

## Oracle Database 12c R2: Advanced PL/SQL Ed 2

**Duration:** 3 Days

### What you will learn

In the Oracle Database 12c R2: Advanced PL/SQL course, students learn how to use the advanced features of PL/SQL in order to design and tune PL/SQL to interface with the database and integrate with the other applications in the most efficient manner. They learn to write powerful PL/SQL programs using external C/Java routines, fine-grained access packages, cursors, extended interfaces and collections.

**Learn To:**

Apply PL/SQL designing best practices.

Create PL/SQL applications that use collections.

Work with JSON data in the database.

Implement a virtual private database with fine-grained access control.

Write code to interface with external C and Java applications.

Write code to interface with large objects and use SecureFile LOBs.

Write and tune PL/SQL code effectively to maximize performance.

### Benefits To You

Students will benefit from using advanced features of program design, packages, cursors, extended interface methods, and collections and students learn how to write powerful PL/SQL programs.

Programming efficiency, use of external C and Java routines, PL/SQL server pages, and fine-grained access are covered. Students learn how to write PL/SQL routines that analyze the PL/SQL applications and caching techniques that can improve performance.

Students are introduced to the Virtual Private Database (VPD) to implement security policies and they learn techniques and tools to strengthen their applications against SQL injection attacks.

### Audience

Application Developers

Database Administrators

Support Engineer

Technical Consultant

### Related Training

*Required Prerequisites*

Basic Knowledge of SQL, PL/SQL

Familiarity with programming languages

Knowledge of PL/SQL Program Units

Oracle Database: Develop PL/SQL Program Units Ed 2

Oracle Database: SQL Workshop I Ed 2

### **Course Objectives**

Design PL/SQL packages and program units that execute efficiently

Write code to interface with external applications and the operating system

Create PL/SQL applications that use collections

Learn to work with JSON data in relational database

Write and tune PL/SQL code effectively to maximize performance

Implement a virtual private database with fine-grained access control

Write code to interface with large objects and use SecureFile LOBs

### **Course Topics**

#### **Introduction**

Course Objectives

Course Agenda

Describe the full Human Resources (HR) Schema

Identify the Appendices Used in this Course

Review the online Oracle Database 12c SQL and PL/SQL documentation and the additional available resources

List the PL/SQL development environments Available in this course

Start SQL Developer and Create a Database Connection

Use the SQL Worksheet

#### **Oracle Database Exadata Express Cloud Service**

Overview of Oracle Database Exadata Express Cloud Service

Accessing Cloud Database using SQL Workshop

Connecting to Exadata Express Database using Database Clients

Using SQL Developer to work with Exadata Express Database

#### **Overview of Collections**

Overview of Collections

Use Associative arrays

Use Nested tables

Use Varrays

## **Using Collections in PL/SQL**

Write PL/SQL programs that use collections

Use Collections effectively

Enhancements to PL/SQL Type Binds

Binding PL/SQL only datatypes to SQL statements using DBMS\_SQL

## **Manipulating Large Objects**

Working with LOBs

Overview of SecureFile LOBs

## **Working with JSON Data**

JSON Data

JSON data columns in tables

Generation of JSON data with SQL/JSON generation function

Querying JSON columns

PL/SQL object types for JSON

## **Using Advanced Interface Methods**

Calling External Procedures from PL/SQL

Benefits of External Procedures

Understand how an external routine is called from PL/SQL

C advanced interface methods

Java advanced interface methods

Access PL/SQL blocks from from Java classes using JDBC

## **Performance and Tuning**

Understand and influence the compiler

Tune PL/SQL code

Enable intra unit inlining

Identify and tune memory issues

Recognize network issues

Designing Applications for Real World Performance

## **Improving Performance with Caching**

Describe result caching

Use PL/SQL function cache

Review PL/SQL function cache considerations

## **Analyzing PL/SQL Code**

Finding Coding Information

PL/Scope Concepts

DBMS\_METADATA Package

PL/SQL Enhancements

PL/SQL Pragma to mark an item deprecated

## **Profiling and Tracing PL/SQL Code**

What is Tracing and Profiling

Tracing PL/SQL Execution

Tracing PL/SQL: Steps

## **Securing application through PL/SQL**

Controlling Access to Program Units

Managing Access to data using PL/SQL

Creating Secure Application roles to control access to applications

### **Safeguarding Your Code Against SQL Injection Attacks**

SQL Injection Overview

Reducing the Attack Surface

Filtering Input with DBMS\_ASSERT

### **Security Features implemented through PL/SQL**

Brief introduction to Security implementation

Fine Grained Access Control

Application Context

List the DBMS\_RLS procedures

Implement a policy

Query the dictionary views holding information on fine-grained access