Course Outline

Oracle 18 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 review
- PL/SQL composite variables
- Working with large objects (LOBs)
- PL/SQL wrapping
- Advanced Oracle supplied packages
- Pipelined and table functions
- The PL/SQL profiler & hierarchical profiler
- Set up requirements for the PL/SQL profiler
- Understanding and interpreting hierarchical profiler output
- Using PL/SQL Scope
- Regular Expressions
- Regular expression concepts
- Oracle regex operators
- Advanced Compilation Techniques
- NATIVE PL/SQL compilation
- Introduction to tuning
- Kinds of performance problems
- SQL statement processing
- The Oracle optimizer
- Optimizing SHARED_POOL utilization
- Effective Indexing
- Using the EXPLAIN PLAN command
- 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. Solid understanding of PL/SQL, including the use of program units (procedures, functions, packages and triggers) is required to succeed in this class. Persons planning to attend ORA-230-10 without this should attend the Oracle 10g/11g PL/SQL Quick Tour (ORA-240-10) class that can be conducted on the day preceding this class.
Oracle 18 Advanced PL/SQL & SQL Tuning

Course Summary (cont.)

Prerequisites

- Skill with GUI interfaces
- Data processing background
- Solid SQL and PL/SQL skill (3 to 6 months of development effort)

Duration

Five Days
Oracle 18 Advanced PL/SQL & SQL Tuning

Course Outline

I. The PetSaver sample database

II. PL/SQL review
   A. PL/SQL block structure
   B. PL/SQL variables
   C. Using SELECT in PL/SQL
   D. PL/SQL exception handling

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

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

V. 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
      • 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_TRANSFER

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

IX. Set up requirements for the PL/SQL profiler
   A. Conducting a profiler ‘run’
   B. Set up requirements for the hierarchical profiler
   C. Conducting a hierarchical profiler run

X. Understanding and interpreting hierarchical profiler output

XI. 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

XII. Regular Expressions

XIII. Regular expression concepts
   A. Metacharacters
   B. Basic regular expressions
   C. Sophisticated regular expressions

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

XV. Advanced Compilation Techniques

XVI. NATIVE PL/SQL compilation
   A. Controlling PL/SQL compiler error reporting with DBMS_WARNINGS
   B. Conditional compilation

XVII. Introduction to tuning

XVIII. Kinds of performance problems
   A. Methods to measure performance
   B. Techniques to improve SQL performance

Due to the nature of this material, this document refers to numerous hardware and software products by their trade names. References to other companies and their products are for informational purposes only, and all trademarks are the properties of their respective companies. It is not the intent of ProTech Professional Technical Services, Inc. to use any of these names generically.
Oracle 18 Advanced PL/SQL & SQL Tuning
Course Outline (cont.)

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

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

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

XXII. 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

XXIII. Creating and understanding an EXPLAIN PLAN

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

XXV. Tuning tools that measure resource consumption
   A. Using statement TIMING
   B. Invoking the SQL Autorace Facility
   C. Interpreting AUTOTRACE Statistics

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

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