Oracle Database 11g: SQL Tuning Workshop Release 2

Duration: 3 Days

What you will learn

This course assists database developers, DBAs, and SQL developers to identify and tune inefficient SQL statement. It covers investigative methods to reveal varying levels of detail about how the Oracle database executes the SQL statement. This allows the student to determine the root causes of the inefficient SQL statements.

Students learn to interpret execution plans, and the different ways in which data can be accessed. They will learn how the optimizer chooses the path and how to influence the optimizer to ensure that the best method is used. This course covers Automatic SQL Tuning tools, and resources available in the Automatic Workload Repository, in addition to taking advantage of bind variables, trace files, and different types of indexes.

This course is based on Oracle Database 11g Release 2.

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

Application Developers
Data Warehouse Administrator
Data Warehouse Developer
Database Administrators
Developer
PL/SQL Developer
Support Engineer

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 trcsess 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 - Self-Study Course