Spotlight® on Oracle10.6

Getting Started Guide

Contents

Welcome to Spotlight® on Oracle

Spotlight® on Oracle is a powerful diagnostic and resolution tool for Oracle databases. Its unique user interface provides you with an intuitive, visual representation of the activity on your database. Graphical flows illustrate the rate at which data is moving between database components. Observe actual database activity in real time.

The power of Spotlight on Oracle lies in its ability to provide visual and audible warnings if the performance metrics exceed acceptable thresholds. The components and data flows change color to show you the source of the problem. Spotlight on Oracle provides detailed information about a specific component allowing you to pinpoint the source of problems.

Spotlight on Oracle incorporates:

- Predictive Diagnostics
- Spotlight on Oracle Data Guard
- Spotlight on UNIX
- Spotlight on Windows
- Spotlight on MySQL

Notes:

- Spotlight on Oracle RAC requires additional licensing. It enables the diagnosis of Oracle databases on multiple host machines under the Real Application Clusters (RAC) architecture and additionally may include monitoring of **Exadata** systems depending on the license purchased.

- When delivered as part of the Toad® DBA Suite for Oracle, Spotlight incorporates **SQL Optimizer for Oracle**. SQL Optimizer offers a fully automated approach to maximizing SQL performance. It eliminates the manual, time-intensive process of ensuring that SQL code is performing as fast as possible.

Install Spotlight

Requirements

Section	Requirement
User Privileges	Ensure the Windows user installing Spotlight has Windows Administrator privileges.
Folder Permissions	During installation, Spotlight requires **write** access to the following: • The Spotlight installation folder (by default, Program Files\Quest Software\Spotlight) • ProgramData\Quest Software\Spotlight • Users\<current user>\AppData\Roaming\Quest Software\Spotlight **Notes**: On a 64-bit operating system the **Program Files** directory is **Program Files (x86)**.
Permissions to Windows registry keys and sub-keys	During installation, Spotlight requires **write** access to the following: • HKEY_LOCAL_ MACHINE\SOFTWARE\Wow6432Node\Quest Software\Products • HKEY_LOCAL_ MACHINE\SOFTWARE\Wow6432Node\Quest Software\Spotlight • HKEY_CLASSES_ROOT **Note**: Wow6432Node is applicable only for 32-bit Spotlight run on 64-bit operating systems.

Steps To Install

To install Spotlight from CD:

1. Close all open applications on your PC.

2. Insert the Spotlight Installer CD into your CD-ROM drive.

    If the installation program does not start select Windows **Start | Run**

    - For Spotlight delivered as part of the Toad DBA Suite for Oracle, enter the command **d:\TOAD DBA Suite for Oracle vvv.exe** (where d: is the CD-ROM identifier and vvv is the Spotlight version).

    - For Spotlight delivered as a standalone installer, enter the command **d:\SpotlightonOracle_vvv.exe** (where d: is the CD-ROM identifier and vvv is the Spotlight version).

3. Follow the instructions on the screen to complete the installation.

To install Spotlight from the downloaded installer:

1. Close all open applications on your PC.

2. Execute the downloaded installer.

3. Follow the instructions on the screen to complete the installation.

Note: To cancel installation at any time, press **Esc** or click **Cancel**.

Multiple Concurrent Installations

There has been a major shift in the architecture from Spotlight on Oracle 9.5. You can install major and minor versions of Spotlight on Oracle side by side (or upgrade). Patch and progressive builds will upgrade.

Note: If Spotlight is delivered as part of the Toad DBA Suite and you require multiple Spotlight installations on your computer then contact Quest Software for more information.

MSI Installers for Spotlight on Oracle

MSI installers are available for Spotlight on Oracle. These installers can be run silently, and produce an installation that can be captured and re-used via automatic deployment techniques.

Contact Quest Software for more information.

Uninstall Spotlight

To remove the application and all associated files from your machine, if required.

Uninstall the Spotlight Diagnostic Server

If the Spotlight Diagnostic Server is installed on the same computer as the Spotlight client and the Spotlight client is still installed then click **View | Options | Configure Diagnostic Server**.

Alternatively, access the computer where the Diagnostic Server is installed:

1. Open **Windows Control Panel**.
2. Select **Programs and Features**.
3. Click **Spotlight Diagnostic Server for Oracle | Remove | Yes**.

Uninstall the Spotlight client

1. Open **Windows Control Panel**.
2. Select **Programs and Features**.
3. Click **Spotlight | Remove | Yes**.

Start Spotlight

To start Spotlight:

Double click on the Spotlight desktop icon

or…

On the Windows task bar, click **Start | Programs | Quest Software | Spotlight | Spotlight**.

During operation

Spotlight requires **write** access to the following:

- Users\<current user>\AppData\Roaming\Quest Software\Shared
- Users\<current user>\AppData\Roaming\Quest Software\Spotlight

You should also verify that you can run the required **Oracle client** on the Spotlight machine.

Spotlight on Oracle now includes web based analytics

The first time you run Spotlight following install you will be prompted to configure Spotlight to upload data to Spotlight Cloud. Spotlight Cloud provides performance health analytics for your Oracle databases, analysis of your wait statistics and a comparison of your data with other users.

Spotlight Cloud is a free service. You are required to create an account on the Spotlight Cloud web site to use the service.

Tip: You can configure Spotlight for web based analytics anytime. Click **View | Options | Spotlight for Mobile devices and web based analytics**.

Get Spotlight on your favorite mobile device

When you configure Spotlight to upload data to Spotlight Cloud you also enable the functionality to monitor databases from your mobile device. Follow the onscreen instructions to install Spotlight on your mobile device.

Tip: You can configure anytime. Click **View | Options | Spotlight Mobile & web analytics**.

User Experience Feedback

You can influence the design of future versions of Spotlight and help us improve its quality, reliability and performance. To participate or change your mind select **Help | User Experience Feedback**.

Refer also to the Privacy Statement.

Authorize Spotlight

Spotlight is supplied with a time-limited trial key so you may test the product. When the trial key expires Spotlight reverts to a preview mode, which limits access to the Spotlight home page and one connection at a time. If you select to open a drilldown in preview mode the following message is displayed:

> The current license does not allow access to this functionality.

When you enter a valid license key and authorization message in the License Viewer, you are licensed to use Spotlight on Oracle.

To enter a valid license key

While Spotlight is running

1. Click **Help | About Spotlight**.

2. Click **license information**.

3. Click **Change this license**.

4. Enter the **Authorization key**.

Notes:

- The Windows user that updates the authorization key must have administrator access to the Windows registry and write access to the **Console\Licenses** folder in the Spotlight installation folder.

- Make sure you enter the authorization key exactly. The site message is case sensitive. If you enter the authorization key incorrectly, the following message is displayed: Invalid authorization key

- If Spotlight is in preview mode and the trial period has not expired, check your computer system date is set correctly.

Spotlight on Oracle

Use Spotlight on Oracle to monitor your Oracle databases, detect and resolve problems.

Connect to an Oracle Database

1. From the Spotlight Browser select **All connections** | **Spotlight on Oracle**

2. Select the database.
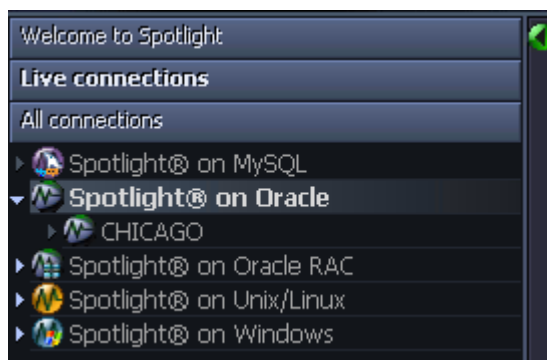
Notes:

- Click **Set timed statistics now** if you are prompted to do so. You see this prompt when for the Spotlight user the **timed_statistics** parameter is set to false in the init.ora file. Spotlight requires this parameter be true for the Spotlight user to accurately monitor the database. Clicking **Set timed statistics now** corrects the problem only if the Spotlight user has Alter System privileges. Ensure the Spotlight user has sufficient privileges. Oracle User Wizard

Add an Oracle database to the list of connections

Notes:

- Create a Spotlight user with sufficient privileges to diagnose the Oracle database. Oracle User Wizard
- Ensure the UNIX or Windows server on which the Oracle database is installed is accessible to Spotlight.

1. Click **File | Connect**

2. Select **Spotlight on Oracle** on the Connections menu.

3. Double-click **Add new connection**.

4. Fill in the connection **Properties | Details** page.

Oracle Connection Details

Field	Description
Connection name	This is the display name for the connection in Spotlight. **Tip:** Fill in the Connection String first.

Oracle connection details

Field	Description
Connection String	Select the name of the database that you wish to connect to. **Note:** When selected, the Connection name field resets to this value. You can then edit the Connection name field if required.
Oracle Username	Enter the Spotlight Oracle user name. Oracle User Wizard **Tip**: If you enter a Username that does not exist, Spotlight will prompt you when you complete this dialog to create a new Spotlight user. **Note**: (*Oracle 12c*) As per Oracle guidelines, the Spotlight Oracle user needs to be of the form **c##<username>** when connecting to an Oracle 12c Container database.
Oracle Password	Enter the Spotlight Oracle user password. Oracle User Wizard
Oracle Home	Select an appropriate Oracle Home. Select a location where Oracle client software is installed. **Note:** Choose a home that contains a version of the Oracle client that is compatible with the Oracle server.

ASM connection details

ASM is built into the Oracle database kernel. It simplifies the creation and space management in Oracle databases.

Note: Available only in Oracle 10g and later.

Field	Description
Monitor ASM	Select to monitor the performance of Oracle's Automated Storage Management (ASM) technology.
ASM Connection String	Enter the connection string required to link to the ASM database instance that is used for storage management for this Oracle database. **Note:** The TNSNAMES entry for the ASM instance must include the option (**UR = A**) for the Spotlight connection to work properly.
ASM Password	Enter the user password for Spotlight to login to the ASM database instance. The user that Spotlight uses to login to the ASM database is SYS. This is the only user name that can provide access to ASM-specific information. Providing SYS access to an ASM instance does NOT create a security issue for the Oracle database, but you should limit access to the SYS account to trusted individuals. Because the SYS password is stored in encrypted format, non-privileged users can still access Spotlight on Oracle. To do so: • Use a pre-configured or shared Spotlight on Oracle connection, OR • Use a Spotlight connection without ASM access. Spotlight will display Oracle-related data, but the **ASM drilldown** will contain no data.

Server connection details

Field	Description
Monitor OS	Select to monitor the operating system on the database server.
OS Server	Enter the name of the server. **Tip:** Use a period "." to monitor the local database.
OS Type	Select the type of operating system. • Windows • Unix(REXEC) • Unix(SSH) • Unix(SSH using Public/Private Keys) If you select one of the Unix systems, make sure the SSH or REXEC daemon is running on the database server and is configured to receive remote connections. Spotlight supports both SSH1 and SSH2 protocols. Public-key encryption is supported under SSH2 only.
SSH Port	Enter the port number for SSH (secure shell) connection to the database server. The default value is *22*. **Note:** Applicable when OS Type is Unix(SSH) or Unix(SSH using Public/Private Keys).

Field	Description
OS Username	Type the user name to login to the database server.
	Note: When OS Type is Windows:
	• Not required if your login details have been assigned remote access to the registry of the database server.
	• Ensure the user has access to the registry of the server.
SSH Key Type	Select the key type from the options: RSA and DSA.
	Note: Applicable when OS Type is Unix(SSH using Public/Private Keys).
SSH Private Key Filename	Locate the filename that contains the private key for the Spotlight connection.
	Hint: Use the "..." button.
	Note: Applicable when OS Type is Unix(SSH using Public/Private Keys).
SSH Passphrase	Type the passphrase used to decrypt the private key.
	Note: Applicable when OS Type is Unix(SSH using Public/Private Keys).
OS Password	Type the user password to login to the database server (if required).
	Note: Not applicable when OS Type is Unix(SSH using Public/Private Keys).
Connect to OS Spotlight when starting this connection	Select to have the database server connection open automatically when you open the connection to the Oracle database.

ESX connection details

Note: Requires **Server connection details | Monitor OS** selected.

Field	Description
Monitor ESX	Select to monitor the ESX Server that hosts the database.
ESX Web Service	Type or select the URL of the ESX Web Service that manages the virtual machine.
ESX Username	Type the username required to connect to the ESX Web Service.
	Note: The username specified must have read only permissions for both the ESX virtual machine and the ESX host that the virtual machine resides on, or may reside on.
ESX Password	Type the password required to connect the specified user to the ESX Web Service.
Virtual Machine Name	Click ... to select the virtual machine.

Spotlight Cloud

Field	Description
Monitor on Mobile Device	Select to monitor this spotlight connection on your mobile device and upload data from this connection to Spotlight Cloud. For more information, see Spotlight on your favorite mobile device on page 32.

Click **Test** to verify Spotlight can connect successfully with the details provided.

Note: For connections to virtual machines, testing the connection validates that Spotlight can connect to the Web Service using the specified username and password combination, and that the virtual machine exists. It does not check permissions, that the virtual machine is turned on, or that it is the same machine as the one specified in the Server Connection Details section.

Click **Save password details (for this connection)** to save all the entered password details.

Note: (*Oracle 11g Release 2 and above*) The Configuring Oracle User for Spotlight Dialog will open when the setup of the Spotlight User through the Oracle User Wizard is incomplete.

Oracle User Wizard

Spotlight on Oracle connects to the Oracle database system through the **Spotlight user**.

Use the Oracle User Wizard to:

- Add a new user to the Oracle database
- Convert the account of an existing user on the Oracle database to use Spotlight
- Reconfigure an existing Spotlight user to work with new versions of Spotlight on Oracle and Spotlight on Oracle RAC. Use this procedure if you have upgraded your version of Spotlight.

To open the Oracle User Wizard

The **Oracle User Wizard** runs automatically when required or to initiate it:

Click **File | Oracle User Wizard**.

Notes:

- Select **Don't show this page in future** to hide the first page of the Oracle User Wizard.
- Spotlight users must be configured for each database they are to diagnose.
- You cannot configure Spotlight users for a database while Spotlight is diagnosing that database.
- You must have the user ID and password of the DBA that manages the database to which you are adding the Spotlight user.
- You should not use any system accounts. We recommend creating a separate user for Spotlight or using a personal account.
- The Spotlight user must have sufficient privileges, views, and tables to diagnose the Oracle database. You can view the privileges, views and tables required by Spotlight users in the **Database Objects and Privileges** document in the Spotlight installation folder: **\Console\Help**.

DBA Connection Credentials

Connect to the Oracle database via an account that has DBA privileges.

Field	Description
Enter the SQL*Net connection string…	Enter the database instance on which you wish to create the user.
Enter the user name of a DBA account…	Enter a DBA user name for that database instance (so that the Spotlight user and the relevant objects can be created). The user name requires SYSDBA access.
Enter the password…	Enter the DBA user password.

User Account

Select one of the available options.

Field	Description
Create a new user	This user does not have an Oracle account on the database. Create a new Oracle user that Spotlight can use to connect to the database.
Set up an existing user	The user has an Oracle account on the database, but has not been configured to use Spotlight on Oracle. Use this option if there is an existing account on the target Oracle database that you want to use when connecting via Spotlight on Oracle.
Reconfigure "user" for use with Spotlight	(Available when a new version of Spotlight on Oracle has been installed.) Use this option if you want to connect to an Oracle database as a user that was set up within a previous version of Spotlight on Oracle. **Note**: This option is available only if Spotlight detects that the current user has been configured using an earlier version of Spotlight on Oracle.

Note: You should not use any system accounts as your Spotlight user account. We recommend creating a separate user for Spotlight or using a personal account.

Note: (*Oracle 12c*) As per Oracle guidelines, the Spotlight Oracle user needs to be of the form "c##<username>" when connecting to an Oracle 12c Container database.

New Oracle User

When you create a new Oracle account for use with Spotlight on Oracle, you need to supply a **user name** and **password** for that account.

The additional options specified on this page give the Spotlight user greater access to the database. If you want to grant the additional privileges, select the **Select any table** and **Alter system** options.

Field	Description
User name	Enter a name for the new user. You can type up to 30 characters. The first character of the user name must be a letter.

Field	Description
	Note: (*Oracle 12c*) As per Oracle guidelines, the Spotlight Oracle user needs to be of the form "c##<username>" when connecting to an Oracle 12c Container database.
Password	Enter a password for the new user. You can type up to 30 characters.
Confirm password	Confirm the password. The password exactly as you typed it in the Password field.
Select any table	Select to allow the user to generate explain plans for SQL statements created by other users.
Alter system	Select to allow the user to trace and terminate sessions.

Select Tablespace

Spotlight stores data in the Oracle database while it diagnoses the performance of the system. Define where the data should be stored.

Control	Description
Tablespace Table	This table is informative. Clicking on it has not effect. It lists the available tablespaces with the amount of free space in each.
Tablespace to use for Spotlight tables	Select the tablespace to store Spotlight tables. The default is *USERS*, if available. **Tip**: Use the **Tablespace Table** to identify the tablespaces with enough free space to host the tables.
Tablespace to use for temporary segments	Select the tablespace to store Spotlight temporary segments. The default is *TEMP*, if available. **Tip**: Use the **Tablespace Table** to identify the tablespaces with enough free space to host the segments.

Predictive Diagnostics

Select **Create/Upgrade Predictive Diagnostics schema** to use Predictive Diagnostics to collect and analyze performance metrics for this Oracle database in order to predict its future behavior.

Ready To Configure Oracle User

Spotlight is ready to change the Oracle database.

Option	Description
Next	Click to create / update the Oracle User based on the settings entered in the Oracle User Wizard.

Option	Description
Back	Click to return to previous pages in the Oracle User Wizard, to edit the settings.
Cancel	Click to close the Oracle User Wizard. No changes will be made.

End

The Spotlight user has been configured successfully.

Option	Description
Go to Connection Manager	Select to connect to the target database as the user you have just created or setup. Connect to an Oracle Database
Launch {user} after closing	Select to connect to the target database as the user you have just upgraded.

Configuring Oracle User for Spotlight Dialog

Note: This dialog is applicable to Oracle 11g Release 2 and above.

This dialog will open from **Spotlight Browser | All connections** or the **Connection Details** dialog when selecting to monitor an Oracle or Oracle RAC connection, and the setup of the Spotlight User through the Oracle User Wizard is incomplete.

Field	Description
Install Objects in my schema	Click to install Spotlight objects in your schema. This automates the running of the Oracle User Wizard up to Predictive Diagnostic Settings if you have DBA privileges. If you do not have DBA privileges you will be prompted for a DBA login.
Configure another user	Click to configure another user to connect to this Oracle instance. To complete these steps you require SYS DBA privileges.
Show connection details	Click to view or edit the connection details. Open the Connection Details dialog. • Oracle Connection Details • Oracle RAC Connection Details
View information about objects installed and privileges required by spotlight	Click to open the *Spotlight on Oracle Database Objects and Privileges* document.

Toad DBA Suite for Oracle

Note: This section is relevant for systems with the following software installed: Toad DBA Suite for Oracle with Spotlight on Oracle.

To connect to an Oracle database from within Toad

1. Click the Spotlight button where it appears in Toad.

2. Spotlight on Oracle opens at the Oracle database connection associated with the Toad for Oracle connection.

The first time you open the Oracle database connection from within Toad

You are required to fill in the Details page with the following additions. Oracle Connection Details

- The Oracle database and username fields are pre filled in as per the Toad connection. Security requires that you re-enter your Oracle password.

- The default connection name is *Toad* followed by the name of the Oracle database. You may choose to replace this with any connection name of your choice. Note that a limitation of the integration of Toad with Spotlight on Oracle is that this is a new Spotlight connection, ignoring all other pre-existing Spotlight connections.

- You may choose a different Oracle username to connect to Spotlight. For example, in an environment with multiple database administrators there may be a communal username for Spotlight connections. Simply replace the filled in Oracle username with the appropriate Oracle username and password details.

- You can enter additional parameters to monitor ASM, the operating system and for virtualization.

Using Spotlight on Oracle

- Spotlight opens at the Home Page or Drilldown relevant to the location in Toad from where Spotlight was opened.

- You are prompted to create a new Spotlight user if the Oracle username has not been created in Spotlight. Oracle User Wizard

- This Spotlight connection can be found in the Spotlight Connection Manager. It can be managed the same as any other Spotlight connection. For example, you can close the connection, edit the connection details and re-open the connection in the Spotlight Connection Manager.

Caution: When you click on the Spotlight button in Toad to connect to the Oracle database, a new Spotlight connection to the Oracle database is created, regardless of any pre-existing Spotlight connections to the Oracle database. To avoid the annoyance of setting up Spotlight connections in Spotlight that will be set up identically through Toad later, you may choose to create all connections through Toad if Toad integration is desired.

Oracle Architecture Overview

The following diagram illustrates some of the basic components of an Oracle server at the memory, database and disk layers. This architecture has been used to design the Spotlight on Oracle home page.

The numbers indicate the order of the flow of information.
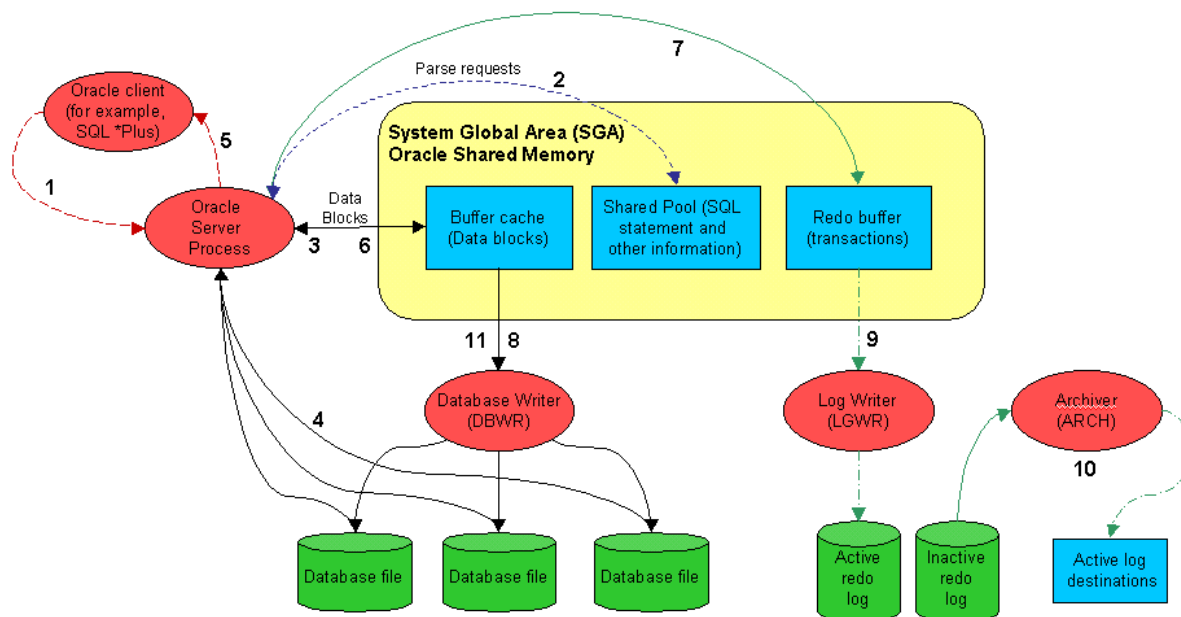
The numbered labels in the Oracle architecture diagram correspond to the following activities:

1. The client program (for example, SQL*PLUS, Oracle Power Objects, or some other tool) sends a SELECT statement to the server process.

2. The server process looks in the shared pool for a matching SQL statement. If none is found, the server process parses the SQL and inserts the SQL statement into the shared pool.

3. The server process looks in the buffer cache for the data blocks required. If found, the data block must be moved on to the most recently used end of the Least Recently Used (LRU) list.

4. If the block cannot be found in the buffer cache the server process must fetch it from the disk file. This requires a disk I/O.

5. The server process returns the rows retrieved to the client process. This may involve some network or communications delay.

6. When the client issues the UPDATE statement the process of parsing the SQL and retrieving the rows to be updated must occur. The update statement then changes the relevant blocks in shared memory and updates entries in the rollback segment buffers.

7. The update statement also makes an entry in the redo log buffer that records the transaction details.

8. The database-writer background process copies modified blocks from the buffer cache to the database files. The Oracle session performing the update does not have to wait for this to occur.

9. When the COMMIT statement is issued the log writer process must copy the contents of the redo log buffer to the redo log file. The COMMIT statement does not return control to the Oracle session issuing the commit until this write is complete.

10. If running in ARCHIVELOG mode, the archiver process copies full redo logs to the archive destination. A redo log is not eligible for re-use until it has been archived.

11. At regular intervals, or when a redo log switch occurs, Oracle performs a checkpoint. A checkpoint requires all modified blocks in the buffer cache to be written to disk. A redo log file cannot be re-used until the checkpoint completes.

Recommended Reading

The best information to help you tune and configure Oracle databases can be found online. Use as your first point of reference web sites such as:

- The Quest Software Spotlight on Oracle Web site.
- Spotlight on Oracle Community Web site
- The Oracle home page.

Spotlight on Oracle Home Page

The Spotlight **home page** is a visual representation of the status of the major components of the database. The detail at this level is designed to help you locate and identify bottlenecks as they develop. Additionally, Spotlight provides tools that allow you to identify and rectify inefficiency in your database's configuration.

To see the Spotlight on Oracle Home Page

1. Select the Spotlight on Oracle connection from the Spotlight browser.

2. Click [home icon].

Spotlight on Oracle Alarms

Spotlight alarms indicate when the Oracle database exceeds acceptable performance thresholds.

Alarm	Description
Agent Status alarm	Spotlight raises the Agent Status alarm when the status of the **EM agent** is **down**. OEM is a Web-based database administration and monitoring tool that manages Oracle components and administers Oracle databases. When installed and active, OEM communicates with the databases it administers via a set of **EM agent** processes under the automated DBSNMP user account.
Archive Critical Failure alarm	An Archive Critical Failure alarm indicates that the number of working archive destinations for the database instance is about to fall below the minimum number needed to archive Oracle redo logs successfully. When you see this alarm, you should make space in the archive log destination by purging – or by backing up to an offline medium – any archived files that are not immediately needed.
Archive Destination Failed alarm	Spotlight raises an Archive Destination Failed alarm when at least one of the archive destinations specified for redo log files has become full. See Archive Destination Failure alarm below.
Archive Destination Failure alarm	An Archive Destination Failure alarm when at least one of the archive destinations specified for redo log files is about to become full. When you see this alarm, you should make space in the archive log destination by purging it, or by backing it up to an offline medium.
Array Fetch Size alarm	When more than one row is retrieved from an Oracle database in a single SELECT (an array fetch), the amount of network traffic associated with SELECT operations is radically reduced. The Array Fetch Size alarm is raised when the array fetch size for the database may be too low.
ASM Balance alarm	This alarm indicates that there is unbalanced access to one or more of the disks in the ASM (Automatic Storage Management) disk group that has been allocated to the Oracle instance.
ASM Service Time alarm	This alarm indicates that the average time taken to perform I/O on the ASM instance has exceeded a specified threshold value. (Service time represents the response time of a disk plus any wait time experienced during disk operations.)
ASM Status alarm	When a Spotlight connection is lost, Spotlight automatically tries to re-establish the connection. The ASM Status alarm indicates that Spotlight is re-establishing its connection to the ASM diskgroup for the Oracle instance.
Average Time to Sync a Redo Log Entry alarm	The Average Time to Sync a Redo Log Entry alarm (formerly the Average Redo Write Time alarm) is activated when the time taken to write redo log entries exceeds a threshold. Unlike most other Oracle write I/Os, Oracle sessions must wait for redo log writes to complete before they can continue processing.
Buffer Busy Wait alarm	The Buffer Busy Wait alarm occurs when a session cannot access a block because it is in use by another session. The two most common causes are insufficient free lists for a table or insufficient rollback segments.
Cache Buffer Chains Latch Wait alarm	The Cache Buffer Chains Latch Wait alarm occurs because contention for the cache buffer chains latch exceeds a threshold.

Alarm	Description
Cache Buffer LRU Chains Latch Wait alarm	The Cache Buffer LRU Chains Latch Wait alarm occurs because contention for the cache buffer chains latch exceeds a threshold.
Collection Status alarm	Spotlight raises the Collection Status alarm when collection of data for the OEM (Oracle Enterprise Manager) stops. Perhaps the server is running low on disk space. The Collection Status alarm often occurs with the Files Pending Upload Alarm.
Continued Fetch Rate alarm	Oracle sometimes needs to migrate a row in a database from its original block to a new block, or needs to chain an updated row across multiple blocks. These migrated and chained rows cause additional I/O, and the Continued Fetch alarm occurs when the number of these "continued row" fetches exceeds a threshold.
CPU Busy alarm	The CPU Busy alarm occurs when the total CPU utilization of the system exceeds a threshold.
CPU Virtualization Overhead alarm	The CPU Virtualization Overhead alarm is activated when Virtualization Overhead is greater than a threshold and CPU Usage is 95% or higher.
Data Guard Configuration Alarm	The Data Guard Configuration Alarm occurs on a Primary database in an Oracle Data Guard environment. Please supply details of Standby connections to Spotlight so Spotlight can monitor the Oracle Data Guard environment. In monitoring the Oracle Data Guard environment Spotlight can alert you if key elements of the Oracle Data Guard environment are not working, or if Standby instances are lagging behind.
Dispatchers Busy alarm	The Dispatchers Busy alarm occurs when all or most dispatcher processes are busy. In an MTS environment, multiple sessions share a smaller number of shared server processes. The servers are usually allocated by a smaller number of dispatcher processes.
Estimated Shared Pool Size alarm	This alarm occurs when the Shared Pool is set too small. A possible cause is the use of literals rather than bind variables in SQL statements. You can also increase the size of the Shared Pool.
Excessive RBS Activities alarm	The Excessive RBS Activities alarm occurs when there are high rollback extent/shrink/wrap activities.
Files Pending Upload alarm	Spotlight raises the Files Pending Upload alarm when a significant number of XML files are pending upload indicating a problem with the upload process. The strategy for dealing with this alarm is dependent on the OEM control. The OEM control is defined in the Spotlight configuration for OEM. This alarm may occur in conjunction with the Collection Status Alarm.
Flash Cache Insert Skip: DBWR Overloaded alarm	The Flash Cache Insert Skip: DBWR Overloaded alarm is raised when the ratio of insert skips from the DBWR being overloaded exceeds a threshold.
Flash Cache Read Latency	The Flash Cache Read Latency alarm is raised when the time taken to read a single block from flash cache exceeds a threshold. This may be caused by a low performance flash device.
Flash Cache Write Complete Waits	The Flash Cache Write Complete Waits alarm is raised when the ratio of 'write complete waits: flash cache' to DB time exceeds a threshold.
Flashback Buffer Wait alarm	The Flashback Buffer Wait alarm indicates that the percentage of available time spent waiting for the Recovery Writer (RVWR) to write data to the flashback logs has

Alarm	Description
	exceeded a specified threshold.
Flashback Space Usage alarm	This alarm is raised when the amount of used space in the Flashback Recovery Area exceeds a threshold.
Free Buffer Waits alarm	The Free Buffer Waits alarm occurs when free buffer waits (as a proportion of total waits) exceeds a threshold.
In Memory CPU Overhead alarm	The In Memory CPU Overhead alarm is raised when the in-memory database is using too much CPU.
In Memory Undo Latch Wait alarm	The in memory undo latch is associated with Oracle's relatively new in memory undo (IMU) structures. These structures hold in memory information formerly maintained in rollback (undo) segments.
Instance Failed alarm	Spotlight raises an Instance Failed alarm when a specified instance has failed because of an Archiver error. See Archive Critical Failure alarm above.
Insufficient Flashback Logs alarm	This alarm fires when the flashback logs in the flashback area do not cover the amount of time specified in the parameter DB_FLASHBACK_RETENTION_TARGET.
Job Processes Busy alarm	The Job Processes Busy alarm occurs when all or most job queue processes are busy.
Large Pool Full alarm	This alarm fires when the Large Pool allocation heap is full. The Large Pool is used in MTS for session memory, and can be used by parallel execution and backup processes.
Latch Free Waits alarm	If a session needs to acquire a latch that is held by another session, a latch free wait may occur. The presence of latch free waits may indicate a bottleneck within the SGA. (The specific action depends on the latch.)
Library Cache Latches alarms	These alarm fire when the time spent waiting on library cache latches or library cache pin latches exceeds a threshold. Library cache latches (or mutexes in 10g R2 and above) protect the cached SQL statements and object definitions held in the library cache within the Shared Pool.
Library Cache Miss Rate alarm	The Library Cache Miss Rate alarm occurs when the library cache hit ratio falls below a given threshold.
Lock Wait alarm	The Lock Wait alarm occurs when the proportion of time sessions spend waiting for locks exceeds a threshold.
Log Buffer Space Wait alarm	The Log Buffer Space Wait alarm occurs if the amount of time spent waiting for space in the redo log buffer exceeds a threshold.
Log Switch Time alarm	The Log Switch Time alarm occurs when the amount of time spent waiting for log switch events exceeds a threshold.
Low Free Physical RAM alarm	The Low Free Physical RAM alarm occurs when the server's available RAM is low.
Maximum Queued Time alarm	The Maximum Queued Time alarm becomes active when a session has been in the parallel execution queue for longer than the specified threshold. **Note**: Applies only to Oracle 11g Release 2.
Multi-threaded Server alarm	The Multi-threaded Server alarm occurs when all or most multi-threaded server (MTS) or dispatcher processes are busy.

Alarm	Description
Non-reclaimable Flashback Space alarm	This alarm is raised when the amount of non-reclaimable used space in the Recovery Area (flashback area) exceeds a threshold. Non-reclaimable files include archived redo logs, which must be backed up before being deleted.
Oracle Memory on Disk alarm	The Oracle Memory on Disk alarm is activated when the amount of guest physical memory mapped to machine memory is less than the current combined size of Oracle's SGA and PGA.
Oracle Parameters for Predictive Diagnostics alarm	The Predictive Diagnostics feature cannot predict the behavior of Oracle databases without the access to Oracle data that is granted by several Oracle parameters.
Oracle Status alarm	When a Spotlight connection is lost, Spotlight automatically tries to re-establish the connection. The Oracle Status alarm indicates that Spotlight is re-establishing its connection to the Oracle instance.
Parallel Query Server alarms	The Parallel Query Server alarm occurs when all or most parallel servers are busy. Parallel server processes perform work to resolve SQL statements that are being executed in parallel. If all parallel server processes are busy, parallel SQL may be downgraded, or even executed serially, thus increasing its execution time. Spotlight can raise these Parallel Query Server alarms: Parallel Query Servers Busy, Parallel Queries Downgraded, and Parallel Queries Serialized.
Parse Ratio alarm	The Parse Ratio alarm is raised when the ratio of parse calls to execute calls exceeds a threshold. **Note** This alarm is initially disabled; see Total Parse Wait Time Ratio alarm.
Predictive Diagnosticsalarms	Predictive Diagnostics alarm (SQL Collector, Bottleneck Collector or Performance Modeling Collector alarm) is raised when the appropriate collection of predictive data has not been scheduled.
Predictive DiagnosticsCustom SQL Error alarm	This alarm indicates that the customized SQL query use to represent database concurrency within Predictive Diagnostics has returned an error.
Predictive DiagnosticsOracle Parameters alarm	The Predictive Diagnostics feature cannot predict the behavior of Oracle databases without the access to Oracle data that is granted by several Oracle parameters.
Redo Allocation and Redo Copy Latch Wait alarms	The Redo Allocation and Redo Copy Latch Wait alarms are raised when there is contention for the redo allocation latch and redo copy latch.
Result Cache Find/Create Ratio alarm	When Oracle executes SQL queries, the result cache stores the result sets of specified queries in shared memory for later use. The Find/Create Ratio alarm occurs when the rate of find operations on the result cache drops below the rate of create operations, and indicates that the contents of the result cache are under-used.
Result Cache Latch Sleep Ratio alarm	Spotlight raises the Result Cache Latch Sleep Ratio alarm when the rate of latch sleeps for the Result Cache latch indicates that there is contention on the Result Cache latch, where multiple processes are competing to use the latch and are causing a significant degradation in response time.
Row Cache objects Latch Wait	The row cache objects latch protects the contents of the row cache; the section of the shared pool to cache dictionary information.
Sequential Read Average Time	The Sequential Read Average Time alarm occurs if the average time for a random datafile read exceeds a given threshold.

Alarm	Description
alarm	
Sequential Read Time alarm	This alarm fires when the average time that Oracle takes to read a single block of data — typically an index-based lookup — is significantly higher than the average time recorded during calibration.
Sessions Queued alarm	The Sessions Queued alarm becomes active when the number of sessions in the parallel execution queue exceeds a threshold.
	Note: Applies only to Oracle 11g Release 2.
Shared Pool Latch Wait alarm	Shared pool latches control access to the shared pool memory map.
Shared Pool Lock Percentage alarm	This alarm is raised when one user session holds a lock on object(s) in the Shared Pool for a prolonged period, and causes other sessions to wait on the same resource. This "blocking lock" happens rarely. When it does occur, use a SQL query to find the affected sessions.
Shared Server Converted into Dedicated Server alarm	Spotlight raises an alarm when many shared servers are converted, leaving too few shared servers to meet the demand. Converted shared servers will have a status of WAIT(RECEIVE) in v$shared_server.
Status Error alarm	This alarm is raised when there is a problem with the way the OEM configuration has been defined in Spotlight. Correct the values entered in the dialog **View	Options	OEM Monitoring**.
Temporary IO Wait Ratio alarm	Spotlight raises the Temporary IO Wait Ratio alarm when the time spent in temporary IO waits is too high as a percentage of the time spent performing user calls on the Oracle database.
Total Parse Wait Time Ratio alarm	Spotlight raises this alarm when the amount of time spent parsing SQL statements as a percentage of the active database time exceeds a level that may cause latch contention on the shared pool and library cache latches.
	Note: The Total Parse Wait Time Ratio alarm is available for (*Oracle 10.2 and later*). When monitoring earlier Oracle systems, consider reactivating the (disabled) Parse Ratio alarm.
Unarchived Logs alarm	The Unarchived Logs alarm occurs when the number of unarchived redo logs exceeds a threshold. If all online logs need archiving, database update activity can be suspended while the redo log writer waits for the next log to be archived.
Unix Status alarm	When a Spotlight connection is lost, Spotlight automatically attempts to re-establish the connection. Where the Oracle database is hosted on a Unix server, this alarm indicates that Spotlight is re-establishing its connection to the Unix server.
WMI Status alarm	When a Spotlight connection is lost, Spotlight automatically attempts to re-establish the connection. Where the Oracle database is hosted on a Windows server, this alarm indicates that Spotlight is re-establishing its WMI connection to the Windows server.
Write Complete Wait alarm	Spotlight raises the a Write Complete Wait alarm when write complete waits (as a proportion of total waits) exceed a threshold. Write complete waits occur when a session tries to modify a block that is currently being written to disk by the database writer process.

Note: Spotlight on Oracle Data Guard alarms occur in the **Alarm Log** of the Primary Database in the Oracle Data Guard environment. See Spotlight on Oracle Data Guard Alarms for more information.

Spotlight on Oracle Drilldowns

Once a problem is isolated you can display a drilldown page with charts and tables that provide a detailed breakdown of the underlying statistics.

Drilldown	Click to open	Description
Top Sessions		The **Top Sessions** drilldown displays information on the users connected to the Oracle database. Identify the users who contribute most to database activity. Display various details for these sessions, including the SQL statements, locks and resource usage.
SQL & Application Workload		Use the **SQL & Application Workload** drilldown to select, sort and display SQL statements executed according to specified criteria.
Activity		The **Activity** drilldown shows Oracle database activity including: waits, waiting events, blocking locks, lock activity, latches, query servers, transactions, rollbacks, and buffer busy waits. Use the **Activity** drilldown to display overall efficiency and resource usage. In particular, the **Event waits** chart shows the amount of time database sessions spend waiting for various resources, as well as the amount of CPU being utilized.
I/O		The **I/O** drilldown shows the input and output activity for the Oracle database including: I/O by category, session, SQL, tablespaces, datafiles, segments and row chaining.
Configuration & Memory		The **Configuration and Memory** drilldown shows the memory utilization for the Shared Pool and the SGA, the shared pool and buffer cache hit ratios, the Oracle alert log and Oracle parameters.
Operating System		Use the **Operating System** drilldown to show information on the performance, processes, and storage on the Spotlight on Oracle connection host. **Tip**: To open the related Spotlight on Windows or Spotlight on Unix connection, click the arrow next to the Operating System drilldown icon.
Disk Storage		Use the **Disk Storage** drilldown to display information on online redo logs, tablespace utilization, archive destinations, and Flashback recovery. Right click the tables in the Disk Storage drilldown to open Space Manager.
Tuning		Use the **Tuning** drilldown to view information on Oracle memory resources in the Oracle SGA and PGA (System and Program Global Areas), to tune memory resources where feasible, and to view and dynamically tune latch activity for systems with multiple CPUs.
ASM		Use the **ASM** drilldown to diagnose ASM performance.

Drilldown	Click to open	Description
		This is relevant if your system uses ASM. ASM (Automatic Storage Management) is a storage management solution from Oracle Corporation that automatically reorganizes data based on statistics collected from usage and user access patterns over time.
DTrace		**DTrace** is a dynamic analysis tool for Sun platforms. Spotlight uses DTrace to capture details of the interaction between Oracle and the operating system. Applicable when the Spotlight on Oracle connection is hosted on a Unix operating system (Solaris 10 onwards). Install before use. Install And Configure DTrace Scripts
Predictive Diagnostics		Collect and analyze performance metrics in order to predict the future behavior of the Oracle database.
Virtualization		Applicable when the Spotlight on Oracle connection is hosted on a virtual machine. Show detailed information on the CPU and memory use of the virtual machine.
Pluggable Databases		(*Oracle 12c*) View the resource usage of pluggable databases.
Data Guard		Configure Spotlight to monitor Standby databases to this Primary database in an Oracle Data Guard environment. **Note**: The **Data Guard** icon is enabled when the current Spotlight on Oracle connection is configured as a Primary database in an Oracle Data Guard environment.
Reports		The **Report Wizard** generates printable reports. The reports are designed and delivered through SAP Crystal Reports.
Alarm Log		The Alarm Log drilldown displays information on the alarms associated with the Windows system, including the name of the component that issued the alarm, the date and time the alarm was logged, and the severity of the alarm. **Note:** The Alarm Log drilldown is common to all Spotlight applications. The alarms are specific to the current Spotlight connection. Spotlight on Oracle Alarms

Install And Configure DTrace Scripts

DTrace is a dynamic analysis tool for Sun Microsystems operating systems. It was first introduced in the Solaris 10 operating system, and can be used ONLY on Sun platforms from Solaris 10 onwards.

Spotlight and DTrace

Spotlight on Oracle uses DTrace to capture details of the interaction between Oracle and the operating system.

When Oracle sessions use CPU time, most of that elapsed time is spent executing Oracle code. However, Oracle sometimes uses system calls to perform functions such as to:

- Allocate or deallocate private (PGA) memory.

- Synchronize activities with other processes through semaphores or other IPC mechanisms.

- Allocate shared memory (SGA).

- Perform I/O operations on datafiles, redo logs, raw devices, and so on.

- Capture CPU or elapsed timing to support the time model and wait interfaces.

Spotlight uses DTrace to investigate these system calls to calculate where that elapsed time is being spent.

To install and configure DTrace scripts

To use DTrace within Spotlight, you need to install and configure a number of DTrace scripts on the server. Once installed, use the DTrace drilldown to view the DTrace analysis. Spotlight on Oracle Drilldowns

1. Locate in the Spotlight installation folder: Plug-ins\SoO\SoO_DTrace_scripts.tar

2. Unpack SoO_DTrace_scripts.tar to a directory on the database server.

3. Ensure the unpacked files have **execute** permission.

4. For the account that will be used to run operating system commands from Spotlight:

    - Edit **.profile** to define a QUEST_SOO_HOME variable that points to the directory on the database server where the unpacked files are.

    - Provide DTrace authority. Add this line to /etc/user_attr:

      <<username>>::::defaultpriv=basic,dtrace_proc,dtrace_kernel

Tune Your Oracle Database

The following is a summary of steps that you can undertake to tune Oracle by using Spotlight on Oracle.

Spotlight on Oracle supports an approach to Oracle performance tuning that could be described as "tuning by bottleneck". Spotlight on Oracle alerts you if any component of the Oracle architecture is forming a bottleneck. Additionally, Spotlight on Oracle provides tools that allow you to identify and rectify any inefficiency in your database's configuration.

In general, you tune your Oracle instance by reiteratively identifying bottlenecks, contention and critical resources, and by using Spotlight's online advice to remove the bottleneck or contention to improve the performance of the resource.

Notes:

- Spotlight on Oracle's approach to Oracle instance-tuning is not the only valid approach. In particular, it emphasizes post-implementation tuning of Oracle applications, and remedial action to correct fundamental physical configuration deficiencies in an Oracle installation.

- Optimal database performance occurs when optimization is built into the application design and development process, and when the database's physical design is specifically tailored to support an accurately estimated workload.

Predictive Diagnostics

Collect and analyze performance metrics in order to predict the future behavior of the Oracle database.

To open Predictive Diagnostics

1. Select the **Spotlight on Oracle** connection (or Spotlight on Oracle RAC connection) in the **Spotlight Browser**.

2. Click **Predictive Diagnostics**.

   The page contains several sections —Configuration, Find Impending Problems, Performance Modeling, and What To Do Next — and a set of images that indicate a basic workflow through the predictive process.

Notes:

- Predictive Diagnostics uses a proprietary set of algorithms to process the data.

- You do NOT need to have Spotlight running continuously in order to collect the data.

- Use the Oracle User Wizard to create a new Spotlight user (or modify an existing user) that employs Predictive Diagnostics. It takes about 10 days for Spotlight to collect enough data to make valid predictions on the future performance of the database.

Diagnostic Category	Description
SQL Performance	Collect and analyze performance metrics for SQL statements as they are executed on the database instance.
	When enough performance data is collected, Spotlight may be able to predict the future performance for individual SQL statements on that database. These predictions can be used to identify SQL statements whose performance may not scale adequately as data volumes and SQL execution rates increase. Spotlight will refer to these SQL statements as degrading SQL.
Impending Bottlenecks - Timed Statistics	**Note**: Available for Oracle 10.2 and later.
	Collect and analyze waiting events as they occur on the database. When enough performance data is collected, Spotlight may be able to predict potential bottlenecks in the system as they affect database throughput and response time.
Performance Modeling	**Note**: Available for Oracle 10.2 and later.
	Collect and analyze statistics on the performance of the database during periods of high activity. When enough performance data is collected, Spotlight may be able to:
	• Predict when database resources such as CPU, memory and disk I/O are expected to reach their full capacity.
	• Recommend strategies to enable the database to handle high loads at those times.

Predictive Diagnostics And Spotlight

For detailed information on Predictive Diagnostics, see the Spotlight online help.

When...	Do this...
Predictive Diagnostics identifies **a SQL statement** that may cause problems	Open the **Top SQL** drilldown to view further details about the SQL statement.
	Open **Explain Plan** to view further information about the statement's execution plan.
	Open **SQL Optimizer** to view context-sensitive tuning advice for the SQL statement based on the Oracle execution plan and the structure of the database.
Predictive Diagnostics identifies a **bottleneck** that may cause problems	Open the **Activity | Waiting Events** drilldown to view further details about the current behavior of potential bottlenecks.
Predictive Diagnostics identifies a database resource whose limitations may cause problems	Open the **I/O, Configuration & Memory**, and **Tuning** drilldowns to view further details about the current behavior of CPU, memory, and disk I/O resources.

Spotlight on Oracle Tools: Explain Plan, SQL Optimizer, Space Manager

Tool	Description
Explain Plan	The Explain Plan allows you to determine the execution plan that Oracle applies to a particular SQL statement. Spotlight on Oracle allows you to view graphical representations of the execution plan for SQL statements being executed by a user, or for those identified by the SQL & Application Workload drilldown.
SQL Optimizer	SQL Optimizer (if installed) provides context-sensitive tuning advice for SQL statements based on the Oracle execution plan and the database structure. You must have DBA privileges for the database you are diagnosing.
Space Manager	Space Manager (if installed) provides a comprehensive solution for space management and reorganization. Space Manager offers preventive maintenance, problem detection and resolution, and capacity planning across any number of databases.

Spotlight on your favorite mobile device

You can monitor Oracle and Oracle RAC connections on your favorite mobile device using Spotlight Cloud.

Mobile Monitoring is able to raise the following alarms. These alarms are not configurable.

- Buffer Busy Waits

- CPU Usage

- Free Buffer Waits

- Latch Waits

- Lock Waits

- Log Buffer Space Waits

- Parse Wait Time

- Average Redo Log Write Time

- Datafile Random Read Avg Time

- Temporary IO Wait Time

- Unarchived Log

- Cannot create new connection

- Not currently connected to database

Tip:

- To configure Spotlight on your mobile device, click **View | Options | Spotlight for Mobile devices and web based analytics**.

- Mobile Monitoring is dependent on the **Spotlight Diagnostic Server** service. See the online help for more information.

- Switch on/off monitoring of individual Oracle and Oracle RAC connections from the Spotlight Connection Manager (Oracle Connection Details, Oracle RAC Connection Details).

Spotlight on Oracle Data Guard

Use Spotlight on Oracle Data Guard to monitor an Oracle Data Guard environment.

Notes:

- Create the Oracle Data Guard environment as per the Oracle Data Guard documentation first.

- Spotlight On Oracle Data Guard requires both the Primary and the Standby be Oracle 10.2 or above.

- It is recommended where possible to monitor the Primary and Standby databases individually in Spotlight on Oracle.

Standby Connections Dialog

Use this dialog to manage monitoring of Oracle Data Guard environments.

1. Open the Primary Database as a Live Connection in the Spotlight Browser.

2. Click Data Guard.

3. Fill in the details of Standby connections in the **Standby connections** dialog.

Note: These fields cannot be edited while the status of the Spotlight connection to the Standby is Connected. To Disconnect a connection, close the Standby connections dialog, right click the Standby database in the Spotlight Browser and select Disconnect.

Field	Description		
Monitor	Select to monitor this Primary to Standby Oracle Data Guard connection in Spotlight.		
DB Name	The name of the Standby database.		
Display Name	The name of the Standby database as it is displayed in the Spotlight Browser. By default this is the DB Name.		
Connection String	The connection string to the Standby database. This field can be entered in one of the following ways:		
	TNSNAMES.ORA entry	Spotlight populates the Connection String field with all entries from the TNS Names file, if configured, and you can select a database from this drop-down list.	
	LDAP server	If using Oracle names directory services (LDAP or Oracle OID), then type the name of the database into this field.	
	Direct Connect	Enter the connection details of the database in the following format: HOST:PORT/SERVICE_NAME.	
Oracle Username	The Oracle Username to the Standby database. **Tip**: On a Logical Standby or Physical Standby with Read Only Access use the Spotlight User account used on the Primary. On a Physical Standby without Read Only Access use a SYSDBA Account.		
Oracle Password	The password to login with the Oracle Username to the Standby database.		
Connect As	The type of login to the Standby database. For example, NORMAL or SYSDBA.		
Status	Is Spotlight connected to the Standby? If not connected the Status field will indicate the reason for the error. If you edit the fields the Status field will indicate **Untested**. Click **Test** to test the connection. If successful the Status field will change to **OK**. Click **Connect** to connect. **Note**: If there is an error and you want to close the dialog without fixing the error, deselect the **Monitor** field.		

4. Further actions on the Standby Connections dialog.

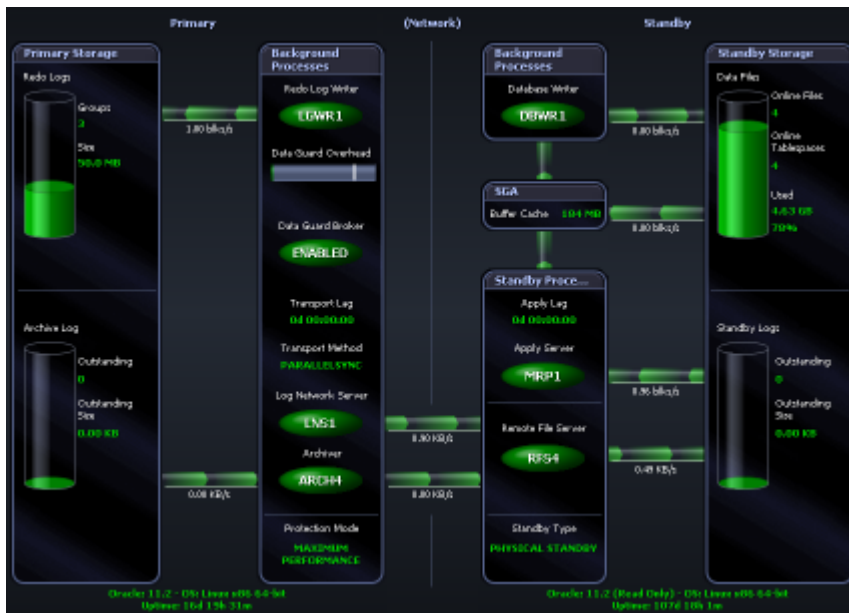| Action	Description
Save password details (for these connections)	Select to save the Oracle password(s) entered into this dialog. Deselect to enter the Oracle password every time
Test	Test all standby connections. **Tip**: Use when the Status field indicates an error or untested. Fix the error if applicable. Click **Test**. If the status field changes to **OK** then click **Connect** to connect. **Note**: Standby connections that are already connected are not tested.
Connect	Connect all connections with the **Monitor** field selected, save all changes and close the dialog.
Save	Save all changes and close the dialog. **Tips**: - Use when you want to save changes and close the dialog without initiating a connection. - If there is an error and you want to close the dialog without fixing the error, deselect the **Monitor** field.
Cancel	Cancel all changes and close the dialog.
Help	Open this help page.

Spotlight on Oracle Data Guard Home Page

The Spotlight home page shows the flow of information and commands between various sub-components and the size and status of internal resources such as processes, disk files and memory structures.

Related statistics are grouped together on panels that are connected by a series of graphical flows and icons. Spotlight updates these flows in real time so you can see how quickly data is moving through the environment. The icons change color as Spotlight alarms are raised, upgraded, downgraded and canceled.

To see the Spotlight on Oracle Data Guard Home Page

1. From the Spotlight Browser select **All Connections | Spotlight on Oracle**
2. Select the **Primary** database. This opens the Primary in **Live connections** in the **Spotlight Browser**.

3. Select the **Standby** database. Standby databases are indented from the Primary and show the Data Guard icon. ![icon] If the Standby database is not in the list of Live connections see Standby Connections Dialog for more information.

Spotlight on Oracle Data Guard Alarms

Spotlight alarms indicate when the Data Guard environment exceeds acceptable performance thresholds.

Alarm	Description
Apply Lag Alarm	The Apply Lag is a description of how far the Standby is behind the Primary.
Apply Process Running Alarm	This alarm is raised when the Apply Processes have stopped running.
Data Guard Overhead Ratio Alarm	The Data Guard Overhead Ratio Alarm is raised when a high proportion of the Primary's activity time is spent in Data Guard activities.

| Alarm	Description
Data Guard Status Alarm	This alarm is raised when Spotlight on Oracle Data Guard has lost contact with the Standby connection (an Oracle database). Spotlight on Oracle Data Guard will attempt to reconnect.
Node Status Alarm	This alarm is raised when Spotlight on Oracle Data Guard has lost contact with the Standby connection (an Oracle RAC). Spotlight on Oracle Data Guard will attempt to reconnect.
Outstanding Logs To Apply Alarm	This alarm is raised when an unacceptable number of logs on the Standby are waiting to be processed by the Apply Server.
Outstanding Logs To Ship Alarm	This alarm is raised when an unacceptable number of logs on the Primary are waiting to be shipped through the Archiver to the Standby.
Standby Connection Status Alarm	This alarm is raised when Spotlight on Oracle Data Guard has lost contact with one or more instances of the Oracle RAC (Standby connection). Spotlight on Oracle Data Guard will attempt to reconnect.
Transport Lag Alarm	Keep Transport Lag low so your Recovery Point Objective can be met.
Transport Process Running Alarm	This alarm is raised when the Transport Processes have stopped for some reason.

Spotlight on Oracle RAC

Note: Spotlight monitoring of Oracle RAC systems requires additional licensing.

Use Spotlight on Oracle RAC to diagnose Oracle databases on multiple host machines under the **Real Application Clusters** (RAC) architecture.

Connect to Spotlight on Oracle RAC

Connect to an Oracle database running on an Oracle RAC cluster.

1. From the Spotlight Browser select **All connections** | **Spotlight on Oracle RAC**

2. Select the RAC to connect to.
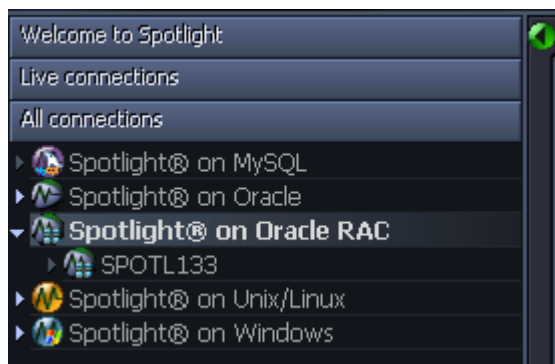
3. The **Verify Cluster Connection Details** dialog is displayed if Spotlight encounters an error during the connection process. Verify Cluster Connection Details Dialog

   Note: You can request Spotlight displays this dialog every time you connect to the Oracle RAC. On the connection **Properties | Details** dialog select **Display Connection Details Verification Dialog**. Alternatively, on the **Verify Cluster Connection Details** dialog select **Display this dialog for the current connection**.

Add an Oracle RAC to the list of connections

Note: Ensure you create a Spotlight user with sufficient privileges to diagnose the Oracle RAC. Oracle User Wizard

1. Click **File | Connect**.

2. Select **Spotlight on Oracle RAC** on the Connections menu.

3. Double-click **Add new connection**.

4. Fill in the connection **Properties | Details** page.

Oracle RAC Connection Details

Field	Description
Connection name	This is the display name for the connection in Spotlight. **Tip:** Fill in the Connection String first.

Oracle Connection Details

Field	Description
Connection String	Select the name (the SQL*Net alias) of the Oracle RAC instance that you wish to connect to. **Notes:** • The database name is defined within SQL*Net configuration utilities. • While this can be the name of any instance in the Oracle RAC cluster, we recommend using the name of the load-balanced instance – the instance whose TNSNAMES entry includes the option (LOAD_BALANCE = yes) • When selected, the Connection name field resets to this value. You can then edit the Connection name field if required.
Oracle Username	Enter the Spotlight user name. **Note**: (*Oracle 12c*) As per Oracle guidelines, the Spotlight Oracle user needs to be of the form "c##<username>" when connecting to an Oracle 12c Container database.
Oracle Password	Enter the Spotlight password.

Field	Description
Oracle Home	Select an appropriate Oracle Home – a location where Oracle client software is installed.
	Notes:
	• Choose a home that contains a version of the Oracle client that is compatible with the Oracle RAC server.
	• You CANNOT change this value while an active Spotlight connection is already using an Oracle Home.
	• When you specify an Oracle Home for a particular Spotlight connection, the connection-based Oracle Home overrides any default values.
	• The first active Spotlight connection in a session forces all subsequent connections to use its specified Oracle Home.

ASM connection details

ASM is built into the Oracle database kernel. It simplifies the creation and space management in Oracle databases.

Note: Available for Oracle 10g and later.

Field	Description
Monitor ASM	Select to monitor the performance of Oracle's Automated Storage Management (ASM) technology.
ASM Connection String	Enter the connection string required to link to the ASM database instance that is used for storage management by this Oracle database.
	Note: The TNSNAMES entry for the ASM instance must include the option (**UR = A**) for the Spotlight connection to work properly.
ASM Password	Enter the password to login to the ASM database instance.
	Note: There is no **ASM Username** field. The ASM Password is to the ASM user name of SYS. SYS is the only username that can provide access to ASM-specific information.
	The user that Spotlight uses to login to the ASM database is SYS. This is the only user name that can provide access to ASM-specific information.
	Providing SYS access to an ASM instance does NOT create a security issue for the Oracle RAC, but you should limit access to the SYS account to trusted individuals.
	Because the SYS password is stored in encrypted format, non-privileged users can still access Spotlight on Oracle RAC. To do so:
	• Use a pre-configured or shared Spotlight on Oracle connection, OR
	• Use a Spotlight connection without ASM access. Spotlight will display Oracle-related data, but the ASM drilldown will contain no data.

Server connection details

Field	Description
Monitor OS	Select to monitor the operating system on the database server.
	Note: Clear this option if the database is running on an operating system NOT supported by Spotlight on Oracle RAC. If you leave this option selected and Spotlight is unable to collect statistics from the server operating system, you may experience errors.
OS Server	Enter the name of the server.
	Tip: Use a period "." to monitor the local database.
OS Type	Select the type of operating system. • Windows • Unix(REXEC) • Unix(SSH) • Unix(SSH using Public/Private Keys) If you select one of the Unix systems, make sure the SSH or REXEC daemon is running on the database server and is configured to receive remote connections. **Note**: Spotlight supports both SSH1 and SSH2 protocols; public-key encryption is supported under SSH2 only.
SSH Port	Enter the port number for SSH (secure shell) connection to the database servercluster. The default value is *22*. **Note:** Applicable when OS Type is Unix (SSH) or Unix (SSH using Public/Private Keys).

OS Username	Type the user name to login to the database servercluster.
	
	Notes:
	
	• Spotlight will connect successfully to all nodes in the cluster only if every node employs the SAME username and password.
	• If the username — and password if required — are not completed, you will not be able to view the operating system performance statistics for the database servercluster.
	• When OS Type is Windows:
	  • Not required if your login details have been assigned remote access to the registry of the nodes in the database servercluster.
	  • If your login details have NOT been set up on the database .servercluster, you must enter a username and password that has access to the registry of each node.

SSH Key Type	Choose the type of key to use when making the Spotlight connection: RSA or DSA. **Note:** Applicable when OS Type is Unix (SSH using Public/Private Keys).
SSH Private Key Filename	Locate the filename that contains the private key for the Spotlight connection. **Hint:** Use the "..." button. **Note:** Applicable when OS Type is Unix (SSH using Public/Private Keys).
SSH	Type the passphrase used to decrypt the private key.

Field	Description
Passphrase	**Note:** Applicable when OS Type is Unix (SSH using Public/Private Keys).
OS Password	Type the user password to login to the database servercluster (if required). **Note:** Not applicable when OS Type is Unix (SSH using Public/Private Keys).

Spotlight Cloud

Field	Description
Monitor on Mobile Device	Select to monitor this spotlight connection on your mobile device and upload data from this connection to Spotlight Cloud. Spotlight on your favorite mobile device

Select **Launch Spotlight on Oracle** to open a Spotlight on Oracle connection to the database when you open the Spotlight on Oracle RAC connection.

Select **Display Connection Details Verification Dialog** to display the Connection Details Verification dialog when you connect to a specified Oracle RAC cluster. The dialog allows you to specify and test connections to ALL instances in the cluster.

Select **Save password details** to save all the password details that have been entered.

Note: On closing this dialog:

- (*Oracle 11g Release 2 and above*) TheConfiguring Oracle User for Spotlight Dialog will open when the setup of the Spotlight User through the Oracle User Wizard is incomplete.
- (*Oracle Exadata systems*) The **Verify Storage Node Connection Details Dialog** will open the first time you connect to an Exadata system and in future if there are problems connecting to the Exadata Storage Server (cells).

Verify Cluster Connection Details Dialog

Spotlight opens the Verify Cluster Connection Details dialog automatically when it encounters an error connecting to an Oracle RAC cluster. Use the dialog to test and modify connection settings to instances in the Oracle RAC cluster.

Connection Details for Instances in the Cluster

Each row in the grid represents an identified instance in the cluster, even if that instance is no longer part of the cluster.

Column	Description
Status	The current status of the instance.

	Value	Description
	Untested	The connection details have been neither tested nor used successfully since they were last modified or created. Click **Test** to investigate.

Column	Description		
		Value	**Description**
		OK	The connection details have been tested successfully.
		Failed	The connection details are missing or faulty. • Refer to **Test Results** for the related error message. • If **Last Successful** shows the most recent date that Spotlight successfully connected to the instance then there may be a problem with the cluster. • If **Last Successful** is empty then the connection details may be invalid.
		No status	The connection has not been tested or you have reset the connection details. Click **Test** to investigate.
Instance Name	The name of the instance.		
TNS Entry	If a separate TNS entry exists for an instance within the relevant TNSNAMES.ORA file, you can choose to use that entry. Click the TNS Entry field. Select the desired value from the list. (Alternatively, type the connection name.) If a TNS Entry is NOT identified, then a connection string is constructed dynamically from the Host, Domain and Port values. If a TNS Entry is identified, these columns will be populated from the TNS Entry when you test the connection.		
Host	The name of the host machine (node) for the instance. **Note**: If you have selected a **TNS Entry** this may contain an IP address instead.		
Domain	The domain where the Host resides.		
Port	The logical port that is used to access each instance in the cluster. **Note**: If Spotlight cannot obtain this information from **TNSNAMES.ORA** it will use the default port *1521*.		
OS User	The name used to log on to the host.		
OS Password	The password used to log on to the host.		
Test results	The error message returned when you click **Test** and the test fails.		
Last successful	The most recent time a successful connection was made to the instance. Look at this value in conjunction with **Status**.		

Service Name

This is the SERVICE_NAME of the cluster. Connections to instances that do not have a specified TNS Entry will use this as their SERVICE_NAME when constructing a dynamic connection string.

Dialog Actions

Action	Description
Display this dialog for the current connection	Select to open this dialog every time you open the Oracle RAC cluster.
	When not selected, this dialog opens when Spotlight encounters a problem opening the Oracle RAC cluster.
Test	Click to test all the connection details. Use to ensure connections to the cluster instances will succeed, and that you have not entered duplicated (but otherwise correct) information.
Remove	Use if an instance is no longer part of this Oracle RAC cluster.
	Select the instance and click **Remove**.
	Removing the instance stops Spotlight raising an alarm when it attempts unsuccessfully to connect to the instance.
Reset	Click to
	• Delete the history of recent connections and connection tests
	• Revert to the original connection settings
OK	Click to connect to the cluster, even if one or more instances do not have a status of OK.
Cancel	Do not connect to the cluster.

Connect to an Exadata Storage Server (Cells)

Refer to this page for background information on Spotlight's connection to Exadata Storage Server (cells).

Note: Spotlight monitoring of Oracle RAC systems requires additional licensing.

How Spotlight connects to Exadata Storage Cells

Spotlight does not directly connect to the Exadata Storage Cells. It uses one of the database nodes as an intermediary to tunnel through to the cell storage nodes to retrieve performance metrics. In a default Oracle Exadata installation, the client will not have direct access to the Storage cells as these are private to the appliance. The database nodes are generally public and can be accessed by the Spotlight client.

1. Spotlight makes an Oracle connection to the Exadata database nodes.

   When this is successful, Spotlight runs a SQL query against an Oracle view - **v$active_instances** - to obtain the operating system host name. On further processing Spotlight also obtains the domain information. This information is used to establish an operating system connection to one of the database nodes.

2. Spotlight establishes an operating system connection to one of the Exadata database nodes.

3. Spotlight uses the Oracle connection to one of the database nodes to execute another SQL query that retrieves Cell IPs from **v$cell** and other Cell information (such as the host name and domain) from **v$cell_config**.

4. 4. Given the information obtained in the preceding steps, Spotlight uses port forwarding to tunnel through to the Exadata Storage Cells via one of the database nodes.

    - Spotlight uses the host names obtained from **v$cell_config**. It binds these host names to the open SSH ports obtained from the same view.

    - Free local ports on the Spotlight client are assigned to receive data for each tunneled connection (for each connection to each online storage node).

    The host names resolve to IP addresses on the management network. You can override this via the dialog that opens on the first connection to the Exadata system.

    It is recommended that the **celladmin** operating system user account be used for connecting to the Storage Cells.

Spotlight on Oracle RAC Home Page

The Spotlight home page shows an overview of the activity in an Oracle RAC database cluster.

To see the Spotlight on Oracle RAC Home Page

1. Select the Spotlight on Oracle RAC connection from the Spotlight browser.

2. Click ⌂.

Where an Oracle Exadata System is installed and licensed the Spotlight on Oracle RAC Home Page looks slightly different. An additional **Exadata Storage Panel** monitors the Exadata Storage System (Cells).

Spotlight on Oracle RAC Alarms

Spotlight alarms indicate when the Oracle RAC exceeds acceptable performance thresholds.

Alarms on A Database Instance

Problems in a single instance may not always affect the operation of the cluster as a whole. In such cases, Spotlight on Oracle RAC can display an alarm in the relevant instance panel without reporting a specific Spotlight on Oracle RAC alarm.

However, if a problem in a single instance DOES affect the operation of the whole cluster – or is repeated in multiple instances so that the combined effect is significant – Spotlight on Oracle RAC reports the problem as an **aggregated alarm**.

These alarms are displayed on the Spotlight on Oracle RAC home page – usually in the **Global Database** heading of the Interconnect and Global Status panel, or on the individual components of the IO Subsystem panel.

Notes:

- Aggregated alarms within Spotlight on Oracle RAC are the same as the corresponding alarms in Spotlight on Oracle.

- Not all Spotlight on Oracle alarms are aggregated in Spotlight on Oracle RAC.

Alarms on The Oracle RAC

Following are the alarms specific to Spotlight on Oracle RAC.

Alarm	Description
Archive Critical Failure alarm	An Archive Critical Failure alarm indicates that the number of working archive destinations for the database cluster is about to fall below the minimum number needed to archive Oracle redo logs successfully. When you see this alarm, you should make space in the archive log destination by purging – or by backing up to an offline medium – any archived files that are not immediately needed.
Archive Destination Failed alarm	Spotlight raises an Archive Destination Failed alarm when at least one of the archive destinations specified for redo log files has become full. See Archive Destination Failure alarm below.
Archive Destination Failure alarm	An Archive Destination Failure alarm when at least one of the archive destinations specified for redo log files is about to become full. When you see this alarm, you should make space in the archive log destination by purging it, or by backing it up to an offline medium.
ASM Status alarm	When a Spotlight connection is lost, Spotlight automatically tries to re-establish the connection. The ASM Status alarm indicates that Spotlight is re-establishing its connection to the ASM diskgroup for the Oracle RAC cluster.
Availability alarm	This alarm indicates that the instances participating in the cluster are NOT all currently available for access. The database administrator should determine why the instances are unavailable, and restart them after taking the required actions.
(Global) Cache Miss Rate alarm	See Miss Rate alarm below.
Cluster Latency alarm	Spotlight raises the Cluster Latency alarm when cluster latency from all causes (interconnect, GES, LMS overhead) exceeds a specified threshold. Cluster latency is defined as the average elapsed time from when a requesting instance requests a block of data to the time when the requesting instance receives the block.
Cluster Overhead alarm	Spotlight raises the Cluster Overhead alarm when the percentage of time dedicated to cluster co-ordination activities exceeds a specified threshold. Cluster overhead is the amount of time spent waiting for cluster related activities as a percentage of the total time spent waiting for all activities.
Corrupt or Lost Blocks alarms	Spotlight raises separate alarms for corrupt and lost blocks when a specified percentage of the blocks transferred across the interconnect are corrupted or lost during global cache consistent read requests. High levels of lost or corrupt blocks should not happen in normal circumstances. If these alarms fire at all, it indicates either very serious overloading of the Oracle RAC cluster, or software or hardware faults in the cluster.
Instance Failed alarm	Spotlight raises an Instance Failed alarm when a specified instance has failed because of an Archiver error. See Archive Critical Failure alarm above.
Load Imbalance alarm	Spotlight raises the Load Imbalance alarm when: • The load across instances in the cluster is significantly unbalanced, and • The imbalance is proven to be statistically significant, beyond a 95% probability. Cluster balance is a fundamental indication of the health and productivity of an Oracle RAC environment. If load is not reasonably evenly distributed across the instances in a cluster, then the DBA is likely to regret having chosen a clustered environment. Spotlight on Oracle RAC calculates balance by recording a user-definable metric of load

Alarm	Description
	over time on each instance (the default is **Logical Reads**, but you can switch this to **CPU usage** or **Physical Writes** via the Spotlight on Oracle RAC Options window) and calculating the relative balance of load across the cluster.
	In the normal course of events, there are always minor variations in load between instances within the cluster, so Spotlight uses a statistical technique to determine if a variation is significant.
	Note: The activation of specific Oracle Services can unbalance the workload across the Oracle RAC cluster. In these cases, Spotlight triggers the Load Imbalance alarm only when a more significant threshold is reached.
Miss Rate alarm	This alarm, more specifically known as the Cache Miss Rate alarm or Global Cache Miss Rate alarm, is raised when the **global cache local miss rate** exceeds a specified threshold. This rate is the percentage of time that a block required for a logical read is located in an inconsistent mode on ANOTHER instance in the cluster and must be transferred.
Average Percentage CPU Load Across The Exadata Storage Cells alarm	The Average Percentage CPU Load Across The Exadata Storage Cells alarm occurs when the total CPU utilization of the Exadata Storage Servers exceeds a threshold. One or more of the Server CPU may encounter a large number of requests, or you may have un-tuned SQL, which uses excessive amounts of CPU.
Maximum Percentage CPU Load on The Exadata Storage Cells alarm	The Maximum Percentage CPU Load on The Exadata Storage Cells alarm occurs when the CPU utilization of one or more Exadata Storage Servers (Cells) exceeds a threshold.. One or more of the Server CPU may encounter a large number of requests, or you may have un-tuned SQL, which uses excessive amounts of CPU.
Single Block Read alarm	The Single Block Read alarm is raised if the average time taken to complete a request for a single block from the Exadata Storage Servers exceeds a given threshold. The source of the latency may be any database using the Exadata Storage Servers.
Cell Balance alarm	The Cell Balance alarm is raised when there is an unequal distribution of work-load between the Exadata Storage Servers.
Exadata Storage Server (Cell) Not Connected	Spotlight has lost its connection to at least one Exadata Storage Server, and is unable to re-connect. Check the status of your network connection. Check the status of the hosts of each Exadata Storage Server.
No Nodes Available alarm	This alarm indicates that Spotlight has lost its connection to the Oracle RAC cluster, and cannot re-connect to any of the nodes in the cluster. Check the status of your network connection, your host machines, and your database instances.

Note: Spotlight on Oracle Data Guard alarms occur in the **Alarm Log** of the Primary Database in the Oracle Data Guard environment. See Spotlight on Oracle Data Guard Alarms for more information.

Spotlight on Oracle RAC Drilldowns

Once a problem is isolated you can display a drilldown page with charts and tables that provide a detailed breakdown of the underlying statistics.

Drilldown	Click to open	Description
Top Sessions		Top Sessions lists all users connected to the Oracle database. *As per Spotlight on Oracle.*
SQL & Application Workload		*As per Spotlight on Oracle.* The SQL & Application Workload drilldown in Spotlight on Oracle RAC does NOT contain the following pages: • Analyze Trace • Result Cache
Activity		*As per Spotlight on Oracle.* The Activity drilldown in Spotlight on Oracle RAC does NOT contain the following pages: • Lock Activity • Server • Rollback
I/O		*As per Spotlight on Oracle.*
Configuration & Memory		*As per Spotlight on Oracle.* The Configuration & Memory drilldown in Spotlight on Oracle RAC does NOT contain the following pages: • Shared Pool Utilization • Buffer Cache
Disk Storage		The Disks drilldown displays detailed information about the logical and physical disks. *As per Spotlight on Oracle.* The Disk Storage drilldown in Spotlight on Oracle RAC does NOT contain the following pages: • Online Redo • Recovery Area
Cluster		The pages in the Cluster drilldown display information about the performance of the Oracle RAC cluster, including details on cluster latency, balance, overhead, miss ratios, and corrupt or lost blocks.

Drilldown	Click to open	Description
ASM		Diagnose the performance of Automatic Storage Management (ASM) for the Oracle RAC cluster. *As per Spotlight on Oracle.*
Services		The Services drilldown displays details of the services defined and deployed for the Oracle RAC cluster. **Note**: Available for Oracle 10.2 and later.
Predictive Diagnostics		As per Spotlight on Oracle.
Pluggable Databases		(*Oracle 12c*) View resource usage of pluggable databases.
Data Guard		Use to configure Spotlight to monitor Standby databases to this Primary database in an Oracle Data Guard environment. **Note**: The Data Guard icon is enabled when the current Spotlight on Oracle RAC connection is configured as a Primary database in an Oracle Data Guard environment.
Exadata		Detect and help resolve performance issues on Oracle's Exadata machine. **Note**: Spotlight on Oracle RAC may include monitoring of Exadata systems depending on the license purchased. When licensed, the Exadata icon is enabled on connection to an Oracle Exadata system.
Alarm Log		The Alarm Log drilldown displays information on the alarms associated with the Windows system, including the name of the component that issued the alarm, the date and time the alarm was logged, and the severity of the alarm. **Note:** The Alarm Log drilldown is common to all Spotlight applications. The alarms are specific to the current Spotlight connection. For more information, see Spotlight on Oracle RAC Alarms on page 47.

Spotlight on UNIX

Use Spotlight on Unix to monitor Unix and Linux operating systems, detect and resolve problems.

Configure the Unix System

To monitor a Unix system with Spotlight, ensure the Unix system is configured as follows.

Unix servers and versions.

Spotlight on Unix supports the following server operating systems:

- Oracle Solaris 9, 10, 11
- HP-UX 11i, 11i v2, 11i v3
- IBM AIX 5.2, 5.3, 6.1, 7.1
- Red Hat operating system based on Linux 2.4, 2.6 and 3.10 kernels
- SUSE operating system based on Linux 2.4, 2.6 and 3.0 kernels
- Oracle Enterprise Linux (OEL) based on Linux 2.4, 2.6 and 3.8 kernels

Unix programs.

Ensure the following Unix programs are accessible to the Unix login (through Spotlight):

- Perl 5.x	- ps
- awk	- sar
- cat	- sed
- date	- tr
- df	- uname
- grep	- uptime
- ifconfig	- vmstat

- iostat (not HP-UX)
- netstat

- wc
- who

For HP-UX, additionally

- bdf
- cstm
- getconf

- swapinfo
- /usr/sbin/ioscan

For AIX, additionally

- lsattr
- lsdev

- lsps
- prtconf

For Solaris, additionally

- /etc/swap
- mpstat

- nawk
- prtconf

Unix User Permissions and Installation Settings

- The Unix user should have no special processing on log-on. In particular there must be no input required from the user, and nor should any special login banners be displayed.

- On AIX, the user must be a member of the "adm" group to be able to run the **sar** command.

- On Linux, the **sysstat** package must be installed to enable the user to get detailed disk I/O information.

- On Linux the **/proc** filesystem must be present.

- For connection using SSH, the **sshd** daemon must be installed and running.

Remote Connectivity: SSH or REXEC

Spotlight on Unix will require you to select the connection type: SSH or REXEC. Information on SSH and REXEC is freely available on the Internet. We recommend SSH as password data is transmitted encrypted. REXEC does not encrypt password data.

Notes:

- Make sure the relevant SSH or REXEC daemon is running on the Unix machine and is configured to receive remote connections.

- Commands to observe system activity (for example, **netstat, vmstat, iostat, sar**) must be accessible to REXEC / SSH sessions for Spotlight to observe Unix activity. Ensure these commands are located in the search path for REXEC / SSH sessions. If not, Spotlight will display an error.

Notes (Specific to SSH):

- Spotlight supports both SSH1 and SSH2 protocols.

- To allow Spotlight to make SSH connections to any Unix or Linux hosts that permit SSH connections, you may need to alter the **PasswordAuthentication** configuration item in the **sshd_config** file. Set the value of **PasswordAuthentication** to **yes**. Once you have modified the **sshd_config** file you must restart the **sshd process** to apply the new setting.

- Public-key encryption is supported under SSH2 only. DSA and RSA are supported.

Note (Specific to REXEC): When Spotlight is monitoring a Unix operating system via **REXEC** with a valid user ID and password, remote commands may not work on the Unix host unless that user ID is added to the **/etc/hosts.equiv** file on the host.

Connect to Unix Systems

1. From the Spotlight Browser select **All connections | Spotlight on Unix**

2. Select the Unix system to connect to.
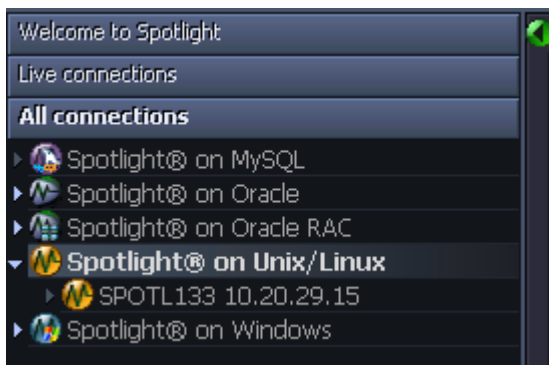
Add a Unix system to the list of connections

Note: Ensure the Unix system is configured before you connect to it. Configure the Unix System

1. Click **File | Connect**

2. Select Spotlight on Unix on the Connections menu.

3. Double-click **Add new connection**.

4. Fill in the connection **Properties | Details** page.

Unix Connection Details

Field	Description
Connection name	Enter the preferred display name for the Unix machine. **Note**: If left blank, the Connection name field resets to the value of the Address field.

Server Connection Details

Field	Description
Address	Enter the hostname or IP address to the Unix machine.
User	Enter the user name to login to the Unix machine. **Note:** The root user is not allowed. Remote login as "root" has been disallowed for security reasons.
Password	Enter the password to login to the Unix machine. **Note:** Not applicable when **Use SSH Public / Private Keys** is selected. Applicable when **Save password details (for this connection)** is selected.
Connection Type	Select according to the Unix system's configuration. The options are: REXEC and SSH. Configure the Unix System
Port Number	Enter the port number for SSH (secure shell) connection to the Unix machine. The default value is *22*. **Note:** Applicable when the **Connection Type** is **SSH**.

SSH Key Authentication

Note: Applicable when the **Connection Type** is **SSH**.

Field	Description
Use SSH Public / Private Keys	Select according to the Unix machine's configuration.
SSH Key Type	Choose the type of key to use when making the Spotlight connection: RSA or DSA. For more information, see Configure the Unix System on page 52.
SSH Private key Filename	Locate the file that contains the private key for the Spotlight connection. Either click ... or type the filename and location.
SSH Passphrase	Type the passphrase used to decrypt the private key. **Note:** Applicable when **Save password details (for this connection)** is selected.

Select **Save password details (for this connection)** to save all entered password details.

Close the dialog.

Click	Description
Connect	Save changes and open the connection in Spotlight. **Note**: If you experience problems connecting there may be an issue with the Unix configuration. For more information, see Configure the Unix System on page 52.
OK	Save changes. Do not open the connection in Spotlight.
Cancel	Do not save changes.

Spotlight on Unix Home Page

The Spotlight home page shows the flow of information and commands between various sub-components and the size and status of internal resources such as processes, disk files and memory structures.

To see the Spotlight on Unix Home Page

1. Select the Spotlight on Unix connection from the Spotlight browser.

2. Click ![home icon].

Spotlight on Unix Alarms

Spotlight alerts you to problems with your system by issuing an alarm.

Alarm	Description
Blocked Processes alarm	Blocked processes are processes that are waiting on information to become available in memory, or that are waiting for a shared resource, or for the completion of disk I/O or network I/O. A high level of blocked processes may indicate an under-configured machine.
Input Error Packets Flow alarm	The Input Error flow represents the number of erroneous network packets coming into the machine per second. The **Input Error Packets Flow** alarm may warrant investigation as even a low error rate can indicate network problems.
Output Error Packets Flow alarm	The Output Error flow represents the number of erroneous network packets sent by the machine per second. The **Output Error Packets Flow** alarm may warrant investigation as even a low error rate can indicate network problems.
Page In alarm	A large number of page-ins may be a symptom of a large number of recent page-outs (see Page Out alarm below). To find out what process is reading these pages in, check the resident size of the processes you are running, and see which ones are increasing in size. Alternatively, a large number of page-ins may occur when a large process has just stopped, and the kernel decides to fill that space with memory pages owned by other processes. Check if an important process has ended unexpectedly.
Page Out alarm	If an active process asks the kernel for more memory than there is immediately available, the kernel will write old memory pages out to swap space. This is known as paging. To stop paging, make sure that there is enough RAM available to support the size of the processes you want to run.
Percentage Busy alarm	The **Most Active Disk** gauge shows the disk with the highest read/write rates. The **Percentage Busy** alarm is triggered when the read/write rate of the most active disk exceeds a specified threshold. The type of alarm that is activated is determined by the percentage of read/write activity experienced by the disk.
Swap Space alarm	If the total amount of swap space allocated to a Unix host becomes full, the machine may halt all processes, or critical actions may be prevented from occurring. The **Swap Space** alarm may indicate a runaway process or an under-configured machine.
Swap In Flow alarm	The Swap In flow represents the number of processes swapped from disk per second. The **Swap In Flow** alarm may indicate a machine that is under-configured for its workload.
Swap Out Flow alarm	The Swap Out flow represents the number of processes swapped to disk per second. The **Swap Out Flow** alarm may indicate a machine that is under-configured for its workload.
Unix Status alarm	Spotlight is re-establishing its connection to the Unix system.
Used Percentage alarm	The **Least Space / Disk Space** container displays the percentage of used disk space for a specified filesystem. The **Used Percentage** alarm indicates that the specified filesystem is full or filling up. If the filesystem fills up completely, no more data can be written to it.
Zombie Processes alarm	The **Zombie** button in the CPU panel shows the number of terminated child processes that have not been acknowledged by their parent process. The **Zombie Processes** alarm may indicate the presence of an inferior program, or an entry in **/etc/inittab** (or equivalent) that prevents **init** from completing its startup sequence.

Spotlight on Unix Drilldowns

Once a problem is isolated you can display a drilldown page with charts and tables that provide a detailed breakdown of the underlying statistics.

Drilldown	Click to open	Description
Processes and Services		The **Processes and Services** drilldown lists all the processes running on the Unix machine (including "zombie" processes), and all the services found in the **/etc/services** file (running or not).
Activity Summary		Use the **Activity Summary** drilldown to show details of the activity on the Unix system.
Filesystems		Use the **Filesystems** drilldown to show disk usage for each filesystem on the Unix system, and the proportion of disk space used by each filesystem.
Alarm Log		The Alarm Log drilldown displays information on the alarms associated with the Windows system, including the name of the component that issued the alarm, the date and time the alarm was logged, and the severity of the alarm. **Note:** The Alarm Log drilldown is common to all Spotlight applications. The alarms are specific to the current Spotlight connection. Spotlight on Unix Alarms

Spotlight on Windows

Use Spotlight on Windows to monitor Windows operating systems, detect and resolve problems.

Connect to Windows Systems

1. From the Spotlight Browser select **All connections** | **Spotlight on Windows**

2. Select the Windows system.
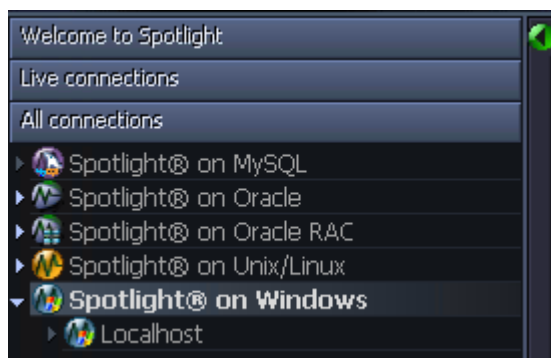
Add a Windows system to the list of connections

You will need	Description
Administrator access	Ensure your login to the Windows machine has Administrator access privileges.
	To add a new connection to the Windows machine you are currently using, ensure you are logged in to the machine with Administrator access privileges. If necessary, logout and login

You will need	Description
	again.
Privileges	Spotlight on Windows retrieves its data from Windows performance counters and the windows registry of the monitored system. An administrator login to the Windows machine has such access.
Remote connectivity	To add a new connection to a Windows machine other than the one you are currently using, ensure the machine is accessible to the Spotlight client. Spotlight uses NetBIOS traffic to retrieve **perfmon** and registry information, so any firewalls between the Spotlight on Windows client and the machine being monitored must allow this traffic to pass through. Troubleshooting Spotlight on Windows

1. Click **File | Connect**

2. Select **Spotlight on Windows** on the Connections menu.

3. Double-click **Add new connection**.

4. Fill in the connection **Properties | Details** page.

Windows Connection Details

Field	Description
Connection name	Enter the preferred display name for the Windows machine. **Note**: If left blank, the **Connection name** field resets to the value of the **Address** field.
Local Machine	Select to diagnose the machine you are now using.
Address	Enter the hostname, IP address or URL to the Windows machine. **Note:** The value changes to "." and cannot be edited when **Local Machine** is selected.

Logon Details

Note: Not applicable when **Local Machine** is selected.

Field	Description
Domain	The name of the domain the user belongs to (to login to the Windows machine).

Field	Description
	Note: If you intend to leave **User** blank then **Domain** should also be left blank.
User	Enter the user name to login to the Windows machine.
	Note: Ensure this user has administrator rights.
Password	Enter the password to login to the Windows machine.
	Note: Applicable when **Save password details (for this connection)** is selected.

Select **Save password details (for this connection)** to save the password.

Note: Not applicable when **Local Machine** is selected.

Close the dialog.

Click	Description
Connect	Save changes and open the connection in Spotlight.
OK	Save changes. Do not open the connection in Spotlight.
Cancel	Do not save changes.

Spotlight on Windows Home Page

The Spotlight home page shows the flow of information and commands between various sub-components and the size and status of internal resources such as processes, disk files and memory structures.

To see the Spotlight on Windows Home Page

1. Select the Spotlight on Windows connection from the Spotlight browser.

2. Click .

Spotlight on Windows Alarms

Spotlight alerts you to problems with your system by issuing an alarm.

This alarm…	Alerts you…
Cache alarms	When the level of cache activity exceeds a threshold.
Disk alarms	As the logical disk is filling up, and also when disk activity exceeds a threshold.
Event Log alarm	When an Event Log entry is found which matches an active Event Log severity rule.
Memory alarms	When the available memory (both physical and virtual) drops below specified thresholds.
Paging alarms	When there is excessive paging activity on the target system.
Process alarms	When processes sustain a high CPU load.
Windows CPU alarm	When the server's CPU usage exceeds a specified percentage.
Windows status alarms	Spotlight is re-establishing its connection to the Windows system.

Spotlight on Windows Drilldowns

Once a problem is isolated you can display a drilldown page with charts and tables that provide a detailed breakdown of the underlying statistics.

Drilldown	Click to open	Description
Processes		The Processes drilldown lists all processes and services currently running on the Windows system. You can view detailed information about each process.
CPUs		The CPU tab displays details of recent processor activity as measured by Windows.
Memory		The Memory drilldown displays detailed information about recent physical and virtual memory usage.
Disks		The Disks drilldown displays detailed information about the logical and physical disks on the Windows system.
Network		The Network drilldown displays detailed information about the network activity to and from the Windows system.
Activity Summary		The Activity Summary drilldown displays summaries of recent Windows activity including, paging and packet rates, CPU usage across all processors, the number of threads waiting to be run, and the number of I/O requests that were queued for each logical disk.
Event Log		The Event Log drilldown shows recent event log items that have occurred on the Windows system.
Single Application		The Single Application drilldown displays detailed information about specified individual processes (or a group of processes) on a Windows system. Choose the processes you want Spotlight to analyze from **View | Options | Data collection | Windows applications metrics**.
Alarm Log		The Alarm Log drilldown displays information on the alarms associated with the Windows system, including the name of the component that issued the alarm, the date and time the alarm was logged, and the severity of the alarm. **Note:** The Alarm Log drilldown is common to all Spotlight applications. The alarms are specific to the current Spotlight connection. Spotlight on Windows Alarms

Spotlight on MySQL

Use Spotlight on MySQL to monitor your MySQL databases, detect and resolve problems.

Connect to a MySQL Database

1. From the Spotlight Browser select **All connections** | **Spotlight on MySQL**

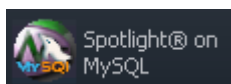2. Select the database to connect to.
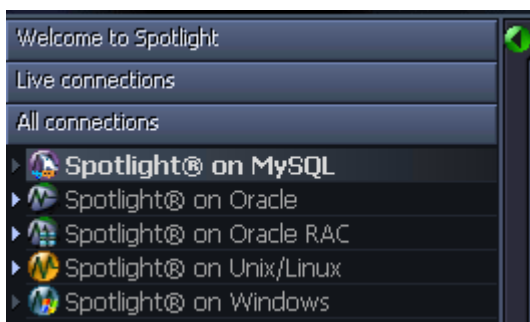
Add a MySQL database to the list of connections

Note: Ensure the Unix or Windows server on which the MySQL database is installed is accessible to Spotlight.

1. Click **File | Connect**.

2. Select **Spotlight on MySQL** on the Connections menu.

3. Double-click **Add new connection**.

4. Fill in the connection **Properties | Details** page.

MySQL Connection Details

Field	Description
Connection name	This is the display name for the connection in Spotlight. **Tip:** Fill in the **Host** field first.

MySQL connection details

Field	Description
Host	Enter the name of the host machine for the MySQL database.
Username	Enter the user name to login to the MySQL database.
Password	Enter the password to login to the MySQL database.
Port	Enter the port used for the Spotlight on MySQL connection. The default value is *3306*.
Database	Select the name of the database that you wish to connect to.

OS Connection Details

Field	Description
Monitor OS	Select to monitor the operating system on the database server. **Tip**: Clear this option if the database is running on an operating system that is NOT supported by Spotlight on MySQL. If you leave this option checked and Spotlight on MySQL is unable to collect statistics from the server operating system, you may experience errors.
Address	Enter the address of the host machine for the MySQL database.
OS Type	Select the type of operating system. • Windows • Unix(REXEC) • Unix(SSH) If you select one of the Unix systems, make sure the SSH or REXEC daemon is running on the database server and is configured to receive remote connections.

Field	Description
SSH Port	Enter the port number for SSH (secure shell) connection to the database server. The default value is *22*. **Note:** Applicable when OS Type is Unix(SSH).
Username	Type the user name to login to the database server. **Note:** When OS Type is Windows: • Not required if your login details have been assigned remote access to the registry of the database server. • Ensure the user has access to the registry of the server.
Password	Type the user password to login to the database server (if required).

Click **Save password details (for this connection)** to save all the entered password details.

Spotlight on MySQL Home Page

The Spotlight home page shows the flow of information and commands between various sub-components and the size and status of internal resources such as processes, disk files and memory structures.

To see the Spotlight on MySQL Home Page

1. Select the Spotlight on MySQL connection from the Spotlight browser.

2. Click .

Spotlight on MySQL Alarms

Spotlight alarms indicate when the MySQL database exceeds acceptable performance thresholds.

Alarm	Description
Buffer Pool Hit Rate alarm	The **Buffer Pool Hit Rate** alarm fires when the proportion of table data that can be found in the **InnoDB** buffer pool drops below a specified threshold.
CPU Busy alarm (% CPU usage)	The **CPU Busy** alarm occurs when the total CPU utilization of the system exceeds a threshold. The CPU may encounter a large number of requests, or you may have un-tuned SQL, which unnecessarily uses excessive amounts of CPU.
Inefficient Sort alarm (Merge per Sort)	The **Inefficient Sort** alarm fires when the number of temporary files created for sorts is high in comparison to the number of sorts performed.
Low Free Physical RAM alarm	The **Low Free Physical RAM** alarm occurs when the server's available RAM is low.
Query Cache Hit Rate alarm	The **Query Cache Hit Rate** alarm fires when the proportion of SQL queries that can be found in the MySQL query cache drops below a specified threshold.

Spotlight on MySQL Drilldowns

Once a problem is isolated you can display a drilldown page with charts and tables that provide a detailed breakdown of the underlying statistics.

Drilldown	Click to open	Description
Top Sessions		The pages in the **Top Sessions** drilldown display information about the users connected to the MySQL database.
Activity		The pages in the **Activity** drilldown display details of the activity on the MySQL database.
Operating System		The pages in the **Operating System** drilldown display information related to the performance of, and processes on, the operating system where the MySQL server is running.
Alarm Log		The **Alarm Log** drilldown displays information on the alarms associated with the MySQL database. **Note:** The Alarm Log drilldown is common to all Spotlight applications. The alarms are specific to the current Spotlight connection. Spotlight on MySQL Alarms

Troubleshooting: Connection Problems

Troubleshooting Spotlight on Windows

This section identifies general problems that you may encounter when using Spotlight on Windows, and details how to address those problems. If you do not find a solution in this section then check the *Release Notes*.

The Registry ... is not accessible.

On connecting to a Windows machine, if Spotlight returns the following error:

> The registry on "<<MachineName>>" is not accessible. You need to connect to this machine with an account with privileges to retrieve server information, query the registry, and access performance monitor objects.

Solution

Login to the Windows machine using an account with administrative rights.

A login with administrative rights satisfies the requirements of Spotlight on Windows, with the privileges to retrieve server information, query the registry, and access WMI and performance monitor objects.

Connecting As The Logged-in User

To connect to a Windows machine as a user who is already logged in, do NOT enter any user credentials (Domain, User or Password) in the Connection Properties window.

Notes:

- Spotlight on Windows requires Administrator access on all the Windows machines under diagnosis. If the current user is not an administrator on a machine, that Spotlight connection will fail.

- Windows connections can only have one set of credentials in use at a time. If a user connects to a machine by using NO user name and password, and then disconnects and reconnects with an Administrator password, Windows returns an ERROR_SESSION_CREDENTIAL_CONFLICT error.

  For example, if you have mapped a drive to the machine \\serverA\share while logged in as serverA\administrator, you CANNOT map another drive to the same machine while logged in as serverA\user.

  You can, however, connect to the same machine with different credentials if you map to the machine via its IP address.

  In the example above, if serverA has the IP address 192.168.1.100, you CAN employ the net use command to connect to the machine \\192.168.1.100\share as serverA\user.

WMI Connection Problems

If Spotlight on Windows is displaying a WMI access denied error, and the user specified in the connection profile is an administrator on that machine then it may be necessary to adjust your DCOM or Firewall settings.

Complete the following steps to ensure that your DCOM and Firewall settings are configured to allow WMI connections.

To test WMI is working on the Spotlight client:

1. Click **Start | Run**.

2. Enter **WBEMTest** to run the WMI Tester Utility.

3. Click **Connect | Connect**.

4. If an **Access is denied** error is displayed you do not have rights to make WMI connections. In this case, check (and adjust if necessary) your local DCOM setting (see below).

To check the DCOM access permissions for the monitored machine:

1. Login to the monitored machine.

2. Click **Start | Run**.

3. Enter **DCOMCnfg** to run the DCOM configuration utility.

4. Select **Component Services**.

5. Click .

6. Click **COM Security**.

7. Under Access Permissions, click **Edit Permission**.

   Ensure **Remote Access** is set to **Allow** for the user specified in the connection profile (or the group containing this user).

8. Under Launch and Activation Permissions, click **Edit Permission**.

   Ensure **Remote Launch** and **Remote Activation** are set to **Allow** for the user.

   For more information, see Securing a Remote WMI Connection on the MSDN site.

To check if Windows Firewall is active on the Spotlight client:

1. Open the **Control Panel | Windows Firewall**.

2. If Windows Firewall is on, see Connecting Through Windows Firewall on the MSDN site for information on how to configure the firewall to allow WMI connections.

Spotlight on Oracle

Cannot Connect to Database

Possible cause…	Solution…
Oracle is not running.	Verify that the Oracle instance is running and can be accessed from a host or client workstation.
The connect string and alias of the database are incorrect or have changed.	Check your SQL* Net configuration and verify the connect string and alias you are using are correct.
The user ID you are using to log into Spotlight does not exist in the database.	Run the User Wizard to establish the user ID in the database.
The Spotlight user has the wrong permissions in the database.	Contact your DBA to add relevant permissions to the user.
Spotlight takes too long to open the Oracle connection so it appears to be unable to connect.	Turn on Fast Initialize. More information on Fast Initialize is available in the online help. 1. Click **View	Options**. 2. Select **Data Collection | Oracle Initialization | Turn Fast Initialize on**. 3. Restart Spotlight.

Cannot Connect to ASM

When installed and available, Automatic Storage Management (ASM) stores Oracle data in a separate ASM database instance. Spotlight on Oracle displays performance metrics for ASM on the home page and in the ASM drilldown.

If the database under investigation uses ASM but Spotlight cannot connect to it to retrieve the required information, you may need to edit the TNSNAMES entry for the ASM instance.

1. Locate the tnsnames.ora file in Oracle's **network/admin** sub-folder of the Oracle installation folder on your Spotlight client.

2. Edit tnsnames.ora so that the TNSNAMES entry for the target ASM instance contains the option (**UR = A**).

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