



Product Review: Quest Software's Spotlight on Oracle version 6

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Introduction

The complexity of Oracle databases continues to increase from version to version. This has negatively impacted database performance and caused:

- ❖ Entry into the field of database administration to be difficult and laden with hours of training, practice, and finding reliable sources of performance tuning information before a DBA becomes productive
- ❖ DBAs to be reluctant in seeking out or implementing tuning tasks for fear of breaking applications or causing additional performance problems
- ❖ Companies to increase hardware purchases to help hide database performance issues and deliver satisfactory runtimes for applications

Spotlight on Oracle can help remove the barrier to database administration and enable DBAs to quickly increase database performance through an easy to understand GUI that directs them to bottlenecks for tuning opportunities. It is foreseeable that Spotlight can easily reduce the amount of time it takes to find the root cause of performance problems by at least 80%. Gone are the days of extensive DBA scripting libraries and hiring the big-gun database guru to pinpoint issues. While it still takes Oracle knowledge to solve problems, with Spotlight's context-sensitive help system, even junior DBAs can quickly come up to speed, reduce uncertainty, and become productive in relieving database performance issues.

Working with Spotlight on Oracle

Regardless of how long you've been working with Oracle, and independent of the Oracle version, Oracle has always had the same basic components. An Oracle session produces a series of SQL statements that in turn generates a workload for the database. Once the workload has been submitted to the database, Oracle begins to interact with allocated CPU, memory, and storage



resources. These three resources interact with each other to produce the desired end result of a query or request to modify data. Until something goes wrong of course, and then the whole inflow of work from applications and the balance of the database suffer. The cause for the slowdown is commonly referred to as a bottleneck.

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When most DBAs get a call that something is wrong with a database, they immediately begin to search through their bag of tricks, firing off one SQL statement after another to probe the database for glimpses into potential areas where problems might exist. This is where the beauty of Spotlight's initial panel comes into play. When looking at Spotlight on Oracle, DBAs are presented with the basic architecture/components that make up an Oracle database and instance. CPU, memory, and disk activity are well presented, as well as an overall representation of sessions and processes that are interacting with these resources. All information displayed is a representation of real-time database activity on one screen so there is no reason for an administrator to run commands, refresh a screen, or begin a tuning session.

While some might think this initial panel overly simplified, it really is a superior way to quickly get to the root cause of an Oracle problem. As issues are detected by Spotlight within each component, that component turns a different color other than green, may flash, or give off an audible sound. The administrator can then quickly mouse-hover over the issue to pop up context-sensitive help, become familiar with the troubled area, and then drill down to a deeper level of detail to locate and identify the current bottlenecks. Knowing that not all Oracle databases are created equal and certain alert conditions may be of higher or lower severity to some IT shops, it was nice to see that Spotlight allows the administrator to fine tune the metrics behind each alerting mechanism—giving complete control to tailor Spotlight to the particular environment.

Adding to the drill-down panel capability, Spotlight can help a DBA with the issues at hand through a series of tools that can help solve performance issues. Since it is the SQL statements that drive the workload of a database and ultimately are the root cause of all performance issues, I was extremely happy to see both an explain plan and SQL Optimizer integrated with Spotlight.

The screenshot displays the Spotlight on Oracle v.6 interface. The top panel, titled "Top Sessions", shows a table of active sessions with columns for InstanceName, Oracle user, OS user, Machine, CPU (ms/s), and Log reads/s. The bottom panel, titled "Session Information", provides detailed information for a selected session, including Session Details, Session Waits, Session SQL, Session Locks, Track Session, and Session Statistics. A "Resource Waits" section on the right shows a circular gauge with a needle pointing to the CPU - CPU resource. The "Most recent SQL" section displays the following query:

```
SELECT x
FROM gh_logical_read_test
```

- ❖ **Explain Plan:** Displaying the execution plan is critical to any SQL statement tuning exercise. Having this feature integrated as part of Spotlight makes it easy for DBAs to quickly access a clear graphical view of the execution plan for a statement that is causing problems.
- ❖ **SQL Optimizer:** After having found SQL statements that are problematic and after looking at the explain plan for them, many DBAs find it difficult to tune SQL. This can often be a

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black-art form. Being able to jump into the SQL Optimizer tool proved quite handy in getting tuning advice. SQL Optimizer will rewrite the SQL and give multiple scenarios that allow a DBA or developer the ability to clearly see the impact of changing SQL statements.

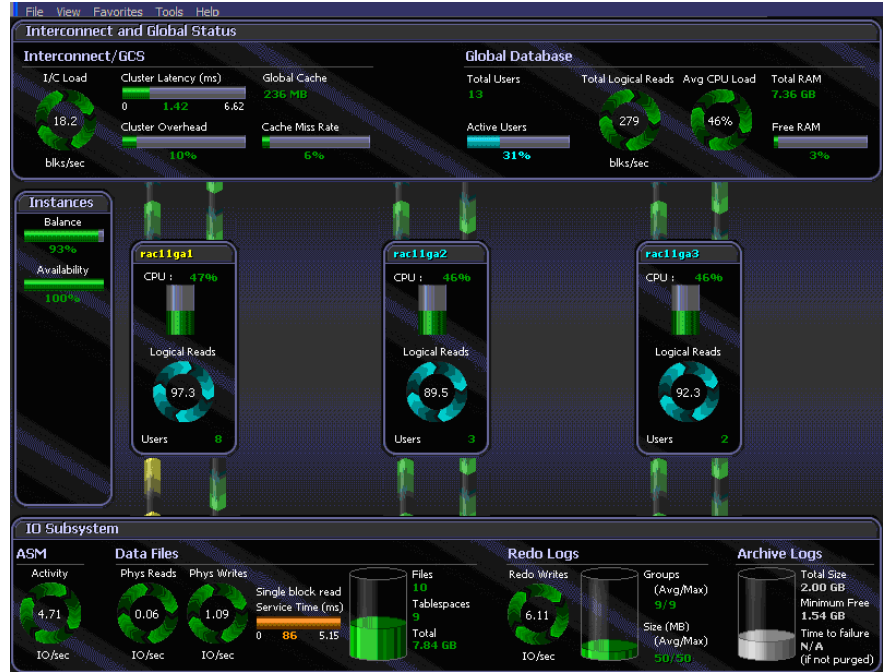
Solving the RAC issue

Oracle real application clusters (RAC) provides a database solution where a single database is shared across a cluster of servers—providing databases with scalability and high availability features. But with any high-level capability comes additional complexity in management. Clusterware, heartbeats, interconnects, and node failure, just to name a few, often scare off the best of intentions to embark on new technology. After all, DBAs have enough trouble administering a single

database instance. With RAC we are now asking our DBAs to monitor and tune multiple instances (nodes) simultaneously and with regard to each node in a RAC environment. This complexity makes it even more important for a DBA to “know his/her stuff”. Having proper tools, not a handful of scripts, is essential to the diagnosis of problems and quickly solving problems in a RAC environment.

Spotlight on Oracle running in a RAC environment extends Spotlight's approach to database diagnostics—that is, a display that mimics the database architecture itself, coupled with drilldowns and context-sensitive help—to include RAC. For example, the initial panel is clearly RAC aware and shows the interconnect, global status, and I/O subsystem, along with specific instance performance information. Clearly seen are all the components of the RAC environment being monitored and the data flow between components—providing a simple yet full and effective picture of the RAC configuration.

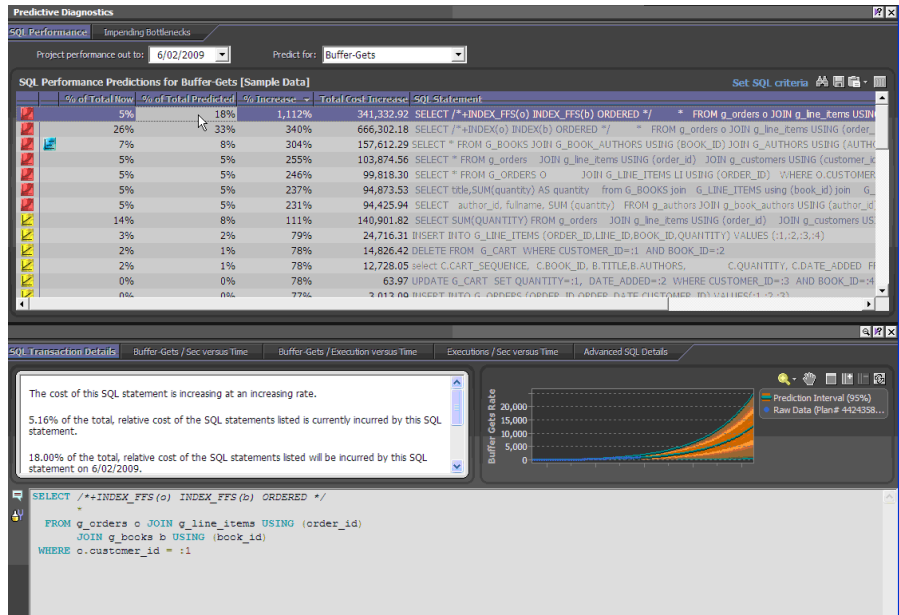
The behavior of Spotlight is always the same. Watch for an alarm, read the contextual help, drill down to the appropriate detail, and solve the bottleneck. Since nearly everything is clickable, a simple click on a RAC node takes the DBA to the basic screen for a single instance. The segregation of layers (Oracle architecture) in Spotlight is quite ingeniously done and has the potential for data centers to provide a clear separation of duties for individuals or groups of DBAs based on machines or instances.



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Predictive diagnostics

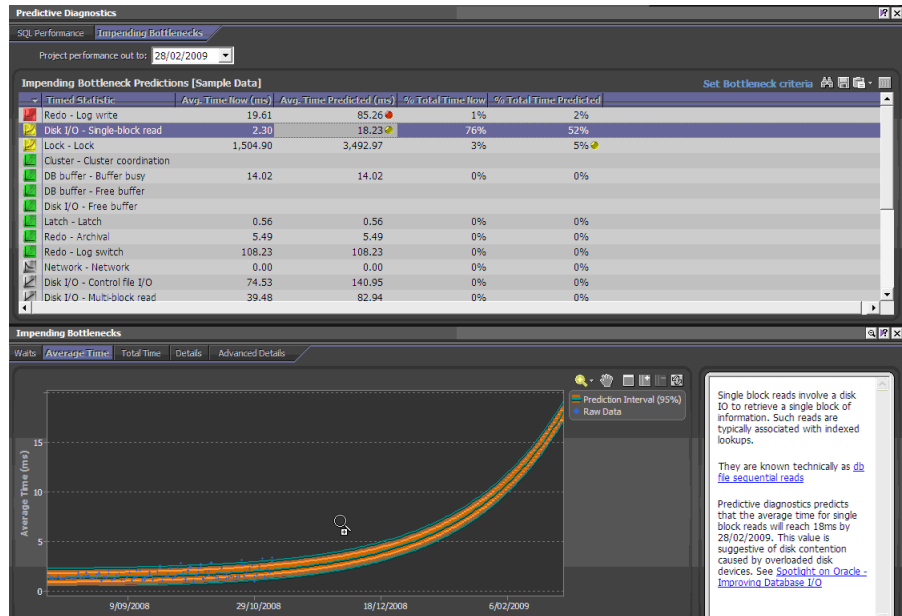
On the wish list of many DBAs—and often requested by upper management—is the ability to predict the future performance of a database. While obviously we cannot see 100% into the future, Spotlight on Oracle does do a super job of taking current trends in database performance and extrapolating them into the future for DBAs to make intelligent decisions in regard to growth, performance, and the need for additional resources.



For instance, the predictive diagnostic feature of Spotlight can collect and analyze performance metrics for SQL statements as they execute. Then, after enough performance data has been collected, Spotlight can predict the future performance for those individual SQL statements—helping DBAs to identify SQL statements whose performance may or may not scale appropriately into the future. I personally liked the way Spotlight didn't get drawn into trying to map the universe of database metrics and create some monolithic forecasting model. Instead, by focusing on SQL and zeroing in on a few key metrics (SQL costs, execution rates, time intervals, and data volumes), Spotlight can easily map, with accuracy, the future growth and cost in resource consumption. This practical approach to mapping SQL performance out over time provides sufficient lead time to change applications, modify database structures, or provision additional resources.

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Extending the predictive diagnostic feature, and new in version 6 of Spotlight on Oracle, DBAs will now be able to predict bottlenecks before they escalate and cause poor database performance in the future. In essence, Spotlight tries to predict what alarms might be raised based on current trends. Just imagine two applications, sessions, or nodes that contend for the same resource but are only intermittently causing lock, buffer, latch, or redo contention. Even if the current contention levels are not causing noticeable degradation in performance, you surely wouldn't want the contention to escalate. With Spotlight's ability to extend and predict future bottlenecks, DBAs are empowered to not only plan for the future but also take immediate action to fix intermittent problems today—improving current performance and extending resource utilization well into the future.



Problems solved

There comes a time in every DBA's career when they must ask themselves some very hard questions:

- ❖ Are the scripts/tools I use sufficient for monitoring the dynamic nature of an Oracle database?
- ❖ Can I easily get to the performance data I need to solve a problem?
- ❖ How quickly can I react to end users who are experiencing problems?
- ❖ Do I know where to begin?

Each of these questions—and there are many more—revolves around the need to solve problems in Oracle quickly. With Spotlight, administrators are liberated from the endless revolving door of searching for problems, haphazardly implementing a solution, and then not seeing benefits—only to be at the same place they began without a clue. Frankly, Spotlight on Oracle provides a clear-cut methodology to easily and quickly find and fix performance bottlenecks. Where manual methods of running one script after another or looking at static health reports produce confusion, Spotlight instead guides users with colors, alarms, and context-sensitive help through to the root cause of a problem. No other product I've seen really does this as cleanly and from an Oracle architectural standpoint like Spotlight does.

Spotlight is more than a performance bottleneck tuning tool. It is in effect well on its way to becoming an architectural tool. We all know that data has a tendency to grow exponentially—opening up application and database performance to gradually deteriorate. Using predictive diagnostics, Spotlight can effectively help an administrator see into the future and predict performance problems before they happen. With Spotlight, DBAs are equipped to be proactive and

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plan for the future—taking a lot of the guessing game out of the picture and providing a real tool, with real performance data, to postulate and solve architectural problems.

Who should use it

Very clearly Spotlight on Oracle is a DBA tool for finding and fixing performance bottlenecks. But we must not forget that databases are not only maintained by DBAs, but they are accessed by applications built by developers, modeled by data modelers and architects, and run on hardware platforms maintained by system administrators. Each of these disciplines needs more information, not less, to properly tune databases, applications, and systems.

- ❖ DBAs are the gate-keepers to Oracle databases and as such will use this product to find bottlenecks, tune those bottlenecks, and direct appropriate issues to other resources within IT for clarification and assistance
- ❖ Developers will benefit by watching their applications and core SQL execute in real-time—watching the SQL execution plans generated, how SQL statements perform and then validating access paths are optimal for the current environment
- ❖ Modelers and architects can learn how to better model databases by ensuring database objects are being accessed by SQL appropriately—validating indexes are being used and limited contention issues exist for the database objects they've modeled
- ❖ System administrators can gain a better understanding of the interaction of the Oracle database and the platform it is running on—keeping a close eye on CPU, memory, and storage resources

What about Oracle's Enterprise Manager (OEM)

Everyone likes to use products straight out-of-the-box and many organizations will use Oracle's Enterprise Manager (OEM) just because it is available. Over the years, OEM has saved many database shops—enabling DBAs to quickly and easily manage corporate databases. Gone are the days of command-line guru DBAs, bags-o-scripts, and monochrome monitors. A new breed of DBA has emerged that embraces GUIs, knows how to use a mouse, and increasingly wants to help drive business results. This is ultimately where I think Spotlight on Oracle fits in. OEM is a good tool that has become the de facto for bringing together the vast number of features and plug-ins within a database environment. But OEM has become somewhat of a monolithic giant that is unwieldy. One only need look at the documentation page for OEM to get a feel for the vast undertaking in configuration, maintenance, and use. Often a DBA just needs a quick and clean method to find immediate solutions to current problems. OEM, in my opinion, still lacks ease of use in pinpointing these current problems and providing a DBA with a clear indication of a solution. Its Web interface, textual nature, difficulty in understanding, and slow response make it difficult to navigate and engage a DBA. Spotlight on Oracle, on the other hand, is intuitive, provides a breadth of information, and steps a DBA through solving problems.

Improvement areas

As with any tool, there are areas for improvement. While the predictive diagnostics are critical to tuning and planning for future growth, this feature needs to tie more directly to causes of anticipated performance problems. Key metrics such as data growth, structural changes, and transaction frequency are available and should be more readily linked.

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Oracle has undergone extreme changes in the last two releases. Spotlight needs to embrace more of these changes, expand into them, and expose these new statistics. This would not only improve real-time analysis but also help validate more extensively the predictive nature of the product.

Conclusion

A simple but effective way to think about Oracle performance—and one that is readily understood across the ranks of DBAs and other IT professionals—is from the perspective of the database architecture itself. Spotlight on Oracle clearly understands this—grouping key components of the Oracle architecture to easily pinpoint performance problems. By effectively grouping the thousands of metrics generated by an Oracle instance or cluster, Spotlight boils the ocean to bubble up the key items we should be concerned with. Spotlight's presentation layer, with the ability to drill down, investigate, and predict performance issues, clearly supplies a quick and efficient method for tuning an Oracle database—saving DBA, computing, and hardware resources.