DB2 V9 Performance and Tuning for Programmers

Course Summary

Description

This course focuses on best practices for proper design, coding and maintenance techniques with the primary objective of improving DB2 performance. This course includes topics up to and including version 9.1 of DB2 for z/OS.

Objectives

At the end of this course, students will be able to:

- Understand the specific factors which impact performance and how they can proactively address performance issues in their SQL and application programs
- Understand the features of the EXPLAIN function, how it is used for optimization and how optimization hints can change the optimizer's decisions
- Understand the purpose and function of the PLAN_TABLE

Topics

- Application Tuning
- SQL Statements That Can Affect Performance
- EXPLAIN Function
- Simple and Complex Access Paths
- Index Structure, Design and Usage
- DB2 Buffer Pools and Their Impact on Performance

Audience

This course is designed for application programmers and programmer/analysts who will be using SQL statements in a high level programming language to manipulate DB2 tables.

Prerequisites

Students should have experience coding in one of the programming languages listed: COBOL, PL/I or C. Also experience with TSO/ISPF and DB2 file structures is recommended.

Duration

Three days

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Course Outline

I. DB2 Overview and Storage Concepts

A. What is DB2?
B. What is the History behind DB2?
C. What are DB2's Objectives?
D. What is a Relational DBMS?
E. What are DB2's Features?
F. Operational Environment
G. SQL
H. Program Preparation Process
I. Unit of Recovery
J. Commit / Rollback
K. DB2 Terminology
L. Physical Hierarchy of DB2 Objects
M. Naming Conventions
N. Object Naming Conventions
O. Databases
P. DB2 and VSAM
Q. Storage Groups
R. Page Management
S. Tablespace
T. Segmented Tablespaces
U. Partitioned Tables
V. Base Tables
W. View Table
X. Synonym
Y. Indexes
Z. Stored Procedures and Functions
AA. DB2 String Data Types
BB. DB2 Numeric Data Types
CC. Data and Time Data Types
DD. Display Formats
EE. ROWID Data Type Versus Identity Column Attribute
FF. User-Defined Data Type
GG. DB2 Catalogs

II. Creating DB2 Objects using Data Definition Language

A. Structured Query Language (SQL)
B. DDL - Create Table Statement
C. Identity Column
D. Check Constraints
E. Alter Table Statement
F. Not NULL with Default
G. Referential Integrity
H. Synonyms
I. Deleting DB2 Objects
J. Index
K. Unique Versus Non-Unique
L. Cluster Versus Non-Cluster
M. Cluster Index
N. Index Create
O. Partitioned Table
P. Views
Q. Creating Common Table Expressions

III. Referential Integrity

A. Referential Integrity - Overview
B. Delete Rules
C. Insert and Update Implications
D. Referential Integrity Summary
E. DDL - Referential Integrity
F. Primary Key Characteristics
G. Foreign Key Characteristics
H. Lab 1
I. Data Model Lab
J. Lab 1 - Loading Tables

IV. Advanced SQL - SELECT

A. JOIN
B. INNER JOIN
C. FULL OUTER JOIN
D. LEFT - RIGHT OUTER JOIN
E. Joins of More Than 2 Tables
F. User Request # 1
G. Subquery
H. Single Value Subquery
I. Multivalued Subqueries
J. Multivalued Subqueries - ALL
K. Multivalued Subqueries - ANY or SOME
L. Multiple Column Subqueries
M. User request # 2
N. Correlated Subqueries
O. Correlated Subqueries - Exists
P. Using Correlation Variables to Check R.I.
Q. Nested table Expression
R. UNION
S. UNION ALL
T. Rules for Union
U. Performance Considerations
V. INTERSECT
W. EXCEPT
X. User Request #3

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V. Update Data Manipulation
- A. INSERT
- B. UPDATE
- C. SELECT FROM UPDATE
- D. DELETE
- E. TRUNCATE
- F. SELECT FROM DELETE
- G. MERGE
- H. DB2 Valid SQL Return Codes for Updating

VI. DB2 Buffers
- A. How Does It Work?
- B. Defining the Pools
- C. Virtual Buffer Pool Tuning
- D. Buffer Pool Size Terminology
- E. Buffer Pool Thresholds

VII. Application Coding Considerations
- A. Application Tuning Performance Tips
- B. Application Tuning – Explain Function and PLAN_TABLE
- C. Definitions and Frequently Asked Questions
- D. Tablespace Scans
- E. Index Access Paths
- F. Index Screening
- G. Nonmatching Index Scan
- H. IN-LIST Index Scan
- I. Backward Index Scan
- J. Multiple Index Access
- K. ONE-FETCH Access
- L. INDEX-ONLY Access
- M. Application Tuning - How Predicates Influence Query Performance
- N. General Rules About Predicate Evaluation
- O. Order of Evaluating Predicates
- P. JOIN Methods
- Q. Tuning Your Subqueries
- R. Application Tuning – Optimization Hints
- S. Application Tuning – Summary
- T. Lab 2 - Tuning

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