Db2 for z/OS: Database Design & Implementation Training

Duration: **2 Day**

BILGINÇ IT Academy
info@bilginc.com
bilginc.com

This course provides a detailed explanation of the methodology to be followed in order to design and implement efficient Db2 for z/OS databases. The course discusses all aspects of database design from the logical data model and implementation of the physical design, through to ongoing performance monitoring of the resultant database.

This course is also available for one-company, on-site presentations and for live presentation over the Internet, via the Virtual Classroom Environment service.

Prerequisites

Attendees should be familiar with the Db2 environment and have knowledge of SQL or have attended RSM's courses **Db2 for z/OS: Introduction, Concepts & Facilities** and **Understanding and Using SQL**.

What You Will Learn

- describe the internal structure and components of Db2 for z/OS databases
- design and assess a logical database model
- design and implement efficient physical databases from the logical model using relevant options to create and amend storage groups, databases, table spaces, tables, indexes, aliases, synonyms, etc.
- understand and implement an effective locking strategy and use Db2 commands and other facilities to monitor locking for performance
- use EXPLAIN to evaluate the effectiveness of the database design.

Training Outline

DBMS Overview

Database Management Systems; Hierarchical database structure; Network database structure; Relational database structure; Database comparison; Table structure; A brief history of Db2.

Relational Theory & Concepts

Dr. E F Codd's 12 rules; The relational model; Structure - tables; Structure - rules for columns and rows; Structure - candidate keys; Structure - primary and alternate keys; Structure - foreign keys; Manipulation - relational algebra; Manipulation: projection, restriction, join, union, intersection, difference, product; Integrity - domain and user-defined integrity; Integrity - entity and referential integrity; Referential integrity - terminology; Tablespace set; Referential integrity - defining constraint; Constraint definition restrictions; Data manipulation restrictions; Catalog entries; Referential Integrity and INSERT; Referential Integrity and UPDATE; Referential Integrity and DELETE; Referential Integrity review.

Table Design

Conventional file systems; Database systems; Data concepts; Entity-relationship diagram; Functional

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dependence; Normalisation; First normal form; Second normal form; Third normal form; Normalisation summary; De-normalisation; De-normalisation integrity exposures; Table creation; Db2 data types; Null attributes; Variable length columns; Variable length row formats; Large object data; XML data; Identity columns; GENERATED options; Column considerations; Constraint and domain management; Constraint catalog tables; Temporary tables; Created temporary tables; Declared temporary tables; Table comparisons.

Db2 Index Usage & Design

Predicates; Accessing data - table or tablespace scan; Sequential prefetch; Index structure; Index page splits; Using index - matching index scan; Using index - non-matching index scan; Using direct row access; Indexable and non-indexable predicates; Statement processing; Stage 1 and stage 2 predicates; Summary of predicate processing; Predicate evaluation sequence; List prefetch; Index lookaside; Index considerations; Creating indexes; Composite keys; Clustering; Variable length index keys; Index compression; Index key randomisation; Indexes on expressions; Non-key columns in unique index; Further considerations; Reorganising indexes; Hash access; Hash table structure; Defining a hash table.

Physical Database Design & Data Definition Language

Pagesets; Pageset structure; Tablespace types; Non-segmented tablespace; Segmented tablespace; Partitioned tablespace; Universal tablespace; Large object tablespace; XML tablespace; Data compression; Db2 data objects overview; Storage group; Database; Tablespace; Determining tablespace type; Table; Indexspace / index; Views; Synonym; Alias; Deleting objects; Performance considerations: space allocations, data set placement, free space, statistics, buffer pools.

Db2 Locking & Concurrency

Controlling concurrent access; Claims and drains; Claim classes; Drains; Utility restrictive states; Transaction locking; Reasons for locking - preventing lost updates; Reasons for locking - preventing reads of uncommitted data; Reasons for locking - allowing repeatable reads of data; Lock control; Lock options - installation parameters; Lock options - tablespace creation; Lock options - SQL statements; Locking hierarchy; Lock compatibility - row and page locks; Lock compatibility - table and tablespace locks; Lock options - BIND parameters; BIND - ACQUIRE and RELEASE parameters; BIND - ISOLATION; BIND - CURRENTDATA; Lock avoidance; Lock avoidance example; Locking and concurrency recommendations; Monitoring locking - Db2 commands; Monitoring locking - LOCKINFO; Monitoring locking - Db2PM / Db2PE reports.

Db2 EXPLAIN

EXPLAIN; EXPLAIN table enhancements; EXPLAIN syntax enhancements; PLAN_TABLE (Db2 version 1); PLAN_TABLE (Versions 2 to 6); PLAN_TABLE (Db2 versions 7 to 11); DSN_STATEMNT_TABLE; DSN_FUNCTION_TABLE; EXPLAIN example 1 (basic access paths); EXPLAIN example 2 (multi-index access); EXPLAIN example 3 (nested queries).