Bristol OpenEnterprise Reference Guide
Session Manager
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1 Overview

The Session Manager allows the user to configure, monitor and administer the operation of the database and associated tasks within an single environment. A session consists of a database and one or more data collectors and ancillary tasks.

A session can be defined as the execution of a number of OpenEnterprise components necessary for the collection and manipulation of process data. There are a number of Server components which must be running in order to constitute a session, and some which are optional, depending on the type of application. Sessions can be standalone or redundant.

Below is a list of some Server components that may be running in a typical Session.

The Database (RTRDB)

The RTRDB is the store of data collected from the process control network. It is an essential session component. The Workstation resident Bristol OPC Server connects to the RTRDB to provide data to OPC Clients. Although normally only one instance of the RTRDB is needed, some applications may use more than one configured database, and each configured database is run by an instance of the RTRDB.

The Real Time Device Interface (RDI)

An RDI is required for each type of RTU/PLC being used within the application. OpenEnterprise currently provides the NW3000 protocol Driver (rdi3000.exe) for Bristol RTU/Controllers - and the AB Driver for Allen-Bradley PLCs. A valid RDI is an essential Session component.

The Database Builder (DBB) and Poll List Builder (TPB)

These applications are used to update the Database when changes are made to the ACCOL program within a Bristol RTU/Controller. When run as part of a Session they may be used to monitor such changes and automatically update the Database. If the project uses Bristol RTU/controllers and the signal load is likely to be changed at the RTU it is recommended to run these components in monitor mode as part of the Session.

The Scheduler

Is used for scheduling applications that run Calculations or Reports. It handles the creation of Expiring and Alarmed Notes. It is also essential for applications that require scheduling of signal values.

The Calculation Server

Runs calculations. It is must be running in Sessions which regularly run calculations or reports.

The OEPing component

Is used for Redundant Servers in conjunction with a dedicated Redundancy Network to enable redundancy in the case of normal network breakdown.

A Session provides high availability to an unlimited number of OpenEnterprise and associated applications for viewing and updating process and configuration data.

A single instance of Session Manager can only run a single OpenEnterprise Session. However, a single OpenEnterprise Server computer can run multiple concurrent instances of the Session Manager.
2 Starting Session Manager

There are four ways in which Session Manager can be started:

- Command Line with parameters
- From the Windows Start Button
- Auto Restarting
- As a Windows Service

2.1 Command Line Parameters

Command line options can be used to open, or open and start a named session. The Session Manager’s command line parameters are defined as follows:

2.1.1.1 DRCP -s<Session> -a -b -m -h -v -rpc+ rpc- -rpc=name -rpc=<ms> -rpcr=<ms>

The ‘-’ character may be substituted with a ‘/’ character, where:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-s&lt;Session&gt;</td>
<td>Name of the session to be opened.</td>
</tr>
<tr>
<td>-a</td>
<td>Indicates that the session should be automatically re-started following a session failure or failover. This option is only applicable to a redundant session. Use the -a parameter to re-start a redundant session automatically following a session failure or failover. The -a parameter can optionally be followed by a time period, specified in milliseconds, that will be used as the delay between the session failing and the auto-restart commencing. The default value is 60000 (60 seconds). Example: DRCP -sMySession -b -a45000</td>
</tr>
<tr>
<td>-b</td>
<td>Indicates that the session specified by the s option should be automatically started. Use this flag in conjunction with the -s option.</td>
</tr>
<tr>
<td>-m</td>
<td>Specifies that the Session Manager will be started as a minimised window. This flag should be used when the Session is to be started in a minimised state.</td>
</tr>
<tr>
<td>-h</td>
<td>Specifies that the Session Manager will be started as a hidden window. Use this flag when the Session is to be started with the Session Manager window hidden. The window can be made visible by double-clicking the Session Manager’s icon in the System Tray.</td>
</tr>
<tr>
<td>-v</td>
<td>Specifies verbose mode. The Status Window will show more information pertaining to starting and stopping tasks. Default is non-verbose mode.</td>
</tr>
<tr>
<td>rpc+</td>
<td>Specifies that the Session Manager should wait until the RPC service has started before continuing to open and start a session. This is the default behaviour.</td>
</tr>
<tr>
<td>rpc-</td>
<td>Specifies that the Session Manager should not wait until the RPC service has started before continuing to open and start a session.</td>
</tr>
</tbody>
</table>
started before continuing to open and start a session.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rpc=&lt;name&gt;</td>
<td>Specifies the name of the RPC service. Default value is “RpcSs”.</td>
</tr>
<tr>
<td>rpct=&lt;ms&gt;</td>
<td>Specifies a time period in milliseconds. This time period is the maximum amount of time that the Session Manager will wait for the RPC service to start-up. The RPC service will be checked once every rpcr milliseconds for a maximum of rpct milliseconds. The default value is 60000 (60 seconds). To override the default value to 120 seconds, for example, please specify -rpct=120000 on the command line.</td>
</tr>
<tr>
<td>rpcr=&lt;ms&gt;</td>
<td>Specifies a time period in milliseconds. This time period specifies how often the Session Manager will check to see if the RPC service has started. The default value is 1000 (1 second). For example, to automatically open and start the standalone session the command line parameters will be: DRCP -sStandalone -b When running the Session Manager as a Windows Service, it is strongly recommended that the check for RPC start-up is not disabled. If the Session starts before the RPC service has started then this may cause incorrect operation.</td>
</tr>
</tbody>
</table>

2.2 Start Session Manager From Start Button

The most usual method for opening the Session Manager is to start it from the Windows Start Menu as demonstrated in the image below.

Remote Automation Solutions

Website: www.EmersonProcess.com/Remote
Selecting the option displayed in the image above will start the OpenEnterprise Session Manager.

### 2.3 Auto Restarting a Session

In order to automatically re-start a failed session, the user will need to specify the /a (-a) command line parameter. See the Command Line Parameters and Auto Restart Menu topics for further information.

### 2.4 Session Manager as a Windows Service

Running a Session as a Windows service will allow a configured Session to start when the operating system starts. This provides an auto-start of the configured Session.

The following example will install the example Standalone session for automatic start-up and desktop interaction.
ServiceLauncher -i -n"Standalone Session" -a -v -c"D:\Program \Files\Bristol\OpenEnterprise\bin\DRCP -sStandalone -b" -d"D:\Program \Files\Bristol\OpenEnterprise\bin"

The following example will remove the auto-start of the Standalone session.
ServiceLauncher -u -n"Standalone Session".

See Service Launcher help for more information on using the Service Launcher to configure the Session Manager to start as a Windows Service.

2.5 StopOE.exe

The StopOE application can be used to send a StopOE request to a named session or to all sessions.

2.5.1 Using StopOE.exe with UPS Servers

It is recommended for use with UPS servers as part of the shutdown script, or when Session Manager is configured as a Windows service, to perform an orderly shutdown of OpenEnterprise server and prevent any data loss.

Note that when StopOE is used to stop a session that the Session Manager will perform a StopOE but will not exit unless the -x flag is used.

The command line options are ...

StopOE <session> -i -x -w

Where:

<session> is the session name to StopOE. Using a session name of _DRCP_BROADCAST will send a StopOE request to all Session Manager instances that are running on the Server.

-i specifies an intelligent StopOE. e.g. If a master with a standby then a failover will be requested.

-x specifies the Session Manager is also to exit.

-w specifies StopOE should wait until the session manager has processed the message. Uses SendMessage instead of PostMessage.

2.5.2 StopOE.exe Examples

2.5.2.1 StopOE.exe Session1

... will send a StopOE request to the Session Manager that has opened Session1.

2.5.2.2 StopOE.exe _DRCP_BROADCAST

... will send a StopOE request to all top level windows so will perform a StopOE for all running Session Managers.

2.5.2.3 StopOE.exe Session1 -w -x

... will result in Session1 stopping followed by a Session Manager close.
2.5.2.4 **StopOE.exe Session1 -i -w**

... if sent to a Master with a healthy standby will result in a failover to the standby followed by a close of the Session Manager task. If sent to a standby then the standby will stop without any effect on the master.
3 Session Manager Interface

The Session Manager has menu options that enable you to create a new OpenEnterprise Session, open and start a saved OpenEnterprise Session or modify an opened OpenEnterprise Session. The following figure shows how the Session Manager will appear to the user when a Session is open and running.

![Session Manager Interface](image)

3.1 Session Manager Window Title

The window title bar identifies the currently open session. If no session is open then the session name will be Untitled.

3.2 Menu Bar

The Session Manager’s Menu Bar contains four items.

- Session Menu
- View Menu
- Options Menu
- Help Menu
3.2.1 Session Menu

The Session Menu option allows the user to open or close a session and stop and start a session.

### 3.2.1.1 New Session

This menu option opens the Add New Session wizard that enables you to configure a whole new OpenEnterprise Session. It is only available when no Session is opened in the Session Manager.
3.2.1.2 Open Menu

Selection of this menu option will display the Open Session dialogue. The Open menu option is only available for selection if no session is currently open.

3.2.1.3 Open Session Dialog

The Open Session dialogue presents the user with a list of all configured sessions. The user should select the session they wish to open. Checking 'Automatically run this session' will result in the session being opened and started when the OK button is selected.
3.2.1.4 Close Menu

Selecting the Close option will close the current open session. The Close option is only available for selection if a session is open and not currently running.

3.2.1.5 Add Task Menu

Selecting this menu item will open up the Add Task wizard, which enables you to configure a new Task for the Session. The Add Task wizard presents you with the Task Property dialog's Pages one at a time, so that you can configure the new Task. The only difference is that you only get to view one Page at a time, and the Pages have <Back and Next> buttons at the bottom:-

To start with these buttons are disabled, and only become enabled when you have configured the new Task's Name, Filename, Working Directory and Program Arguments. Once enabled you can move forward and back through the wizard using these buttons.
3.2.1.6 Session Properties

This option opens the Modify Session property pages for the currently opened session. It is not enabled until a session has been opened by selecting the Open... option from the Session menu.

3.2.1.7 Start Menu

Selecting the Start option will start the session that is currently open. Starting a session will result in all those tasks configured for start-up, being started. The Start option is only available for selection if a session is currently open and not running.
3.2.1.8 Stop Menu

Selecting the Stop option will present the user with a confirmation dialogue prior to stopping the currently running session. Selecting Yes will continue with the Stop, selecting No will cancel the Stop. The Stop option is only available for selection if a session is open and running.

It is possible to enforce security via a password to a Stop request. If security is enabled then a Stop request will prompt the user to enter a password.

If the entered password is valid then the Stop request will proceed. The password is configured on a per server basis by setting the Password value on the Session Manager Task key in the Settings Editor.

When running a redundant session, a message may be displayed when a Stop is requested on the Master session whilst a healthy standby is running.

This message is intended as a reminder that performing a Stop of a Master server should not be used as an alternative to a failover request. Certain session configurations may result in both master and standby databases closing if a Stop is performed on the Master. The displaying of this message can be disabled by setting the DisableStopOEWarning value to 1 on the Session Manager key in the Settings Editor.

3.2.1.9 Exit Menu

If a session is currently running when the Exit option is chosen then this will be treated as a Stop request. This will result in the Stop Session confirmation dialogue appearing.
If a session is currently open but not running, then the session will be closed and the Session Manager will exit.

If no session is currently open the Session Manager will exit.

### 3.2.2 Menu Bar View Menu

The View Menu option allows the user to show and hide the Session Manager's status bar.

Select the Status Bar option to show or hide the Session Manager's Status Bar. If a tick is present, then the Status bar will be displayed.

### 3.2.3 Options Menu

The Options menu allows the user to configure various behavioral properties of the Session Manager. Within a redundant Session it will also allow for manual failovers to be performed.

#### 3.2.3.1 Failover Menu

The Failover option is disabled for a standalone session. On redundant systems, it is available when a healthy standby is available. It enables a controlled failover operation. Before the failover, a confirmation message box is displayed:

If the [Yes] button is selected the Session Manager will initiate a failover. The current master server will stop running and the standby will become the master.
3.2.3.2 Record Timestamps Menu

The Record Status Timestamps option allows the user to turn on or off timestamped messages from appearing in the Status Window. When the option is selected each message appearing in the Status Window will be preceded by a timestamp. By default the timestamp will appear in the default local format and will be adjusted to local time. If GMT timestamps are required then a key value can be set to override the default behaviour on the Session Manager key in the Settings Editor. See the Settings Editor document for further information.

Note: This option is persistent across consecutive invocations of the Session Manager.

3.2.3.3 Auto Restart Menu

only applicable to a redundant session. The Auto Restart option allows the user to turn on automatic restart of the session. An automatic restart will only occur for a redundant session when the session stops following a software triggered shutdown. A shutdown performed using the Stop menu will not result in an auto restart occurring. This option can be used to override the behaviour of the Session Manager's -a command line option.

3.2.3.4 Enable Status File

When this option is ticked, Session Manager will keep a text file with the name <SessionName>.txt in the Working Directory for the running Session. This will consist of the contents of the Session Manager Status Pane.

3.2.3.5 Append to Status File

When this option is selected, Session Manager will append details of successive runs of the named session to the Status File.

3.2.3.6 Hide When Minimized Menu

The Hide When Minimized option allows the user to control whether the Session Manager window will be hidden when minimised. When the Session Manager is minimised and this option is selected, double-clicking the Session Manager icon in the Windows System Tray will show the Session Manager.

Note: This option is persistent across consecutive invocations of the Session Manager.

3.2.4 Help Menu

The Help menu option gives access to this Help file and also to the About Box. The About Box provides product version and build numbers and Bristol contact information.
3.3 Session Manager Status Pane

The Status Pane will be updated with events as and when they occur. The event at the top of the window will be the most recent event. Any event pertinent to the session will be logged to the Status Window. These will include:

- Opening and closing sessions.
- Starting and Stopping the session.
- Session state changes.
- Critical task failures and restarts.

All events can be optionally preceded by a timestamp. Timestamps can be enabled using the Options menu.

3.4 Session Manager Task List Pane

The Task List window details all the tasks configured for the open session.

If the list is empty then no session is open. Each item in the task list details an individual task. It specifies how and where the task will run. The Active column shows whether the task is currently running or not.

Right clicking the mouse within the Task List will display a context menu. This allows the user to perform a number of actions. Click on the link below to view these context menu options.
3.4.1 Task List Context Menu

The Task List not only displays details concerning the currently configured Tasks for a Session, but provides a context menu that can be used to start, stop, show, hide, disable, delete, modify or import Tasks.

To add a Task, use the Session>Add Task menu. This will enable a new task to be added using the Task wizard.

The availability of Context Menu options depends on the current state of the Task. The image below shows the available context options on the same task in both active and stopped mode.

Note:

- To access the Context menu for a Task, select a Task by positioning the mouse pointer over it and press the right mouse button. The task will become highlighted and a context menu will be displayed.

3.4.1.1 Start Or Stop Tasks

If the task is currently running then a Stop option will be available. If the task is currently stopped then a Start option will be available.

Note:

Manually stopping and starting tasks within a redundant session can potentially cause redundancy problems and unpredictable behaviour.
3.4.1.2 Show Or Hide Tasks

If the user hides a task then the task will not be visible on the Desktop. If the user shows a hidden task then the task will be visible on the Desktop.

3.4.1.3 Task Properties

This option will open the Task Properties dialog, which displays all configuration pages for the selected Task. Note that while the Task is running, this dialog will be presented in Read-Only mode.

3.4.1.3.1 Modify Mode

In order to make changes to the configuration of a Task, you need to firstly stop the Task, using the Stop option on the Task List Context Menu. Then, select the Properties option again, and the Properties dialog will be presented in Modify Mode, so that changes can be made.

3.4.1.4 Delete Task

Selecting this option will delete the Task. Note, the Task must be stopped before this option becomes available.

3.4.1.5 Import New Tasks

Session Manager searches the Tasks keys for the current Session in the OpenEnterprise settings file. If any Task key is found that is not in the current list of tasks running in the Session Task list, the task is imported into the current Session.

This option supports the notion of adding new tasks to a Session that have been exported, modified and re-imported from the Settings Editor, thereby avoiding use of the Task wizard.

If no new tasks are found, a message box appears with the message 'No new tasks found'.

3.5 Session Manager Status Bar

The Status Bar will show the current state of the open session. The example shows that the session is currently running in Standalone mode. In a redundant system the two fields will show Master and Standby.

3.6 Windows System Tray Icon

Icons will be displayed in the Windows System Tray to indicate the state of the Session.

The following example shows an Active Master session.

Placing the pointer over the icon will display the session name and state, as shown:
The following list details the icons that may be displayed and their associated meaning.

- No session opened or the opened session has not been started.
- Standalone or Redundant session starting.
- Standalone or Redundant master session has failed.
- Standalone or Redundant healthy master session.
- Redundant standby session has failed.
- Redundant healthy standby session.
4 Session Configuration

4.1 Add New Session Wizard

The Add New Session Wizard is displayed when the Session>New menu option is selected from the Session Manager's menu bar.

The number of pages in the wizard depends on whether a standalone or redundant configuration is specified.

The pages are exactly the same as those that are on the Session Properties dialog, but they are presented one at a time, and navigation through the pages is by [Next>] and [<Back] buttons.

The pages of the New Session wizard are:

1. The Session Type Page
2. The Session Settings Page
3. The Software Watchdog Page
4. The Server Identification Page (redundant system only)
5. The Arbitrator Page (redundant system only)
6. The T-bar Page (redundant system only)
7. The Tasks Page
4.2 Modify Session Dialog

The Modify Session Dialog appears when the Session>Properties menu is selected from the Session Manager's menu bar.

The dialog provides four to seven pages that enable you to modify an OpenEnterprise Session, depending on whether it is a standalone or redundant system. They are identical to the Add Session Wizard pages, except that you can immediately access any page you want by clicking on the tabs across the top of the dialog. They are:-

1. The Session Type Page
2. The Session Settings Page
3. The Software Watchdog Page
4. The Server Identification Page (redundant system only)
5. The Arbitrator Page (redundant system only)
6. The T-bar Page (redundant system only)
7. The Tasks Page
4.3 Session Type Page

The Session Type Page in Wizard mode enables you to select whether the Session will be a Standalone or Redundant type. In Edit mode, the type cannot be changed, but the dataservice and Command File Folder can be changed.

4.3.1 Name

The name of the Session, which must be unique. When modifying a Session, this field is disabled, and cannot be changed.

4.3.2 Standalone Session

When creating a new Session, click here to create a Standalone Session. A Standalone Session is a single Server running a single OpenEnterprise database. This selection cannot be modified at a later stage.

4.3.3 Redundant Session

When creating a new Session, click here to create a Redundant Session. A Redundant Session is two Servers running a single OpenEnterprise database in Master and Standby mode. If the Master fails, the Standby takes over, becoming the new Master. This selection cannot be modified at a later stage.
4.3.4 Dataservice

This is the string which identifies the database to clients and enables them to connect. It is of the format <ServerName>:<Portname>, unless the database is running locally, when all that is required is <Portname>.

<ServerName> can be the actual network name of the Server, but is often an alias that is entered against the Server's IP address into the Windows Hosts file (%WinDir%\system32\drivers\etc). If it is a remote database it enables clients to locate the Server on which the database is running.

<PortName> is an alias for a TCP/IP port that is entered into the Windows Services file (%WinDir%\system32\drivers\etc). It enables clients to connect to the database. This is set up when OpenEnterprise is installed with an alias of rtrdb1, and a port number of 11101.

4.3.5 Command File Folder

This is the folder where the special Custom Command files for redundant systems are placed. These are the LoadingDatabase.cmd, Master.cmd and Standby.cmd files. For further information on these files see the Custom Commands - Redundant topic.

4.3.6 Browse button

Opens up a browse dialog, so that you can search for the required object, whether it be a directory, a file or a tag from an OPC Server. The context determines the type of browser dialog.
4.4 Session Settings Page

The Session Settings Page in Wizard mode enables you to select a single CPU on which to run the Task, (if multiple CPUs are available).

4.4.1 CPU Affinity Setting

This is a drop-down list of all the CPUs available on the Server. If a single CPU is selected, the Task will only run on that CPU.
4.5 Software Watchdog Page

The Software Watchdog allows you to configure the Software Watchdog.

#### 4.5.1 Software Watchdog Enabled

Check this box by clicking on it to enable the Software Watchdog. If it is not enabled, the Session Manager will not restart failed critical tasks.

#### 4.5.2 Software Watchdog Frequency

The frequency, in seconds, at which the Software Watchdog will run.
4.6   Server Identification Page

The Server Identification Page enables you to define the Server's label, and also to define its own and the other computer's name. These settings are only needed for Redundant systems, so this page will not be displayed for a Standalone setup.

4.6.1   This Server Label

The label that the Session Manager associates with this computer.

4.6.2   This Computer Name

The actual computer name (or alias as defined in the Hosts file) of this computer. This name must be an exact case-sensitive match with the name used in the oejcpcntrol table in the Arbitrator database for this computer.

4.6.3   Other Computer Name

The actual computer name (or alias as defined in the Hosts file) of the other computer. This name must be an exact case-sensitive match with the name used in the oejcpcntrol table in the Arbitrator database for this computer.
4.6.4 Test Button

The Session Manager will test the network for a reply from the computer defined in the computer name field to the left of the button. If there is no reply, you will be notified.

4.6.5 Browse Network Button

A network browsing dialog will open, enabling you to identify the other Server.
4.7 Arbitrator Page

The Arbitrator Page enables you to configure the Arbitrator Dataservice, along with Connection Options. It is only available if you are configuring a Redundant Session.

![Arbitrator Page](image)

4.7.1 Arbitrator Dataservice

This is the order in which the journal process within the Database looks for a connection with the arbitrator database. Please refer to the Arbitrator Build and Configuration - Redundant topic for more information on the Arbitrator dataservice.

4.7.2 Retries

Determines the number of times the Session Manager should try to find the arbitrator using the options in the Arbitrator Dataservice field.

4.7.3 Retries Multiplier

This value is used with the Retries value. Session Manager will retry the connection attempt (Retries * RetriesMultiplier) times. To speed up start-up time therefore, lower the Timeout, RetriesMultiplier and TimeoutMultiplier values.
4.7.4 **Timeout**

Determines the amount of time the Session Manager should spend in trying to connect to the arbitrator using each of the sources listed in the Dataservice value.

4.7.5 **Timeout Multiplier**

This value is used with the Timeout value. Session Manager will retry the connection after (Timeout * TimeoutMultiplier) seconds. To speed up start-up time therefore, lower the Timeout, RetriesMultiplier and TimeoutMultiplier values.

4.8 **T-bar Page**

This page allows you to configure options for a T-bar if you are using one. This page is only available if you are modifying a Redundant Session.

- **T-Bar Enabled**
  
  When checked, the T-bar is enabled. Leave unchecked if not using a T-bar.

- **T-Bar OPC Tag**
  
  Type the T-bar tag in here, or use the Browse button to browse for the required tag.
4.8.3  Browse button

Opens up a browse dialog, so that you can search for the required object, whether it be a directory, a file or a tag from an OPC Server. The context determines the type of browser dialog.

4.9  Tasks Page

Every Session requires that a number of Tasks be configured. This page enables you to add and at the same time configure each Task that will be needed for the Session.

4.9.1  Task List

Configured Tasks are listed here. They can be modified or removed by selecting the Task followed by the appropriate button.

4.9.2  Add button

This button opens up the Task Properties Dialog at the Task Page. The Page will be in Wizard mode.

4.9.3  Remove button

The selected Task will be deleted from the list, and will no longer be a part of the Session being configured.
4.9.4 Modify button

This button opens up the Task Properties Dialog at the Task Page. The Page will be in Modify mode.
5 Task Configuration

New Tasks can be added to a Session by selecting the Session>Add Task option from the Session Manager's menu bar.

Individual Tasks that are part of a Session can be modified from the Task List Pane by clicking on the Task and selecting the Properties option from the Context Menu. This opens the Task Properties Dialog with the five Property Pages available for configuring the Task. To be able to configure a Task in this way, the Task must be stopped first.

- Task Page
- Shutdown Page
- Advanced Shutdown Page
- Settings Page
- Dependencies Page
5.1 Task Page

In Modify Mode, the Task Property Page enables you to configure the session name and file name of an OpenEnterprise Task, its working directory, and the arguments that must be passed to it when it starts.

5.1.1 Task Name

This is the name of the Task as it will appear in the Session Manager's Task List. It can be made to be more descriptive than the file name of the Task. Spaces are allowed.

5.1.2 Task File Name

This is the absolute filename of the Task. Enter the absolute filename or browse for the file using the [Browse...] button.

5.1.3 Task Working Directory

The directory in which the Task will run. If you do not specify a directory, the Task will run in the Working Directory of the Session. Most Server Tasks output a log file, which is placed by default in the same directory in which its executable resides. This Working Directory can be changed here, so that any outputted files are placed in a different location.
5.1.4 Task Program Arguments

The command line arguments you want to pass to the Task at start-up. To see what arguments are available for each Task, please refer to it's own Help File. These can be accessed from the Server Specific Help page found in the main OpenEnterprise Help file. This can be opened by selecting:

Start>Program Files>OpenEnterprise>Documentation

5.1.4.1 The Database Task and Persistence

The Task Program Arguments for the Database Task are worth and extra mention here, because they determine whether or not the Database will be configured to be persistent. When the Database is set to be persistent, it uses a data file with a .MMF extension, rather than a .DAT extension (the MMF stands for Memory Mapped File). The example here shows the Database Task configured for persistence with the program arguments set to:-

-m"realtime.mmf" -s51435559 db > db.txt

For a more detailed explanation of this program argument, and how it affects the Database Task, please see the Configuring Persistence and Sizing the MMF File topics.

5.1.5 Database Ready Port

The UDP port number or name used by the database to inform the Session that the database is ready to accept client connections. Only applicable to database Tasks (rtrdb.exe).
5.2 Shutdown Page

In Modify Mode, this Page enables you to select the most appropriate way of shutting down the selected Task. These options include the option to use a separate executable to shut the Task down.

5.2.1 Shutdown Type

This is a drop-down list of four different methods which may be used to close a Task. They are listed below, with an explanation of each:-

- **Close** - Shuts down the task cleanly using a Windows close message.
- **Kill** - Kills the Task in the same way that tasks are killed in the Windows Task Manager.
- **Nothing** - No Shutdown action is performed. Used for Tasks that handle their own shutdown criteria. This can be used on redundant systems with Tasks that would normally close themselves anyway when the database is stopped, such as a Remote Device Interface (eg RDI3000).
- **Run a Shutdown Task** - Run a separate program to close the Task. When this option is selected, the fields in the *Shutdown Task* section become enabled. For instance, the *ShutdownDB.exe* should be used when closing a Standalone database because ShutdownDB automatically saves the database before closing it down. The ShutdownDB application can be found in the ....OpenEnterprise\bin directory.
5.2.2 Shutdown Task File Name

This is the absolute filename of the Shutdown Task. Enter the absolute filename or browse for the file using the [Browse...] button.

5.2.3 Shutdown Task Working Directory

The directory in which the Task will run. If you do not specify a directory, the Task will run in the Working Directory of the Session. Most Server Tasks output a log file, which is placed by default in the same directory in which it's executable resides. This Working Directory can be changed here, so that any outputted files are placed in a different location.

5.2.4 Shutdown Task Program Arguments

The command line arguments you want to pass to the Shutdown Task at start-up. To see what arguments are available for this application, please refer to the Configuring the Database Shutdown Task topic.

5.2.5 Advanced Shutdown Button

This button opens the Advanced Shutdown Page. This is for use with OpenEnterprise systems that are using redundant servers. It allows you to configure a special Shutdown procedure for when a redundant system is running with a Master server only.
5.3 Advanced Shutdown Page

This Page enables you to control the way a Task closes when you are running redundant Servers and you only have the Master running. It is important that you do this, because the normal method for closing the database when running redundant servers (the Windows WM_CLOSE method) does not save the database. Therefore, when running a redundant system with a Master only you run the risk of losing data if the ShutdownDB program is not used to stop the database. You can set a time period for the ShutdownDB Task itself to exit, after which it may be killed.

5.3.1 Shutdown Task File Name

This is the absolute filename of the Shutdown Task. Enter the absolute filename or browse for the file using the [Browse...] button.

5.3.2 Shutdown Task Working Directory

The directory in which the Task will run. If you do not specify a directory, the Task will run in the Working Directory of the Session. Most Server Tasks output a log file, which is placed by default in the same directory in which it’s executable resides. This Working Directory can be changed here, so that any outputted files are placed in a different location.

5.3.3 Shutdown Task Program Arguments

The command line arguments you want to pass to the Shutdown Task at start-up. To see what arguments are available for this application, please refer to the Configuring the Database Shutdown Task topic.
5.3.4 Shutdown Timeout

A time, in seconds, which the Session Manager will wait for the application to exit.

5.3.5 Kill Task

Select this if you want the Session Manager to attempt to kill the Task after the Shutdown Timeout has expired.

5.4 Settings Page

In Modify Mode, this Page enables you to configure other factors which control the way the Task is run, for instance its behaviour, criticality, process affinity and whether or not it should be visible.

5.4.1 Disabled Task

Check this box to disable the selected Task. Disabled Tasks will not be started by the Session Manager. A disabled Task cannot be run until it is first enabled by un-checking this box.

5.4.2 Run Task on Standby

In a redundant system, there may be some Tasks that are required to be running on the Standby as well as the Master (i.e. the Archive File Manager, OEPing etc.). Check this box to ensure that the Task runs on the Standby as well as the Master.
5.4.3 Make Task Critical

Checking this box makes the Task critical. A critical Task is one which the Session Manager will attempt to restart should it fail during the lifetime of a Session. Stopping the Task from the Session Manager interface will not cause the Session Manager to attempt to restart it.

5.4.4 Number of Retries

The number of times the Session Manager will attempt to restart a failed critical Task.

5.4.5 Infinite Retries

When checked, the Session Manager will continue to attempt to start the failed critical Task until the Task is restarted or the Session is stopped.

5.4.6 Inherit Affinity from Session

When checked, the Session Manager will use the same AffinityMask value which has been set for the Session. This is the default setting, and means that on a multi-processor computer, no particular CPU will be designated for the Task to run on (AffinityMask=0(zero)).

5.4.7 Select CPU

Select the CPU that this Task will run on. On multi-processor computers, this list will be populated with numbers representing the number of processors available. To designate a single CPU to run this Task, un-check the Inherit settings from session box, and select the CPU from this list.

5.4.8 Make Task Visible

Check this box to allow the Task to run with desktop interaction (i.e. visible on the Windows desktop). A Task may be run invisibly or visibly to give access to its interface from the Windows desktop. Un-check this box to make the Task run as a background Task with no desktop interaction.
5.5 Dependencies Page

In Modify Mode, this Page enables you to configure the order in which you want Tasks to start up when the Session is started.

5.5.1 Session Start

This is the default setting for starting Tasks. The Session Manager will start the components of the Session in alphabetical order as seen here.
If your Session has no dependency issues, then leave this button selected.

5.5.2 Start After a Named Task

If you would rather control the order which components are started when a Session begins, then select this option. For instance, if you want to make the Database to start before anything else, configure all other Tasks to depend on the Database being started before they are started, as shown in the example below.

- Task Dependency
  - This task depends on the following condition:
    - Session start or Session Master (default behaviour)
    - A named task has started (select the task from the list below)
    - This task depends on the following task: Database
    - Stop the task when the dependency stops

5.5.3 Dependency Task

Click on this list to select the Dependency Task for this Task. Session Manager will then ensure that this Task starts after the dependency Task has successfully started.

5.5.4 Stop Task When Dependent Task Stops

Check this box if you want this Task to be stopped automatically when the Dependency Task stops.

5.5.5 Startup Delay

You can delay the start-up of the Task. Enter the number of seconds delay in this field. The Session Manager will start this Task the configured number of seconds after the dependency condition has been met e.g. Session has started or the dependency Task has started.
6 Sessions Worked Examples

This section contains two worked examples to further help you to understand the process of configuring the Session Manager.

1. Configuring a Standalone Session
2. Configuring a Redundant Session

6.1 Standalone Example

The first step in creating a new Standalone or Redundant Session is to select the New... option from the Session Menu of the main Session Manager window. Click the hotspots* on the image below for further information.

6.1.1 Add New Option

Selection of this item will open the Add New Session Wizard, giving you the option to create a brand new Standalone or Redundant Session.

6.1.2 SessionType Page

The Add New Session - Session Type page enables you to specify the new Session's name, whether it will be a Standalone or Redundant Session, plus its Dataservice connection string and its Command File directory.
6.1.2.1 Name

The name of the Session, which must be unique. When modifying a Session, this field is disabled, and cannot be changed.

6.1.2.2 Standalone Session

When creating a new Session, click here to create a Standalone Session. A Standalone Session is a single Server running a single OpenEnterprise database. This selection cannot be modified at a later stage.

6.1.2.3 Redundant Session

When creating a new Session, click here to create a Redundant Session. A Redundant Session is two Servers running a single OpenEnterprise database in Master and Standby mode. If the Maser fails, the Standby takes over, becoming the new Master. This selection cannot be modified at a later stage.

6.1.2.4 Dataservice

This is the string which identifies the database to clients and enables them to connect. It is of the format `<ServerName>:<Portname>`, unless the database is running locally, when all that is required is `<Portname>`.
<ServerName> can be the actual network name of the Server, but is often an alias that is entered against the Server's IP address into the Windows Hosts file (%WinDir%\system32\drivers\etc). If it is a remote database it enables clients to locate the Server on which the database is running.

<PortName> is an alias for a TCP/IP port that is entered into the Windows Services file (%WinDir%\system32\drivers\etc). It enables clients to connect to the database. This is set up when OpenEnterprise is installed with an alias of rtrdb1, and a port number of 11101.

6.1.2.5 Command File Folder

This is the folder where the special Custom Command files for redundant systems are placed. These are the LoadingDatabase.cmd, Master.cmd and Standby.cmd files. For further information on these files see the Custom Commands - Redundant topic.

6.1.2.6 Browse button

Opens up a browse dialog, so that you can search for the required object, whether it be a directory, a file or a tag from an OPC Server. The context determines the type of browser dialog.

6.1.3 Session Settings Page

The only decision on this page is regarding whether to run the Session on a single CPU or all CPUs.
6.1.3.1 CPU Affinity Setting

This is a drop-down list of all the CPUs available on the Server. If a single CPU is selected, the Task will only run on that CPU.

6.1.4 Software Watchdog Page

This page enables you to configure the Software Watchdog for the Session.

**Add New Session - Software Watchdog**

**Enabled**

The Software Watchdog is responsible for automatically restarting critical tasks following a task failure. If the Software Watchdog is not enabled, failed tasks will not be restarted.

- Enabled

**Frequency**

Define the frequency at which the Software Watchdog runs. A failed task will not be restarted until the Software Watchdog next runs.

- Frequency: 50 seconds

6.1.4.1 Software Watchdog Enabled

Check this box by clicking on it to enable the Software Watchdog. If it is not enabled, the Session Manager will not restart failed critical tasks.

6.1.4.2 Software Watchdog Frequency

The frequency, in seconds, at which the Software Watchdog will run.
6.1.5 Tasks Page

This page enables you to configure the Tasks you require for the Session. The main difference between configuring a Standalone and Redundant Session comes when you add the Database Task. Also some of the other Tasks may need extra settings when being configured for a Redundant Session.

6.1.5.1 Task List

Configured Tasks are listed here. They can be modified or removed by selecting the Task followed by the appropriate button.

6.1.5.2 Add button

This button opens up the Task Properties Dialog at the Task Page. The Page will be in Wizard mode.

6.1.5.3 Remove button

The selected Task will be deleted from the list, and will no longer be a part of the Session being configured.

6.1.5.4 Modify button

This button opens up the Task Properties Dialog at the Task Page. The Page will be in Modify mode.
6.1.6 Task Configuration

New Tasks can be added to a Session by selecting the Session>Add Task option from the Session Manager's menu bar.

Individual Tasks that are part of a Session can be modified from the Task List Pane by clicking on the Task and selecting the Properties option from the Context Menu. This opens the Task Properties Dialog with the five Property Pages available for configuring the Task. To be able to configure a Task in this way, the Task must be stopped first.

- Task Page
- Shutdown Page
- Advanced Shutdown Page
- Settings Page
- Dependencies Page
6.1.6.1 Task Page

In Modify Mode, the Task Property Page enables you to configure the session name and file name of an OpenEnterprise Task, its working directory, and the arguments that must be passed to it when it starts.

6.1.6.1.1 Task Name

This is the name of the Task as it will appear in the Session Manager's Task List. It can be made to be more descriptive than the file name of the Task. Spaces are allowed.

6.1.6.1.2 Task File Name

This is the absolute filename of the Task. Enter the absolute filename or browse for the file using the [Browse...] button.

6.1.6.1.3 Task Working Directory

The directory in which the Task will run. If you do not specify a directory, the Task will run in the Working Directory of the Session. Most Server Tasks output a log file, which is placed by default in the same directory in which it's executable resides. This Working Directory can be changed here, so that any outputted files are placed in a different location.
6.1.6.1.4 Task Program Arguments

The command line arguments you want to pass to the Task at start-up. To see what arguments are available for each Task, please refer to its own Help File. These can be accessed from the Server Specific Help page found in the main OpenEnterprise Help file. This can be opened by selecting:-

Start>Program Files>OpenEnterprise>Documentation

6.1.6.1.4.1 The Database Task and Persistence

The Task Program Arguments for the Database Task are worth and extra mention here, because they determine whether or not the Database will be configured to be persistent. When the Database is set to be persistent, it uses a data file with a .MMF extension, rather than a .DAT extension (the MMF stands for Memory Mapped File). The example here shows the Database Task configured for persistence with the program arguments set to:-

```
-m"realtime.mmf" -s51435559 db > db.txt
```

For a more detailed explanation of this program argument, and how it affects the Database Task, please see the Configuring Persistence and Sizing the MMF File topics.

6.1.6.1.5 Database Ready Port

The UDP port number or name used by the database to inform the Session that the database is ready to accept client connections. Only applicable to database Tasks (rtrdb.exe).

6.1.6.1.6 OK Button

Saves any changes and closes the Properties dialog currently open.

6.1.6.1.7 Apply Button

Saves any changes and keeps the current Properties dialog open.

6.1.6.2 Shutdown Page

In Modify Mode, this Page enables you to select the most appropriate way of shutting down the selected Task. These options include the option to use a separate executable to shut the Task down.
6.1.6.2.1 Shutdown Type

This is a drop-down list of four different methods which may be used to close a Task. They are listed below, with an explanation of each:

- **Close** - Shuts down the task cleanly using a Windows close message.
- **Kill** - Kills the Task in the same way that tasks are killed in the Windows Task Manager.
- **Nothing** - No Shutdown action is performed. Used for Tasks that handle their own shutdown criteria. This can be used on redundant systems with Tasks that would normally close themselves anyway when the database is stopped, such as a Remote Device Interface (eg RDI3000).
- **Run a Shutdown Task** - Run a separate program to close the Task. When this option is selected, the fields in the Shutdown Task section become enabled. For instance, the ShutdownDB.exe should be used when closing a Standalone database because ShutdownDB automatically saves the database before closing it down. The ShutdownDB application can be found in the ....OpenEnterprise\bin directory.

6.1.6.2.2 Shutdown Task File Name

This is the absolute filename of the Shutdown Task. Enter the absolute filename or browse for the file using the [Browse...] button.
6.1.6.2.3 Shutdown Task Working Directory

The directory in which the Task will run. If you do not specify a directory, the Task will run in the Working Directory of the Session. Most Server Tasks output a log file, which is placed by default in the same directory in which it's executable resides. This Working Directory can be changed here, so that any outputted files are placed in a different location.

6.1.6.2.4 Shutdown Task Program Arguments

The command line arguments you want to pass to the Shutdown Task at start-up. To see what arguments are available for this application, please refer to the Configuring the Database Shutdown Task topic.

6.1.6.2.5 Advanced Shutdown Button

This button opens the Advanced Shutdown Page. This is for use with OpenEnterprise systems that are using redundant servers. It allows you to configure a special Shutdown procedure for when a redundant system is running with a Master server only.

6.1.6.3 Advanced Shutdown Page

This Page enables you to control the way a Task closes when you are running redundant Servers and you only have the Master running. It is important that you do this, because the normal method for closing the database when running redundant servers (the Windows WM_CLOSE method) does not save the database. Therefore, when running a redundant system with a Master only you run the risk of losing data if the ShutdownDB program is not used to stop the database. You can set a time period for the ShutdownDB Task itself to exit, after which it may be killed.

![Advanced Shutdown Settings](image-url)

- **Master Shutdown Program**
  - Select the program to run and specify any program arguments.
  - **Program**: Enter the program name here.
  - **Browse** button to locate the program.

- **Run program in the following folder**
  - Enter the folder path or browse.

- **Program Arguments**
  - Enter any command line arguments here.

- **Shutdown Timeout**
  - Specify the period of time to wait for the task to exit.
  - **Shutdown timeout**: 45 seconds
  - Check the box to `Kill task when still running after shutdown timeout`.

[Buttons]: OK, Cancel, Help
6.1.6.3.1 Shutdown Task File Name

This is the absolute filename of the Shutdown Task. Enter the absolute filename or browse for the file using the [Browse...] button.

6.1.6.3.2 Shutdown Task Working Directory

The directory in which the Task will run. If you do not specify a directory, the Task will run in the Working Directory of the Session. Most Server Tasks output a log file, which is placed by default in the same directory in which it's executable resides. This Working Directory can be changed here, so that any outputted files are placed in a different location.

6.1.6.3.3 Shutdown Task Program Arguments

The command line arguments you want to pass to the Shutdown Task at start-up. To see what arguments are available for this application, please refer to the Configuring the Database Shutdown Task topic.

6.1.6.3.4 Shutdown Timeout

A time, in seconds, which the Session Manager will wait for the application to exit.

6.1.6.3.5 Kill Task

Select this if you want the Session Manager to attempt to kill the Task after the Shutdown Timeout has expired.

6.1.6.4 Settings Page

In Modify Mode, this Page enables you to configure other factors which control the way the Task is run, for instance it's behaviour, criticality, process affinity and whether or not it should be visible.
6.1.6.4.1 Disabled Task

Check this box to disable the selected Task. Disabled Tasks will not be started by the Session Manager. A disabled Task cannot be run until it is first enabled by un-checking this box.

6.1.6.4.2 Run Task on Standby

In a redundant system, there may be some Tasks that are required to be running on the Standby as well as the Master (i.e. the Archive File Manager, OEPing etc.). Check this box to ensure that the Task runs on the Standby as well as the Master.

6.1.6.4.3 Make Task Critical

Checking this box makes the Task critical. A critical Task is one which the Session Manager will attempt to restart should it fail during the lifetime of a Session. Stopping the Task from the Session Manager interface will not cause the Session Manager to attempt to restart it.

6.1.6.4.4 Number of Retries

The number of times the Session Manager will attempt to restart a failed critical Task.

6.1.6.4.5 Infinite Retries

When checked, the Session Manager will continue to attempt to start the failed critical Task until the Task is restarted or the Session is stopped.
6.1.6.4.6 Inherit Affinity from Session

When checked, the Session Manager will use the same AffinityMask value which has been set for the Session. This is the default setting, and means that on a multi-processor computer, no particular CPU will be designated for the Task to run on (AffinityMask=0(zero)).

6.1.6.4.7 Select CPU

Select the CPU that this Task will run on. On multi-processor computers, this list will be populated with numbers representing the number of processors available. To designate a single CPU to run this Task, un-check the Inherit settings from session box, and select the CPU from this list.

6.1.6.4.8 Make Task Visible

Check this box to allow the Task to run with desktop interaction (i.e. visible on the Windows desktop). A Task may be run invisibly or visibly to give access to its interface from the Windows desktop. Un-check this box to make the Task run as a background Task with no desktop interaction.

6.1.6.5 Dependencies Page

In Modify Mode, this Page enables you to configure the order in which you want Tasks to start up when the Session is started.
6.1.6.5.1 Session Start

This is the default setting for starting Tasks. The Session Manager will start the components of the Session in alphabetical order as seen here.

If your Session has no dependency issues, then leave this button selected.

6.1.6.5.2 Start After a Named Task

If you would rather control the order which components are started when a Session begins, then select this option. For instance, if you want to make the Database to start before anything else, configure all other Tasks to depend on the Database being started before they are started, as shown in the example below.

6.1.6.5.3 Dependency Task

Click on this list to select the Dependency Task for this Task. Session Manager will then ensure that this Task starts after the dependency Task has successfully started.

6.1.6.5.4 Stop Task When Dependent Task Stops

Check this box if you want this Task to be stopped automatically when the Dependency Task stops.

6.1.6.5.5 Startup Delay

You can delay the start-up of the Task. Enter the number of seconds delay in this field. The Session Manager will start this Task the configured number of seconds after the dependency condition has been met e.g. Session has started or the dependency Task has started.
6.2 Redundant Example

The first step in creating a new Standalone or Redundant Session is to select the New... option from the Session Menu of the main Session Manager window. Click the hotspots* on the image below for further information.

6.2.1 Add New Option

Selection of this item will open the Add New Session Wizard, giving you the option to create a brand new Standalone or Redundant Session.
6.2.2 Session Type Page

The Add New Session - Session Type page enables you to specify the new Session's name, whether it will be a Standalone or Redundant Session, plus its Dataservice connection string and its Command File directory.

6.2.2.1 Name

The name of the Session, which must be unique. When modifying a Session, this field is disabled, and cannot be changed.

6.2.2.2 Standalone Session

When creating a new Session, click here to create a Standalone Session. A Standalone Session is a single Server running a single OpenEnterprise database. This selection cannot be modified at a later stage.

6.2.2.3 Redundant Session

When creating a new Session, click here to create a Redundant Session. A Redundant Session is two Servers running a single OpenEnterprise database in Master and Standby mode. If the Maser fails, the Standby takes over, becoming the new Master. This selection cannot be modified at a later stage.
6.2.2.4 Dataservice

This is the string which identifies the database to clients and enables them to connect. It is of the format <ServerName>:<Portname>, unless the database is running locally, when all that is required is <Portname>.

<ServerName> can be the actual network name of the Server, but is often an alias that is entered against the Server’s IP address into the Windows Hosts file (%WinDir%\system32\drivers\etc). If it is a remote database it enables clients to locate the Server on which the database is running.

<PortName> is an alias for a TCP/IP port that is entered into the Windows Services file (%WinDir%\system32\drivers\etc). It enables clients to connect to the database. This is set up when OpenEnterprise is installed with an alias of rtrdb1, and a port number of 11101.

6.2.2.5 Command File Folder

This is the folder where the special Custom Command files for redundant systems are placed. These are the LoadingDatabase.cmd, Master.cmd and Standby.cmd files. For further information on these files see the Custom Commands - Redundant topic.

6.2.2.6 Browse button

Opens up a browse dialog, so that you can search for the required object, whether it be a directory, a file or a tag from an OPC Server. The context determines the type of browser dialog.
6.2.3 Session Settings Page

The only decision on this page is regarding whether to run the Session on a single CPU or all CPUs.

6.2.3.1 CPU Affinity Setting

This is a drop-down list of all the CPUs available on the Server. If a single CPU is selected, the Task will only run on that CPU.
6.2.4 Software Watchdog Page

This page enables you to configure the Software Watchdog for the Session.

6.2.4.1 Software Watchdog Enabled

Check this box by clicking on it to enable the Software Watchdog. If it is not enabled, the Session Manager will not restart failed critical tasks.

6.2.4.2 Software Watchdog Frequency

The frequency, in seconds, at which the Software Watchdog will run.

6.2.5 Server Identification Page

This is the first of the extra pages that require configuration for a Redundant Session.
6.2.5.1 This Server Label

The Label that the Session Manager associates with this computer.

6.2.5.2 This Computer Name

The actual computer name (or alias as defined in the Hosts file) of this computer. This name must be an exact case-sensitive match with the name used in the oejcpcntrol table in the Arbitrator database for this computer.

6.2.5.3 Other Computer Name

The actual computer name (or alias as defined in the Hosts file) of the other computer. This name must be an exact case-sensitive match with the name used in the oejcpcntrol table in the Arbitrator database for this computer.

6.2.5.4 Test Button

The Session Manager will test the network for a reply from the computer defined in the computer name field to the left of the button. If there is no reply, you will be notified.
6.2.5.5 Browse Network Button

A network browsing dialog will open, enabling you to identify the other Server.

![Browse for Computer](image)

6.2.6 Arbitrator Page

This is the second extra page requiring configuration for a Redundant Session only. It sets up the Arbitrator Data service.
6.2.6.1 Arbitrator Dataservice

This is the order in which the journal process within the Database looks for a connection with the arbitrator database. Please refer to the Arbitrator Build and Configuration - Redundant topic for more information on the Arbitrator dataservice.

6.2.6.2 Retries

Determines the number of times the Session Manager should try to find the arbitrator using the options in the Arbitrator Dataservice field.

6.2.6.3 Retries Multiplier

This value is used with the Retries value. Session Manager will retry the connection attempt (Retries * RetriesMultiplier) times. To speed up start-up time therefore, lower the Timeout, RetriesMultiplier and TimeoutMultiplier values.

6.2.6.4 Timeout

Determines the amount of time the Session Manager should spend in trying to connect to the arbitrator using each of the sources listed in the Dataservice value.
6.2.6.5 Timeout Multiplier

This value is used with the Timeout value. Session Manager will retry the connection after (Timeout * TimeoutMultiplier) seconds. To speed up start-up time therefore, lower the Timeout, RetriesMultiplier and TimeoutMultiplier values.

6.2.7 T-Bar Page

This is the third of the extra pages requiring configuration for a Redundant OpenEnterprise system. It configures T-Bar OPC Server, if a T-Bar is being used.

### 6.2.7.1 T-Bar Enabled

When checked, the T-bar is enabled. Leave unchecked if not using a T-bar.

### 6.2.7.2 T-Bar OPC Tag

Type the T-bar tag in here, or use the Browse button to browse for the required tag.

### 6.2.7.3 Browse button

Opens up a browse dialog, so that you can search for the required object, whether it be a directory, a file or a tag from an OPC Server. The context determines the type of browser dialog.
6.2.8 Tasks Page

This page enables you to configure the Tasks you require for the Session. The main difference between configuring a Standalone and Redundant Session comes when you add the Database Task. Also some of the other Tasks may need extra settings when being configured for a Redundant Session.

6.2.8.1 Task List

Configured Tasks are listed here. They can be modified or removed by selecting the Task followed by the appropriate button.

6.2.8.2 Add button

This button opens up the Task Properties Dialog at the Task Page. The Page will be in Wizard mode.

6.2.8.3 Remove button

The selected Task will be deleted from the list, and will no longer be a part of the Session being configured.

6.2.8.4 Modify button

This button opens up the Task Properties Dialog at the Task Page. The Page will be in Modify mode.
6.2.9 Task Configuration

New Tasks can be added to a Session by selecting the Session>Add Task option from the Session Manager's menu bar.

Individual Tasks that are part of a Session can be modified from the Task List Pane by clicking on the Task and selecting the Properties option from the Context Menu. This opens the Task Properties Dialog with the five Property Pages available for configuring the Task. To be able to configure a Task in this way, the Task must be stopped first.

- Task Page
- Shutdown Page
- Advanced Shutdown Page
- Settings Page
- Dependencies Page

6.2.9.1 Task Page

In Modify Mode, the Task Property Page enables you to configure the session name and file name of an OpenEnterprise Task, it's working directory, and the arguments that must be passed to it when it starts.
6.2.9.1.1 Task Name

This is the name of the Task as it will appear in the Session Manager's Task List. It can be made to be more descriptive than the file name of the Task. Spaces are allowed.

6.2.9.1.2 Task File Name

This is the absolute filename of the Task. Enter the absolute filename or browse for the file using the [Browse...] button.

6.2.9.1.3 Task Working Directory

The directory in which the Task will run. If you do not specify a directory, the Task will run in the Working Directory of the Session. Most Server Tasks output a log file, which is placed by default in the same directory in which it's executable resides. This Working Directory can be changed here, so that any outputted files are placed in a different location.

6.2.9.1.4 Task Program Arguments

The command line arguments you want to pass to the Task at start-up. To see what arguments are available for each Task, please refer to it's own Help File. These can be accessed from the Server Specific Help page found in the main OpenEnterprise Help file. This can be opened by selecting:-

Start>Program Files>OpenEnterprise>Documentation
6.2.9.1.4.1 The Database Task and Persistence

The Task Program Arguments for the Database Task are worth and extra mention here, because they determine whether or not the Database will be configured to be persistent. When the Database is set to be persistent, it uses a data file with a .MMF extension, rather than a .DAT extension (the MMF stands for Memory Mapped File). The example here shows the Database Task configured for persistence with the program arguments set to:-

-m"realtime.mmf" -s51435559 db > db.txt

For a more detailed explanation of this program argument, and how it affects the Database Task, please see the Configuring Persistence and Sizing the MMF File topics.

6.2.9.1.5 Database Ready Port

The UDP port number or name used by the database to inform the Session that the database is ready to accept client connections. Only applicable to database Tasks (rtrdb.exe).

6.2.9.1.6 OK Button

Saves any changes and closes the Properties dialog currently open.

6.2.9.1.7 Apply Button

Saves any changes and keeps the current Properties dialog open.

6.2.9.2 Shutdown Page

In Modify Mode, this Page enables you to select the most appropriate way of shutting down the selected Task. These options include the option to use a separate executable to shut the Task down.
6.2.9.2.1 Shutdown Type

This is a drop-down list of four different methods which may be used to close a Task. They are listed below, with an explanation of each:

- **Close** - Shuts down the task cleanly using a Windows close message.
- **Kill** - Kills the Task in the same way that tasks are killed in the Windows Task Manager.
- **Nothing** - No Shutdown action is performed. Used for Tasks that handle their own shutdown criteria. This can be used on redundant systems with Tasks that would normally close themselves anyway when the database is stopped, such as a Remote Device Interface (eg RDI3000).
- **Run a Shutdown Task** - Run a separate program to close the Task. When this option is selected, the fields in the **Shutdown Task** section become enabled. For instance, the ShutdownDB.exe should be used when closing a Standalone database because ShutdownDB automatically saves the database before closing it down. The ShutdownDB application can be found in the ....OpenEnterprise\bin directory.

6.2.9.2.2 Shutdown Task File Name

This is the absolute filename of the Shutdown Task. Enter the absolute filename or browse for the file using the **[Browse...]** button.
6.2.9.2.3 Shutdown Task Working Directory

The directory in which the Task will run. If you do not specify a directory, the Task will run in the Working Directory of the Session. Most Server Tasks output a log file, which is placed by default in the same directory in which it's executable resides. This Working Directory can be changed here, so that any outputted files are placed in a different location.

6.2.9.2.4 Shutdown Task Program Arguments

The command line arguments you want to pass to the Shutdown Task at start-up. To see what arguments are available for this application, please refer to the Configuring the Database Shutdown Task topic.

6.2.9.2.5 Advanced Shutdown Button

This button opens the Advanced Shutdown Page. This is for use with OpenEnterprise systems that are using redundant servers. It allows you to configure a special Shutdown procedure for when a redundant system is running with a Master server only.

6.2.9.3 Advanced Shutdown Page

This Page enables you to control the way a Task closes when you are running redundant Servers and you only have the Master running. It is important that you do this, because the normal method for closing the database when running redundant servers (the Windows WM_CLOSE method) does not save the database. Therefore, when running a redundant system with a Master only you run the risk of losing data if the ShutownDB program is not used to stop the database. You can set a time period for the ShutdownDB Task itself to exit, after which it may be killed.

![Advanced Shutdown Settings](image-url)
6.2.9.3.1 Shutdown Task File Name

This is the absolute filename of the Shutdown Task. Enter the absolute filename or browse for the file using the [Browse...] button.

6.2.9.3.2 Shutdown Task Working Directory

The directory in which the Task will run. If you do not specify a directory, the Task will run in the Working Directory of the Session. Most Server Tasks output a log file, which is placed by default in the same directory in which it's executable resides. This Working Directory can be changed here, so that any outputted files are placed in a different location.

6.2.9.3.3 Shutdown Task Program Arguments

The command line arguments you want to pass to the Shutdown Task at start-up. To see what arguments are available for this application, please refer to the Configuring the Database Shutdown Task topic.

6.2.9.3.4 Shutdown Timeout

A time, in seconds, which the Session Manager will wait for the application to exit.

6.2.9.3.5 Kill Task

Select this if you want the Session Manager to attempt to kill the Task after the Shutdown Timeout has expired.

6.2.9.4 Settings Page

In Modify Mode, this Page enables you to configure other factors which control the way the Task is run, for instance it's behaviour, criticality, process affinity and whether or not it should be visible.
6.2.9.4.1 Disabled Task

Check this box to disable the selected Task. Disabled Tasks will not be started by the Session Manager. A disabled Task cannot be run until it is first enabled by un-checking this box.

6.2.9.4.2 Run Task on Standby

In a redundant system, there may be some Tasks that are required to be running on the Standby as well as the Master (i.e. the Archive File Manager, OEPing etc.). Check this box to ensure that the Task runs on the Standby as well as the Master.

6.2.9.4.3 Make Task Critical

Checking this box makes the Task critical. A critical Task is one which the Session Manager will attempt to restart should it fail during the lifetime of a Session. Stopping the Task from the Session Manager interface will not cause the Session Manager to attempt to restart it.

6.2.9.4.4 Number of Retries

The number of times the Session Manager will attempt to restart a failed critical Task.

6.2.9.4.5 Infinite Retries

When checked, the Session Manager will continue to attempt to start the failed critical Task until the Task is restarted or the Session is stopped.
6.2.9.4.6 Inherit Affinity from Session

When checked, the Session Manager will use the same AffinityMask value which has been set for the Session. This is the default setting, and means that on a multi-processor computer, no particular CPU will be designated for the Task to run on (AffinityMask=0(zero)).

6.2.9.4.7 Select CPU

Select the CPU that this Task will run on. On multi-processor computers, this list will be populated with numbers representing the number of processors available. To designate a single CPU to run this Task, un-check the Inherit settings from session box, and select the CPU from this list.

6.2.9.4.8 Make Task Visible

Check this box to allow the Task to run with desktop interaction (i.e. visible on the Windows desktop). A Task may be run invisibly or visibly to give access to its interface from the Windows desktop. Un-check this box to make the Task run as a background Task with no desktop interaction.

6.2.9.5 Dependencies Page

In Modify Mode, this Page enables you to configure the order in which you want Tasks to start up when the Session is started.
6.2.9.5.1 Session Start

This is the default setting for starting Tasks. The Session Manager will start the components of the Session in alphabetical order as seen here.

If your Session has no dependency issues, then leave this button selected.

6.2.9.5.2 Start After a Named Task

If you would rather control the order which components are started when a Session begins, then select this option. For instance, if you want to make the Database to start before anything else, configure all other Tasks to depend on the Database being started before they are started, as shown in the example below.

6.2.9.5.3 Dependency Task

Click on this list to select the Dependency Task for this Task. Session Manager will then ensure that this Task starts after the dependency Task has successfully started.

6.2.9.5.4 Stop Task When Dependent Task Stops

Check this box if you want this Task to be stopped automatically when the Dependency Task stops.

6.2.9.5.5 Startup Delay

You can delay the start-up of the Task. Enter the number of seconds delay in this field. The Session Manager will start this Task the configured number of seconds after the dependency condition has been met e.g. Session has started or the dependency Task has started.
7 Administrator Overview

A pre-condition for creating an OpenEnterprise Session is that the OpenEnterprise Database has already been built and configured properly. This section provides an overview for Administrative users who have overall responsibility for building the OpenEnterprise Database ready for Session configuration. An OpenEnterprise Session consists of the Database plus a number of ancillary Tasks managed by the Session Manager. The most important Task of any OpenEnterprise Session is the Database, since all other Tasks only function properly when they are connected to and communicating with it.

Whereas the other Tasks only need to be told how to connect to the Database in order to run as a Task, the OpenEnterprise Database needs to be first built and populated with data before it can be run as a Task within a Session. Therefore, configuration of an OpenEnterprise Session must be done in two stages:

- Database build and configuration
- Session configuration

There are two main types of OpenEnterprise Server configuration:

- Standalone - This comprises one Database running on one Server.
- Fault Tolerant - This configuration comprises one Database running on two Servers with an Active Master and a warm Standby Server. Fault Tolerant Servers require extra Database and Session configuration.

7.1 Database Configuration

Before you can create an OpenEnterprise Session, you have to build the OpenEnterprise Database. This can either be done by a Wizard, using the Database Project Builder, or by using a combination of SQL Scripts provided by OpenEnterprise and your own project specific Scripts. These are then applied to the Database using the SQL Client.

7.1.1 Database Build

When first installed, the OpenEnterprise Database only has the most basic of tables in it, and contains no project specific data. However, for a real OpenEnterprise project, the tables necessary for OpenEnterprise to work properly have to be created. Then the database has to be populated with the data that the actual project requires. This includes time zone information, field devices, device drivers, signal data, historical logging configuration and more. The Database can be built using the Database Project Builder wizard, or can be built as it were manually, using the SQL Client and using the NW3000 Database Builder (DBB) and Poll List Builder (TPB) to insert the signal data.

7.1.1.1 Automated Build - Database Project Builder Wizard

The Database Build can be performed automatically, using the Database Project Builder (DPB).

The DPB utilizes other OpenEnterprise components (namely, NW3000 Database Builder and NW3000 Poll List Builder) to insert the signals from Bristol-Babcock RTUs into the Database.
7.1.1.2 Manual Build - SQL Scripts and Toolbox

The Database Build can also be achieved by using the SQL Client to utilize pre-configured SQL Scripts. See the Manual Database Build topics.

7.1.2 Start-up Configuration File

When the Database starts, it refers to a configuration file. This resource file is named `Poly.cfg`. It resides in the database's working directory. The `Poly.cfg` file which comes with OpenEnterprise is sufficient for most Standalone configurations.

Master and Standby Servers of a Redundant system, however, need to have different settings for the Fault Tolerant module of the Poly.cfg file (the `ft` module).

7.1.3 Manual Database Build

When building a typical NW3000 OpenEnterprise database from scratch, the build can be split into six main sections: Click on the headings below for an explanation of each step.

1. Loading the table schema definitions;
2. DBB;
3. TPB;
4. Save database contents

Note: DBB is the Network 3000 database builder, TPB is the Network 3000 template (poll list) builder.

7.1.3.1 Loading the Table Schema Definitions

Start an Empty Database using the installed short cut in the OpenEnterprise Empty Database program group. Then start an SQL session using the installed short cut in the OpenEnterprise Empty Database program group. The initial script is called `alltables.sql` and it calls other scripts to build the OpenEnterprise Database. It is provided by OpenEnterprise ready for you to use.

1. SQL> include 'alltables';
2. SQL> shutdown;
3. Now copy the contents of the OpenEnterprise\Database\Schema folder to the OpenEnterprise\Data folder, or any other data directory that you intend to run the Database from (the Working Directory). If you do change the Database Working Directory, you will have to change the Working Directory of the shortcuts to the Database and SQL client off the Start>Programs>OpenEnterprise>Database menu.

7.1.3.2 Pre-DBB

This next section uses a combination of SQL Script files provided by OpenEnterprise, plus some that you have to prepare yourself for the specific project in hand. Those which you have to prepare yourself start with the word 'custom'. Start a Database using the installed short cut in the OpenEnterprise Database program group. Then start an SQL session using the installed short cut in the OpenEnterprise Database program group.

1. SQL> include ‘defaultload’; *(Includes mandatory OpenEnterprise database settings:)*
2. SQL> include 'nw3000def'; *(Includes the network3000 driver:)*

3. SQL> include 'GMT'; *(Includes the time zone file appropriate to your locale. A number of different SQL script files are installed for your use.)*

4. SQL> include 'custom_nw3000def'; *(Customise the behaviour of the nw3000 driver. Modifies values in the nw3000driver table.)*

5. SQL> include 'custom_schedules'; *(Includes the network3000 timeclass definitions. Inserts entries into the dvi_schedule table.)*

6. SQL> include 'custom_alarmpriorities'; *(Customise the default alarm priorities for network3000. Priorities 0, 1, 2 and 3. Modifies entries in the alarmpriorityblock table.)*

7. SQL> include 'custom_historical'; *(Include your historical configuration.)*

8. SQL> include 'custom_views'; *(Define your specific view requirements.)*

9. SQL> include 'custom_security'; *(Include your specific security requirements.)*

It is recommended that when the custom files have been created and load correctly, the above SQL statements are included in a single SQL file called custom_project.sql. The following is an example custom_project.sql file.

-- Filename: custom_project.sql--

-- Description: Include this file before running DBB
-- Include mandatory OpenEnterprise database settings.
Include 'defaultload';
-- Include the network3000 driver.
include 'nw3000def';
-- Include the time zone file appropriate to your locale.
include 'GMT';
-- Customise the behaviour of the nw3000 driver.
include 'custom_nw3000def';
-- Include the network3000 timeclass definitions.
include 'custom_schedules';
-- Customise the default alarm priorities for network3000.
include 'custom_alarmpriorities';
-- Include your historical configuration.
include 'custom_historical';
-- Define your specific view requirements.
include 'custom_views';
-- Include your specific security requirements.
include 'custom_security';

Then, this build step will just be: SQL> include 'custom_project';

7.1.3.3 DBB

Start the Database Builder using the short cut in the OpenEnterprise Network 3000 program group. Select Build All from the Database Builder dialog. This should now populate the database with signals for all NW3000 devices configured within OpenBSI.

7.1.3.4 Post DBB

Set the window focus on the SQL Client window that should still be running and type the following SQL statements (not the text in italics). These scripts are all to be prepared by you for the specific needs of the project in hand.

1. SQL> include 'custom_deviceschedules'; (Assign nw3000 devices to timeclasses. Modify nw3000device timeclass values)

2. SQL> include 'custom_signaldescriptors'; (Define signal descriptors. Modify nw3000realanalog and nw3000digital descriptions)

3. SQL> include 'custom_signalschedules'; (Define any specific network3000 timeclass requirements. Modify nw3000realanalog and nw3000digital timeclass values.)

4. SQL> include 'custom_signaldataset'; (Define signal historical database mapping. Modify nw3000realanalog and nw3000digital dataset values.)

It is recommended that when the custom files have been created and load correctly, the above SQL statements are included in a single SQL file called custom_postdbb.sql. The following is an example custom_postdbb.sql file.

-- Filename: custom_postdbb.sql--
-- Description: include after running DBB
-- Define signal descriptors
include 'custom_signaldescriptors';
-- Assign nw3000 devices to timeclasses
include 'custom_deviceschedules';
-- Define any specific network3000 timeclass requirements.
include 'custom_signalschedules';
-- Define signal historical database mapping.
include 'custom_signaldataset';

Then, this build step will just be: SQL> include 'custom_postdbb';
### 7.1.3.5 TPB
Start the Poll List Builder using the short cut in the OpenEnterprise Network 3000 program group. Select Build All from the Poll List Builder dialog. This should now build templates (poll lists) for all Network3000 signals and devices.

### 7.1.3.6 Save Database Contents
Set the window focus on the SQL Client window that should still be running, and type.

```
SQL> save into 'realtime.dat';
```

The OpenEnterprise database is now ready for customisation, if so required.

### 7.2 General Database Configuration
The Poly.cfg file is a database resource and configuration file used by the RTRDB (RealTime Relational DataBase). It is located by default in the `C:\Program Files\Bristol\OpenEnterprise\Data` directory. The example Poly.cfg file that is installed with OpenEnterprise should be sufficient for most Standalone systems without any changes being required.

There are three things it is helpful to know of when dealing with the Poly.cfg file.

- Modules and Resources
- Naming Data Services
- Main Database Resources

#### 7.2.1 Data Services
Data Services are TCP/IP port addresses, from which the database offers clients a means of connection.

##### 7.2.1.1 Server
The server (database), to uniquely identify the service offered by the database, uses data services. In the Poly.cfg file, all database data services are local to the host. Hence they it is in the following format:

```
data_service=<service>
```

* e.g. rtrdb1
  
  where the string "rtrdb1" will be resolved into a port number using the Windows Services file.

##### 7.2.1.2 Client
Clients are applications that use data services to specify the database (or databases) they wish to connect to. A single client data service can name multiple database data services but the client can only connect to a single database.
There are several types of data service that a client can use depending on whether they are connecting to a standalone or redundant database.

7.2.1.1.4 Standalone

When connecting to a standalone database the client need only specify a single data service. If the database is on a remote host the client will need to specify the remote host and the database data service offered on that host.

7.2.1.1.5 <hostname>:<service>

E.g.

* rtrdb1 will connect to the local database rtrdb1.
* hosta:rtrdb1 will connect to the remote database on hosta.

7.2.1.1.6 Redundant

When connecting to a redundant data database the client needs to specify both database data services and additional options as to whether the client wishes a standby connection. If no additional options are provided then the client will always connect to the active database.

7.2.1.1.7 <hostname>:<service>,<hostname>:<service><[ro | standby]>

E.g.

* hosta:rtrdb1,hostb:rtrdb1 ...will connect to the active database.
* hosta:rtrdb1,hostb:rtrdb1[ro] ...will connect to the standby in preference.
* hosta:rtrdb1,hostb:rtrdb1[standby] ...will connect to a standby only.

7.2.2 Modules and Resources

The Poly.cfg file is a database resource and configuration file used by the RTRDB (RealTime Relational DataBase). It resides in the RTRDB's designated working directory (by default the C:\Program Files\Bristol\OpenEnterprise\Data directory).

The file combines resources set within named modules to provide the Database with configuration parameters based on the module name passed to it when it is invoked. This enables the rtrdb.exe database to be run with a range of configuration parameters.

For instance, the Start>Programs>OpenEnterprise>Empty Database>Database link is set up to open the rtrdb.exe in the default Data directory, with a resource module of emptydb. This means the rtrdb.exe will start up, then look in the provided Start In: directory for a file named Poly.cfg. It will then look in that file for a resource module named emptydb. Then it will apply any resources it finds in that module to itself. The emptydb module contains no 'load_file' resource, so the rtrdb1 starts with an empty database.

The Poly.cfg file is similar to a Windows .ini file, but the module names are completely arbitrary. Resource modules are created in the Poly.cfg file by naming the module followed by a colon. For example, a module called Dataservice, containing resources for the RTRDB is created like this: -

```
DataService:
```
data_service = rtrdb1
default_user = SYSTEM
default_access_area = ALL
default_plant_area = ALL

Often used modules can be copied to other modules by using the name of the assigned module immediately after the colon. The module named db in the following example will have all of the resources of the DataService module assigned to it as well as its own resources:

    db:dataservice
type = rtrdb
    suppress_building_dvi_tables = true
    enable_gdi = Yes
dvi_nulls_allowed = true

For more detail on the Poly.cfg file click here for Standalone, click here for Redundant.

7.2.3 Database Resources

The resources below can be added to the DB: section of the Poly.cfg file as resources for the database.

7.2.3.1 dvi_register_datum_with_values

Controls whether datum (signal) are registered with their RDI with or without initial values for monitored columns. Default value: FALSE. Recommended value: TRUE

7.2.3.2 dvi_triggers_on

Controls whether the DVI places triggers on monitored columns. If set to FALSE then the DVI will not set triggers on monitored columns and it will be up to the application to set the forcewrite boolean. Default value: TRUE. Recommended value: FALSE.

7.2.3.3 load_file

The name of the disk based database load file that is read by the database at start-up. This load file contains a disk based copy of the database. Default value: none. Recommended value: realtime.dat.

7.2.3.4 ft_enable

Enables fault tolerant database to database connectivity. Set to TRUE to enable fault tolerant database to database connectivity. Currently only used for redundancy Arbitrator functionality. Default value: FALSE. Recommended value: TRUE for redundant systems, otherwise FALSE.

7.2.3.5 ft_heartbeat_interval

When using fault tolerant database to database communications, once every ft_heartbeat_interval milliseconds, the database sends a heartbeat request to the connected database. A heartbeat response is expected within ft_heartbeat_timeout milliseconds.
7.2.3.6 ft_heartbeat_timeout
See “ft_heartbeat_interval” section.

7.2.3.7 journal_heap_increment
The number of bytes by which the journal buffer grows when it becomes full. Default value: 256. Recommended value: 1000000.

7.2.3.8 oe_active_alarmsumary_value
When set to TRUE the AlarmSummary table is automatically updated with the latest signal values sourced from external devices. Currently only supported for nw3000 devices. Default value: FALSE. Recommended value: system dependent.

7.2.3.9 enable_object_locking
When set to TRUE certain configuration object attributes can be locked for exclusive update when using ToolBox. Default value: FALSE. Recommended value: system dependent.

7.2.3.10 patdbg_timestamp
Enables the output of timestamps for all JCP status messages. Default value: FALSE. Recommended value: TRUE.

7.2.3.11 cl_library
The list of one or more CL files loaded at database start-up. The CL files define the database methods.

7.2.3.12 suppress_log
Controls whether the Historian component is enabled or not. Set to TRUE to disable the Historian. Note that the product CL will fail to load if this resource is set to TRUE. Default value: FALSE. Recommended value: FALSE.

7.2.3.13 sql_privilege_cache_size
The security system stores all its privilege information in database tables. To improve performance it caches these privileges, on a per user basis, in a form that is much quicker to check (bitmaps). The sql_privilege_cache_size specifies the size of the cache in terms of how many users privileges are cached. The default is 1. This means that every time the privileges for a different user is checked the current cache of privileges is dropped and a new set loaded. e.g. If the resource is set to 20 it will store all privileges for all tables for the last 20 users that have accessed the database. Default value: 1 Recommended value: <number of users defined in database>.

7.2.3.14 quiet
When set to TRUE no output will be sent to the RTRDB window. Note that all output will continue to go to standard output, if configured (db.txt). Default value: FALSE. Recommended value: TRUE.

7.2.3.15 data_service
The data service offered by the database. Any host name mentioned is ignored as all services are offered locally. Default value: none. Recommended value: system dependent.
7.2.3.16  default_user

The user whose privileges comprise the base privileges for all clients that have not explicitly logged onto the database. Default value: none. Recommended value: SYSTEM if not using security, otherwise PUBLIC.

7.2.3.17  default_access_area

The access area assigned to objects created in the database if no access area is explicitly named. Default value: none. Recommended value: ALL.

7.2.3.18  default_plant_area

The plant area assigned to objects created in the database if no plant area is explicitly named. Default value: none. Recommended value: ALL.

7.2.3.19  type

The component type. Mandatory - must be set to the correct resource type for the module - in this case, "rtrdb".

7.2.3.20  suppress_building_dvi_tables

Controls whether the RTRDB builds the standard DVI tables. Within OE, the DVI tables must be created by the application. Default value: FALSE. Recommended value: TRUE.

7.2.3.21  enable_gdi

Obsolete.

7.2.3.22  oe_journal_per_connection

When set to FALSE journal messages for client connections, logons, logoffs and disconnections are only journaled on a per host basis. When set to TRUE they are journaled on a per client connection basis. Default value: TRUE. Recommended value: TRUE.

7.2.3.23  suppress_dvi

Controls whether the internal DVI component is enabled or not. The DVI component is used for all RDIs. Default value: FALSE. Recommended value: FALSE.

7.2.3.24  suppress_cl

Controls whether the CL component is enabled or not. Set to TRUE will prevent any CL from running. Default value: FALSE. Recommended value: FALSE.

7.2.3.25  log_dst_adjusted

When set to TRUE, this resource causes the oelogdata.compressionoffset attribute to be treated as a local time (DST adjusted) rather than as UTC.
7.3 Configuring a Standalone Session

A Standalone Session consists of a single Database and ancillary Tasks running on a single Server. To create a Standalone Session you only need to follow the instructions on the following pages:-

1. Database Build and Configuration
2. Session Configuration
3. Custom Commands

7.3.1 Session Configuration

7.3.1.1 New Session

This menu option opens the Add New Session wizard that enables you to configure a whole new OpenEnterprise Session. It is only available when no Session is opened in the Session Manager.

7.3.1.2 Configuring Persistence

OpenEnterprise has the ability to run a persistent database. This is primarily designed to protect the database contents against system or software failures.

7.3.1.2.1 What is Persistence?
Persistence allows database contents to be recovered from a disk file. Recovery will occur in the event of a database failure or database closure that did not result in a realtime.dat update.

7.3.1.2.2 What Data is Persistent?
Both realtime data and historical online buffers are persistent data. All data in all tables is persistent, even tables and attributes that are configured as transient. The database schema is also persistent.

7.3.1.3 Sizing the MMF File

There is currently no formula for sizing the MMF file. The best advice is to create the database with no persistence. Then enable persistence starting with -s10000000. If this is too small a value then the database will terminate, probably at start-up, with an 'Out of Memory' error in db.txt. Keep increasing the MMF size until the database loads successfully. At this stage there should be an MMF file only just large enough. If system resources allow the MMF file should now be at least doubled to allow for database expansion.
7.3.1.4 Task Configuration

The Session Manager enables users to modify existing Sessions by adding, deleting or modifying individual Tasks within a Session on the fly. This is done from the Session Menu's Add Task option, which opens the Add Task Wizard. This runs the user through the process of creating a new Task. Once a Task is added in this way, it will automatically be saved.

To modify existing Tasks, use the Properties option on the Task's context menu to access its Property Pages, and perform the changes whilst the Session is running. The Task itself needs to be stopped to do this.

Session Configuration

7.3.1.5 Redirect Session Properties

Type topic text here.

7.3.1.6 Session Properties

This option opens the Modify Session property pages for the currently opened session. It is not enabled until a session has been opened by selecting the Open... option from the Session menu.

7.3.2 Custom Commands - Standalone

The Session Manager will attempt to run custom windows command files upon certain state changes and critical events. The System Administrator can optionally use these files to invoke custom actions e.g. Send an Alert message when a critical process fails. The Session Manager will expect these files to exist in the default-working directory for the session.

Two general command files are called when the session is started and stopped, StartOE.cmd and StopOE.cmd respectively. Neither takes any input parameters.

For example, the following StopOE.cmd file is used to copy the database output files. This can be useful when diagnosing problems.

REM StopOE.cmd

Copy db.txt db.old.txt
Two further command files can be used for critical process failures and restarts. When a critical process fails, the TaskFail.cmd file is invoked. When the failed process is successfully restarted, TaskStart.cmd is called. Both command files are passed a single command line parameter that is the name of the task that failed.

The following example shows how TaskFail.cmd can be used to broadcast a message to computer name WS1 when a critical process fails. It also shows a check for the database failing so the database output file can be saved for later diagnosis.

REM TaskFail.cmd

if "%1"="database" goto DATABASE
goto ALERT
:DATABASE
REM save the database output file as it may contain something useful
copy db.txt db.old.txt
goto ALERT
:ALERT
net send WS1 OpenEnterprise Critical Process Failure: %1

7.4 Configuring a Redundant Session

A Fault Tolerant or Redundant configuration consists of a single Database which is run on two Servers - one is the Active or Master Server, and the other is a hot Standby. A Redundant Server configuration requires extra Database and Session configuration. The extra configuration (over and above that required for a Standalone application) is as follows.

7.4.1 Redundant Database Build

The main and Arbitrator Databases can be built on the Master Server and copied directly over (including Log Files and any Archives created) to the Standby Server with no changes.

7.4.2 Hosts File

Fault Tolerant Servers need to have their Hosts files set up so that they can locate each other over the Local Area Network.

7.4.3 Fault Tolerance Settings - Configuration File

A Fault Tolerant set-up requires extra elements of the Database Configuration file (Poly.cfg) to be correctly configured. These include the Journal Service for the local and other Server, and the Arbitrator Service for the local and other Server.

7.4.4 Arbitrator Database

A Fault Tolerant database requires the Arbitrator database to be configured and run as part of the Session also. This is a completely separate database that runs alongside the main Database on the Master Server. It functions as a software arbitrator between the two Servers. It must be configured currently using the SQL Client and SQL scripts.

7.4.5 Extra and Distinct Session Settings

In a Fault Tolerant system, each Server has to have extra Session settings, as well as slightly different Session settings on each Server.
7.4.6 Other Configuration Decisions

Persistence and Custom Commands are set up in the same way for Fault Tolerant Sessions as Standalone Sessions: -

- Persistence
- Custom Commands

7.4.7 Windows Hosts File - Redundant

It is essential to configure the Windows Hosts file correctly for a Redundant session. The Hosts file is found in the C:\Winnt\System32\drivers\etc folder. It can be opened using Notepad or Wordpad and edited. It must be saved with no extension. OpenEnterprise Servers can be configured to have both a Client/Server network address and a separate dedicated JCP network address. This can only be done if two network cards are fitted to each Server.

7.4.7.1.1 Hosts File for a Dedicated JCP Network

Here is an example Hosts file fragment for a Redundant session which uses a separate network, dedicated to redundancy traffic (the JCP Network). The essential components have been labelled:

<table>
<thead>
<tr>
<th>Host IP address</th>
<th>Designated Host name</th>
<th>Server Addresses</th>
<th>JCP Addresses</th>
<th>Client Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>101.100.0.181</td>
<td>oeserv1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>101.100.0.182</td>
<td>oeserv2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>101.2.0.101</td>
<td>oeserv1_jcp</td>
<td></td>
<td>JCP Addresses</td>
<td></td>
</tr>
<tr>
<td>101.2.0.182</td>
<td>oeserv2_jcp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>101.100.0.183</td>
<td>workstation1</td>
<td></td>
<td></td>
<td>Client Addresses</td>
</tr>
<tr>
<td>101.100.0.184</td>
<td>workstation2</td>
<td></td>
<td></td>
<td>(Client / Server Network)</td>
</tr>
</tbody>
</table>

As shown, the IP addresses of each Server must be followed by the designated Server names. There are separate IP addresses for the JCP network and the SCADA network.

7.4.7.1.2 Hosts File for a Redundant Setup not using a Dedicated JCP Network

Here is a sample Hosts file for an OpenEnterprise Session that is not using a dedicated JCP Network:

<table>
<thead>
<tr>
<th>Host IP address</th>
<th>Designated Host name</th>
<th>Server Addresses</th>
<th>Client Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>101.100.0.181</td>
<td>oeserv1 oeserv1_jcp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>101.100.0.182</td>
<td>oeserv2 oeserv2_jcp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>101.100.0.183</td>
<td>workstation1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>101.100.0.184</td>
<td>workstation2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Server Addresses (Combined Client / Server and JCP Network)

Client Addresses (Client / Server Network)
In the above example, the Server and JCP host names are assigned to the same (SCADA) network IP address, because only there is only one network card per Server.

Configuring a Redundant Session

7.4.8 Poly.cfg file configuration - Redundant Session

In a Redundant Session, the Database is controlled by the Journal Control Process (JCP), and is not started directly by the Session Manager. The JCP knows whether it is running in Master or Standby mode because it connects first to another database - the Arbitrator. This means that for a Redundant Session database resources must be provided for the JCP process.

7.4.8.1 Fault Tolerance Resources

Database (RTRDB) resources should be set up as for a Standalone session except that fault tolerance resources should be set.

7.4.9 Journal Process Resources

The Journal Process, or Journal Control Process (JCP) keeps the Standby Database in step with the Master. It used to be a separate process, but it is now actually a part of the Database process. However, the Journal Control Process (JCP) still requires its own resources. These must be configured correctly in the Poly.cfg file.

7.4.9.1 The FT Module

JCP resources should be included under the FT: module. The FT: module is named so in the provided Poly.cfg file because the initials stand for Fault Tolerant, but modules can have any name. The Poly.cfg file is not as rigid in naming of resources as is a standard Windows .INI file.

When starting up, the Journal process (JCP) attempts to link to the live Arbitrator database to determine whether it is in Master or Standby mode. Since the Arbitrator could be running locally or on the other Server, the JCP process must look both locally and on the other machine for the Arbitrator database.

7.4.9.2 Finding the Arbitrator Database

Arbitrator resources consist of the possible TCP/IP addresses of the Arbitrator, and the order in which the JCP should search for it. This is in the form

\[
\text{arbitrator\_service} = \text{hosta:arbitrator1,hostb:arbitrator1}
\]

If no Arbitrator database is detected, a local instance is started. Once the Arbitrator has been located, the current Server is aware whether it is running as Master or Standby.

7.4.9.3 Communication with the Other JCP

The Journal process is also responsible for keeping the Standby database up to date with the Master database, so it needs resources to tell it how to communicate with the Journal process on the other Server. This takes the form \[
\text{other\_journal\_service} = \text{hostb:jcp1}
\]
7.4.10 Custom State Commands - Redundant

Although a redundant system has special Custom Commands, the Custom Commands specified for standalone systems are also valid. The special Custom Command files for redundant systems are the LoadingDatabase.cmd, Master.cmd and Standby.cmd files. The latter two files have no input parameters but LoadingDatabase.cmd is passed the state of the loading database, either STANDBY or MASTER.

**Note:** When running a persistent redundant system, LoadingDatabase.cmd must be used to delete the memory-mapped file when a session is starting as standby.

The following example shows the recommended use of LoadingDatabase.cmd within a redundant, persistent environment. It also demonstrates how the input argument can be used.

```rem
REM LoadingDatabase.cmd
if "%1"=="STANDBY" goto STANDBY
goto DONE
:STANDBY
del realtime.mmf
:DONE
```

7.4.11 Redundant Session Configuration

When configuring a Redundant Session, there are extra factors to be configured for the Session. These are catered for by the introduction of extra configuration pages for Redundant Sessions. They are:

7.4.11.1 Extra Session Settings

1. The Server Identification Page
2. The Arbitrator Page
3. The T-Bar Page

7.4.11.2 Extra Task Settings

For a Redundant Session, the Database needs extra configuration, particularly with regard to the way the Database closes:

- Advanced Shutdown Page

7.4.12 Arbitrator Build and Configuration

The Arbitrator is a mandatory component within a Redundant OpenEnterprise Session. It is not required for a Standalone session. The Arbitrator is a special database that is used to decide which server should be the Master and which should be the Standby. At any one time only one arbitrator will be running on the Master Standby pair. Typically it will be running on the Master.

In order to configure an Arbitrator first start an empty arbitrator database by clicking on the Windows Start button and selecting:

```
Start>Programs>OpenEnterprise>Arbitrator>Empty Arbitrator
```

Then start an SQL session to the arbitrator using:
Start>Programs>OpenEnterprise>Arbitrator>SQL

At the SQL prompt type: -

    SQL> include 'alltables';
    SQL> shutdown;

The Arbitrator's schema is now initialised. Now start an Arbitrator to load the correct configuration using:

Start>Programs>OpenEnterprise>Arbitrator>Arbitrator

The user should now edit the example database load file Example.sql found in the %INSTALLDRIVE%:\Program Files\Bristol\OpenEnterprise\Database\ArbitratorSchema directory to add configuration specifics. (Change the name attribute to match the hostnames of the specific servers.)

Example Script for the Arbitrator:-

    insert into oejcpcontrol ( name, heartbeat_interval, heartbeat_timeout, startup_timeout, server_label) values ('ServerA:jcp1', SECONDS(30), 90, 120, 'A');
    commit;
    insert into oejcpcontrol ( name, heartbeat_interval, heartbeat_timeout, startup_timeout, server_label) values ('ServerB:jcp1', SECONDS(30), 90, 120, 'B');
    commit;

Note: The names used must match the journal_service name specified in poly.cfg and they are case sensitive. They should also match the host name values specified on the FaultTolerance key within the Settings Editor - (ThisHostName and OtherHostName).

Once satisfied with the edits the file must be saved to a different filename, keeping the SQL extension. The following assumes the file is called myarbitrator.sql.

Then start an SQL session to the arbitrator using the provided Arbitrator SQL shortcut.

At the SQL prompt type:-

    SQL> include 'myarbitrator';
    SQL> save into 'arbitrator.dat';
    SQL> shutdown;

The user can optionally modify the:-

1. heartbeat_interval
2. heartbeat_timeout
3. startup_timeout values.
Adjust these values according to the application's requirements.

7.4.12.1 Monitoring a redundant session

The Session Manager will monitor and make available the status of both redundant servers. This state information is displayed in the Session Managers Status Bar and also written to the Redundancy table within the realtime database.

7.4.12.2 Arbitrator Heartbeat Interval

This determines how often the journal process will send a heartbeat to the arbitrator. It is recommended that this value should be at least a factor of three times less than the heartbeat_timeout value e.g. SECONDS(30)

7.4.12.3 Arbitrator Heartbeat Timeout

If a heartbeat is not received within Heartbeat_timeout seconds then the session is deemed to have failed and will be shutdown. Increasing this value will make the system less sensitive to errors occurring but failover times will be longer given a critical failure on the master. It is recommended that this value should be at least a factor of three times greater than the heartbeat_interval e.g. 90

7.4.12.4 Arbitrator Startup Timeout

This value should be set to a count of seconds that corresponds to the amount of time it takes the system, from start-up to reach its idle state. Any errors heartbeat time-outs occurring within this period will be ignored e.g. 12
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Engineered and supported by:

Remote Automation Solutions,

Bristol Babcock Ltd. Blackpole Road, Worcester, WR3 8YB, UK

Reg office: 2nd Floor, Accurist House, 44 Baker Street, London, W1U 7AL

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