Course Outline

# Oracle Advanced PL/SQL & SQL Tuning

## Course Summary

### Description

This class covers advanced topics related to Oracle PL/SQL. This class provides the technical expertise necessary to utilize these powerful components of Oracle.

Attention in this class is given to some aspects of PL/SQL that are often not clearly understood (PL/SQL composite datatypes, regular expressions) or fully utilized (Oracle supplied packages, native compilation) along with advanced topics such as wrapping PL/SQL and pipelined functions and PL/SQL profiling. Techniques for measuring PL/SQL performance through profiling are also presented.

The PL/SQL content includes a class project consisting of the creation of a PL/SQL package to work with contents of the Oracle data dictionary.

Additional coverage to build knowledge about Oracle SQL tuning issues is also included. These areas begin with understanding how a SQL statement is processed by Oracle RDBMS, how the chosen execution plan can be obtained, gaining understanding of the various approaches the Oracle cost-based optimizer (CBO) can take to satisfy a SQL statement and basic to moderate coverage of actions to improve performance.

### Topics

- The PetSaver sample database
- PL/SQL composite variables
- Working with large objects (LOBs)
- PL/SQL wrapping
- Group coding project – The Oracle data dictionary
- Advanced Oracle supplied packages
- Pipelined and table functions
- The PL/SQL profiler & hierarchical profiler
- Using PL/SQL Scope
- Regular Expressions
- Oracle regex operators
- Advanced Compilation Techniques
- Introduction to tuning
- SQL statement processing
- The Oracle optimizer
- Optimizing SHARED_POOL utilization
- Effective IndexingC
- Creating and understanding an EXPLAIN PLAN
- Tuning tools that measure resource consumption
- TKPROF
- Histograms

### Audience

This course is designed for Intermediate Oracle PL/SQL developers and DBAs

### Prerequisite

Before taking this course, students should have skill with GUI interfaces, data processing background, and solid SQL and PL/SQL skill (3 to 6 months of development effort).

### Duration

Five Days

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### I. The PetSaver sample database
A. PL/SQL review
B. PL/SQL block structure
C. PL/SQL variables
D. Using SELECT in PL/SQL
E. PL/SQL exception handling

### II. PL/SQL composite variables
A. Records
B. Working with collections
C. Associative arrays
D. VARRAYs
E. Nested tables

### III. Working with large objects (LOBs)
A. Understanding LOBs
B. Creating LOBs
C. Manipulating LOBs with DBMS_LOB
D. LOBs and NULL values

### IV. PL/SQL wrapping
A. Understanding what PL/SQL wrapping can achieve
B. Understanding the limitations of wrapping
C. Using Oracle's "wrap" command line tool

### V. Group coding project – The Oracle data dictionary

### VI. Advanced Oracle supplied packages
A. UTL_SMTP
B. DBMS_DESCRIBE
C. DBMS_ALERT
D. DBMS_SESSION
E. DBMS_DDL
F. DBMS_STATS
G. DBMS_UTILITY
H. DBMS_FILE_TRANSER

### VII. Pipelined and table functions
A. Why use a 'pipeline'?
B. Creating pipelined functions
C. Why use a 'table' function?
D. Creating table functions

### VIII. The PL/SQL profiler & hierarchical profiler
A. Set up requirements for the PL/SQL profiler
B. Conducting a profiler 'run'
C. Set up requirements for the hierarchical profiler
D. Conducting a hierarchical profiler run
E. Understanding and interpreting hierarchical profiler output

### IX. Using PL/SQL Scope
A. Set up requirements for using PL/SQL Scope
B. Running PL/SQL for Scope
C. Understanding and interpreting PL/SQL Scope output

### X. Regular Expressions
A. Regular expression concepts
B. Metacharacters
C. Basic regular expressions
D. Sophisticated regular expressions

### XI. Oracle regex operators
A. REGEX_LIKE
B. REGEX_SUBSTR
C. REGEX_INSTR
D. REGEX_REPLACE
E. SOUNDEX

### XII. Advanced Compilation Techniques
A. NATIVE PL/SQL compilation
B. Controlling PL/SQL compiler error reporting with DBMS_WARNINGS
C. Conditional compilation

### XIII. Introduction to tuning
A. Kinds of performance problems
B. Methods to measure performance
C. Techniques to improve SQL performance

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## Course Outline (cont.)

### *XIV. SQL statement processing*

A. Understanding SQL statement processing steps
B. Dynamic performance (V$) tables related to SQL (V$SQLAREA, V$SQL, V$SQLTEXT)

### *XV. The Oracle optimizer*

A. The cost-based optimizer (CBO)
B. Version specific optimization (OPTIMIZER_FEATURES_ENABLE

### *XVI. Optimizing SHARED_POOL utilization*

A. Identifying ways to minimize parsing
B. Using bind variables
C. Using PL/SQL packages

### *XVII. Effective Indexing*

A. Creating B*-Tree indexes
B. Utilizing "super" indexes and partial index utilization
C. Indexes in the data dictionary
D. Monitoring index usage

### *XVIII. Creating and understanding an EXPLAIN PLAN*

A. Using the EXPLAIN PLAN command
B. Interpreting EXPLAIN PLAN output
C. Understanding row access methods

### *XIX. Tuning tools that measure resource consumption*

A. Using statement TIMING
B. Invoking the SQL Autorace Facility
C. Interpreting AUTOTRACE Statistics

### *XX. TKPROF*

A. Prerequisites for TKPROF
B. Formatting trace files with TKPROF
C. Interpreting TKPROF output

### *XXI. Histograms*

A. Understanding histograms
B. Creating histograms
C. Verifying histogram usage