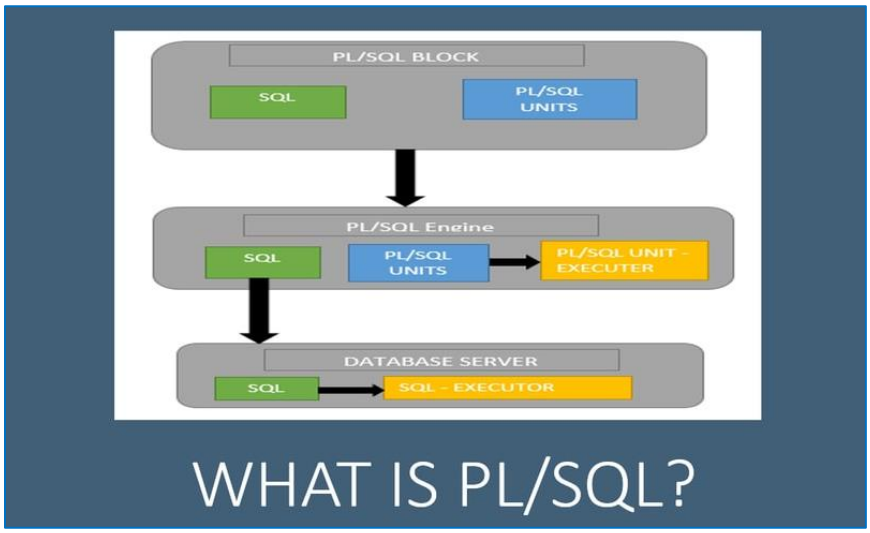
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IT176:
Oracle Database Program with PL/SQL (Fundamentals)

Training Description:

This intensive training course introduces one to Oracle database programming using the PL/SQL programming language. One will learn the syntax, structure and features of the language. This will also lay the foundation for the entire Sideris Oracle PL/SQL programming series, allowing one to progress from introductory topics to advanced application design and programming and finally onto writing complex high-performance applications.

PL/SQL may be considered as one of the basic skill sets required for any Oracle professional, nearly as important as the SQL language itself.

This training course will also continue on to show those who are now ready to employ the language in the development of database applications. In particular, the focus of this course will be on the use of database-resident stored program units such as procedures, functions, packages and database triggers. New features introduced with the Oracle 12c release of the database are also explained and demonstrated.

This course begins with an explanation of the intent and usage of the PL/SQL programming language for database applications. Important reasons why one should incorporate PL/SQL modules within the application architecture right from the initial design and planning phase are presented. Next one learns how to begin building executable PL/SQL program units. One learns about each of the major segments of a working program and how these interact with each other during program execution, including the important error or exception handling capabilities of the language. The final section goes beyond the basics and begins to explore advanced topics that will be useful later in the Sideris Oracle PL/SQL developer textbook series. One learns techniques and features that allow modular and reusable programs to be developed, increasing productivity and maintainability of database applications.

In addition, this course explains how database-resident program units can be used as part of the overall database application architecture and the benefits realized by doing so. It then builds upon one's knowledge of database-resident program units and applies these to the development of PL/SQL packages. In a production environment most PL/SQL program units should be packaged, and these advanced database programming capabilities along with the benefits of using these are discussed. It concludes with extensive demonstrations on how a particular type of database-resident program unit known as a database trigger can be used as part of an advanced database application design.

This course content is applicable to versions 12c, 18c, and 19c.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Write queries against single and multiple tables, manipulate data in tables
- ✓ Create PL/SQL blocks of application code that can be shared by multiple forms, reports and data management applications
- ✓ Develop anonymous PL/SQL blocks, stored procedures, and functions
- ✓ Declare identifiers and trap exceptions
- ✓ Use DML statements to manage data
- ✓ Use DDL statements to manage database objects
- ✓ Declare PL/SQL Variables

- ✓ Conditionally control code flow (loops, control structures)
- ✓ Describe stored procedures and functions

Training Designed for:

This course is intended for all Oracle professionals, Application designers and database developers, Database administrators and Web server administrators.

Prerequisites:
Oracle Database 12c: SQL Fundamentals

Training Program:

DAY ONE:

- ❖ SELECTION & SETUP OF THE DATABASE INTERFACE
  - CONSIDERING AVAILABLE TOOLS
  - SELECTING THE APPROPRIATE TOOL
  - ORACLE NET DATABASE CONNECTIONS
  - ORACLE PAAS DATABASE CONNECTIONS
  - SETUP SQL DEVELOPER
  - SETUP SQL*PLUS
  - SETUP JDEVELOPER
- ❖ ABOUT BIND & SUBSTITUTION VARIABLES
  - USING SQL DEVELOPER
  - USING SQL*PLUS
- ❖ CHOOSING A DATABASE PROGRAMMING LANGUAGE
  - WHAT IS DATABASE PROGRAMMING?
  - PL/SQL PERFORMANCE ADVANTAGES
  - INTEGRATION WITH OTHER LANGUAGES
- ❖ PL/SQL LANGUAGE FUNDAMENTALS
  - PL/SQL PROGRAM STRUCTURE
  - LANGUAGE SYNTAX RULES
  - EMBEDDING SQL
  - WRITING READABLE CODE
  - GENERATING DATABASE OUTPUT
  - SQL*PLUS INPUT OF A PROGRAM BLOCK
- ❖ DECLARE SECTION
  - ABOUT THE DECLARE SECTION
  - DECLARE PRIMITIVE TYPES
  - DECLARATION OPTIONS
  - NOT NULL
  - CONSTANT
  - DATA DICTIONARY INTEGRATION
  - %TYPE

- DECLARE SIMPLE USER-DEFINED TYPES
- TYPE ... TABLE
- TYPE ... RECORD
- EXTENDED USER-DEFINED TYPES

DAY TWO:

❖ EGIN SECTION
- ABOUT THE BEGIN SECTION
- MANIPULATING PROGRAM DATA
- LOGIC CONTROL & BRANCHING
- GOTO
- LOOP
- IF-THEN-ELSE
- CASE

❖ EXCEPTION SECTION
- ABOUT THE EXCEPTION SECTION
- ISOLATING THE SPECIFIC EXCEPTION
- PRAGMA EXCEPTION_INIT
- SQLCODE & SQLERRM Example
- SQL%ROWCOUNT & SELECT...INTO

❖ BEYOND THE BASICS: EXPLICIT CURSORS
- ABOUT EXPLICIT CURSORS
- EXTENDED CURSOR TECHNIQUES
- FOR UPDATE OF Clause
- WHERE CURRENT OF Clause
- Using FOR...LOOP Cursors

❖ INTRODUCING DATABASE-RESIDENT PROGRAM UNITS
- ABOUT DATABASE-RESIDENT PROGRAMS
- PHYSICAL STORAGE & EXECUTION
- TYPES OF STORED PROGRAM UNITS
- STORED PROGRAM UNIT ADVANTAGES
- MODULAR DESIGN PRINCIPLES

DAY THREE:

❖ CREATING STORED PROCEDURES & FUNCTIONS
- STORED PROCEDURES & FUNCTIONS
- CREATE PROCEDURE / CREATE FUNCTION
- CREATING PROCEDURES & FUNCTIONS
- RAISE_SALARY() Procedure
- SALARY_VALID() Function
- THE PARAMETER SPECIFICATION
- DEFAULT Clause
- SYSTEM & OBJECT PRIVILEGES
- USING THE DEVELOPMENT TOOLS

- ❖ EXECUTING STORED PROCEDURES & FUNCTIONS
  - CALLING PROCEDURES & FUNCTIONS
  - UNIT TESTING WITH EXECUTE
  - ANONYMOUS BLOCK UNIT TESTING
  - SPECIFYING A PARAMETER NOTATION
  - SQL WORKSHEET UNIT TESTING
  - CALLING FUNCTIONS FROM SQL
- ❖ MAINTAINING STORED PROGRAM UNITS
  - RECOMPILING PROGRAMS
  - Mass Recompilation Using UTL_RECOMP()
  - DROPPING PROCEDURES & FUNCTIONS
  - DROP PROCEDURE / FUNCTION
  - DATA DICTIONARY METADATA
  - Using USER_OBJECTS
  - Using USER_SOURCE
  - Using USER_ERRORS
  - Using USER_OBJECT_SIZE
  - Using USER_DEPENDENCIES
- ❖ MANAGING DEPENDENCIES
  - DEPENDENCY INTERNALS
  - TRACKING DEPENDENCIES
  - THE DEPENDENCY TRACKING UTILITY
  - SQL DEVELOPER DEPENDENCY INFO
  - DEPENDENCY STRATEGY CHECKLISTS
- ❖ CREATING & MAINTAINING PACKAGES
  - ABOUT PACKAGES
  - CREATING PACKAGES
  - MAINTAINING PACKAGES
  - PERFORMANCE CONSIDERATIONS

DAY FOUR:

- ❖ ADVANCED PACKAGE CAPABILITIES
  - DEFINER & INVOKER RIGHTS
  - WHITE LISTS & ACCESSIBLE BY
  - PERSISTENT GLOBAL OBJECTS
  - DEFINING INITIALIZATION LOGIC
  - OBJECT ORIENTATION SUPPORT
- ❖ ADVANCED CURSOR TECHNIQUES
  - USING CURSOR VARIABLES
  - Using SYS_REFCURSOR
  - USING CURSOR EXPRESSIONS
- ❖ USING SYSTEM-SUPPLIED PACKAGES
  - DBMS_OUTPUT()

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- UTL_FILE()
- FOPEN() Example

❖ DATABASE TRIGGER CONCEPTS
- ABOUT DATABASE TRIGGERS
- DML EVENT TRIGGER SUB-TYPES
- DATABASE TRIGGER SCENARIO
- TRIGGER EXECUTION MECHANISMS
- TRIGGERS WITHIN SQL WORKSHEET

❖ CREATING DATABASE TRIGGERS
- STATEMENT-LEVEL TRIGGERS
- Using RAISE_APPLICATION_ERROR()
- ROW-LEVEL TRIGGERS
- EXAMPLES OF TRIGGERS
- EMPLOYEE_SALARY_CHECK Example
- EMPLOYEE_JOURNAL Example
- BUDGET_EVENT Example
- INSTEAD OF TRIGGERS
- TRIGGERS WITHIN AN APPLICATION

DAY FIVE:

❖ MAINTAINING DATABASE TRIGGERS
- CALL SYNTAX
- TRIGGER MAINTENANCE TASKS
- SHOW ERRORS TRIGGER
- DROP TRIGGER
- ALTER TRIGGER
- MULTIPLE TRIGGERS FOR A TABLE
- HANDLING MUTATING TABLE ISSUES

❖ IMPLEMENTING SYSTEM EVENT TRIGGERS
- WHAT ARE SYSTEM EVENT TRIGGERS?
- DEFINING THE SCOPE
- AVAILABLE SYSTEM EVENTS
- SYSTEM EVENT ATTRIBUTES

❖ COURSE CONCLUSION

❖ FINAL EXAMINATION AND EVALUATION

Training Requirement:

"Hand's on practical sessions, equipment and software will be applied during the course if required and as per the client's request."

This training course is available upon request in English or Arabic. Content, location and duration can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

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Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

As per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break & Lunch)
13:30 - 16:00	Last Session

For training registrations or in-house enquiries, please contact:

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Training & Career Development Department