Oracle SQL Tuning

Description

This training provides an in-depth exploration of concepts and techniques for improving **Oracle SQL performance**. It covers SQL tuning principles, optimizer fundamentals, execution plan analysis, table and index access methods, join types, optimizer statistics, parameterized SQL usage, and SQL plan management. Participants will gain hands-on experience through practical exercises on real database scenarios.

Audience

- Database Administrators
- Software Developers
- Performance Analysts
- All professionals interested in Oracle SQL performance

Learning Outcomes

- Understand SQL tuning methodology
- Identify and analyze inefficient SQL queries
- Comprehend the core logic of the optimizer
- Read and interpret SQL execution plans
- Resolve performance issues using hints and plan management

Outline

Introduction to SQL Tuning

- What is SQL Tuning

- Recognize: What is Bad SQL
- Clarify: Understand the Current Issue
- Verify: Collect Data
- Verify: Is Bad SQL a Real Problem (Top-Down Analysis)
- Sanity Check
- Advanced SQL Tuning Analysis
- Parse Time Reduction
- Plan Comparison
- Query Analysis

Optimizer Fundamentals

- SQL Statement Processing
- Why Do You Need an Optimizer
- Query Transformer
- Estimator: Selectivity and Cardinality
- Plan Generator
- Adaptive Query Optimization
- Quarantined SQL Plans
- Controlling the Behavior of the Optimizer

Creating and Viewing SQL Plans

- What is an Execution Plan
- Reading an Execution Plan
- Reviewing an Execution Plan
- Viewing Execution Plans
- The EXPLAIN_PLAN Command
- PLAN_TABLE
- AUTOTRACE
- Using the V$SQL_PLAN View
- Automatic Workload Repository (AWR)
- SQL Monitoring

Table Partition Types and Operations

- List Partition
- Range Partition
- Hash Partition
- Composite Partition

- Interval Partition
- CREATE TABLE PARTITION BY

Understanding SQL Plans and Their Characteristics

- Execution Order of Plan Steps
- Adaptive Plans
- SQL Advisors

Table and Index Access Methods

- Full Table Scan
- ROWID Scan
- Sample Table Scan
- Index Scan (Unique)
- Index Scan (Range)
- Index Scan (Full)
- Index Scan (Fast Full)
- Index Scan (Skip)
- Index Scan (Index Join)
- Bitmap Index
- Bitmap Index Combine

Join Types

- Nested Loop Join
- Sort-Merge Join
- Hash Join
- Cartesian Join
- Equijoin / Natural / Nonequijoin
- Outer Join (Full, Left, Right)
- Semi Join (EXISTS)
- Anti Join (NOT IN)

Optimizer Statistics Concepts

- Table Statistics
- Index Statistics
- Column Statistics (Histogram)
- Column Statistics (Extended Statistics)

- Global Temporary Tables
- System Statistics

Parameterized SQL Usage and Benefits

- Cursor Sharing and Bind Variables
- Bind Variable Peeking
- Adaptive Cursor Sharing

Prerequisites

Basic knowledge of Database and SQL