Oracle Performance Tuning – 40 Hours

Course description

This advanced, hands-on course provides a deep understanding of the core principles and practices of Oracle Performance Tuning. Participants will learn how Oracle works under the hood, how to analyze performance bottlenecks, and how to optimize SQL queries and database design for real-world production environments.
The course covers Oracle architecture, indexes and execution plans, SQL tuning, tracing, performance reports (AWR, ASH, ADDM), optimizer statistics, partitioning strategies, and real-life optimization scenarios. Emphasis is placed on practical techniques, diagnostic tools, and decision-making skills required to improve performance, stability, and scalability of Oracle-based systems in enterprise environments.

What Participants Gain?

- Deep understanding of Oracle architecture and how it impacts performance
- Ability to analyze execution plans and identify performance bottlenecks
- Practical skills in SQL tuning and query optimization
- Using tracing and monitoring tools (AWR, ASH, ADDM, SQL Trace, TKPROF) to diagnose issues
- Designing and using indexes efficiently, including advanced index types
- Applying partitioning strategies to improve performance and data management
- Managing optimizer statistics and ensuring plan stability in production
- Rewriting SQL and applying hints to improve execution plans in real-world scenarios

Prerequisites

- Practical experience with SQL
- Basic familiarity with relational databases
- Experience working with Oracle databases – an advantage

Target Audience

- Oracle developers
- Database Administrators (DBAs)
- QA engineers working with database-intensive systems
- Project managers involved in database-heavy projects
- Team leaders responsible for performance and scalability

Course Syllabus

Oracle Architecture

- Database and instance
- Buffer Cache and Shared Pool
- Logical storage: tablespaces and segments

Indexes

- B*Tree index structure
- Indexes vs. full table scans
- Unique vs. non-unique indexes
- Single-column and composite indexes

SQL Tuning & Execution Plans

- Identifying high-load SQL (OEM, AWR, tracing)
- Retrieving execution plans (Autotrace, DBMS_XPLAN, EXPLAIN PLAN)
- Oracle Optimizer concepts: cost, cardinality, selectivity
- Constraints and keys for data integrity
- Oracle client tools: SQL*Plus, SQL Developer
- Performance considerations and new Oracle features

Influencing Execution Plans

- Hints, optimizer statistics, parameters, SQL rewrites

Access Paths & Join Methods

- Full scans, index access, RowID access
- Index scans: unique, range, full, fast full
- Join algorithms: nested loops, sort-merge, hash join

Real-Time Execution Statistics

- SQL Monitoring
- Actual vs. estimated plan values
- Logical vs. physical I/O

SQL Rewriting for Performance

- Practical tips, tricks, and real-life examples

Application Tracing

- SQL Trace and TKPROF
- DBMS_APPLICATION_INFO, DBMS_MONITOR, TRCSESS

Performance Reports

- AWR, ASH, ADDM reports

Advanced Indexing

- Efficient index usage
- Function-based indexes, composite indexes, invisible indexes
- Indexes with expressions and NULL values
- Indexes and DML considerations

Partitioned Tables

- Partitioning concepts
- Global vs. local indexes
- Partition pruning

Data Cleanup & Maintenance

- High-water mark
- Delete vs. truncate vs. drop
- Partition-based data purging

Optimizer Statistics

- Gathering statistics (table, schema, database)
- Histograms and extended statistics
- Automatic statistics gathering
- Statistics locking and restoring

Real-World SQL Tuning

- Practical optimization examples throughout the course