

# ORACLE TUNING PACK



## FEATURES

- SQL Tuning Advisor
- Automatic SQL Tuning Advisor
- Real-Time SQL Monitoring
- SQL Profiles
- SQL Access Advisor
- SQL Tuning Sets
- Object Reorganization Wizard

## BENEFITS

- Comprehensive solution for application and SQL tuning that eliminates need for manual tuning.
- Provides automatic tuning of SQL statements.
- Enhances system performance and reliability and significantly lowers management costs.

*Oracle Tuning Pack, an add-on pack for management of Oracle Database 11g, offers an extremely cost effective and easy-to-use solution that automates the entire application tuning process. Enhancement of SQL performance is achieved through real-time monitoring and SQL Advisors that are seamlessly integrated with the Enterprise Manager, and together provide a comprehensive solution for automating the complex and time-consuming task of application tuning.*

For database administrators and application developers, application tuning is a critically important area and a considerable amount of their time is spent performing this very important function. A poorly tuned business application can potentially affect not just a few users but an entire business operation and for this reason companies invest significant resources to ensure smooth running of applications vital for their businesses.

### **SQL Access Advisor**

The design of the database schema can have a big impact on the overall application performance. SQL Access Advisor, provides comprehensive advice on how to optimize schema design in order to maximize application performance. SQL Access and SQL Tuning Advisors, together, provide a complete solution for tuning database applications. The SQL Access Advisor accepts input from all possible sources of interest, such as the cursor cache, the Automatic Workload Repository (AWR), any user-defined workload, and will even generate a hypothetical workload if a schema contains dimensions or primary/foreign key relationships. It comprehensively analyzes the entire workload and provides recommendations to create new partitions or indexes if required, drop any unused indexes, create new materialized views and materialized view logs. Determining the optimal partitioning or indexing strategy for a particular workload is a complicated process that requires expertise and time. SQL Access Advisor considers the cost of insert/update/delete operations in addition to the queries on the workload and makes appropriate recommendations, accompanied by a quantifiable measure of expected performance gain as well as scripts needed to implement the recommendations. The SQL Access Advisor takes the mystery out of access structure design process. By automating this very critical function, SQL Access Advisor obviates the need for the error-prone, lengthy, and expensive manual tuning process.

### **SQL Tuning Advisor**

Manual SQL tuning is a complex process that presents many challenges. It requires expertise in several areas, is very time consuming, and requires an intimate

knowledge of the schema structures and the data usage model of the application. All these factors make manual SQL tuning a challenging and resource intensive task that is ultimately very expensive for businesses.

SQL Tuning Advisor is Oracle's answer to all the pitfalls and challenges of manual SQL tuning. It automates the SQL tuning process by comprehensively exploring all the possible ways of tuning a SQL statement. The analysis and tuning is performed by the database engine's significantly enhanced query optimizer. Four types of analysis are performed by the SQL Tuning Advisor:

- **Statistics Analysis:** In this analysis objects with stale or missing statistics are identified and appropriate recommendations are made to remedy the problem.
- **SQL Profiling:** This feature, introduced in Oracle Database 10g, revolutionizes the approach to SQL tuning. SQL Profiling tunes SQL statements without requiring any change to the application code.
- **Access Path Analysis:** In this analysis new indexes that can significantly enhance query performance are identified and recommended.

The output of this analysis is in the form of recommendations, along with a rationale for each recommendation and its expected performance benefit.

The SQL Tuning Advisor offers a powerful, intuitive, and user-friendly way for performing SQL tuning. Tuning of SQL statements no longer has to be the domain of experts. Oracle has built a tuning expert inside the database engine to perform this very important function for the database administrators in a fraction of the time and cost needed to carry out the same task manually.

### Automatic SQL Tuning Advisor

The SQL Tuning Advisor also runs in automatic mode. In this mode, the advisor runs automatically during system maintenance windows as a maintenance task. During each run, the advisor selects high-load SQL queries in the system, and generates recommendations on how to tune them.

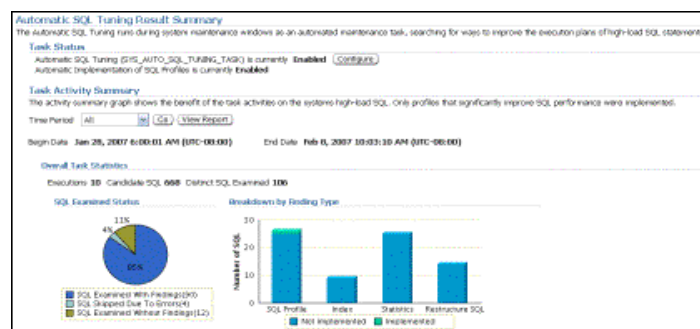


Figure 1: Automatic SQL Tuning Results Summary

The Automatic SQL Tuning Advisor can be configured to auto-implement SQL Profile recommendations. If you enable automatic implementation, the advisor will create SQL Profiles for only those SQL statements where performance improvement would be at least threefold. Other types of recommendations such as to create new

indexes, refresh optimizer statistics or restructure SQL can only be implemented manually. DML statements are not considered for tuning by the Automatic SQL Tuning Advisor.

You can view a summary of the automatic SQL tuning results over a specified period, and can view a detailed report on recommendations made for all SQL statements processed. The recommendations can then be implemented selectively by a manual process. You can also view the recommendations that were automatically implemented.

### Real-time SQL Monitoring

The first step in SQL tuning is identifying poor SQL that is consuming excessive system resources. Traditionally, DBAs have always struggled with long-running SQL in live production environments because they never had the tools to figure out if the long-running query was moments away from completion or a run-away query that could take an inordinate amount of time to complete. Real-Time SQL Monitoring introduced in Oracle Database 11g provides the fastest and easiest way to identify and fix performance problems with long running SQL statements. Live visual displays track the details of SQL execution using new, fine-grained SQL statistics that are updated automatically at no cost to the performance of production systems.

By default, SQL monitoring is automatically started when a SQL statement runs parallel, or when it has consumed at least 5 seconds of CPU or IO time in a single execution. Once monitoring is initiated, an entry is added to performance views. This entry tracks row source information at each step of the execution collecting key performance metrics, including the elapsed time, CPU time, number of reads and writes, I/O wait time and various other wait times. This allows the DBAs to decide whether to let the query complete or terminate the query.

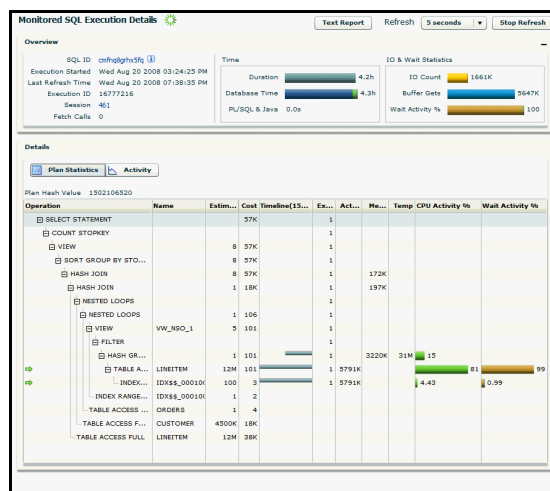


Figure 1: Real Time SQL Monitoring

Real Time SQL Monitoring has been enhanced in Oracle Database 11g Release 2 to support execution plans that are being executed in part by the Oracle Database

**ORACLE TUNING PACK**

Oracle Tuning Pack 11g delivers maximum benefits when used with the following Oracle products:

## RELATED PRODUCTS

- Oracle Diagnostics Pack
- Oracle Configuration Management Pack
- Oracle Provisioning Pack
- Oracle Database Change Management Pack
- Oracle Real Application Testing Option

machine, Exadata.

DBAs now have a powerful tool to track complex execution plans, identify poor indexing mechanisms and identify skew in parallel queries— all in real time.

**Object Reorganization Wizard**

Oracle Tuning Pack also provides the ability to reorganize objects. Managing the space usage of your tablespaces efficiently by removing wasted space is not only a good space management practice but it also enhances performance by reducing unnecessary disk I/Os. Reorganization is used for: 1) rebuilding indexes and tables that are fragmented, 2) relocating objects to another tablespace, and 3) recreating objects with optimal storage attributes.

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