet1
at '(row2, column2).

Set Tag = Worksheets("Sheet1").Cells(2, 2)

'we will call the function DDEPoke again.  We will use the same channel as before and use the Tag and
'Value variable we received from the Excel worksheet.

Application.DDEPoke channel, Tag, Value

'this function terminates the conversation with a DDE server application

DDETerminate channel

'signifies the end of the 'Poke' function.

End Sub
```

This is a picture of where the Value information for both examples was stored and the Tag information for the second example.

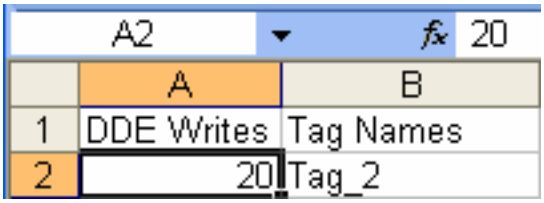

Figure 7: Shows where the 'Value' and 'Tag' information was stored.

Creating a Macro in Excel

To create a macro using Microsoft Excel, select **Tools | Macro | Visual Basic Editor** or **Alt + F11**.

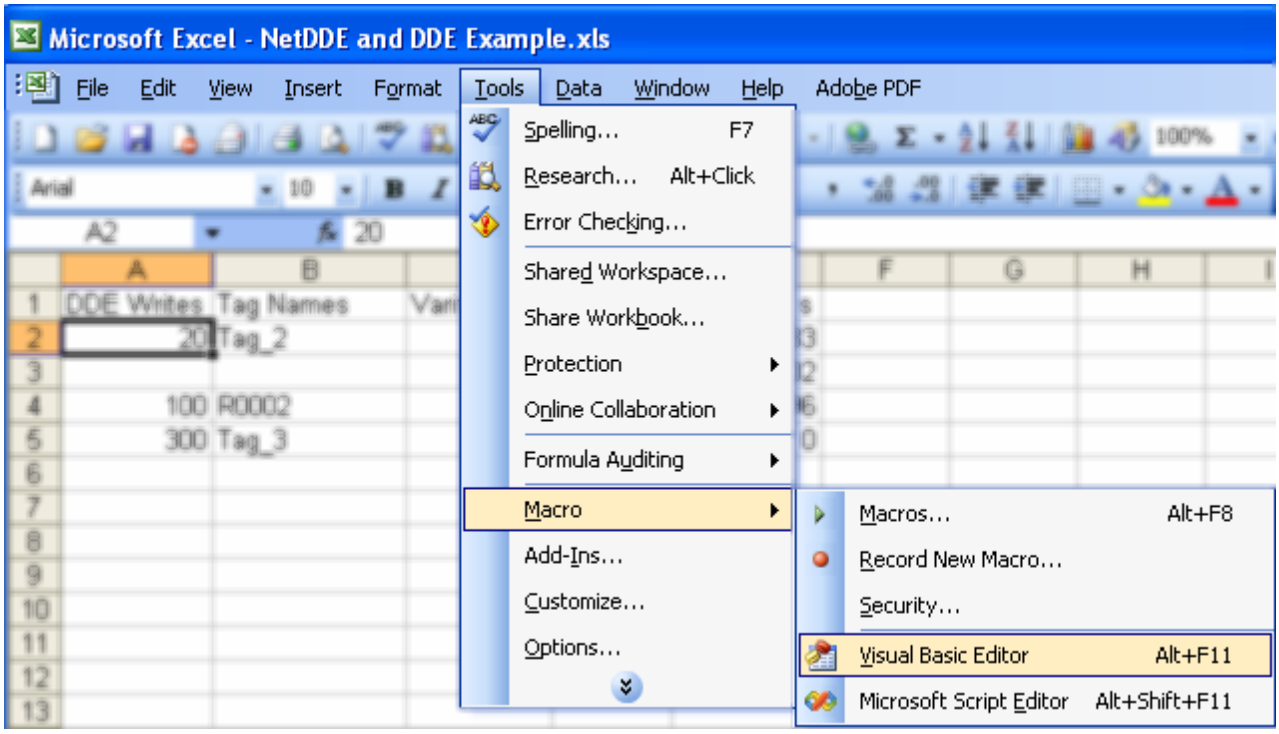

Figure 8: Opening the Visual Basic Macro Editor

Once the editor is open you must double click the sheet you are working in, as each sheet can have a different macro associated with it. This will now allow you to insert Visual Basic code for that particular sheet. If you have set up your Excel sheet1 to look identical to **Figure 7:** Shows where the 'Value' and 'Tag' information was stored., you may cut and paste the code section of the *Macro Example* above into your Visual Basic editor.

To verify the writes are working correctly you can create cells to read the tag values you are writing to, see section *Writing using a DDE Connection*.

Running a Macro in Excel

Once you have created and saved the macro in the Visual Basic editor it is time to run the macro. To run a macro in Microsoft Excel, select **Tools | Macro | Macros…** or **Alt + F8**.

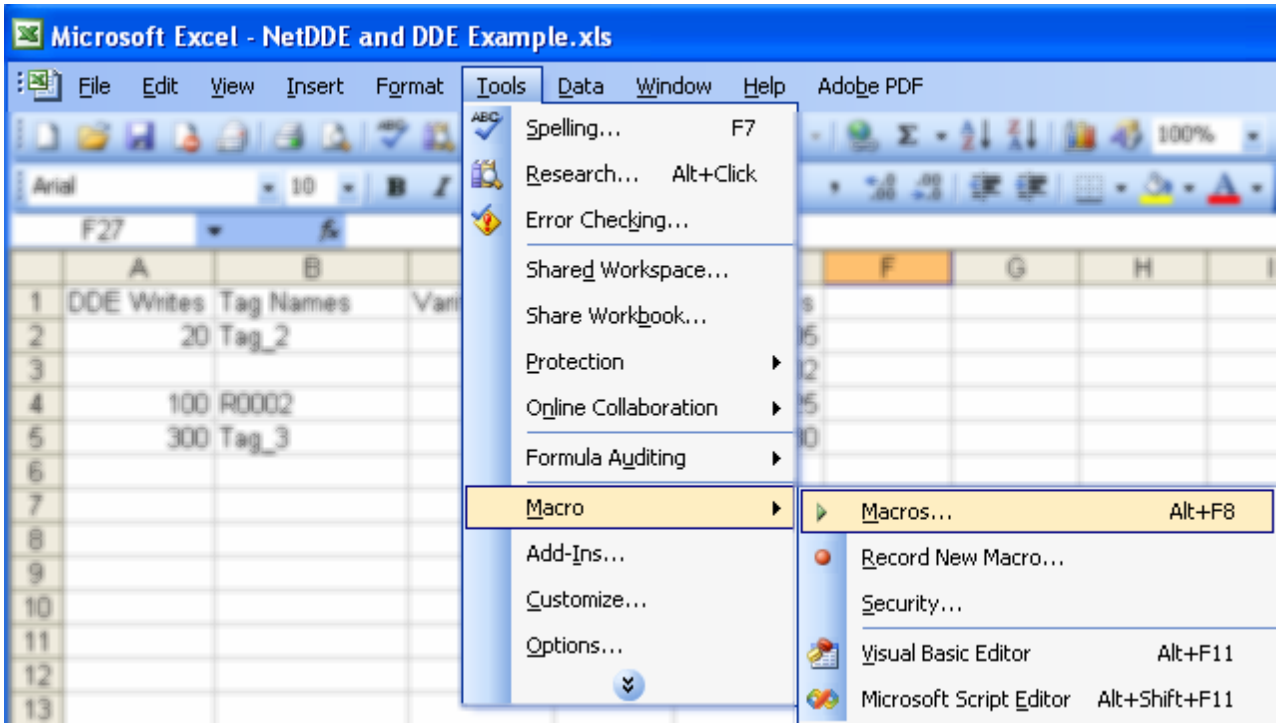

Figure 9: Opening the Macro window.

From this Macro window select the macro you wish to run from the list box and select **Run**.

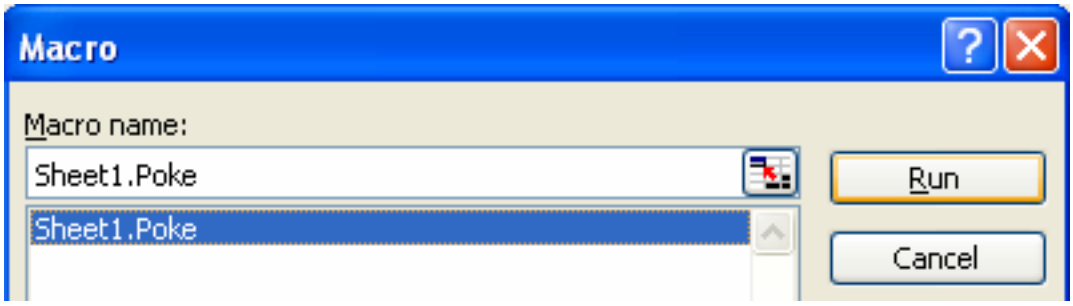

Figure 10: Running a Macro

Configuring your Client and Server PC's to use NetDDE

Enabling NetDDE on the TOP Server

NetDDE allows the user to share data from a DDE server on a local PC to a DDE client on a remote PC. Before NetDDE will work you must first make sure it is enabled in the TOP Server. By default this setting is turned off. From the main menu of TOP Server, select **Tools | Options…** in the **DDE** tab you will see the option **Enable Net DDE**, make sure that box is checked and select **OK.**

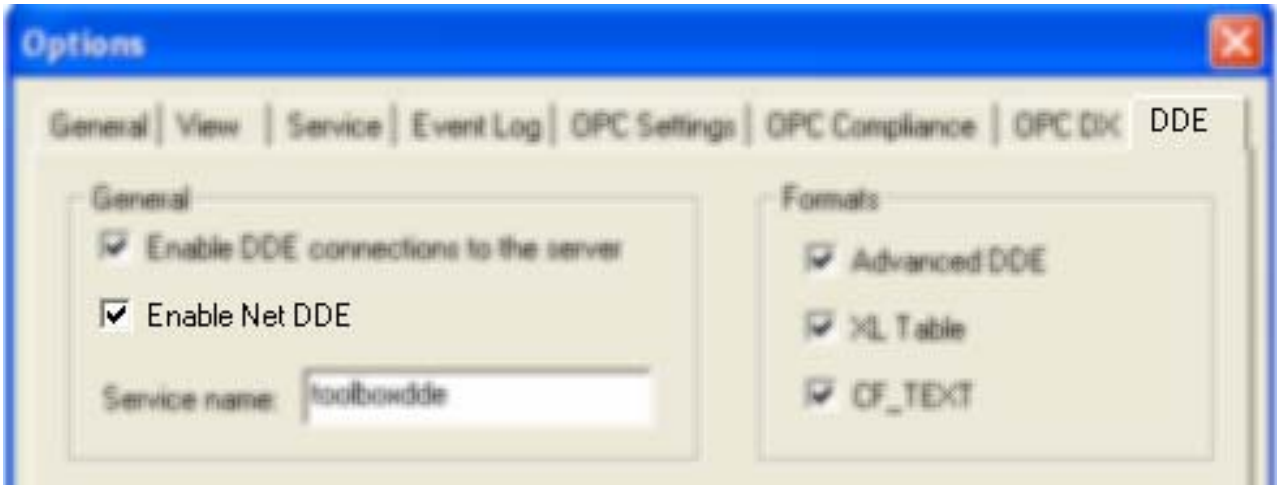

Figure 11: Enable NetDDE

Enabling NetDDE on Windows

You must now enable NetDDE on **both** the client and server PC. To enable NetDDE:

1. Open up the **Control Panel** and
2. Select **Administrative Tools | Services.**
3. Scroll down until you see the **Name – Network DDE**
4. Right-click **Network DDE** and select **Properties.**
5. In the **Properties** window find the **Startup Type** option and set it to **Automatic.** Now select **OK**.

Now you must enable **Network DDE DSDM.** To enable this repeat steps 4-5 with **Network DDE DSDM**:

4. Right-click **Network DDE DSDM** and select **Properties**.

5. In the **Properties** window find the **Startup Type** option and set it to **Automatic.** Now select **OK**

Figure 8 below shows how to complete step 5.

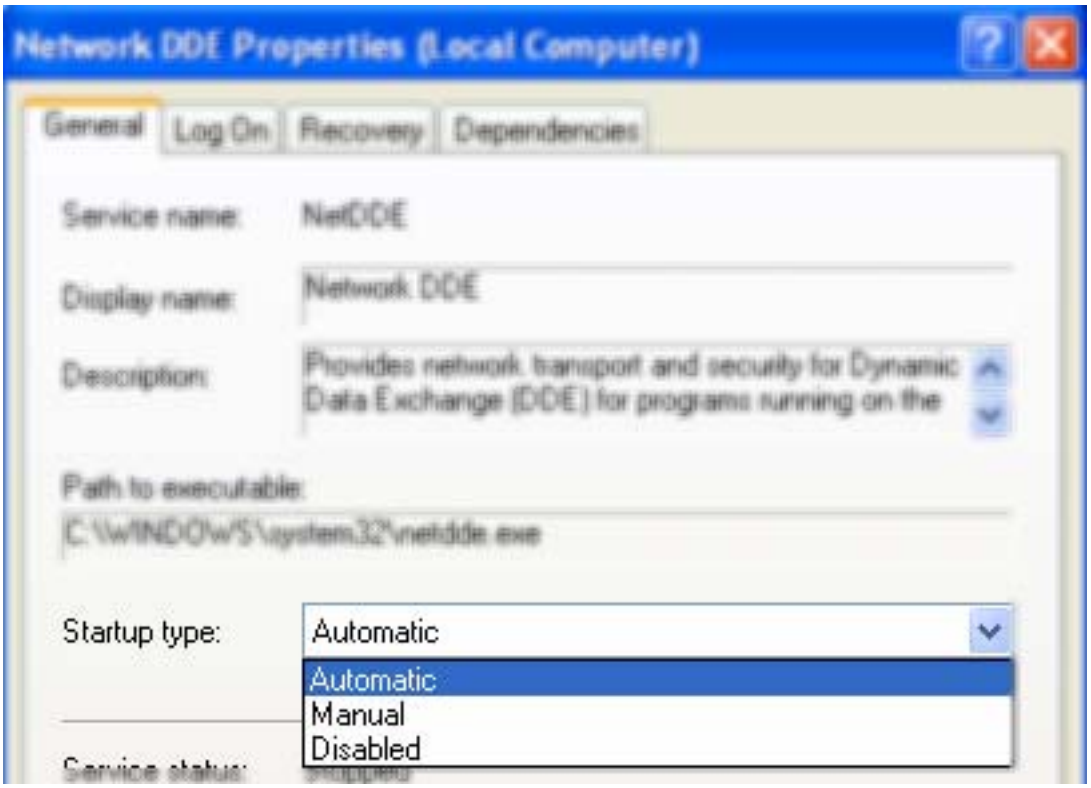

Figure 12: Enabling Network DDE for Windows

Assuming you have enabled Network DDE and Network DDE DSDM on both client and server PC's. You should now restart the TOP Server for these changes to take effect.

Creating a NetDDE Connection and Reading

Creating a NetDDE connection is basically the same as creating a DDE connection with some minor syntax changes. The DDE client, Excel in this case, needs three parts of information to open a connection to the DDE server over the network:

1. Application name
2. Topic name
3. Item name

The syntax for Excel looks as follows: =****<*PC name*>**\NDDE$|**<*topic*>$!<*item*>

Application Name

The application name when working with NetDDE is always '\\<*PC name*>**NDDE$**'. The PC name will be the name of the computer that is running the server. To find out your computer name open **My Computer** and selecting **View system information** on the left side of the page under **System Tasks**.

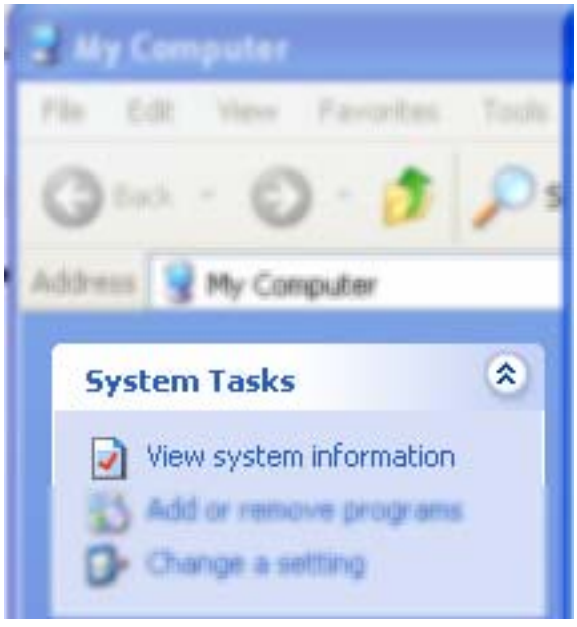

Figure 13: How to View system information

In the **System Properties** page select the **Computer Name** tab. You will see a full computer name which consists of the computer name and the domain. The *PC name* we are referring to above is the piece of the full computer name excluding the domain.

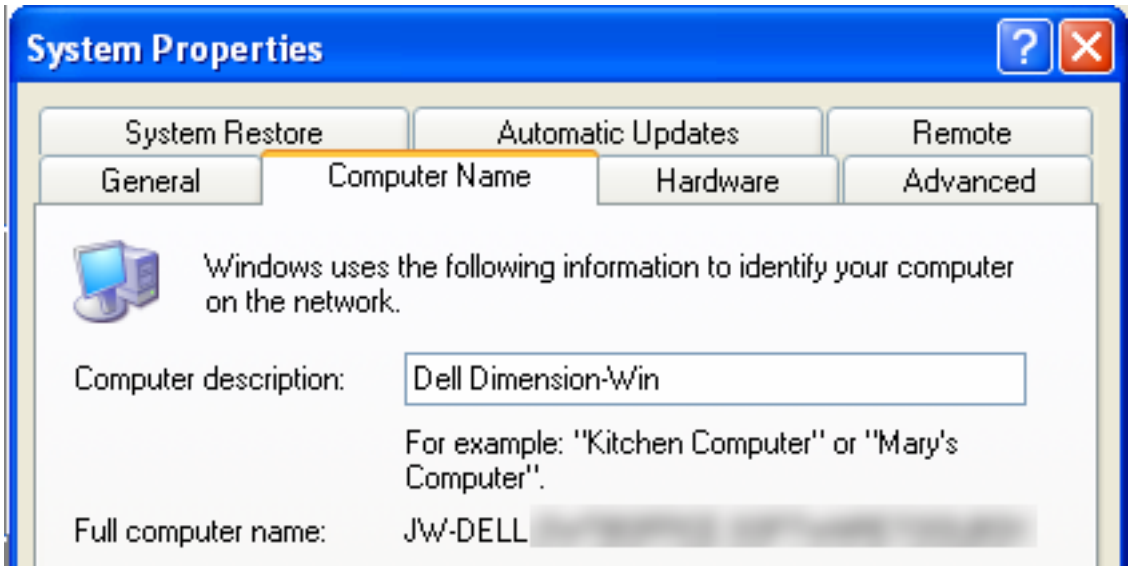

Figure 14: How to get your Computer Name

The application name is a combination of the *PC name* and NDDE$. In this case our application name should be the following: **'\\JW-DELL\NDDE$'**

Topic Name

The default Topic name is _ddedata. You may also use the alias name as your Topic. To find the alias name in your TOP Server application, select **Edit | Alias Map…**. All items under Alias are valid Topic names. Using the default Topic name your Topic should look like the following: **'_ddedata$'**

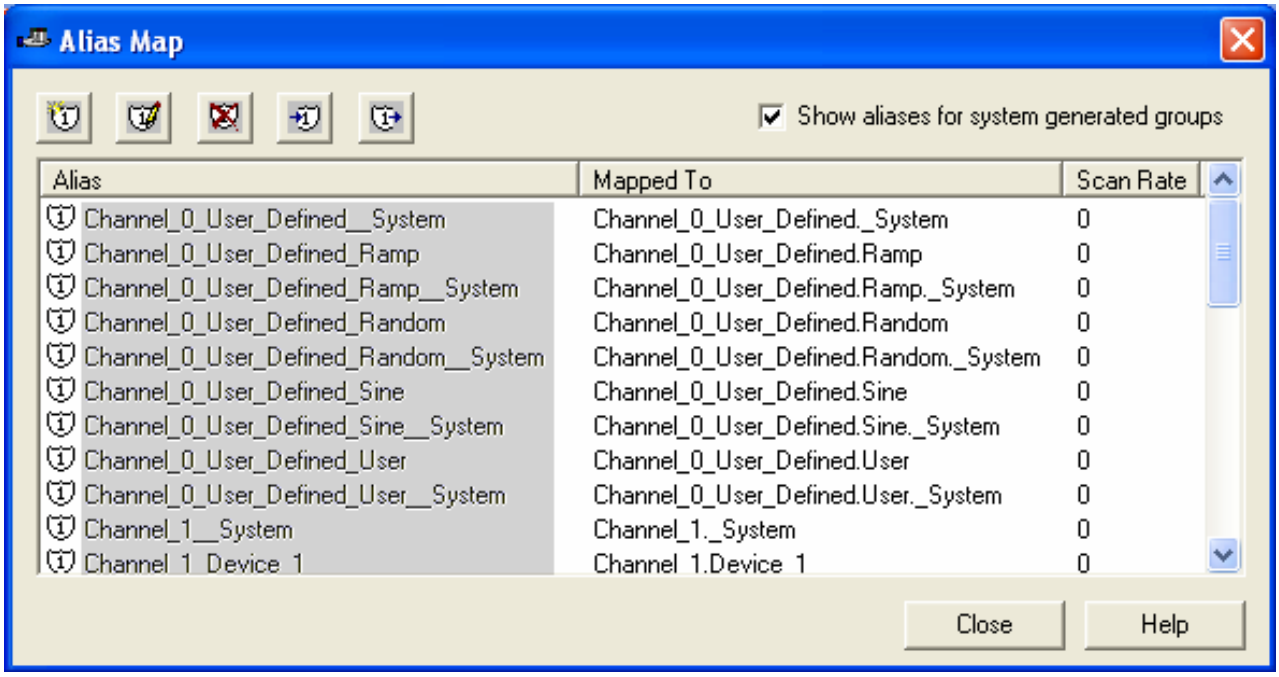

Figure 15: Alias Map

Notes:

1. Each separate Topic name used creates a separate client connection to the server.

2. Using an Alias as the Topic allows the user to control Scan Rate. Refer to *Update Rates* section.

Item Name

The Item name depends on what you have used for your Topic name. If you have used the default Topic name then your Item name must include the Alias. If you have used the Alias as your topic the Item name will only be the Tag Name or Address of that tag. Using the default Topic name your Item name would look like the following: **Channel_1.Device_1.Tag_1** or **Channel_1.Device_1.R0001**

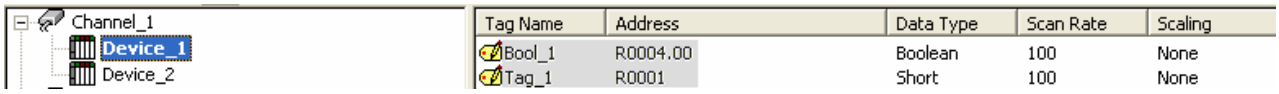

Figure 16: Tag Name or Address

NetDDE Examples

Example 1: Using default Topic Name.

These two lines connect to the same Tag using the default Topic name, _ddedata. One uses the Tag Name and the other uses the Address of the Tag. The following example formulas should be placed inside the *Formula Bar* of the cell you would like the data to update.

='\\JW-DELL\NDDE$'|'_ddedata$'!Channel_1_Device_1.Tag_1

='\\JW-DELL\NDDE$'|'_ddedata$'!Channel_1_Device_1.R0001

where:
application = '\\JW-DELL\NDDE$'
topic = '_ddedata$'
item = Channel_1_Device_1.Tag_1 **or**
item = Channel_1_Device_1.R0001

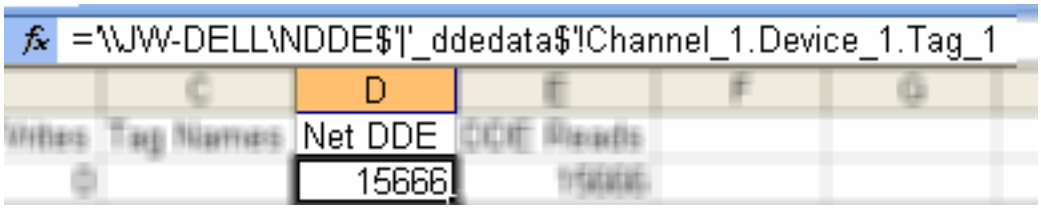

Figure 17: NetDDE Excel Example using default Topic Name

Example 2: Using Alias as Topic Name

Connecting to Channel_1.Device_1.Tag_1 on computer named JW-DELL using an Alias as your Topic name.

='\\JW-DELL\NDDE$'|'Channel_1_Device_1$'!'Tag_1'

where:

application = '\\JW-DELL\NDDE$'

topic = 'Channel_1_Device_1$'

item = Tag_1

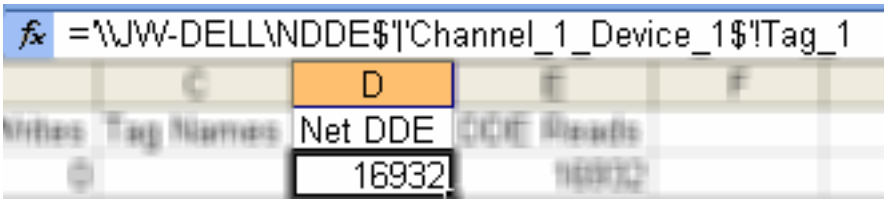

Figure 18: NetDDE Excel Example using Alias as Topic Name

Update Rates

This section will discuss how to control *Device Scan Rates* and *Client Update Rates* using the TOP Server.

Device Scan Rates

When using the default Topic, _ddedata, the device scan rate that is used will be the default scan rate of 100ms. Device scan rates can only be controlled when using the Alias as your Topic Name. To change these setting you must open your TOP Server and select **Edit | Alias Map…** from the main menu. Next you must double click the Alias whose scan rate you want to change.

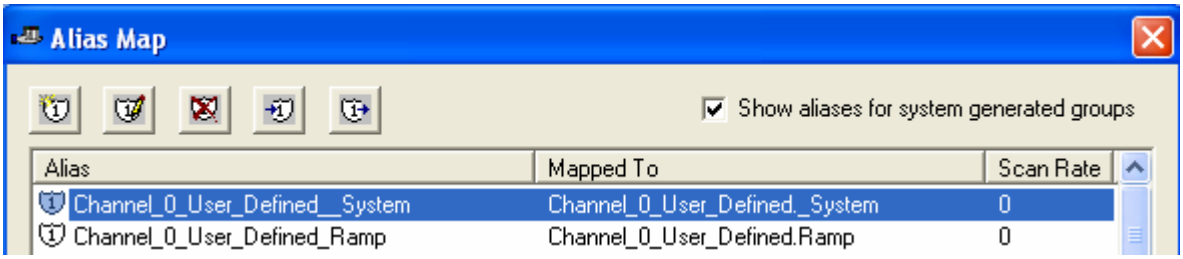

Figure 19: Alias Map to control scan rates

From here you can change the *Scan Rate Override*. You will notice this value defaults to zero. As long as this value is set to zero the DDE update rate will be 100ms. You may now set the scan rate as desired.

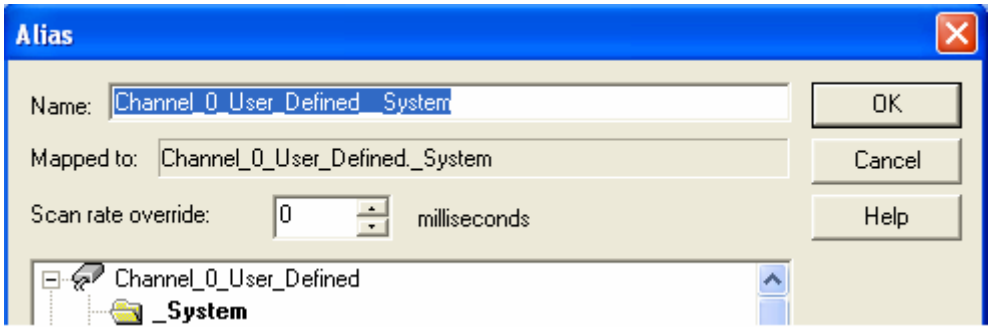

Figure 20: Scan Rate Override

Client Update Rates

The client update rate is how often the DDE data is sent to the client applications. This option can be found by opening the TOP Server and selecting **Tools | Options…** from the main menu, then by selecting the DDE tab. You will see the timer settings at the bottom of this tab.

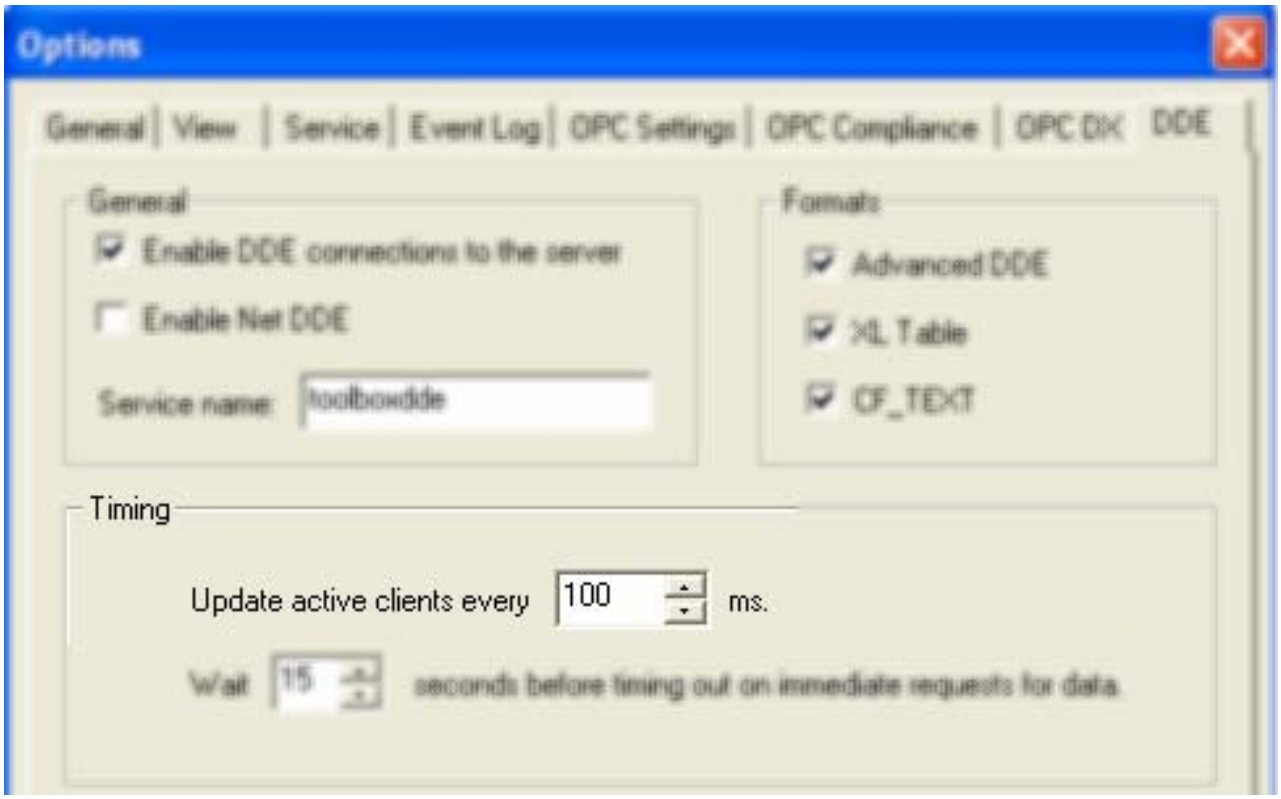

Figure 21: Setting Client Update Rate

The valid range of the update timer is 20 – 60,000 milliseconds. The default is 100 milliseconds.