Introduction to Tuning Oracle SQL

CDT683

This course provides an introduction to tuning SQL and PL/SQL to improve performance. Students will learn concepts including the optimizer, statement processing, and execution plans. They will learn to use several tools to investigate how and why statements are executed in specific ways, how to change execution, and how to measure the effects of various changes. This course does not cover tuning the database itself by means such as adjusting memory alllocation.

Audience
- Application developers, system analysts, and DBAs who need to know how to improve the performance of their SQL commands and PL/SQL code by changing the code itself.

Course Length
- Three Days

Prerequisites
- Students must have a good foundation in the basics of manipulating databases using SQL and PL/SQL, including the ability to use an Oracle interface such as SQL*Plus or iSQL.

Teaching Methods
- Lectures and examples
- Hands-on exercises

Course Outline

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Introduction
- Why Tuning is Needed
- The Goals of SQL Tuning
- The Optimizer
- lBarriers to SQL Tuning
- lThe Process of SQL Tuning
- Other Factors in Oracle Tuning

SQL Statement Processing
- The SQL Statement Processing Steps
- CBO Statistics
- Parsing

EXPLAIN PLAN and AUTOTRACE
- Using EXPLAIN PLAN to view the optimizer's execution plan
- Creating a table to hold the execution plan
- Viewing the contents of the plan table with a utility
- Viewing the contents of the plan table with a script to select desired fields
- Clearing the plan table
- Using AUTOTRACE to view the execution plan
- Using AUTOTRACE to generate resource usage statistics
- AUTOTRACE options
- Using TIMING to determine elapsed time

Improving SQL Performance
- Processing Options
- Table Access Methods
- Index Access Methods
- Join Operations
- Table Scans
- Indexes
- Hints
- Joins
- Views
- Subqueries
- Sorts
- SELECT
- Predicates
- RANK

Optimization
- How the Oracle Optimizer works
- Cost-Based Optimization
- Hints

SQL_TRACE and TKPROF
- Using SQL_TRACE to generate execution statistics
- Using TKPROF to format the trace output
- Calculating performance ratios in trace output
- Comparing SQL_TRACE to AUTOTRACE

OUTLINE
- Creating a permanent optimization plan

Special Topics
- Materialized Views and Query Rewrite
- Parallel Query
- Index Clusters
- Bitmapped Index
- Function-Based Index
- Histograms
- Star Query
- Partitions

Summary
- The Tuning Environment
- A Process for SQL Tuning