Oracle Database 11g: SQL Tuning Workshop

Duration: 3 Days

What you will learn
This Oracle Database 11g: SQL Tuning Workshop Release 2 training assists database developers, DBAs and SQL developers in identifying and tuning inefficient SQL statements. You'll explore investigative methods to reveal varying levels of detail about how the Oracle database executes the SQL statement; this helps you determine the root causes of the inefficient SQL statements.

Learn To:

- Use Oracle tools to identify inefficient SQL statements.
- Use Automatic SQL Tuning.
- Use Real Time SQL monitoring.
- Write more efficient SQL statements.
- Monitor and trace high load SQL statements.
- Manage optimizer statistics on database objects.
- Interpret execution plans, and the different ways in which data can be accessed.

Benefits to You
Gain expertise in relational database data management as you learn how to effectively use SQL commands against your business data. These features will help you query and manipulate data within the database, use the dictionary views to retrieve metadata and create reports about their schema objects.

Explore the Optimizer
Expert instructors will also help you explore how the optimizer chooses the path. You'll also learn how to influence the optimizer to ensure the best method is used.

Automatic SQL Tuning Tools
This course covers Automatic SQL Tuning tools and resources available in the Automatic Workload Repository. Furthermore, take advantage of bind variables, trace files and different types of indexes.

Note: this course is based on Oracle Database 11g Release 2.

Application Developers
Data Warehouse Administrator
Data Warehouse Developer
Database Administrators
Developer
Related Training

**Required Prerequisites**

Oracle Database: Introduction to SQL

**Course Objectives**

- Identify poorly performing SQL
- Trace an application through its different levels of the application architecture
- Understand how the Query Optimizer makes decisions about how to access data
- Define how optimizer statistics affect the performance of SQL
- List the possible methods of accessing data, including different join methods
- Modify a SQL statement to perform at its best

**Course Topics**

**Exploring the Oracle Database Architecture**

- Oracle Database Server Architecture: Overview
- Connecting to the Database Instance
- Physical Structure
- Oracle Database Memory Structures: Overview
- Automatic Shared Memory Management
- Automated SQL Execution Memory Management
- Database Storage Architecture, Logical and Physical Database Structures
- Segments, Extents, and Blocks & SYSTEM and SYSAUX Tablespaces

**Introduction to SQL Tuning**

- Reason for Inefficient SQL Performance
- Performance Monitoring Solutions
- Monitoring and Tuning Tools: Overview
- CPU and Wait Time Tuning Dimensions
- Scalability with Application Design, Implementation, and Configuration
- Common Mistakes on Customer systems & Proactive Tuning Methodology
- Simplicity in Application Design
- Data Modeling, Table Design, Index Design, Using Views, SQL Execution Efficiency, Overview of SQL*Plus & SQL Deve

**Introduction to the Optimizer**

- Structured Query Language
- SQL Statement Parsing: Overview
- Why Do You Need an Optimizer?
Optimization During Hard Parse Operation
Transformer & Estimator
Cost-Based Optimizer
Plan Generator
Controlling the Behavior of the Optimizer, Optimizer Features and Oracle Database Releases

Interpreting Execution Plans
What Is an Execution Plan? Where To Find Execution Plans and Viewing Execution Plans
Plan Table & AUTOTRACE
Using the V$SQL_PLAN View
Automatic Workload Repository (AWR)
SQL Monitoring: Overview
Interpreting an Execution Plan
Reading More Complex Execution Plans and Reviewing the Execution Plan
Looking Beyond Execution Plans

Application Tracing
End-to-End Application Tracing Challenge
Location for Diagnostic Traces
What is a Service? Use Services with Client Applications & Tracing Services
Use Enterprise Manager to Trace Services
Session Level Tracing: Example
The tcrsess Utility and SQL Trace File Contents
Invoking the tkprof Utility and Output of the tkprof Command
tkprof Output with and without Index: Example

Optimizer: Table and Index Operations
Row Source Operations, Main Structures and Access Paths
Full Table Scan
Indexes: Overview and B*-tree Indexes and Nulls
Using Indexes: Considering Nullable Columns
Index-Organized Tables
Bitmap Indexes, Bitmap Operations and Bitmap Join Index
Composite Indexes and Invisible Index
Guidelines for Managing Indexes and Investigating Index Usage

Optimizer Join Methods
Nested Loops Join
Nested Loops Join: 11g Implementation
Sort Merge join
Hash Join and Cartesian Join
Equijoins and Nonequijoins
Outer Joins
Semijoins
Antijoins

Optimizer: Other Operators
When Are Clusters Useful?
Sorting Operators and Buffer Sort Operator
Inlist Iterator and View Operator
Count Stop Key Operator
Min/Max and First Row Operators and Other N-Array Operations
Filter operations and Concatenation Operations
UNION [ALL], INTERSECT, MINUS
Result Cache Operator

**Case Study: Star Transformation**
The Star Schema Model and The Snowflake Schema Model
Star Transformation
Retrieving Fact Rows from One Dimension and from All Dimensions
Joining the Intermediate Result Set with Dimensions
Star Transformation Plan Examples
Star Transformation Hints
Using Bitmap Join Indexes
Bitmap Join Indexes: Join Model 1 to 4

**Optimizer Statistics**
Types of Optimizer Statistics
Table, Index and Column Statistics
Index Clustering Factor
Histograms, Frequency Histograms and Histogram Considerations
Multicolumn Statistics and Expression Statistics Overview
Gathering System Statistics and Statistic Preferences
Manual Statistics Gathering
Locking Statistics, Export/Import Statistics and Set Statistics

**Using Bind Variables**
Cursor Sharing and Different Literal Values
Cursor Sharing and Bind Variables
Bind Variable Peeking
Cursor Sharing Enhancements
The CURSOR_SHARING Parameter
Forcing Cursor Sharing
Adaptive Cursor Sharing
Interacting with Adaptive Cursor Sharing

**Using SQL Tuning Advisor**
Tuning SQL Statements Automatically
Application Tuning Challenges
SQL Tuning Advisor: Overview
Stale or Missing Object Statistics and SQL Statement Profiling
Plan Tuning Flow and SQL Profile Creation
SQL Tuning Loop, Access Path Analysis and SQL Structure Analysis
Database Control and SQL Tuning Advisor
Implementing Recommendations

**Using SQL Access Advisor**
SQL Access Advisor: Overview
Possible Recommendations
SQL Access Advisor Session: Initial Options
SQL Access Advisor: Workload Source
SQL Access Advisor: Recommendation Options
SQL Access Advisor: Schedule and Review
SQL Access Advisor: Results
SQL Access Advisor: Results and Implementation

Using Automatic SQL Tuning
- SQL Tuning Loop
- Automatic SQL Tuning
- Automatic Tuning Process
- Configuring Automatic SQL Tuning
- Automatic SQL Tuning: Result Summary
- Automatic SQL Tuning: Result Details
- Automatic SQL Tuning Result Details: Drilldown
- Automatic SQL Tuning Considerations

SQL Performance Management
- Maintaining SQL Performance and SQL Plan Management: Overview
- SQL Plan Baseline: Architecture
- Important Baseline SQL Plan Attributes
- SQL Plan Selection
- Possible SQL Plan Manageability Scenarios
- SQL Performance Analyzer and SQL Plan Baseline Scenario
- Loading a SQL Plan Baseline Automatically and Purging SQL Management Base Policy
- Enterprise Manager and SQL Plan Baselines

Related Courses

Oracle Database 11g: SQL Tuning Workshop