Oracle Database 19c: SQL Tuning Workshop

Course Duration: 24 Hours **Course code:19c SQL Tuning**

1. Course Overview

This workshop provides practical knowledge and hands-on experience in tuning SQL queries for optimal performance in Oracle Database 19c. Participants will learn how to diagnose performance problems, analyze execution plans, optimize SQL statements, and leverage Oracle tuning tools and techniques. The course emphasizes real-world troubleshooting, best practices, and proactive performance monitoring. By the end of the workshop, learners will be able to improve query performance, reduce resource consumption, and enhance overall database efficiency.

2. What you'll learn?

By the end of the course, you should be able to:

- Understand SQL performance tuning fundamentals
- Diagnose and resolve slow-running SQL queries
- Analyze execution plans using Oracle tools
- Apply indexing strategies and SQL rewriting techniques
- Utilize Oracle Optimizer statistics and hints
- Use SQL Tuning Advisor and SQL Access Advisor
- Monitor SQL performance using Oracle Enterprise Manager
- Implement best practices for SQL performance optimization

3. Target Audience

- Database Administrators (DBAs)
- SQL Developers
- Application Developers responsible for query performance
- IT Professionals focusing on database performance and optimization

4. Pre-Requisites

Familiarity with:

- Oracle Database Administration (basic to intermediate)
- SQL and PL/SQL fundamentals
- Understanding of database schemas and indexing

5. Course content

Module 1: Course Introduction

- Introduction
- Course contents

Module 2: SQL Performance Fundamentals

- SQL processing in Oracle Database
- Cost-based optimizer overview
- Understanding SQL execution flow
- Common causes of SQL performance issues

Module 3: Analyzing SQL Execution Plans

- Using EXPLAIN PLAN and DBMS_XPLAN
- Understanding operation types (joins, scans, sorts)
- Identifying bottlenecks from execution plans

Module 4: Optimizer Statistics and Hints

- Gathering and interpreting optimizer statistics
- Role of histograms and cardinality estimates
- Using optimizer hints for query tuning

Module 5: Indexing Strategies for SQL Tuning

- Types of indexes and their use cases
- Index monitoring and maintenance
- Avoiding index-related performance pitfalls

Module 6: SQL Rewriting and Query Optimization

- Using subquery unnesting and join methods
- Transforming SQL for efficiency
- Reducing logical and physical I/O

Module 7: SQL Tuning Advisor and SQL Access Advisor

- Overview and setup of SQL Tuning Advisor
- SQL Access Advisor for indexing and materialized views
- Implementing recommendations and tracking improvements

Module 8: Monitoring SQL Performance

- Using Oracle Enterprise Manager for SQL monitoring
- AWR (Automatic Workload Repository) and ASH (Active Session History) reports
- Identifying long-running queries and resource-intensive SQL

Module 9: Advanced SQL Tuning Techniques

- Parallel execution and partitioning considerations
- Bind variable peeking and adaptive cursor sharing
- Using SQL profiles and SQL plan baselines

Module 10: Real-World SQL Tuning Scenarios

- Case studies and hands-on labs
- Troubleshooting common SQL performance issues
- Best practices for ongoing SQL tuning

Module 11: Wrap-Up and Best Practices

- Summary of SQL tuning strategies
- Performance optimization checklist
- Q&A and next steps

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