

## Course 275: Oracle Tuning: Diagnostics, Tools and Techniques (3 days)

### Course Overview:

This course will help experienced DBAs learn techniques for identifying existing performance problems, correcting those problems and how to prevent/avoid future performance problems. Participants will gain experience with the tools and techniques used to diagnose and correct performing problems.

### You will learn to...

- Use tools and techniques that are used to identify and improve poor performing SQL statements
- Identify how the Optimizer and other Oracle components can be used to improve performance
- Use OEM, TKPROF, DBMS\_SYSTEM, DBMS\_STATS, SQL Trace, DBMS\_XPLAN

## COURSE OUTLINE

### Unit 1: Guidelines for Identifying Performance Problems

- Identifying the causes of poor performance (System, Schema, SQL)
- Discuss how the various causes can be addressed (intro the tuning process)
- Sequence the steps involved in the tuning methodology.
- Identify the guidelines to be followed when applying the tuning methodology.
- **Lab: Querying v\$sql, v\$sql\_area and v\$sql\_plan to identify worst SQL**
- Discuss/match the columns of the V\$LIBRARYCACHE view with the information that they contain.
- Discuss/match the columns of the V\$SQLAREA view with the information that they contain.

### Unit 2: Using Explain Plan

- Understanding the Explain Plan Command and columns on the Plan Table
- Explaining statements using OEM
- Learning what and how to obtain the information needed to identify performance problems
- Setting up and using DBMS\_XPLAN to get the most accurate plan.



## Unit 3: Using SQL Trace

- Setting SQL tracing in SQL Plus
- Setting SQL Tracing for the instance
- Locating your trace file, finding the dump directory and your Process ID
- Using dbms\_system.set\_sql\_trace\_in\_session to trace other sessions
- Reading Trace files using TKPROF
- Reading Raw Trace Files – Wait event tuning
- **Lab: Setting up and using SQL trace**

## Unit 4: Getting the most out of Tracing - Setting Trace Events

- Identify the common events used for tracing
- How to set events for the session using ‘Alter session set events’
- Using 10046 Tracing Event – tracing wait events, bind variable, plans
- Using 10053 Tracing Event – tracing possible optimizer plans
- Other events – 100928, 100938, 100731
- Use dbms\_system to set events in other peoples sessions for tracing.
- **Lab: Solving a performance problem using the techniques and information learned in units 1 –4**

## Unit 5: Understanding the Optimizer

- Explaining how the Optimizer functions and identifying its components
- Explaining the transformations that an Optimizer makes to a SQL statement
- List the Optimizer parameters and identify how they can be used to improve performance,
- Highlight the differences in the Optimizer between 9i and 10G
- What is Cardinality?
- What is Selectivity?
- What is the difference?
- Discuss Skewed Data and its impact
- Identify basic mathematical computations the CBO Uses to COST explain plans
- **Lab: Using Hidden Optimizer parameters/Setting Optimizer parameters**

## Unit 6: Histograms

- What is a histogram and what are the various types (Frequency, Height Balanced, Equi-Depth)
- Guidelines for using histograms (when to use them / when not to use them / how to use them)
- Discuss Skewed Data and its impact
- **Lab: Determining which columns are / are not candidates for a histogram**

## Unit 7: DBMS\_STATS

- DBMS\_STATS: What is it and which procedures are most relevant
- How to determine frequency of generating statistics
- Generating statistics with DBMS\_STATS and factors to consider (Method\_Opt options,cascade)
  - should I use: “FOR ALL COLUMNS, FOR ALL INDEXED COLUMNS”?



- what should I use for SIZE: an integer, SKEWED ONLY, AUTO (\*histogram)
- when to gather statistics on index
- Setting STATS with DBMS\_STATS (“manually”)
- Using DBMS\_STATS to moving statistics from one instance to another
- Using DBMS\_STATS to monitor table changes
- **Lab: Using key DBMS\_STATS procedures**

## Unit 8: Hints

- Definition of HINT and Identification of the most common hints and their usage
- Locate the “definitive list” of hints
- How HINTS work
- **Lab:**
  - **Identifying when to use a HINT and when not to use a HINT**
  - **Determining when a HINT is being used**
  - **Identifying “bad” HINTS**

## Unit 9: Plan Stability (When you can’t risk changes in application performance)

- What is Plan Stability, what are Outlines
- Outline parameters
- Outlines: how to create them and how to use them
- Brief overview USER\_OUTLINES and USER\_OUTLINE\_HINTS views
- **Lab: How to enable Outlines**  
**(which parameters to set and highlight issues with parameters**  
**QUERY\_REWRITE\_ENABLED, STAR\_TRANSFORMATION\_ENABLED**  
**and OPTIMIZER\_FEATURES\_ENABLE)**
- Identify how cursor\_sharing affect outline usage
- Maintaining/working with Outlines:
  - How to view Outline data
  - How to tell if an Outline is being used
  - How to disable an Outline
  - How to move (export & import) Outlines tables
  - Fixing/changing Outlines
- **Lab: Viewing, verifying usage, disabling, moving and changing Outlines**

## Unit 10: Monitoring Index usage and Column Usage

- Identify which indexes are being used
- Identify which columns are used in where clauses
- Monitor v\$sql tables for Predicate data
- What is clustering Factor
- How is clustering Factor calculated
- How is clustering factor affected by DBMS\_STATS
- **LAB: How clustering factor is determined and used**



## Unit 11: Group Exercises

- Tuning an SQL statement using OEM (SQL Analyze, TopSQL, Hint and Tuning Wizards)
- Fixing statements using a histogram
- Identifying if Optimizer is selecting the correct path
- Determining if Optimizer is selecting the correct driving table (joins)
- Identifying when Index scan + Table access is not better than Table Scan
- Practice identifying columns to be used in the where clause
- Practice Identifying and computing the selectivity of the index column/columns used

## Unit 12: Conclusion

- Discuss traffic and locking / maintaining schemas in a shared environment
- Summarization of steps DBA should take to resolve performance problems
- Summarization of steps DBA should take to avoid performance problems

***Please contact your ROI Representative to discuss customizing this course to your environment!!!***