

Topics – Advanced PL/SQL, Integration with PROIV SuperLayer and use within Glovia

1. SQL Review

Single Row Functions

Character Functions

Date Functions

Numeric Function

Conversion Functions

General Functions

Hierarchical Queries

Using SQL in PROIV to eliminate functions and costly updates

2. SQL: Joining Multiple Tables

Cartesian Product

Types of Joins

Equijoin

Retrieving Records with Equijoin

Non-Equijoins or Theta Join

Outer Join

Antijoin

Self Join

Set Operations

Aggregating Data Using Group Functions

Using Group Functions

The GROUP BY clause

The HAVING clause

3. SQL: Subqueries

When to use Subqueries

Guidelines for using Subqueries

Single Row Subqueries

The HAVING clause with Subqueries

The EXISTS clause

4. Variables and Program data

Character Datatypes

The CHAR datatype

The VARCHAR2 and VARCHAR datatypes

LONG Datatype

CHAR and VARCHAR2 strings interaction

String comparisons

5. Database Interaction and Cursors

- Transaction Management
- COMMIT Statement
- ROLLBACK Statement
- SAVEPOINT Statement
- SET TRANSACTION Statement
- LOCK TABLE Statement
- Cursor Operations
- Cursor RETURN Clause
- Maximum Number of Cursors
- Cursor Parameter Modes
- Default Values for Parameters
- SELECT FOR UPDATE in Cursors
- WHERE CURRENT OF Clause
- Cursor Variables
- Declaring REF CURSOR Types and Cursor Variables
- Handling the ROWTYPE_MISMATCH exception
- Rules for Cursor Variables
- Cursor Variable Aliases
- Cursor Variable Restrictions

6. Handling Exceptions

- What is an Exception?
- How is it raised?
- How do you handle it?
- Exception Types
 - Named system exceptions
 - Named programmer-defined exceptions
 - Unnamed system exceptions.
 - The EXCEPTION_INIT pragma
 - Unnamed Programmer-Defined Exceptions
- Raising an Exception
- Exceptions Raised in a Declaration
- Using SQLCODE and SQLERRM in WHEN OTHERS Clause
- Trapping Exceptions
- Trapping Exceptions Guidelines
- Trapping Predefined Oracle Server Errors
- Predefined Exception
- Trapping Non-Predefined Oracle Server Errors
- Trapping User Defined Exceptions
- Functions for Trapping Exceptions
- RAISE_APPLICATION_ERROR procedure

7. Records in PL/SQL

- Types of Records
- Benefits of Using Records
- Guidelines for Using Records
- PL/SQL Records
- Creating a PL/SQL record
- PL/SQL record structure

- The %ROWTYPE attribute
- Advantages of using %ROWTYPE
- SELECT INTO from an Implicit Cursor
- FETCH INTO from an Explicit Cursor
- Assignment Restrictions

8. PL/SQL Tables

- PL/SQL tables
- Characteristics of PL/SQL Tables
- Creating a PL/SQL table
- PL/SQL table structure
- Referencing a Table of Records
- Referencing an Undefined Row
- Using PL/SQL table methods
- PL/SQL table of records

9. Procedures and Functions

- Parameters
- Parameter Modes
- Actual and Formal Parameters
- Matching Actual and Formal Parameters in PL/SQL
 - Positional notation
 - Named notation
- Benefits of named notation
- Module Overloading
- Overloading in PL/SQL Built-Ins
- Where to Overload Modules
- Restrictions on Overloading

10. Calling PL/SQL Functions in SQL

- Capabilities and Benefits
- Requirements for Stored Functions in SQL
- Restrictions on PL/SQL Functions in SQL
- RESTRICT_REFERENCES Pragma
- Asserting Purity Level with Package Initialization Section
- Drawbacks of Calling PL/SQL Functions in SQL

11. Packages

- Benefits of Packages
 - Encapsulation
 - Public and Private Data and Procedures
 - Performance Improvement
- Dependency Tracking for Packages
- How Oracle Stores Procedures and Packages
 - Compiling Procedures and Packages
 - Storing the Compiled Code in Memory
 - Storing Procedures or Packages in Database
- How Oracle Executes Procedures and Packages
- Verifying User Access
- Verifying Procedure Validity

- Executing a Procedure
- Automatic First-Time-Only Code
- Package Invalidations and Session State

12. Built-in Packages

- List of Oracle Built-in Packages
- Executing Dynamic SQL and PL/SQL
 - DBMS_SQL Programs
 - Types of Dynamic SQL
 - Processing Flow of Dynamic SQL
 - Opening the cursor
 - Parsing the SQL Statement
 - Binding Values into Dynamic SQL
 - Defining Cursor Columns
 - Executing the Cursor
 - Fetching Rows
 - Retrieving Values
 - Closing the Cursor
 - Checking Cursor Status
 - Describing Cursor Columns
 - Some restrictions in using Dynamic SQL
- Generating Output from PL/SQL Programs
 - DBMS_OUTPUT: Displaying Output
 - DBMS_OUTPUT Programs
 - DBMS_OUTPUT concepts
 - DBMS_OUTPUT exceptions
 - DBMS_OUTPUT nonprogram elements
 - Enabling and Disabling Output
 - The DBMS_OUTPUT.ENABLE procedure
 - The DBMS_OUTPUT.DISABLE procedure
 - Enabling Output in SQL*Plus
 - Writing to the DBMS_OUTPUT Buffer
 - The DBMS_OUTPUT.PUT procedure
 - The DBMS_OUTPUT.PUT_LINE procedure
 - The DBMS_OUTPUT.NEW_LINE procedure
 - Retrieving Data from the DBMS_OUTPUT Buffer
 - The DBMS_OUTPUT.GET_LINE procedure
 - The DBMS_OUTPUT.GET_LINES procedure

13. Triggers

- How Triggers are Used
- Triggers vs. Declarative Integrity Constraints
- Parts of a Trigger
 - Guidelines in Designing Triggers
- Creating Triggers
- Trigger Restriction
- Trigger Action
- Types of Triggers
- Row Triggers and Statement Triggers
 - Row Triggers
 - Statement Triggers

- The BEFORE and AFTER Options
- The INSTEAD OF Option
- Manipulating Triggers
 - Dropping Trigger
 - Disabling Trigger
 - Enabling Trigger
- How triggers are compiled?
- Recompiling a Trigger
- Trigger Execution
- The Execution Model for Triggers and Integrity Constraint Checking
- Data Access for Triggers
- Storage of Triggers
- Execution of Triggers
- Dependency Maintenance for Triggers

14. Understanding Oracle Architecture

- Database Components
- The System Global Area (SGA)
- The Shared Pool
- The Database Buffer Cache
- The Redo Log Buffer
- Background Processes
- PMON and SMON Processes
- User Processes
- Server Processes
- An Example of How Oracle Works
- An Oracle Instance
- An Oracle Database
- Redo Log Files
- Read Consistency
- Locking Mechanisms
- The Control Files
- The Parameter Files
- Trace Files and the Alert File

15. Managing the Database Structure

- Objects
- Logical Database Structures
- Tablespaces
- Physical Database Structures
- Resizing Datafiles
- Segments
- Data and Index Segments
- Temporary Segments
 - When are Temporary Segments Required
 - How Temporary Segments are Allocated

16. Managing Storage Allocation

- Database Blocks
 - Properties of Database Blocks
 - Parts of a Database Block

- An Introduction to PCTFREE, PCTUSED, and Row Chaining
 - The PCTFREE Parameter
 - The PCTUSED Parameter
 - How PCTFREE and PCTUSED Work Together
- Availability and Compression of Free Space in a Data Block
- Row Chaining and Migrating
- Extents
 - When Extents are Allocated
 - How Extents are Allocated
 - When Extents are Deallocated
- Characteristics of Extents
- Controlling Extent Allocation
- Displaying Extent and Segment Information
- Coalescing Free Space

17. The Data Dictionary

- An Introduction to the Data Dictionary
- The Structure of the Data Dictionary
- SYS, the Owner of the Data Dictionary
- How the Data Dictionary is Used
 - How Oracle Uses the Data Dictionary
 - Adding New Data Dictionary Items
 - Deleting Data Dictionary Items
 - How Oracle Users Can Use the Data Dictionary
 - Views with Prefix USER
 - Views with Prefix ALL
 - Views with Prefix DBA
- DUAL
- The Dynamic Performance Tables

18. SQL Tuning Quick Start

- Design and Develop for optimal Performance
- Establish a Tuning Environment
- Use SQL Tuning Tools
- Index Wisely
- Reduce Parsing
- Use and Take Advantage of the COST-BASED OPTIMIZER
- Avoid Accidental Table Scans
- Optimize Necessary Table Scans
- Optimize Joins
- Avoid Lock Contention
- Use Partitioning For Large Tables

19. The Optimizer

- Cost Based and Rule Based Optimizer
- Details Common to Both Optimizers
- Setting the Optimizer Goal
 - Ways To Set the Optimizer Goal
- Using Hints
- List of Optimizer Hints