

PL/SQL is Oracle's embedded procedural database language, allowing developers and administrators to write scripts, stored procedures, functions, packages, and database triggers which run in the optimized environment of the Oracle Database server. This advanced course helps PL/SQL programmers take advantage of language features, advanced techniques, and packages and facilities provided by Oracle to develop and tune efficient and effective PL/SQL subprograms.

Course Objectives:

- Use detailed understanding of the PL/SQL execution environment in your application design and tuning.
- Develop programs that make sophisticated and effective use of cursors.
- Use all kinds of dynamic SQL in your PL/SQL code.
- Design and write solutions using Oracle's object types.
- Use Oracle's tools and supplied packages to trace, profile, and tune your PL/SQL programs
- Use a variety of techniques and tools for debugging PL/SQL code.
- Write programs that interface between PL/SQL, and external procedures and programs.
- Use package state to solve application problems.
- Use autonomous transactions in stored subprograms and triggers.
- Choose which user's application context and rights will apply when a stored subprogram runs.
- Write high-performance code using NOCOPY and pipelines table functions.
- Create functions to implement fine-grained access control.
- Use DBM_PIPE to set up inter-session communications between PL/SQL programs.

Audience: Oracle application developers and database administrators.

Prerequisites: *Introduction to Oracle PL/SQL Programming*

Number of Days: 2 days

1. Course Introduction

Course Objectives
 Course Overview
 Using the Workbook
 Suggested References

2. The PL/SQL Execution Environment

The Server Process
 PL/SQL Execution
 The PL/SQL Compiler
 Compiler Optimization
 SQL — Parse
 SQL — Execute and Fetch
 Server Memory
 Latches
 Locks

3. Advanced Cursors

Cursor Types
 Cursors and Storage
 Spanning Commits Across FETCHes
 Dynamic SQL in PL/SQL
 Bulk Operations
 Bulk Returns
 Limiting Results
 Cursor Parameters
 Cursor Variables
 Strong and Weak Cursors
 Using Cursor Variables
 Cursor Type Errors
 Cursor Subqueries

4. **Dynamic SQL**
 - Generating SQL at Runtime
 - Native Dynamic SQL vs. DBMS_SQL Package
 - The EXECUTE IMMEDIATE Statement
 - Using Bind Variables
 - Multi-row Dynamic Queries
 - Bulk Operations with Dynamic SQL
 - Using DBMS_SQL for DML and DDL
 - Using DBMS_SQL for Queries
 - Retrieving Meta Information with DBMS_SQL
5. **Object-Oriented Oracle**
 - Introducing Object-Oriented Oracle
 - Defining Object Types and Tables in SQL
 - Querying and Modifying Object Data
 - Object Method
 - Inheritance
 - Type Evolution
 - Object Views
 - Object Types in PL/SQL
 - REF Pointers
 - Object Functions and Operators
6. **Tuning PL/SQL**
 - PL/SQL vs SQL
 - PL/SQL Performance Tips
 - Tuning Goals
 - Monitoring Wait Events
 - DBMS_PROFILER
 - DBMS_TRAC
 - Execution Plans
 - Interpreting Explain Plan Results
 - Execution Plan Details
 - Trace Files
 - TKPROF
 - Using trcsess
 - DBMS_APPLICATION_INFO
7. **Debugging and Error Handling**
 - Exception Management
 - Exception Propagation
 - User-Defined Exceptions
 - Exception Error Messages
 - Stack Management
 - Debugging with DBMS_OUTPUT
8. **Advanced Programming Topics**
 - Debugging with a Table
 - Using UTL_FILE
 - Using DBMS_DEBUG
 - SQL Developer
 - Avoiding Bugs
 - Autonomous Transactions
 - Invoker's Rights
 - Fine-Grained Access Control with DBMS_RLS
 - Creating Pipes with DBMS_PIPE
 - Writing to and Reading from a Pipe
 - Table Functions
 - Pipelined Table Functions
 - Enabling parallel execution
 - DETERMINISTIC Functions
9. **Interfacing with External Code**
 - External Programs and Procedures
 - External Procedure Architecture
 - Configure Oracle for External Procedures
 - Creating a java Stored Procedure
 - Security and External Programs
 - The Job Scheduler
 - Manage and Drop External Jobs
 - Native Compilation of PL/SQL Code
 - The Oracle Call Interface (OCI and OCCI)
 - Pro*C and Pro*C++
 - Using Pro*C and Pro*C++
 - Perl DBI/DBD Architecture
 - Perl and Stored Procedures
 - ODBC
 - Using ODBC
 - JDBC
10. **Working With XML**
 - Databases and XML
 - Schema Validation
 - Unstructured and Structured Storage
 - The XMLType Datatype
 - XPath Expressions
 - Extracting XML Data
 - Generating XML
 - XMLQuery
 - XMLType Views
 - Oracle XML DB Repository