Oracle Database 12c: PL/SQL III – Advanced Programming & Tuning

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General Description

The PL/SQL programming language is at the core of most Oracle database applications. This training textbook will give attention to three fundamental pillars of effective implementation of PL/SQL applications. First, we will explore the advanced features of the language that allow powerful and adaptable database applications to be built. Next, we will discuss performance tuning techniques that allow these applications to run efficiently. Finally, we will consider critical security measures which should be implemented to counter hacker attacks and other security threats.

Target Audience

The target audience for this textbook is senior application developers. Developers who will be building, debugging and tuning PL/SQL program units will benefit from this textbook.

Prerequisites

Specific prerequisites for this textbook are the following Sideris titles, or equivalent experience:

- ORACLE DATABASE 12C: SQL FUNDAMENTALS (LEVELS I & II)
- ORACLE DATABASE 12C: PL/SQL FUNDAMENTALS (LEVELS I & II)

You can see where this textbook and its prerequisites fit within the Sideris Oracle Database 12c Application Developers curriculum.

Certification

This textbook considers subjects applicable to certification as an Oracle Advanced PL/SQL Developer Certified Professional (OCP). The topics considered are included within "Exam 1Z0-146: Oracle Database Advanced PL/SQL".

Content

Volumes: 2
Pages: 838
Hands-on Workshops: 16
Exercises: 99

Suggested Next

Objectives

The objectives for this course are as follows:

- Among the specific topics contained within these training materials are:
- Invoking external procedures and integrating these into PL/SQL applications. These include external Java classes using the JDBC interface and external C programs contained within DLL libraries.
- Using dynamic SQL to extend the functionality and flexibility of database programs, including the DBMS_SQL() system-supplied package for maximum flexibility.
- Identifying SQL injection attack vulnerabilities within an application and applying countermeasures to address security risks and protect against hacking.
- Incorporating collections and other advanced types into application logic to increase efficiency and execution speed.
- Working with LOBs, including piece-wise data manipulation and dynamic modification of

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SecureFiles storage options.

- Expanding database application functionality with advanced system-supplied database utility packages, integrating ones applications with external mail systems, database internals and other facilities.
- Tuning with the DBMS_PROFILER() system-supplied package and debugging with the DBMS_TRACE() system-supplied package.
- Writing efficient PL/SQL code and avoiding common coding mistakes.
- Enabling native compilation and execution of all database-resident program units.
- Controlling and managing PL/SQL compilation for high-efficiency execution.
- Analyze PL/SQL code structure by means of the PL/Scope facility.
- Analyze PL/SQL application performance and tune bottlenecks using the PL/SQL Hierarchical Profiler.
- Implementing fine-grained security mechanisms as part of an advanced security model using application contexts and the Oracle virtual private database (VPD).
- Dynamic partitioning and DML parallelization using the system-supplied package DBMS_PARALLEL_EXECUTE().
- Using the wrap utility to hide the source code of database-resident programs, even from the owner or authorized users of the programs.

Contents

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System-Supplied Packages: DBMS_METADATA() – Part I

- Why Retrieve Object Definitions?
- Retrieving Default Metadata
- Retrieving Customized Metadata
- Using SET_COUNT()
- Using ADD_TRANSFORM()
- Using FETCH DDL()
- Calling FETCH_DDL()

System-Supplied Packages: DBMS_METADATA() – Part II

- SET_TRANSFORM_PARAM()
- GET_QUERY()

System-Supplied Packages: DBMS_METADATA() – Part III

- FETCH CLOB()
- SET_FILTER() Dependent Objects
- SET_PARSE_ITEM()
- Primary & Dependent Object DDL

System-Supplied Packages: DBMS_REDEFINITION()

- About Table Redefinition
- Using DBMS_REDEFINITION()
- DBA_REDEFINITION_ERRORS
- CAN_REDEF_TABLE()
- START_REDEF_TABLE()
- FINISH_REDEF_TABLE()
- ABORT_REDEF_TABLE()
- COPY_TABLE_DEPENDENTS()
- SYNC_INTERIM_TABLE()

System-Supplied Packages: DBMS_LOB()

- Working With External BFILES
- Working With Internal LOBS
- SUBSTR()
- INSTR()
- Dynamic SECUREFILE Options

High-Performance: Advanced System-Supplied Packages

- COMPRESSION & UTL_COMPRESS()
- LZ_COMPRESS()
- LZ_UNCOMPRESS()
- DBMS_DESCRIBE()
- UTL_MAIL()
- DBMS_UTILITY()
- COMPILE_SCHEMA()
- DB_VERSION()
- GET_PARAMETER_VALUE()
- WAIT_ON_PENDING_DML()
- GET_TIME()
- GET_ENDIANNESS()
- DBMS_FILE_TRANSFER()

High Performance: Programming & Coding Techniques

- Autonomous Transactions
- Using NOCOPY FOR Parameters
- Choosing The Optimum Data Type
- About NOT NULL
- Useful PL/SQL Coding Techniques
- Handling String Literals
- User-Defined SQL Functions

High Performance: Influencing Oracle Pl/Sql Compilation

- PL/SQL Compiler Optimization
- PLSQL_OPTIMIZE_LEVEL

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- Controlling Compilation Messages
- PL/SQL Native Execution
- Wrapping Source Code

High Performance: Dynamic Partitioning & Parallelization

- Dynamic Partitioning (Chunks)
- Creating & Processing Chunks
- CREATE_TASK()
- CREATE_CHUNKS_BY_ROWID()
- CREATE_CHUNKS_BY_NUMBER_COL()
- EXECUTE_RUN_TASK()
- TASK_STATUS()
- DROP_TASK()
- Monitoring Chunk Processing

High Performance: Using PL/SCOPE For Code Analysis

- Configuring PL/SCOPE
- PLSCOPE_SETTINGS
- Using PL/SCOPE Data

High Performance: Tuning With The Hierarchical Profiler

- What Is The Hierarchical Profiler?
- Configuring The Profiler
- Managing Profiler Runs
- Analyzing Profiler Data
- Interpreting The Results
- DBMSHP_RUNS
- DBMSHP_FUNCTION_INFO
- DBMSHP_PARENT_CHILD_INFO

High Performance: Debugging With DBMS_TRACE()

- Using The Trace Facility
- DBMS_TRACE() To Manage Runs
- Examining The Trace Data
- EVENT_KIND Values

Application Security: SQL Injection Attacks

- Understanding The Threat
- Applying Countermeasures

Application Security: Virtual Private Databases

- Understanding VPDS
- Preparing For A VPD
- Configuring A VPD
- Managing Application Contexts
- Managing Policies & Security Rules

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