

## Oracle Database 11g: Advanced PL/SQL

**Duration:** 3 Days

### What you will learn

In this Oracle Database 11G Advanced PL/SQL training, expert Oracle University instructors will help you explore the advanced features of PL/SQL to design and tune PL/SQL. You'll learn how it interfaces with the database and other applications in the most efficient manner.

Learn To:

PL/SQL designing best practices.

Create PL/SQL applications that use collections.

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

Extend the functionality of the SQL language with PL/SQL language to write application code. This will help your organization realize the full benefit of utilizing Oracle best practices.

### Virtual Private Database

You'll also be introduced to Virtual Private Database (VPD) to implement security policies. Learn techniques and tools to strengthen applications against SQL injection attacks. Explore programming efficiency, use of external C and Java routines, PL/SQL server pages and fine-grained access.

### Audience

Application Developers

Database Administrators

PL/SQL Developer

### Related Training

#### *Required Prerequisites*

Knowledge of SQL

PL/SQL Programming experience

Oracle Database: Introduction to SQL

## 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

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

Tables and data used for this course

Overview of the development environments: SQL Developer, SQL Plus

### PL/SQL Programming Concepts Review

Identify PL/SQL block structure

Create procedures

Create functions

List restrictions and guidelines on calling functions from SQL expressions

Create packages

Review of implicit and explicit cursors

List exception syntax

Identify the Oracle supplied packages

### Designing PL/SQL Code

Describe the predefined data types

Create subtypes based on existing types for an application

List the different guidelines for cursor design

Cursor variables

### Using Collections

Overview of collections

Use Associative arrays

Use Nested tables

Use VARRAYs

Compare nested tables and VARRAYs

Write PL/SQL programs that use collections

Use Collections effectively

### Manipulating Large Objects

Describe a LOB object

Use BFILEs

Use DBMS\_LOB.READ and DBMS\_LOB.WRITE to manipulate LOBs

Create a temporary LOB programmatically with the DBMS\_LOB package

Introduction to SecureFile LOBs

Use SecureFile LOBs to store documents

Convert BasicFile LOBs to SecureFile LOB format

Enable reduplication and compression

### **Using Advanced Interface Methods**

Calling External Procedures from PL/SQL

Benefits of External Procedures

C advanced interface methods

Java advanced interface methods

### **Performance and Tuning**

Understand and influence the compiler

Tune PL/SQL code

Enable intra unit inlining

Identify and tune memory issues

Recognize network issues

### **Improving Performance with Caching**

Describe result caching

Use SQL query result cache

PL/SQL function cache

Review PL/SQL function cache considerations

### **Analyzing PL/SQL Code**

Finding Coding Information

Using DBMS\_DESCRIBE

Using ALL\_ARGUMENTS

Using DBMS\_UTILITY.FORMAT\_CALL\_STACK

Collecting PL/Scope Data

The USER/ALL/DBA\_IDENTIFIERS Catalog View

DBMS\_METADATA Package

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

Tracing PL/SQL Execution

Tracing PL/SQL: Steps

### **Implementing VPD with Fine-Grained Access Control**

Understand how fine-grained access control works overall

Describe the features of fine-grained access control

Describe an application context

Create an application context

Set an application context

List the DBMS\_RLS procedures

Implement a policy

Query the dictionary views holding information on fine-grained access

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

SQL Injection Overview

Reducing the Attack Surface

Avoiding Dynamic SQL

Using Bind Arguments  
Filtering Input with DBMS\_ASSERT  
Designing Code Immune to SQL Injections  
Testing Code for SQL Injection Flaws