Reference Guide
D301516X412
April 2012

OpenEnterprise OPC Alarm and Event Server Reference Guide (V2.83)

Remote Automation Solutions

Website: www.EmersonProcess.com/Remote

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1 OPC Alarm and Event Server

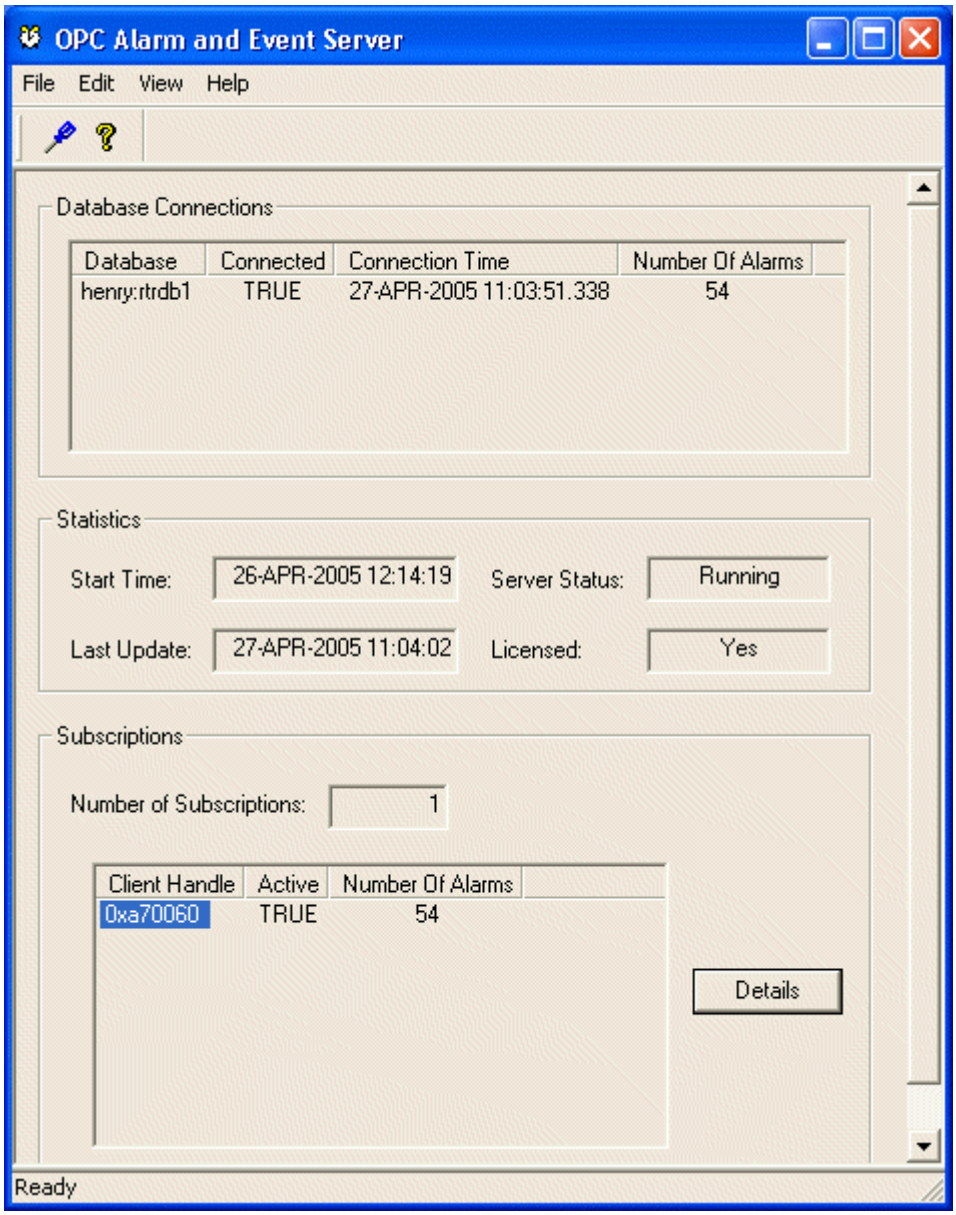
OPC (OLE for Process Control) is an industry wide standard, defining the collection and distribution of data from RTUs, PLCs or Controllers. The OPC standard contains rules relating to a number of data types: -

- Realtime data
- Historical data
- Alarm and Event data

The OpenEnterprise OPC Alarm and Event Server will provide Alarm and Event data from Bristol RTUs to any Alarm and Event client implementing the OPC standard. You should refer to the client's documentation for instructions on how to set the client up to receive data from the OPC Alarm and Event Server.

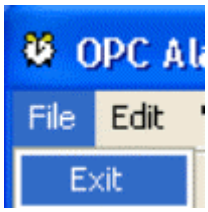
2 Main Dialog

The OPC Alarm and Event Server's User Interface provides Server and Client information to the user, and also allows the user to configure various parameters, which define how the interface behaves.



2.1 File_Menu

The file menu provides the option to close the OPC Server's User Interface.



2.2 Edit Menu

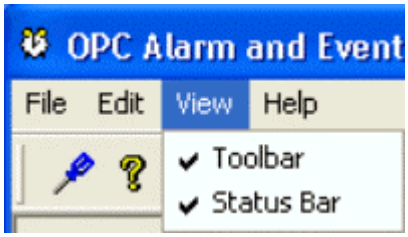
The Edit menu provides access to the Property pages for the OPC Alarm and Event Server's User Interface. If this option is disabled, you can enable it by setting the following value data to 0 (zero) in the OpenEnterprise Settings Editor:-

Key: *OpenEnterprise\Tasks\BristolOPCServer*

Value: *DISABLEPROPERTIES*

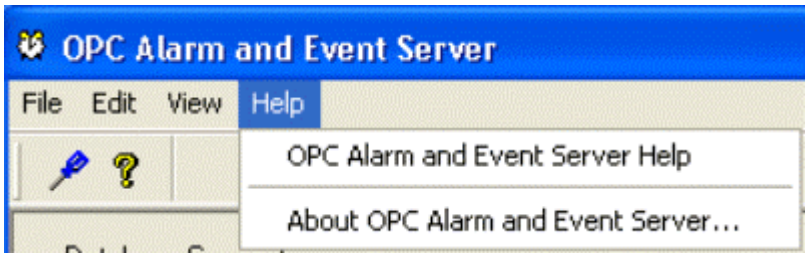
2.3 View Menu

The View menu has two options, which allow you to show or hide the Toolbar and Status bar. A tick indicates that the item will be visible.



2.4 Help Menu

The Help menu has two options. The first option (OPC Alarm and Event Server Help) provides access to this Help file. The second option (About OPC Alarm and Event Server) opens an 'About' information dialog having two tabs. The first tab displays the OpenEnterprise version and build, and the second tab provides contact information.



2.5 Properties Command Button

This command button opens the OPC Alarm and Event Server's Property pages.

2.6 About Command Button

This opens an 'About' information dialog having two tabs. The first tab displays the OpenEnterprise version and build, and the second tab provides contact information.

2.7 Database Connections

This list displays the databases that the OPC Server has attempted to connect to. The list also provides information on connection status, connection time and the number of alarms currently available from those databases.

2.8 Start Time

This shows the time when the OPC Alarm and Event Server was started.

2.9 Last Update

Shows the last time that the OPC Alarm and Event Server reported alarms to any of the connected clients.

2.10 Server Status

Shows the OPC Alarm and Event Server status. The main options will be 'Running' or 'Failed'.

2.11 Licensing Status

This field displays the Licensed Status of the Server.

2.12 Number of Subscriptions

Displays the number of 'Subscriptions' to the OPC Alarm and Event Server. Each subscription refers to a client application requesting alarms and events.

In order to request alarms and events from an OPC Alarm and Event Server, an OPC Client is required to register itself with the relevant Server. To do this it creates an Event Subscription, through which the OPC Client can optionally define which alarms and events it is specifically interested in.

Once the Event Subscription has been fully defined, the OPC Alarm and Event Server will then send unsolicited Event Notifications to the OPC Client in order to satisfy it’s alarm and event requirements.

2.13 Client List

This list contains information about the clients requesting data from the OPC Alarm and Event Server, and the number of alarms that have been supplied by the Server in response to the clients' requests.

In order to request alarms and events from an OPC Alarm and Event Server, an OPC Client is required to register itself with the relevant Server. To do this it creates an Event Subscription, through which the OPC Client can optionally define which alarms and events it is specifically interested in.

This is achieved by defining a filter based on the following criteria.

- The Event Types and Categories of interest.
- An Event Severity range.
- The Event Areas and Sources of interest.

In addition, the OPC Client can request - based on the list of user defined Event Attributes supported by the OPC Alarm and Event Server - which of those attributes are supplied when alarm information is reported to the client. The list of attributes can be defined on a per Event Category basis.

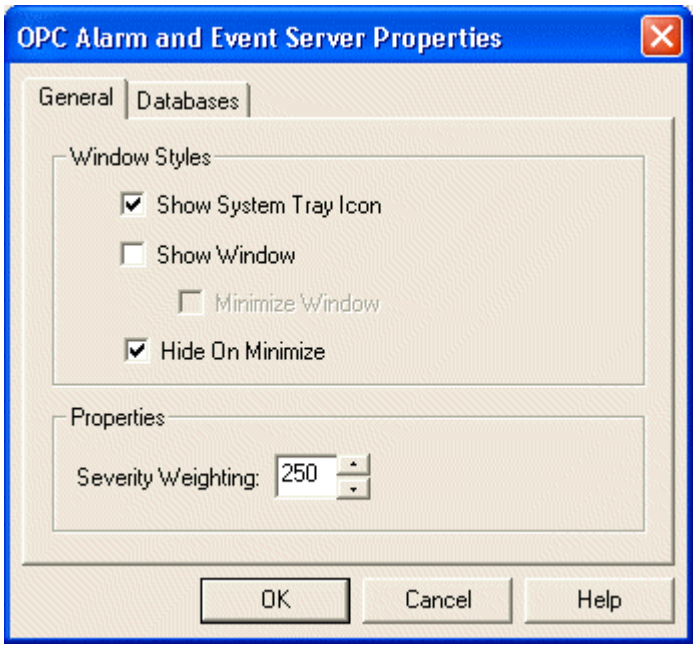
Once the Event Subscription has been fully defined, the OPC Alarm and Event Server will then send unsolicited Event Notifications to the OPC Client in order to satisfy its alarm and event requirements.

2.14 Details Button

When a client is selected from the Clients list, this button is enabled. Select it to display the *Event Subscription Details Dialog.*

3 General Property Tab

The General Property tab enables you to set parameters that affect the OPC Alarm and Event Server's User Interface, and also how it maps non Network3000 alarm priorities to the OPC Alarm and Event Severity standard.



3.1 Show System Tray Icon

Indicates whether an icon is inserted into the Windows system tray when the OPC Alarm and Event Server is running.

3.2 Show Window

Used to indicate if the OPC Alarm and Event Server is created visible or hidden.

3.3 Minimize Window

Used in conjunction with the ShowWindow setting to indicate whether the window is created minimised or normalised.

3.4 Hide on Minimize

Used to indicate that the window should be hidden rather than minimised if the user attempts to minimise the OPC Alarm and Event Server.

3.5 Severity Weighting - Non Network3000 Alarms

For non-Network3000 alarms, the OPC Alarm and Event Server employs a weighting method in order to convert OpenEnterprise alarm priorities to OPC Severities. This field allows you to define a severity weighting which will be multiplied against the OpenEnterprise alarm priority to provide the OPC Severity using the following simple algorithm.

OPC Severity = (OpenEnterprise Alarm Priority + 1) * Severity Weighting

For instance, if the severity weighting were 47, then for an OpenEnterprise alarm with a priority of 3, the resultant OPC Severity would be 188. If following the calculation the OPC Severity is greater than 1000, then the OPC Severity for the alarm will be set to the OpenEnterprise alarm priority.

The Severity Weighting value will be stored within the OpenEnterprise Settings file. If no value is defined then a default value of 250 will be used. To find out more about mapping between OpenEnterprise alarm priorities and the OPC standard, see the:-

Severity Weighting Continued page.

3.6 Severity Weighting - Network3000 Alarm Priorities

Network3000 alarms provide an additional complication for OpenEnterprise in that alarm priority ordering for these, range from 0 to 3, with 3 being the most critical alarm priority.

Therefore Network3000 alarms will be handled differently from those sourced from elsewhere. All Network3000 alarms will be mapped to OPC Severities using the method laid out on the NW3000 Severity Mapping page.

Properties General Tab

3.7 Severity Weighting Continued

OpenEnterprise alarm priorities don't directly map to the OPC Severity range defined within the OPC Alarm and Event standard. Whereas OPC Severities are bounded and range from 1 to 1000, OpenEnterprise alarm priorities have no fixed range, and the user can, if they wish define any value that can be contained within a 4-byte integer. In addition the priority/severity ordering is different between OpenEnterprise and OPC. For OpenEnterprise , except when handling Network3000 alarms, a priority 0 alarm is considered the alarm of most importance, whereas for OPC an alarm with a severity of 1000 is considered the most critical.

The OPC Alarm and Event Server maps non-NW3000 alarm priorities to the OPC Alarm Severity standard by the use of a configurable Severity Weighting multiplier, found on the General Properties page.

For NW3000 alarms, however, mapping NW3000 alarms to the OPC standard is hard coded. For detailed information on this mapping, refer to the NW3000 Severity Mapping page.

Properties General Tab

3.8 NW3000 Severity Mapping

In the OPC standard, Event severities are the equivalent of Alarm priorities. They range from 1 to 1000, with 1 being the lowest severity and 1000 being the highest severity. The table below shows how the OPC Alarm and Event Server maps NW3000 and Control Wave alarm priorities and related Alarm Types (conditions) to OPC Event Severities.

NW3000 Priority	NW3000 Alarm Type	OPC Event Severity
0 (Event)	Low limit	110
	High limit	120
	Digital	200
	Low-Low limit	210
	High-High limit	220
1 (Operator Guidance)	Low limit	310
	High limit	320
	Digital	400
	Low-Low limit	410
	High-High limit	420
2 (Non-Critical)	Low limit	510
	High limit	520
	Digital	600
	Low-Low limit	610
	High-High limit	620
3 (Critical)	Low limit	810

	High limit	820
	Digital	900
	Low-Low limit	910
	High-High limit	920

Properties General Tab

3.9 OK Button

When selected, the currently active OPC Alarm and Event Server's Property dialog will be closed. Any changes made will be saved.

3.10 Cancel Button

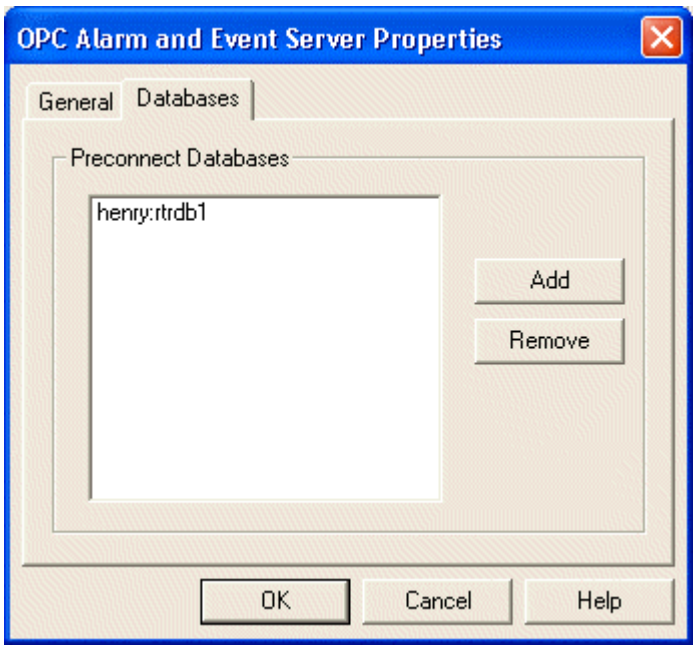
When selected the currently active OPC Alarm and Event Server's Property dialog will close. Any changes made will not be saved.

3.11 Help Button

When selected, the relevant context sensitive help page will be provided.

4 Databases Tab

The Databases Property tab enables you to configure Pre-connect databases for the OPC Alarm and Event Server.



4.1 Pre-connect Databases

As with the OpenEnterprise OPC Server, you can configure a list of databases to which the OPC Alarm and Event Server will attempt connection on start-up, and from which it will source OpenEnterprise alarms and events. These are called pre-connect databases, and will be defined under the following value in the OpenEnterprise Settings Editor:-.

Key: `OpenEnterprise\Tasks\BristolAEServer`

Value: Databases

Upon successful connection, the OpenEnterprise OPC Alarm and Event Server will start an active SQL query on the AlarmSummary view in order to obtain the list of alarms and events that are available from that database.

4.2 Add Button

The **[Add]** button opens the *Add Database* dialog, which enables you to add a pre-connect database to the list.

Add Database Dialog

4.3 Remove Button

To remove a pre-connect database from the list, first select it from the list and then select this button.

4.4 OK Button

When selected, the currently active OPC Alarm and Event Server's Property dialog will be closed. Any changes made will be saved.

4.5 Cancel Button

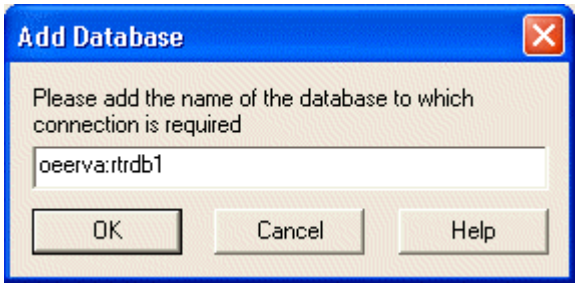
When selected the currently active OPC Alarm and Event Server's Property dialog will close. Any changes made will not be saved.

4.6 Help Button

When selected, the relevant context sensitive help page will be provided.

4.7 Add Database Dialog

This dialog enables you to add a pre-connect database to the list of pre-connect databases. When the OPC Alarm and Event Server is started it will automatically attempt to connect to these databases. This improves the efficiency and stability of the Server.



4.7.1 Database Field

Type the name of the OpenEnterprise database here, using the standard <ServerName>:<DatabasePort> identifier.

4.7.2 OK Button

When selected, the currently active OPC Alarm and Event Server's Property dialog will be closed. Any changes made will be saved.

4.7.3 Cancel Button

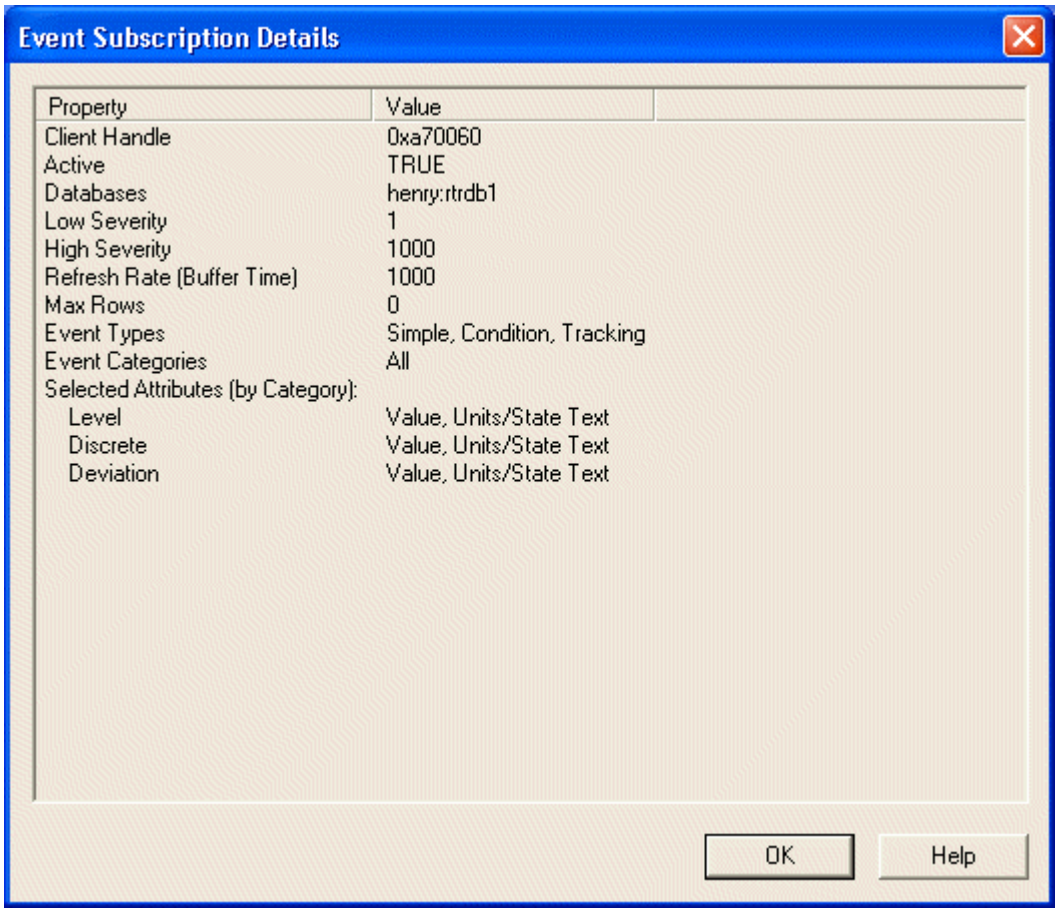
When selected the currently active OPC Alarm and Event Server's Property dialog will close. Any changes made will not be saved.

4.7.4 Help Button

When selected, the relevant context sensitive help page will be provided.

5 Event Subscription Details Dialog

This dialog displays details of the selected client's Event Subscription.



5.1 Client Handle

A unique handle number for the client, managed by the Windows operating system.

5.2 Active

Indicates that the subscription is active and is therefore receiving unsolicited alarm updates.

5.3 Databases

The databases that the OPC Alarm and Event Server is currently connected to and receiving alarm data from.

5.4 Low Severity

Only alarms with a severity greater than or equal to this value will be reported to the client.

5.5 High Serverity

Only alarms with a severity less than or equal to this value will be reported to the client.

5.6 NW3000 Alarm Severity Mapping

In the OPC standard, Event severities are the equivalent of Alarm priorities. They range from 1 to 1000, with 1 being the lowest severity and 1000 being the highest severity. The table below shows how the OPC Alarm and Event Server maps NW3000 and Control Wave alarm priorities and related Alarm Types (conditions) to OPC Event Severities.

NW3000 Priority	NW3000 Alarm Type	OPC Event Severity
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	High-High limit	420
2 (Non-Critical)	Low limit	510
	High limit	520
	Digital	600
	Low-Low limit	610
	High-High limit	620
3 (Critical)	Low limit	810
	High limit	820
	Digital	900
	Low-Low limit	910
	High-High limit	920

5.7 Refresh Rate

Defines how often, in milliseconds that unsolicited alarm update messages will be sent to the OPC Client.

5.8 Max Rows

The client can request that alarm updates are packaged up into max row packets. However the OpenEnterprise Alarm and Event Server does not support this and will always send all alarm updates in a single call every refresh rate, hence this value is always (re)set to 0, to indicate this.

5.9 Event Types

The Event Types requested by the client. The following describes first how the OPC Alarm and Event standard defines Event Types,and then how the OpenEnterprise ObjectServer OPC Alarm and Event Server implements these definitions.

5.9.1 The OPC Standard

The OPC Alarm and Event standard splits Alarms and Events into 3 distinct types.

- Condition events, such as limit violations, changes of state.
- Tracking events, such as alarm acknowledgement events, and operator set-point changes.
- Simple events, which are used to indicate component failures, and problems internally within the OPC Alarm and Event Server.

The Event Type of an alarm dictates what type of information is available for that alarm, as well as how an OPC Alarm and Event Client should handle the alarm. For instance, only Condition alarms and events require acknowledgement, or have an active, (i.e. cleared) state. Tracking and Simple alarms and events do not support cleared and acknowledged states, and are therefore treated as informational messages only.

5.9.2 OpenEnterprise Implementation

In OpenEnterprise terms all alarms and events are generated as a result of alarm conditions being violated, and based on the configuration of the OpenEnterprise alarm priorities, it is possible that even a journal message may be configured such that it requires a return to normal and an alarm acknowledgement in order for the alarm to be deleted from the alarm summary.

OPC Tracking and Simple alarms/events are stateless, which means that they cannot be acknowledged, nor can they return to an out of alarm condition. In OPC Client terms - and using AlarmWorX as the example - once a Tracking or Simple alarm has been reported to an OPC Client it cannot then be deleted, and so removed from view, through changes of state reported by the OPC Alarm and Event Server.

Therefore, in order to provide the full alarm priority configuration flexibility that is supported by the OpenEnterprise alarm and event system, all OpenEnterprise alarms and events are labelled as Condition events when handled by the OpenEnterprise OPC Alarm and Event Server.

5.10 Event Categories

The Event Categories requested by the client. The following is a description of how the OPC standard defines Event Categories and how the OpenEntperprise implements these.

5.10.1 OPC Standard

Event Categories define groupings of events supported by an OPC Alarm and Event Server, and can be construed as providing finer granularity to the three Event Types defined by the Event Types.

For instance, Condition events would have Event Categories such as Limit (i.e. this is a limit violation alarm) and Discrete, (i.e. a digital change of state), whereas Tracking events would have Event Categories such as Operator Value Change, and Alarm Acknowledgement.

The OPC Alarm and Event Standard recommends a set of Event Categories that should be supported by all OPC Alarm and Event Servers. It is also possible for an OPC Alarm and Event Server to define it’s own specific Event Categories.

5.10.2 OpenEnterprise Implementation

The following table shows those Event categories that will be supported by the OpenEnterprise OPC Alarm and Event Server.

Category	Description

Level	Describes alarms that are raised based on level violation, e.g. HI-HI, HI, LO-LO LO etc.
Deviation	Describes alarms that are raised based on deviation conditions e.g. Rate of Change, and Deviation alarms.
Discrete	Describes alarms that are raised based on a specific change of state, e.g. Digital change of State alarms.
Questionable	Describes alarms that are raised based on the questionable state of a signal.
System Message	This category will be used to handle all journal messages produced within an OpenEnterprise system, as well as any alarm conditions that are not categorised above.

5.11 Selected Attributes

The optional attributes that can be requested for display by the client. They are the same for all event categories, although the client can, if they wish request that different attributes are reported for each event category

5.12 Level

Describes alarms that are raised based on level violation, e.g. HI-HI, HI, LO-LO LO etc.

5.13 Discrete

Describes alarms that are raised based on a specific change of state, e.g. Digital change of State alarms.

5.14 Deviation

Describes alarms that are raised based on deviation conditions e.g. Rate of Change, and Deviation alarms.

5.15 OK Button

When selected, the currently active OPC Alarm and Event Server's Property dialog will be closed. Any changes made will be saved.

5.16 Help Button

When selected, the relevant context sensitive help page will be provided.

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April 2012

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Engineered and supported by:

Remote Automation Solutions,

Blackpole Road, Worcester, WR3 8YB, UK

Registered office: Meridian East, Leicester, LE19 1UX

Registered in England and Wales, Registration No. 00671801

VAT Reg No. GB 705 353 652

Emerson Process Management
Remote Automation Solutions
1100 Buckingham St
Watertown, CT 06795
T 1 (860) 945 2200
F 1 (860) 945 2278
www.EmersonProcess.com/Remote
binfo@EmersonProcess.com

Emerson Process Management
Remote Automation Solutions
Blackpole Road
Worcester, WR3 8YB
T 44 (0) 1905 856848
F 44 (0) 1905 856930
www.EmersonProcess.com/Remote
oedsupport@EmersonProcess.com

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