

Reference Guide

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OpenEnterprise Calculation Configuration Reference Guide (V2.83)

Remote Automation Solutions

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1 Calculation Configuration Tool

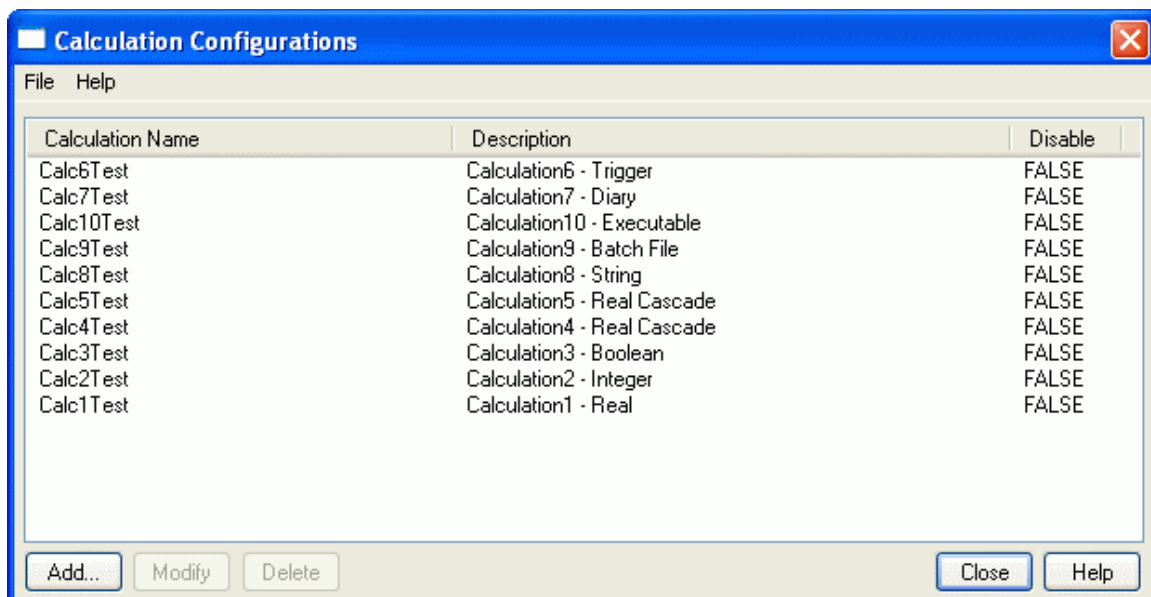
The Calculation Configuration Tool enables the user to create and schedule calculations, or to regularly run any type of executable file. Through the tool the user may: -

- Create and schedule a Calculation.
- Compose a Calculation expression using the Calculation Editor. This uses the Server Side Calculation module, a powerful, ready to use DLL (Dynamic Link Library file), which will perform the calculation and write the result to a signal value.
- Specify a user calculation (written as a DLL) to be run by the Calculation Server. The Calculation Editor cannot be used with user written DLLs.
- Create a reporting schedule. An executable file (i.e. MsExcel) can be scheduled to run, and instructed to open a configured worksheet template. The configured worksheet template can contain VBA (Visual Basic for Applications), which instruct it to run a query on the OpenEnterprise database, and save the results of the query to a new file.
- Schedule the Calculation or report by using a Diary or a Signal's changing value.
- Configure the cascading of calculations or reports.

There are three OpenEnterprise components which work together to execute calculations or reports - the Calculation Configuration Tool, the Calculation Server and the Scheduler. The Configuration Tool creates Calculation objects within the database, the Scheduler ensures the Calculations execute on time, and the Calculation Server actually runs them.

2 Calculation Configurations

The main dialog presents the user with a list of application configured calculations, with features that allow the user to add, modify or delete. The dialog can be re-sized for optimal viewing of the calculation list.



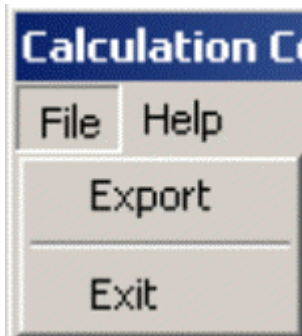
2.1 Menu

There are two items on the menu bar.



2.1.1 File Menu

The File menu provides two submenu options.



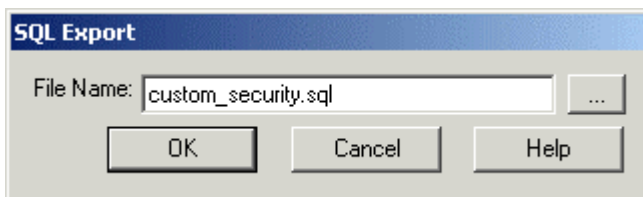
2.1.1.1 Export

The Export option enables you to save the current database Security Configuration to an SQL script file, which can be used to restore your Security settings at a later date.

When the Export option from the File drop down menu is selected, you will be presented with the SQL Import-Export File Dialog. This enables you to use the default SQL Export file, or to specify another file.

2.1.1.2 SQL Export Dialog

This dialog enables the user to override the default SQL script file for Export.

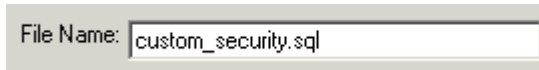


When the Export is completed, you will be informed by this message.



You must select the **[Close]** button to dismiss this dialog.

2.1.1.2.1 File Name



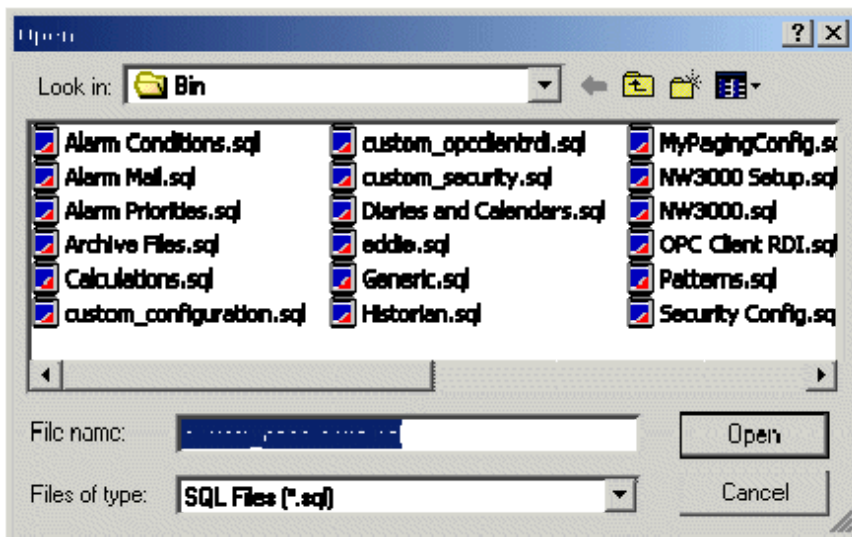
By default the Import or Export file will be named *custom_<Component>.sql*, where <Component> indicates the OpenEnterprise configuration component from which the Import/Export is initiated, and will be written to the standard OEToolbox export file directory. The Status file has a default name of *custom_<Component>.txt*. If a file already exists in the directory with the filename specified, then the existing file should be renamed such that .old is appended to the end of it, e.g. *custom_opcclientrdi.sql.old*.

When Importing or Exporting, this file will be selected automatically and placed in the *File Name* field. The user will however have the ability to override both the name and location if they so require, using the browse button, or by manually editing the filename.

2.1.1.2.2 File Browse Button



When the File Browse Button is selected, a standard File Open or File Save dialog is displayed, depending on which function has been chosen. The user can then select a file for Import, Export or Saving Import Status.



2.1.1.3 File Menu Exit

When selected, the Calculation configuration tool will close without committing any changes to the database.

2.1.2 Main Dialog Help Menu

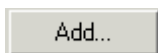
The help menu provides access to this help file, and also to the 'About...' pages, which provide version and contact information.

2.2 Configured Calculations List

Calculation Name	Description	Disable
Calculation LOCAL:CALC.RE...	Update LOCA...	FALSE
Calculation LOCAL:CALC.RE...	Update LOCA...	TRUE
Calculation TANKS:CALC.TA...	Update TANK...	FALSE
Calculation TANKS:CALC.TA...	Update TANK...	FALSE
Calculation TANKS:CALC.TA...	Update TANK...	FALSE
Calculation TANKS:CALC.TA...	Update TANK...	FALSE
Calculation TANKS:CALC.TA...	Update TANK...	TRUE

This list displays the list of previously configured application calculations. It details the calculation's name, description and enabled/disabled status.

2.3 Add Calculation Button



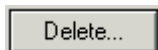
This button invokes a Calculation Wizard that initializes with a General Details dialog.

2.4 Modify Calculation Button



If a configured calculation is selected from the list, the [Modify] button is enabled. This button opens the tabbed dialog.

2.5 Delete Button



The currently selected Calculation will be deleted. A confirmation message will appear before the deletion, giving the user the opportunity to abort the deletion.

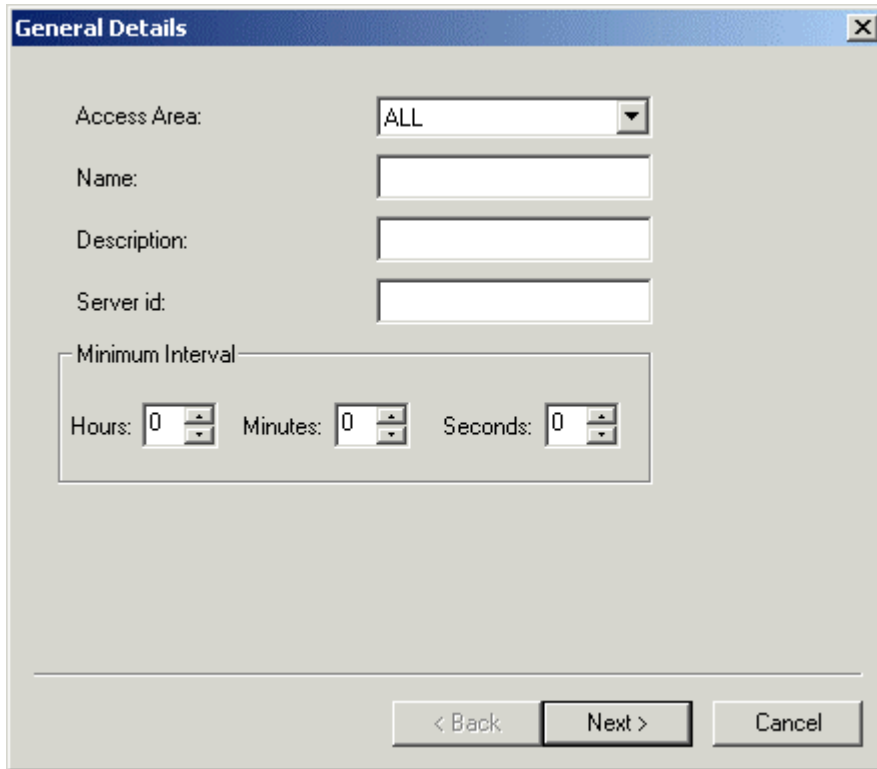
3 Calculation Wizard

When the [Add] button is selected from the Calculation Configurations dialog, the Add Calculation Wizard is launched. As with all wizards, each page must be configured properly before the user can move on to the next. There are three main pages in the wizard:-

1. General Details
2. Action Details
3. Trigger Details

3.1 General Details

The General Details dialog enables the user to start configuring a new calculation.



3.1.1 Access Area

This field must have a value. The wizard will not move on to the next dialog unless it contains a valid entry. It is a list of configured access areas from which one must be chosen for the current calculation. It may be modified later.

3.1.2 Calculation Name

This field must have a value. The wizard will not move on to the next dialog unless it contains a valid entry. It is a text entry field. The user must type a unique name for the calculation in here. When modifying Calculations, this field is disabled, and can not be modified.

3.1.3 Description

This field is optional. It should contain text which explains more fully what the calculation does. It can be changed later by using the **[Modify]** button.

3.1.4 Server Id

This field is optional. It refers to the Calculation Server instance id, and not to the DNS names of the OE Servers which are running the Database.

If only one instance of the OE Calculation Server is to be run, then it may be left blank.

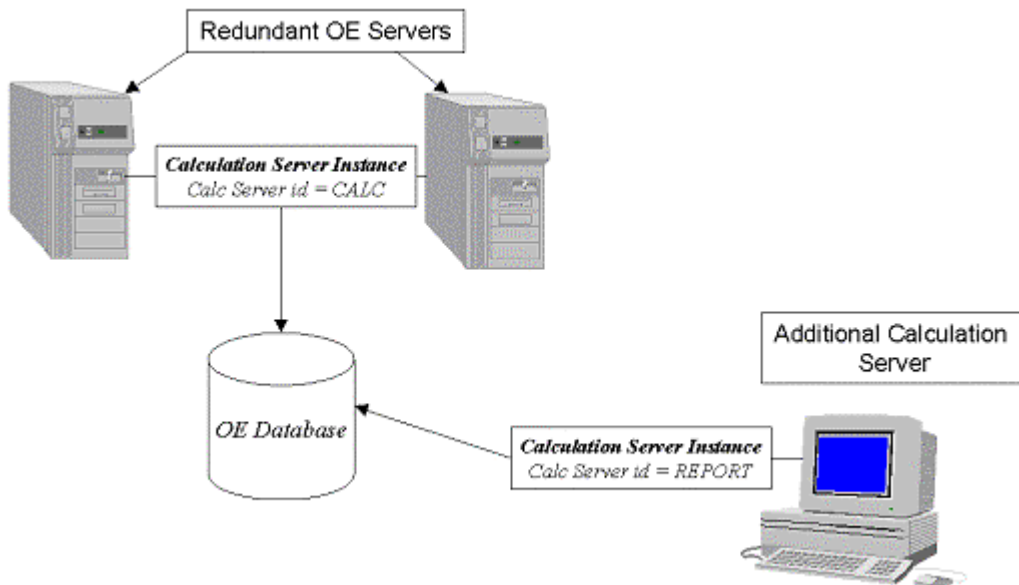
The field is used in OpenEnterprise applications where it has been decided to use more than one instance of the OE Calculation Server to run calculations.

This would make sense, for instance, in large SCADA systems, where there are many calculations and reports running. It would ease processing and storage on the Main and Standby Servers if another Server ran a separate instance of the OE Calculation Server to take care of the 'report' type calculations. This is best described in the Multiple Calculation Server Diagram.

3.1.5 Multiple Calculation Servers Diagram

Any calculations with a Calculation Server id of 'CALC' would be run by the Calculation Server instance on the currently active Main OE Server. Calculations with a server id of 'REPORT' would be run by the Calculation Server instance on the additional calculation server.

The Calculation Server dataservice and id is determined by arguments given to the Calculation Server instance at start up..



3.1.6 Minimum Interval

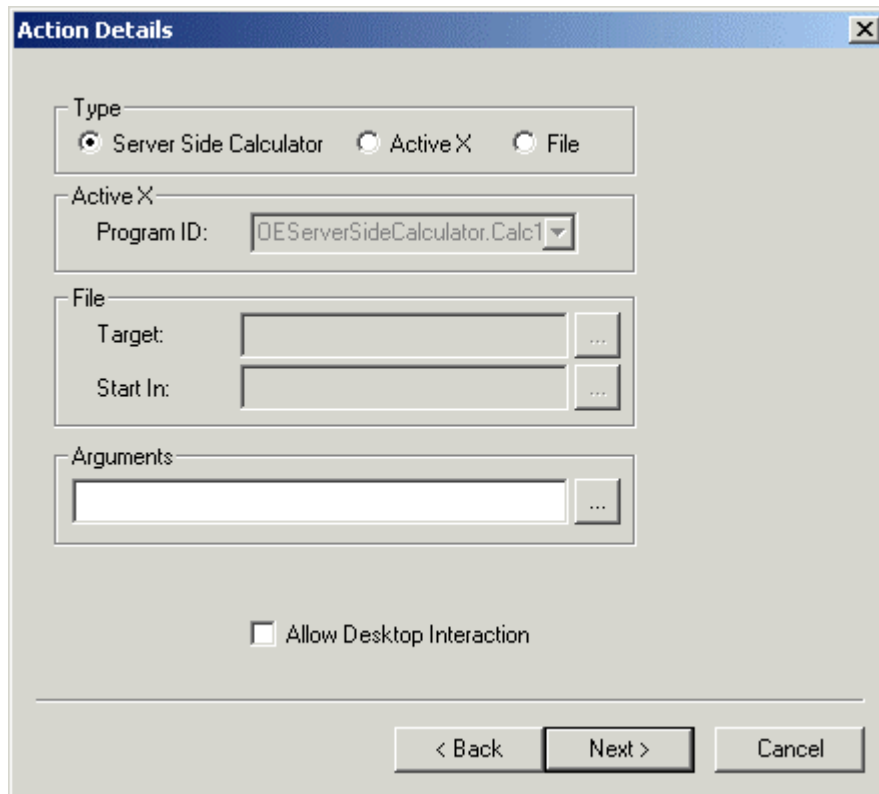
This field allows the user to specify a minimum time which must elapse between the operation of successive calculations.

It is useful when a calculation is being triggered by a signal, or a combination of diary and signal triggering, and the readvalue of the trigger signal is changing rapidly.

It ensures that there will be a sensible amount of time elapsing between runs of the calculation or report in these circumstances.

3.2 Action Details

This dialog enables the user to specify the type of Calculation that the Calculation Server will run, as well as defining the arguments to pass to the Calculation.



3.2.1 Type

This group of controls enables the user to specify whether the Calculation Server is to run the Server Side Calculator, a custom ActiveX DLL or an executable file.



3.2.1.1 Server Side Calculator

This is the default selection. The Server Side calculation type is automatically available for defining Calculations. It is the only Calculation type that enables the user to define calculation arguments (expressions) using the Calculation Editor, which is accessed via the Browse button ([...]) to the right of the Arguments field.

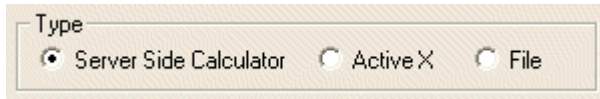
3.2.1.2 ActiveX

If this radio button is left selected, then the Program ID field will be enabled for selection. This option should be used when using Calculation DLL files created by the user. A Program Id must be specified. The Calculation Editor will not be available for this type of Calculation.

3.2.1.3 File

If this option is selected, the Program ID field will be disabled and the Target and StartIn fields will become enabled.

3.2.1.4 Server Side Calculation Module



The OpenEnterprise ServerSide Calculation Module is a DLL (Dynamic Link Library file) that allows the user to create simple calculations which are run on the server by the OpenEnterprise Calculation Server component. Calculations may be triggered by the OpenEnterprise Scheduler, using a Diary, or may be triggered by specific Signal values.

The Server Side Calculation module takes two parameters, of the form **Arg1, Arg2**. Note that **Arg1** and **Arg2** are separated by a single comma.



- **Arg1** must be a realanalog signal name. It is the target for the calculation, and its value will be written to with the result of the expression in Arg2.
- **Arg2** is an expression which is evaluated and written to Arg1. The expression may contain more than one Signal name, plus constant values and operators. The operators may be arithmetic or logical operators, or may be functions, such as Max, Min, Sine, Cosine.

These two parameters are stored in the 'args' attribute of the 'calculation' table in OpenEnterprise

An example might be:

"{RTU1:TOTAL.VALUE}","{RTU3:TOTAL.VALUE}+{RTU2:TOTAL.VALUE}"

3.2.1.4.1 Available Operators

There are four main types of operators available for use with the Server Side Calculation module, providing a wide variety of calculation options.

1. Arithmetic operators
2. Comparison operators
3. Logical operators
4. Functions

3.2.1.4.2 Arithmetic Operators

There are seven arithmetic operators: -

Operator	Functionality	Example	Example Result
+	Addition	13+5	18
-	Subtraction	13-5	8
*	Multiplication	3*5	15
/	Division	100/8	12.5
%	Modulus (Remainder)	100%8	4
\	Integer Division	100\8	12
^	Raised to the Power (POW button)	2^4	16

3.2.1.4.3 Comparison Operators

There are six comparison operators available: -

Operator	Functionality	Example	Example Result
<	Is less than	13<5	False
<=	Is less than or equal	13<=5	False
>	Is greater than	13>5	True
>=	Is greater than or equal	13>=5	True
=	Is equal to	13=5	False
!=	Is not equal to	13!=5	True
<>	Is not equal to (same as !=)	13<>5	True

3.2.1.4.4 Logical Operators

There are three logical operators: -

Operator	Functionality	Example	Example Result
&	Boolean AND (AND button)	1&0	False
	Boolean OR (OR button)	1 0	True
!	Boolean NOT (NOT button)	!(3>5)	True (-1 if stored in realanalog table)

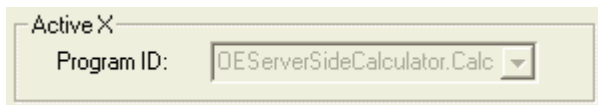
3.2.1.4.5 Functions

There are seven functions available: -

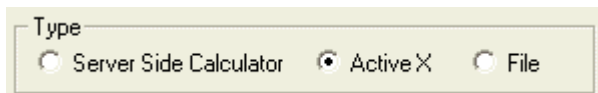
Operator	Functionality	Example	Example Result
MAX(x;y)	Returns the larger of x and y	max(19.5;6)	19.5
MIN(x;y)	Returns the smaller of x and y	min(19.5;6)	6
IF(x;y;z)	If x is true returns y, else z	if((5-6);19;5)	5
SIN(x)	Returns the sine of x	sin(0)	0
COS(x)	Returns the cosine of x	cos(0)	1
TAN(x)	Returns the tangent of x	tan(0)	0
SQR(x)	Returns the square root of x	sqr(4)	2

3.2.1.5 ActiveX Program ID

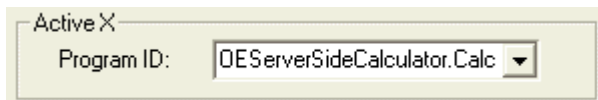
If the Server Side Calculator is chosen, this field will be grayed out, and will contain the name of the Server Side Calculator DLL (OEServerSideCalculator.Calc1).



If the ActiveX radio button is selected:-



Then the Program ID field is editable:-

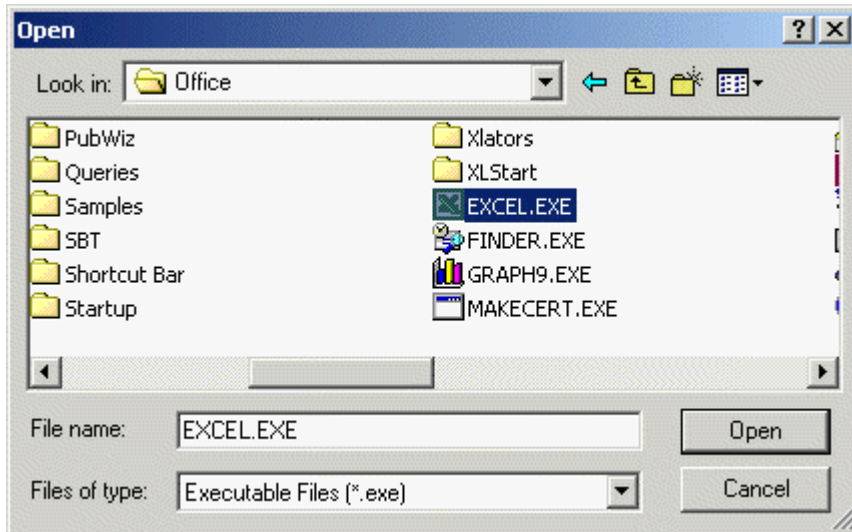


The required user created ActiveX DLL file name must be entered.

The Calculation Server is able to find the path to the file from the Server's registry. File names of this sort are in the format of two strings separated by a full stop (i.e. RealCalc.Add). The user must create these files on the Server(s) using a programming language such as C++ or Visual Basic.

3.2.1.6 File Target

If the File radio button in the Type section has been chosen, this field is mandatory. The full pathname of the target file may be typed in, or the user may select the [...] browse button to locate the target file on the Server, and the file browse dialog will be opened.



It must be borne in mind however, that the pathname is relative to the Server, so DNS names will not work. The file type may be an executable or a batch file.

3.2.1.6.1 File Start In

This is the working directory for the application started by the calculation. Any files created will be stored within the identified directory.

3.2.2 Arguments

These are arguments that are passed to the target file as it is opened. They may be typed in directly or, depending on the Type of Calculation: -

- Be configured using the Calculation Editor (Server Side Calculator only). The Calculation Editor is opened by selecting the browse button [...].
- Be contained in a batch file which may be located using the browse button [...], remembering that the path name must be relative to the Server.

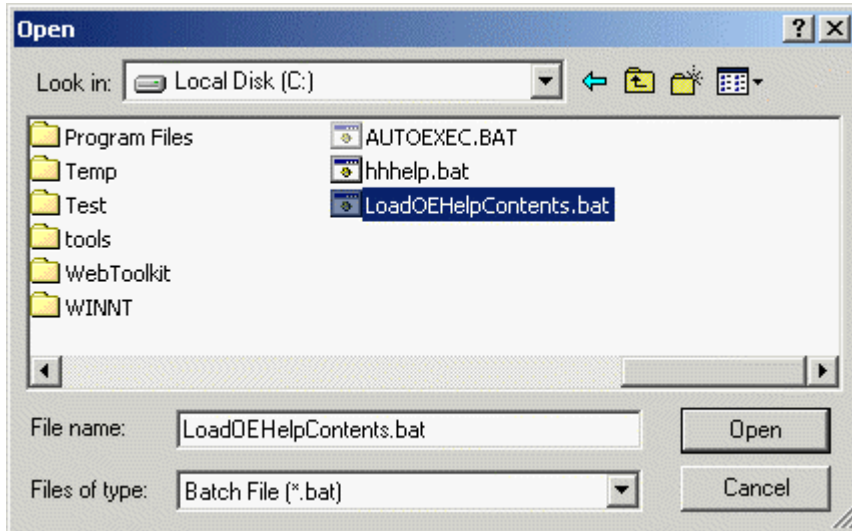
3.2.3 Arguments Browse Button

This button will function differently, depending on the Type of Calculation: -

1. If it is a Server Side Calculation, this button will open the Calculation Editor
2. If it is a user defined ActiveX DLL, the button will be disabled
3. If it is a File, this button will display an 'Open File' dialog.

3.2.4 Open File Dialog

The 'Open' dialog has *.bat type files selected by default. This can be changed to view executable files (*.exe) or all files (*.*) also.

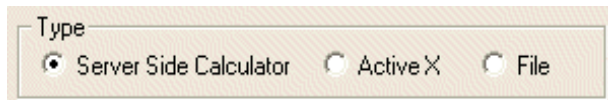


3.2.5 Allow Desktop Interaction

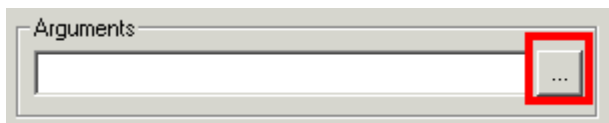
If this box is checked, then the interface of the target application will be displayed on the Server for user interaction. If unchecked, then the target application will run invisibly on the Server.

3.2.6 Calculation Editor

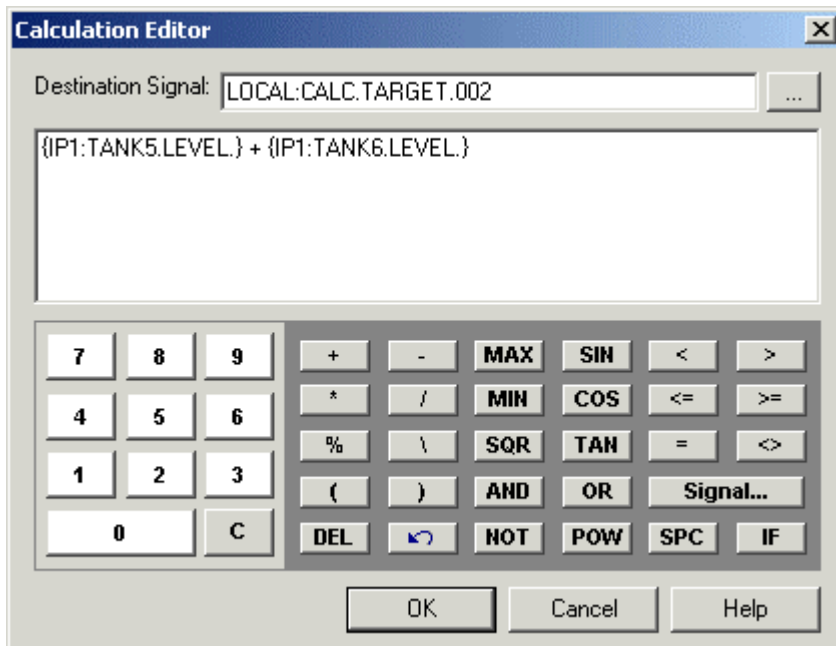
The Calculation Editor appears when on the Action Details dialog, the Action Type is set to Server Side Calculation Module:-



... and the Arguments Browse button is selected:-



The Calculation Editor enables the user to enter valid expressions for use with the Server Side Calculation Module.



3.2.6.1 Destination Signal

The destination signal must be a real analog type. It is typically a local signal. A signal may be selected by using the 'Signal Browser', which is invoked by selecting the Browse button ([...]) to the right of this field.

3.2.6.2 Number Pad

Numbers may be entered into the editing area by clicking on them with the mouse. A decimal point may be added by using the full-stop key on the keyboard. The contents of the editing area may be cleared by clicking the 'C' button.

3.2.6.3 Editing Area

The Editing Area is where the expression is written as it is built up. It may also be edited like a text editor by entering text from the keyboard.

3.2.6.4 Parentheses

Any valid expression may be enclosed in parentheses, in order to change the default operator precedence.

3.2.6.4.1 Example

- $1-2*3+4$ would evaluate to -1
- $(1-2)*(3+4)$ would evaluate to -7

3.2.6.5 Delete and Undo

- The [Delete] button deletes the character immediately to the right of the cursor.
- The [Undo] button undoes the last action performed by the user within the editing area.

3.2.6.6 Space

This allows the user to enter a space into the expression.

3.2.6.7 OK button

Selection of this button will close the Calculation Editor and enter the expression contained in the Editing Area into the Arguments field within the 'Action Details Dialog'.

3.2.6.8 Cancel button

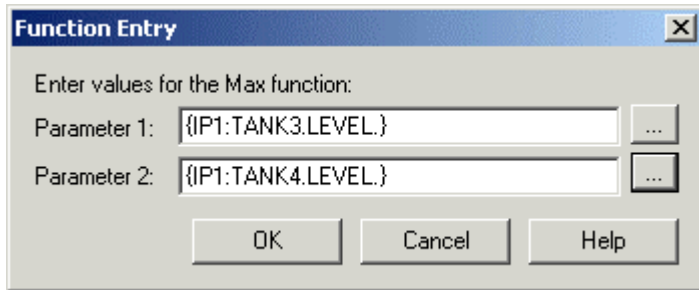
The Calculation Editor will close without entering the expression contained within the Editing Area into the Arguments field on the 'Action Details Dialog'.

3.2.6.9 Help Button

Selection will display this Help file.

3.2.6.10 Max Function

The Max Function dialog enables the user to insert the Max function into the Calculation expression.



3.2.6.10.1 Max Function Parameter 1

This is the first parameter for the Max function. It can contain a constant value, which must be typed in, or can contain a signal. To browse for a signal to enter into this field, click on the signal browse button [...] to the right of this field. This will open the Signal Browser.

3.2.6.10.2 Max Function Parameter 2

This is the second parameter for the Max function. It can contain a constant value, which must be typed in, or can contain a signal. To browse for a signal to enter into this field, click on the signal browse button [...] to the right of this field. This will open the Signal Browser.

3.2.6.10.3 Signal Browse Button

The Signal Browse Button opens the Signal Browser. When a signal has been selected from the Browser, it will be placed into the appropriate field on the dialog.

3.2.6.10.4 OK Button

When selected, the Function dialog will close. Any values entered into the parameter fields on the dialog will be written as parameters of the chosen function into the Calculation Editing Area. If there are no values in the parameter fields the chosen function will be written to the Calculation Editing Area without any parameters. The parameters can be entered directly into the Editing Area later.

3.2.6.10.5 Cancel Button

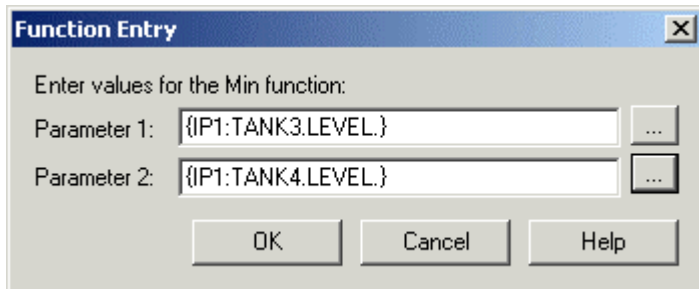
When selected, the Function dialog will close without entering the function or any parameters into the Calculation Editing Area. Values or signals already in the parameter fields will be lost.

3.2.6.10.6 Help Button

Selection will display this Help file.

3.2.6.11 Min Function

The Min Function dialog enables the user to insert the Min function into the Calculation expression.



3.2.6.11.1 Min Function Parameter 1

This is the first parameter for the Min function. It can contain a constant value, which must be typed in, or can contain a signal. To browse for a signal to enter into this field, click on the signal browse button [...] to the right of this field. This will open the Signal Browser.

3.2.6.11.2 Min Function Parameter 2

This is the second parameter for the Min function. It can contain a constant value, which must be typed in, or can contain a signal. To browse for a signal to enter into this field, click on the signal browse button [...] to the right of this field. This will open the Signal Browser.

3.2.6.11.3 Signal Browse Button

The Signal Browse Button opens the Signal Browser. When a signal has been selected from the Browser, it will be placed into the appropriate field on the dialog.

3.2.6.11.4 OK Button

When selected, the Function dialog will close. Any values entered into the parameter fields on the dialog will be written as parameters of the chosen function into the Calculation Editing Area. If there are no values in the parameter fields the chosen function will be written to the Calculation Editing Area without any parameters. The parameters can be entered directly into the Editing Area later.

3.2.6.11.5 Cancel Button

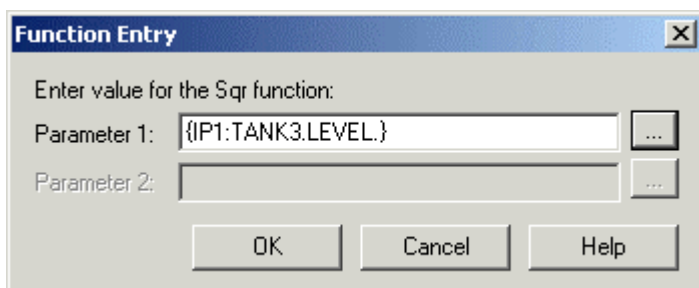
When selected, the Function dialog will close without entering the function or any parameters into the Calculation Editing Area. Values or signals already in the parameter fields will be lost.

3.2.6.11.6 Help Button

Selection will display this Help file.

3.2.6.12 Sqr Function

The Sqr Function dialog enables the user to insert the Sqr function into the Calculation expression.



3.2.6.12.1 Sqr Function Parameter

This is the only parameter required for the Sqr function. It can contain a constant value, which must be typed in, or can contain a signal. To browse for a signal to enter into this field, click on the signal browse button [...] to the right of this field. This will open the Signal Browser.

3.2.6.12.2 Signal Browse Button

The Signal Browse Button opens the Signal Browser. When a signal has been selected from the Browser, it will be placed into the appropriate field on the dialog.

3.2.6.12.3 OK Button

When selected, the Function dialog will close. Any values entered into the parameter fields on the dialog will be written as parameters of the chosen function into the Calculation Editing Area. If there are no values in the parameter fields the chosen function will be written to the Calculation Editing Area without any parameters. The parameters can be entered directly into the Editing Area later.

3.2.6.12.4 Cancel Button

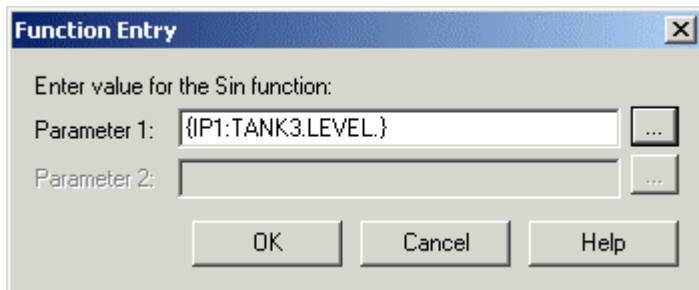
When selected, the Function dialog will close without entering the function or any parameters into the Calculation Editing Area. Values or signals already in the parameter fields will be lost.

3.2.6.12.5 Help Button

Selection will display this Help file.

3.2.6.13 Sin Function

The Sin Function dialog enables the user to insert the Sin function into the Calculation expression.



3.2.6.13.1 Sin Function Parameter

This is the only parameter required for the Sin function. It can contain a constant value, which must be typed in, or can contain a signal. To browse for a signal to enter into this field, click on the signal browse button [...] to the right of this field. This will open the Signal Browser.

3.2.6.13.2 Signal Browse Button

The Signal Browse Button opens the Signal Browser. When a signal has been selected from the Browser, it will be placed into the appropriate field on the dialog.

3.2.6.13.3 OK Button

When selected, the Function dialog will close. Any values entered into the parameter fields on the dialog will be written as parameters of the chosen function into the Calculation Editing Area. If there are no values in the parameter fields the chosen function will be written to the Calculation Editing Area without any parameters. The parameters can be entered directly into the Editing Area later.

3.2.6.13.4 Cancel Button

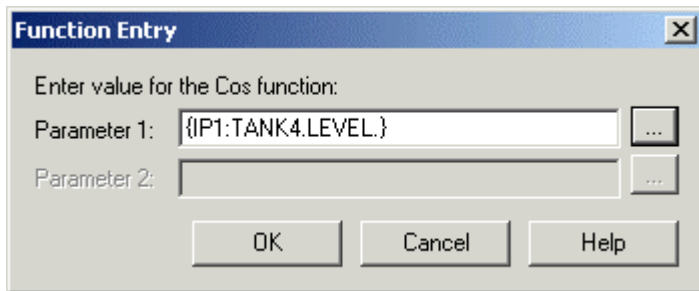
When selected, the Function dialog will close without entering the function or any parameters into the Calculation Editing Area. Values or signals already in the parameter fields will be lost.

3.2.6.13.5 Help Button

Selection will display this Help file.

3.2.6.14 Cos Function

The Cos Function dialog enables the user to insert the Cos function into the Calculation expression.



3.2.6.14.1 Cos Function Parameter

This is the only parameter required for the Cos function. It can contain a constant value, which must be typed in, or can contain a signal. To browse for a signal to enter into this field, click on the signal browse button [...] to the right of this field. This will open the Signal Browser.

3.2.6.14.2 Signal Browse Button

The Signal Browse Button opens the Signal Browser. When a signal has been selected from the Browser, it will be placed into the appropriate field on the dialog.

3.2.6.14.3 OK Button

When selected, the Function dialog will close. Any values entered into the parameter fields on the dialog will be written as parameters of the chosen function into the Calculation Editing Area. If there are no values in the parameter fields the chosen function will be written to the Calculation Editing Area without any parameters. The parameters can be entered directly into the Editing Area later.

3.2.6.14.4 Cancel Button

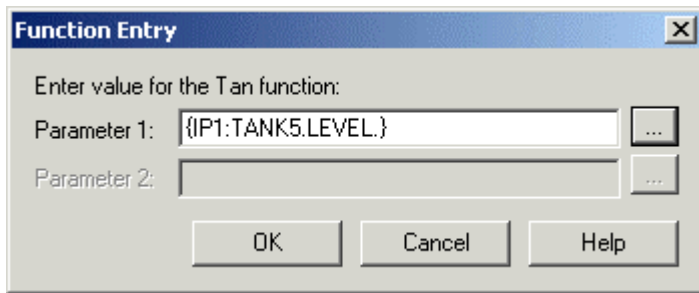
When selected, the Function dialog will close without entering the function or any parameters into the Calculation Editing Area. Values or signals already in the parameter fields will be lost.

3.2.6.14.5 Help Button

Selection will display this Help file.

3.2.6.15 Tan Function

The Tan Function dialog enables the user to insert the Tan function into the Calculation expression.



3.2.6.15.1 Tan Function Parameter

This is the only parameter required for the Tan function. It can contain a constant value, which must be typed in, or can contain a signal. To browse for a signal to enter into this field, click on the signal browse button [...] to the right of this field. This will open the Signal Browser.

3.2.6.15.2 Signal Browse Button

The Signal Browse Button opens the Signal Browser. When a signal has been selected from the Browser, it will be placed into the appropriate field on the dialog.

3.2.6.15.3 OK Button

When selected, the Function dialog will close. Any values entered into the parameter fields on the dialog will be written as parameters of the chosen function into the Calculation Editing Area. If there are no values in the parameter fields the chosen function will be written to the Calculation Editing Area without any parameters. The parameters can be entered directly into the Editing Area later.

3.2.6.15.4 Cancel Button

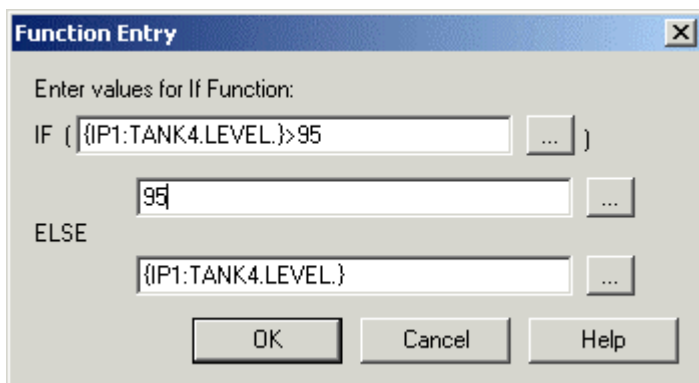
When selected, the Function dialog will close without entering the function or any parameters into the Calculation Editing Area. Values or signals already in the parameter fields will be lost.

3.2.6.15.5 Help Button

Selection will display this Help file.

3.2.6.16 If Function

The If Function dialog enables the user to insert the If function into the Calculation expression.



3.2.6.16.1 If Function Parameter 1

This is the first parameter for the If function. It can contain a constant value, which must be typed in, or can contain a signal. To browse for a signal to enter into this field, click on the signal browse button [...] to the right of this field. This will open the Signal Browser.

3.2.6.16.2 If Function Parameter 2

This is the second parameter for the If function. It can contain a constant value, which must be typed in, or can contain a signal. To browse for a signal to enter into this field, click on the signal browse button [...] to the right of this field. This will open the Signal Browser.

3.2.6.16.3 If Function Parameter 3

This is the third parameter for the If function. It can contain a constant value, which must be typed in, or can contain a signal. To browse for a signal to enter into this field, click on the signal browse button [...] to the right of this field. This will open the Signal Browser.

3.2.6.16.4 Signal Browse Button

The Signal Browse Button opens the Signal Browser. When a signal has been selected from the Browser, it will be placed into the appropriate field on the dialog.

3.2.6.16.5 OK Button

When selected, the Function dialog will close. Any values entered into the parameter fields on the dialog will be written as parameters of the chosen function into the Calculation Editing Area. If there are no values in the parameter fields the chosen function will be written to the Calculation Editing Area without any parameters. The parameters can be entered directly into the Editing Area later.

3.2.6.16.6 Cancel Button

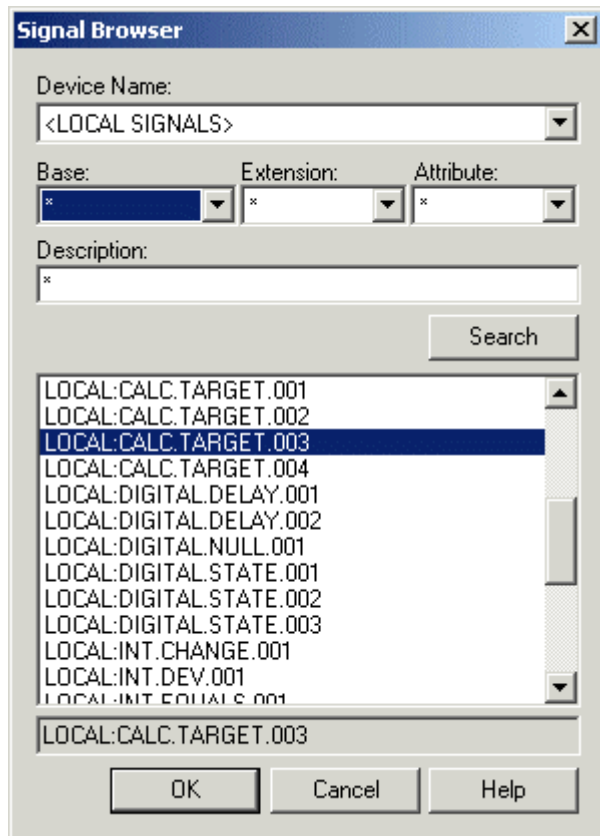
When selected, the Function dialog will close without entering the function or any parameters into the Calculation Editing Area. Values or signals already in the parameter fields will be lost.

3.2.6.16.7 Help Button

Selection will display this Help file.

3.2.6.17 Signal Browser

This dialog enables the user to select a signal for entering into the expression Editing Area.



3.2.6.17.1 Device Name

Select a Device from the list to filter on the Device Name, or <LOCAL SIGNALS> to filter on local real analog signals.

3.2.6.17.2 Base

Select a Base name from the list to add a Base name filter to the query.

3.2.6.17.3 Extension

Select an Extension name from the list to add an Extension name filter to the query.

3.2.6.17.4 Attribute

Select an Attribute name from the list to add an Attribute name filter to the query.

3.2.6.17.5 Signal Description

Will filter on the Description attribute for signals. Type the description in and select the **[Search]** button.

3.2.6.17.6 Search button

Selection of the **[Search]** button will query the OpenEnterprise database using the filters which have been applied to the dialog. The results of the query will be entered into the Search List.

3.2.6.17.7 Search List

When the **[Search]** button is selected, this list will be populated with the results of the query. A signal can be selected from the list for entry into the Calculation Editor.

3.2.6.17.8 Selected Signal

The selected signal is written into this non-editable field. This is the signal that will be entered into the Calculation Editing Area if the [OK] button is selected.

3.2.6.17.9 OK button

When selected, the Signal Browser will close and the signal highlighted in the Search List will be entered into the Calculation Editor.

3.2.6.17.10 Cancel button

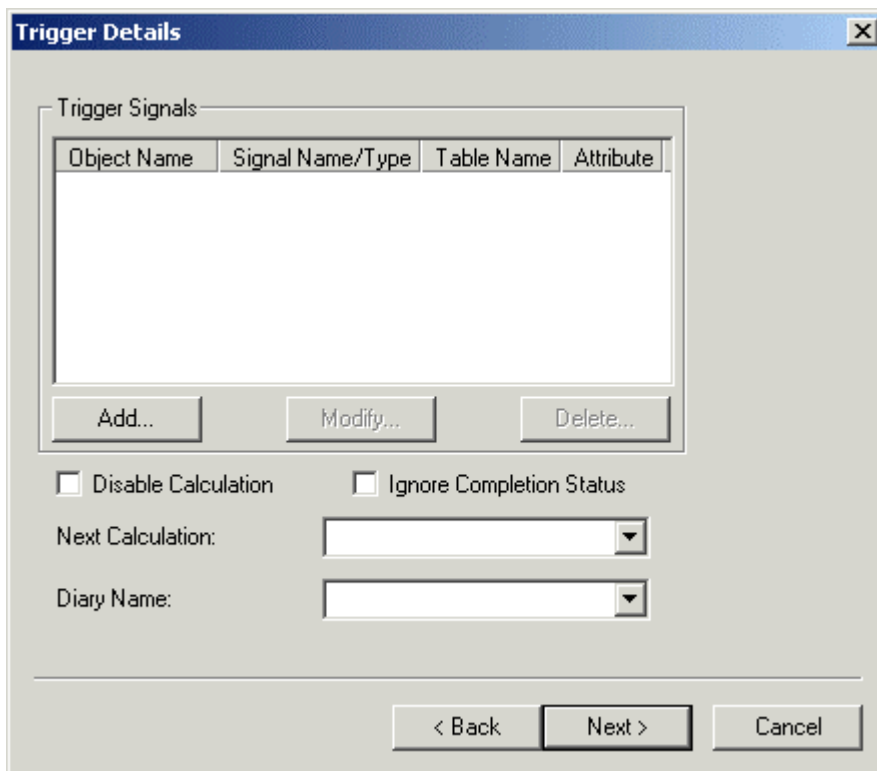
When selected, the Signal Browser will close without entering any selected signal into the Calculation Editor.

3.2.6.17.11 Help Button

Selection will display this Help file.

3.3 Trigger Details

This dialog enables the user to specify triggers for the calculation.



3.3.1 Trigger Signals List

This list displays all configured trigger signals for the calculation. Trigger signals initiate the running of a calculation when their readvalue attribute changes.

3.3.2 Add Trigger

If selected, the Configure Trigger Attribute dialog is displayed.

3.3.3 Modify Trigger

If selected, the Configure Trigger Attribute dialog is displayed.

3.3.4 Delete Trigger

The selected Trigger will be deleted. Before deletion a confirmation message will be displayed, which will enable the user to abort the operation.

3.3.5 Disable Calculation

If checked, the Calculation is disabled, and will not run until enabled.

3.3.6 Ignore Completion Status

If checked, the next calculation will run regardless of the completion status of the current calculation. If unchecked, the next calculation will only run if the current calculation completes successfully. The default value is unchecked.

3.3.7 Next Calculation

A list of currently configured calculations are available for selection. If one is selected, then the selected calculation will run immediately after the current calculation, depending on the configuration of the Ignore Completion Status field, and whether the current calculation is completed successfully.

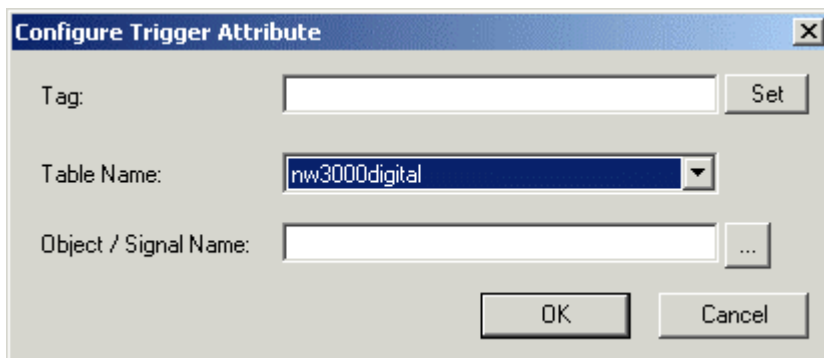
3.3.8 Diary Name

A list of configured diaries is available to act as a triggering mechanism for the calculation. Both diary and trigger signals may be used to trigger the same calculation.

3.3.9 Configure Trigger

The Configure Trigger Attribute dialog enables the user to configure a signal that will act as the trigger to the calculation. Any change in the Trigger signal's value will trigger the calculation. Any of these three methods can be adopted to specify the Trigger signal:-

1. Drag and drop the signal's OPC tag onto the Tag field from the Database Object Viewer.
2. Select a table from the Table Name drop-down list and then select a signal from the chosen table using the Signal browser button ([...]) to the right of the Object/Signal Name field.
3. Copy an OPC Tag from another source (ie an OEGraphics display) and paste it into the 'Tag' field.



3.3.9.1 Tag

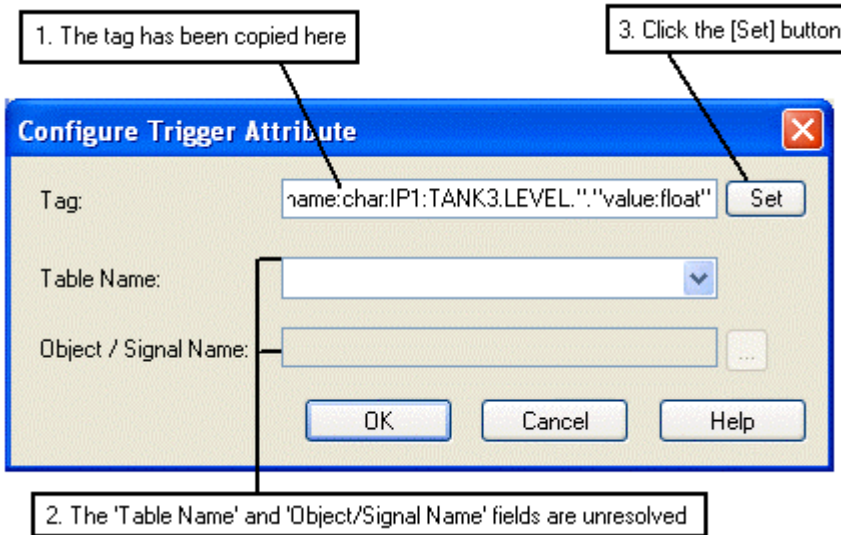
An OPC tag identifying the trigger signal can be drag-dropped or copied and pasted here. To 'drag-drop' a tag into this field open an instance of the Database Object Viewer, configure a query, select the required signal and 'drag-drop' its value into this field. The 'Table Name' and 'Object/Signal Name' fields will be automatically updated if the 'drag-drop' method is used.

See the 'Set' topic to find out how the populate these fields when the tag is copied and pasted.

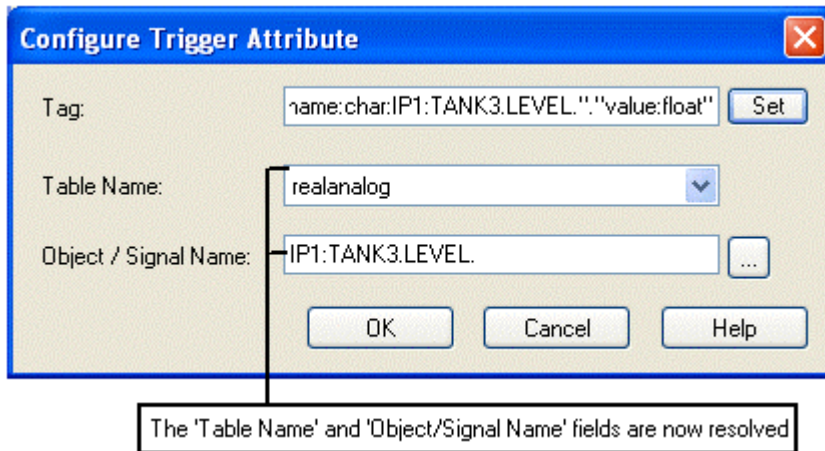
3.3.9.2 Set

If an OPC tag is drag-dropped into the 'Tag' field from a Database Object Viewer instance, the 'Table Name' and 'Object/Signal Name' fields will be updated automatically.

However, if an OPC tag is copied from elsewhere as a string and pasted into the 'Tag' field on the 'Configure Trigger' dialog, the 'Table Name' and 'Object/Signal Name' fields can be updated by using the [Set] button.



To do this, click the [Set] button, and 'Table Name' and 'Object or Signal Name' fields will be resolved from the tag in the 'Tag' field.



Configure Trigger

3.3.9.3 Table Name

This field combined with the Object / Signal Name field may be used instead of the 'drag-drop' method to identify a trigger signal. Selecting the field will reveal a list of signal tables. Once one is selected, the Object / Signal Name field becomes enabled.

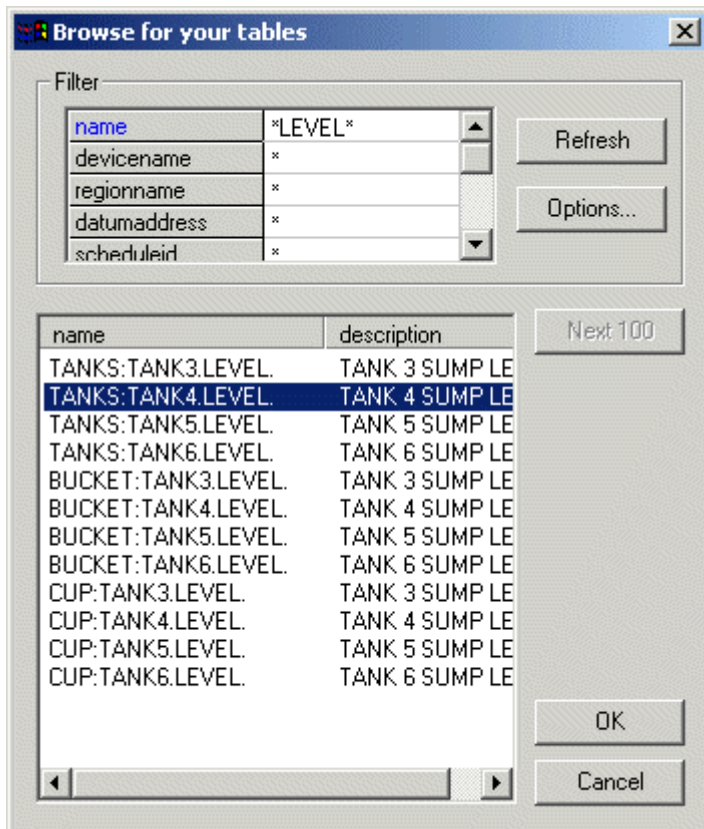
3.3.9.4 Object or Signal Name

The object name may be typed directly in, or the [...] browse button selected. Selection of the [...] browse button will allow you to Browse for a signal.

3.3.9.5 Browse for Trigger Signal

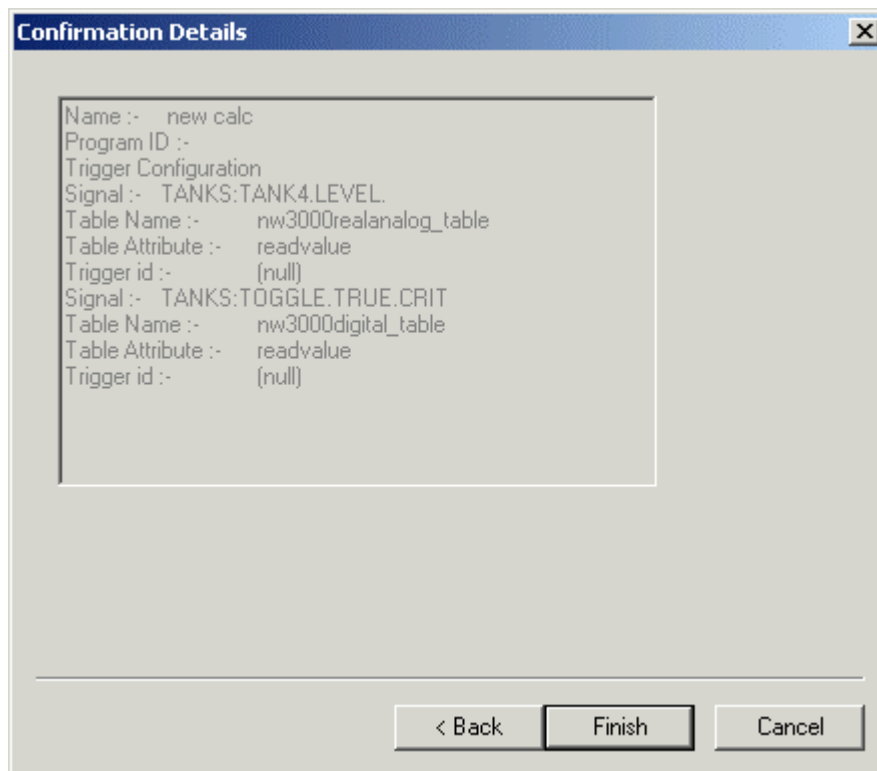
The signal list on this dialog will be filled with the first 100 signals sourced from the table chosen from the **Configure Attribute dialog**. The fields in the Filter section may be used to filter the signal list. In the example below the filter string ***LEVEL*** is applied to the **name** field and the **[Refresh]** button is selected. This finds only signals with the words **LEVEL** in the name and places these into the signal list.

A signal is selected, and then when the **[OK]** button is chosen the selected signal will be placed into the **Object / Signal Name** field on the **Configure Attribute dialog**. A change in this signals value will then trigger the calculation. When this is completed the user may select the **[Next]** button on the Trigger Details dialog.



3.4 Confirmation Details

This dialog displays all of the configured details for the new calculation. If any detail is wrong, then the user may select the **[<Back]** button to reconfigure the new calculation. If the details are correct, then selection of the **[Finish]** button will add the new calculation to the OpenEnterprise Database.



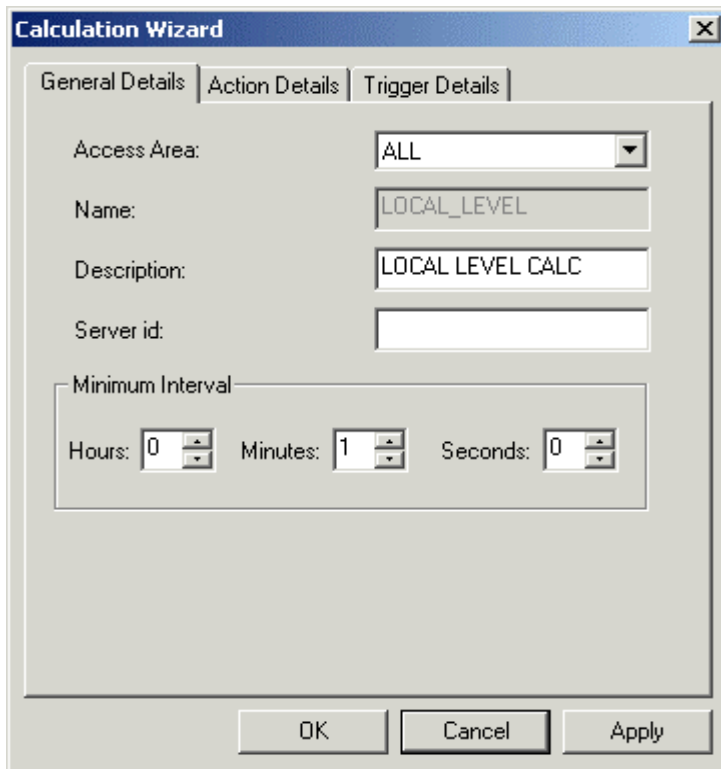
4 Tabbed Calculation Dialog

When the [Modify] button is selected, the user is presented with the Tabbed Calculation dialog. This gives access to any configuration setting immediately to enable modifications to be made more quickly. Each tab is exactly the same as the General, Action and Trigger Details pages of the Calculation Wizard. The three tabs available are;-

1. General Tab
2. The Action Tab
3. The Trigger Tab.

4.1 General Tab

This dialog enables the user to change certain general details belonging to the Calculation. Any field that is enabled can be modified.



4.1.1 Access Area

This field must have a value. The wizard will not move on to the next dialog unless it contains a valid entry. It is a list of configured access areas from which one must be chosen for the current calculation. It may be modified later.

4.1.2 Calculation Name

This field must have a value. The wizard will not move on to the next dialog unless it contains a valid entry. It is a text entry field. The user must type a unique name for the calculation in here. When modifying Calculations, this field is disabled, and can not be modified.

4.1.3 Description

This field is optional. It should contain text which explains more fully what the calculation does. It can be changed later by using the **[Modify]** button.

4.1.4 Server Id

This field is optional. It refers to the Calculation Server instance id, and not to the DNS names of the OE Servers which are running the Database.

If only one instance of the OE Calculation Server is to be run, then it may be left blank.

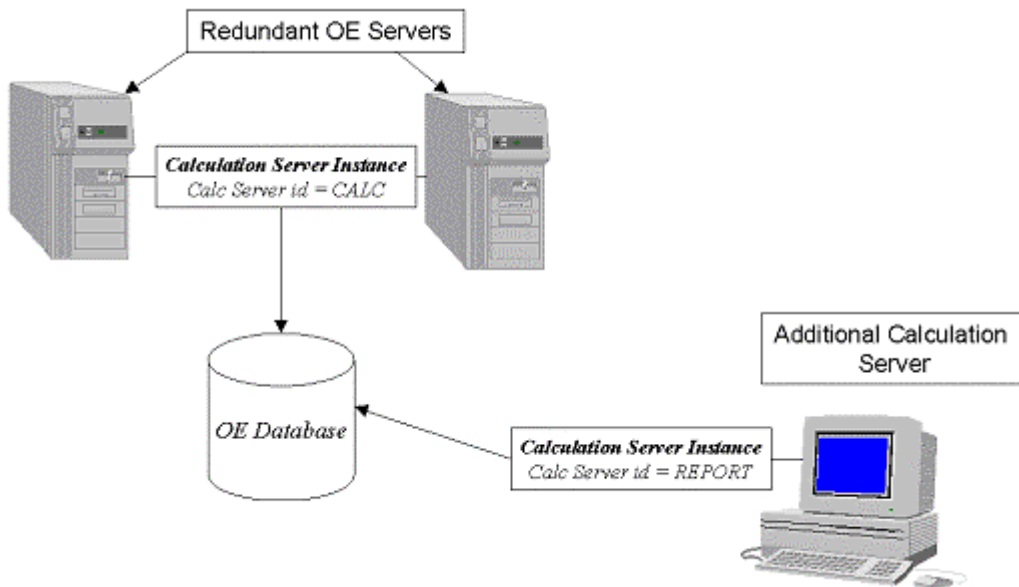
The field is used in OpenEnterprise applications where it has been decided to use more than one instance of the OE Calculation Server to run calculations.

This would make sense, for instance, in large SCADA systems, where there are many calculations and reports running. It would ease processing and storage on the Main and Standby Servers if another Server ran a separate instance of the OE Calculation Server to take care of the 'report' type calculations. This is best described in the Multiple Calculation Server Diagram.

4.1.5 Multiple Calculation Servers Diagram

Any calculations with a Calculation Server id of 'CALC' would be run by the Calculation Server instance on the currently active Main OE Server. Calculations with a server id of 'REPORT' would be run by the Calculation Server instance on the additional calculation server.

The Calculation Server dataservice and id is determined by arguments given to the Calculation Server instance at start up..



4.1.6 Minimum Interval

This field allows the user to specify a minimum time which must elapse between the operation of successive calculations.

It is useful when a calculation is being triggered by a signal, or a combination of diary and signal triggering, and the readvalue of the trigger signal is changing rapidly.

It ensures that there will be a sensible amount of time elapsing between runs of the calculation or report in these circumstances.

4.1.7 OK button

When selected, the Tabbed Calculation Configuration tool will close, saving any changes made to the OpenEnterprise database.

4.1.8 Cancel Button

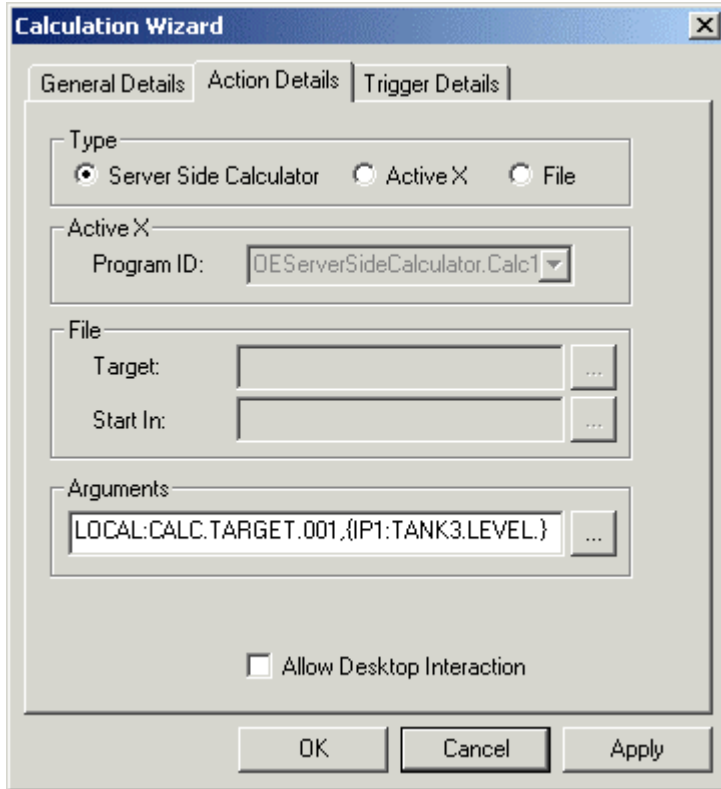
Tabbed Calculation Configuration tool will close. Any changes made on the dialog will not be saved to the OpenEnterprise database.

4.1.9 Apply Button

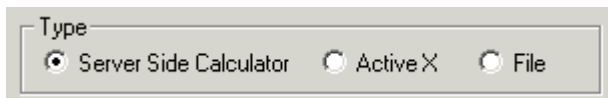
When a change is made on the tabbed dialog, the **[Apply]** button becomes enabled. If it is selected, any changes already made on the dialog are saved to the OpenEnterprise database, but the configuration tool is not closed, remaining open for further modifications to be made.

4.2 Action Tab

This dialog enables the user to change details belonging to the type of Calculation being used. Any field that is enabled can be modified.



This group of controls enables the user to specify whether the Calculation Server is to run the Server Side Calculator, a custom ActiveX DLL or an executable file.



4.2.1 Server Side Calculator

This is the default selection. The Server Side calculation type is automatically available for defining Calculations. It is the only Calculation type that enables the user to define calculation arguments (expressions) using the Calculation Editor, which is accessed via the Browse button ([...]) to the right of the Arguments field.

4.2.2 ActiveX

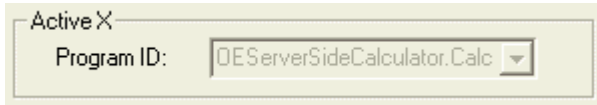
If this radio button is left selected, then the Program ID field will be enabled for selection. This option should be used when using Calculation DLL files created by the user. A Program Id must be specified. The Calculation Editor will not be available for this type of Calculation.

4.2.3 File

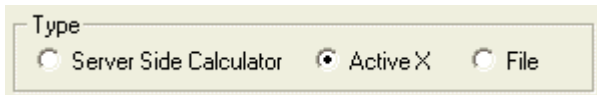
If this option is selected, the Program ID field will be disabled and the Target and StartIn fields will become enabled.

4.2.4 ActiveX Program ID

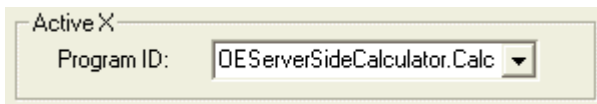
If the Server Side Calculator is chosen, this field will be grayed out, and will contain the name of the Server Side Calculator DLL (OESeverSideCalculator.Calc1).



If the ActiveX radio button is selected:-



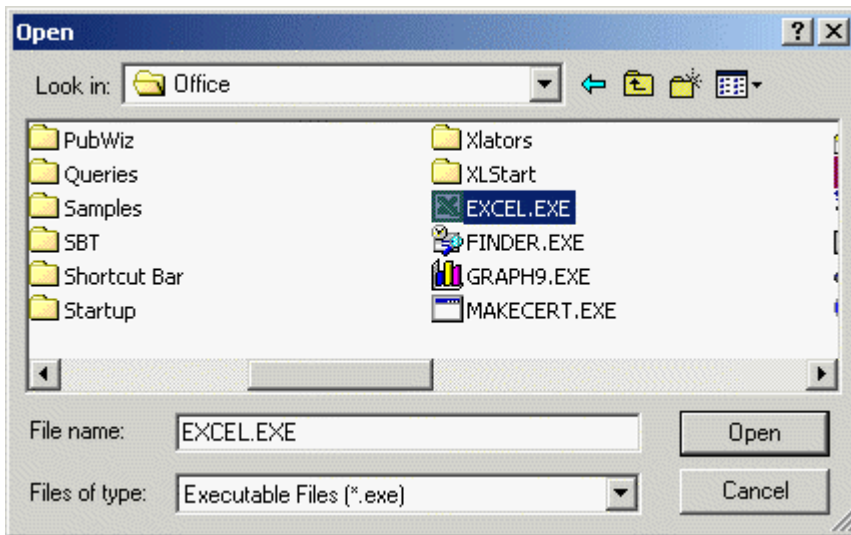
Then the Program ID field is editable:-



The required user created ActiveX DLL file name must be entered.

The Calculation Server is able to find the path to the file from the Server's registry. File names of this sort are in the format of two strings separated by a full stop (i.e. RealCalc.Add). The user must create these files on the Server(s) using a programming language such as C++ or Visual Basic.

If the File radio button in the Type section has been chosen, this field is mandatory. The full pathname of the target file may be typed in, or the user may select the [...] browse button to locate the target file on the Server, and the file browse dialog will be opened.



It must be borne in mind however, that the pathname is relative to the Server, so DNS names will not work. The file type may be an executable or a batch file.

4.2.5 File Start In

This is the working directory for the application started by the calculation. Any files created will be stored within the identified directory.

4.2.6 Arguments

These are arguments that are passed to the target file as it is opened. They may be typed in directly or, depending on the Type of Calculation: -

- Be configured using the Calculation Editor (Server Side Calculator only). The Calculation Editor is opened by selecting the browse button [...].
- Be contained in a batch file which may be located using the browse button [...], remembering that the path name must be relative to the Server.

4.2.7 Arguments Browse Button

This button will function differently, depending on the Type of Calculation: -

1. If it is a Server Side Calculation, this button will open the Calculation Editor
2. If it is a user defined ActiveX DLL, the button will be disabled
3. If it is a File, this button will display an 'Open File' dialog.

4.2.8 Allow Desktop Interaction

If this box is checked, then the interface of the target application will be displayed on the Server for user interaction. If unchecked, then the target application will run invisibly on the Server.

4.2.9 OK button

When selected, the Tabbed Calculation Configuration tool will close, saving any changes made to the OpenEnterprise database.

4.2.10 Cancel Button

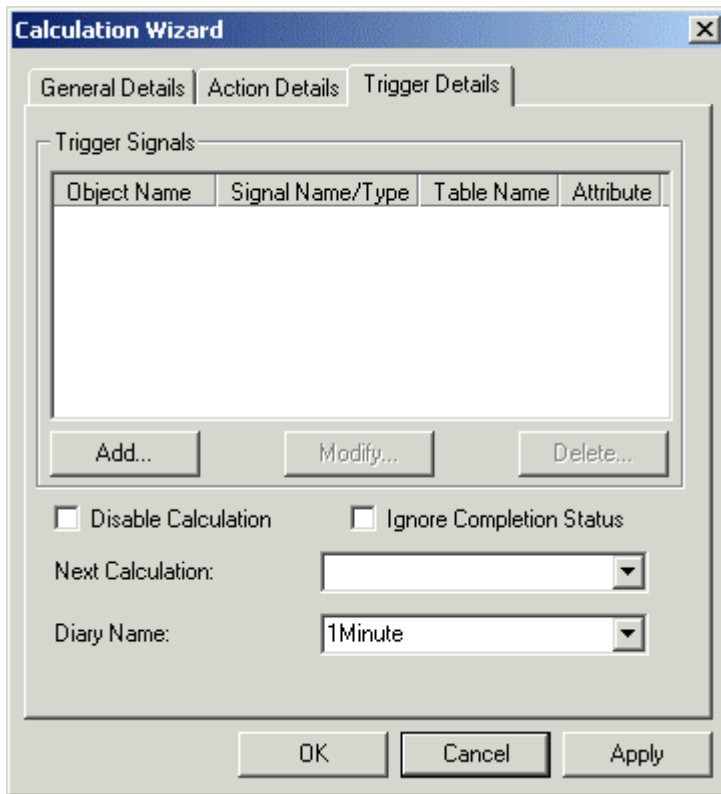
Tabbed Calculation Configuration tool will close. Any changes made on the dialog will not be saved to the OpenEnterprise database.

4.2.11 Apply Button

When a change is made on the tabbed dialog, the **[Apply]** button becomes enabled. If it is selected, any changes already made on the dialog are saved to the OpenEnterprise database, but the configuration tool is not closed, remaining open for further modifications to be made.

4.3 Trigger Tab

This dialog enables the user to change details belonging to the triggering of Calculations. Any field that is enabled can be modified.



4.3.1 Trigger Signals List

This list displays all configured trigger signals for the calculation. Trigger signals initiate the running of a calculation when their readvalue attribute changes.

4.3.2 Add Trigger

If selected, the Configure Trigger Attribute dialog is displayed.

4.3.3 Modify Trigger

If selected, the Configure Trigger Attribute dialog is displayed.

4.3.4 Delete Trigger

The selected Trigger will be deleted. Before deletion a confirmation message will be displayed, which will enable the user to abort the operation.

4.3.5 Disable Calculation

If checked, the Calculation is disabled, and will not run until enabled.

4.3.6 Ignore Completion Status

If checked, the next calculation will run regardless of the completion status of the current calculation. If unchecked, the next calculation will only run if the current calculation completes successfully. The default value is unchecked.

4.3.7 Next Calculation

A list of currently configured calculations are available for selection. If one is selected, then the selected calculation will run immediately after the current calculation, depending on the configuration of the Ignore Completion Status field, and whether the current calculation is completed successfully.

4.3.8 Diary Name

A list of configured diaries is available to act as a triggering mechanism for the calculation. Both diary and trigger signals may be used to trigger the same calculation.

4.3.9 OK button

When selected, the Tabbed Calculation Configuration tool will close, saving any changes made to the OpenEnterprise database.

4.3.10 Cancel Button

Tabbed Calculation Configuration tool will close. Any changes made on the dialog will not be saved to the OpenEnterprise database.

4.3.11 Apply Button

When a change is made on the tabbed dialog, the **[Apply]** button becomes enabled. If it is selected, any changes already made on the dialog are saved to the OpenEnterprise database, but the configuration tool is not closed, remaining open for further modifications to be made.

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