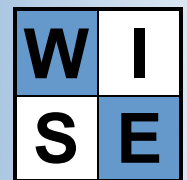
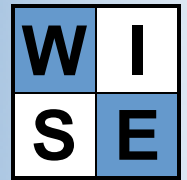


DB2 UDB for z/OS: Visual Explain for DB2 z/OS & SQL Tuning



WISE LTD.

- COURSE CODE:** DZOVEX
- COURSE TITLE:** Visual Explain (VE) for DB2 z/OS & SQL Tuning
- CURRENCY:** DB2 for z/OS V8
- AUDIENCE:** Application Developers, Application Programmers, Production DBAs, Database Administrators and Capacity Planners.
- PREREQUISITES:** Completion of course 'DB2 SQL Essentials' (DZOSQE) or equivalent knowledge.
- DURATION:** 4 days
- SUMMARY:** After reviewing the usage and the scope and limits of SQL operations such as:
- INNER JOINS
 - OUTER JOINS
 - UNIONS
 - CASE expressions
 - Subqueries
 - Subselects
 - Table expressions
 - Row expressions
 - Column/scalar functions
 - Date/time arithmetic
 - Cursor operations
 - Locking & concurrency
 - Index design & usage
- this course focuses on using **Visual Explain V8 for DB2 z/OS** to optimise SQL statements in terms of elapsed, CPU and I/O times.
- OBJECTIVES:** Upon completion of this presentation, the participant should be able to exploit the DB2 Optimizer in deciding which of several SQL alternatives will provide reduced elapsed times, CPU and I/O.
- LAB:** About 65% hands-on, incorporating DB2 for z/OS V8 Visual Explain.



1. DB2 OBJECTS – OVERVIEW

- Storage groups
- Databases
- Table spaces
- Tables
- Indexes
- Views
- Aliases vs. synonyms
- MetaData via SYSIBM tables

2. DATA INTEGRITY – OVERVIEW

- Referential integrity
- Check constraints
- Unique constraints
- Primary vs. foreign keys

3. THE DB2 ENVIRONMENT – OVERVIEW

- Address spaces
- Database/SQL services
- Catalog services
- Logging/recovery services
- Locking/concurrency services
- Caching/buffering services

4. ZPARMs – APPLICATION SPECIFIC

- EDM pool
- SORT pool
- RID pool
- DSMAX

5. INDEX DESIGN & USAGE

- Index structure
- Advantages/disadvantages
- Clustered index criteria
- Composite indexes
- Index lookaside
- When to reorganise

6. DB2'S ACCESS TYPES

- Table space scan
- Sequential prefetch
- List prefetch
- Dynamic prefetch
- Matching index scan
- Non-matching index scan
- Index screening
- Multiple index access
- Index look-aside
- Direct row access

7. PREDICATE TYPES

- Definitions
- Indexable vs. non-indexable
- Stage 1 vs. Stage 2
- 'Stage 3' (i.e., host program implemented)
- Predicate evaluation order

8. DATE-TIME ARITHMETIC

- YEAR/MONTH calculations
- Last day of month calculations
- TIME calculations
- Subtracting DATE/TIME values
- DAYS function
- Converting DATE/TIME types

9. TEMPORARY TABLE USAGE GUIDELINES

- When to consider
- CREATE vs. DECLARED temporary tables
- DBA responsibility
- Application responsibility
- Examples of use
- Workshop

10. PLANS vs. PACKAGES

- One large plan
- Many packages
- Collections
- Version controls
- ACQUIRE & RELEASE parameters
- CURRENTDATA options
- ISOLATION LEVEL options
- CICS vs. Batch

11. BATCH APPLICATION PERFORMANCE

- Index lookaside
- Prefetch
- Utilities (e.g., application INSERTs vs. LOAD)
- Caching data in working storage
- How to reduce SQL calls
- Checkpoint/restart

12. LOCKING & CONCURRENCY

- Reasons for locking
- Commits
- Page/row locks
- Table space locks
- Partition locks
- Isolation levels
- Lock avoidance
- BIND/REBIND parameters optimisation

13. EFFICIENT SQL GUIDELINES SUMMARY

- Number of SQL calls
- Number of rows searched
- Number of columns retrieved
- Stage 1 vs. Stage 2 predicates
- Static vs. dynamic SQL
- Joins
- Local vs. join predicate
- Nested table expressions
- CASE vs. UNION
- Singleton select vs. cursor
- OPTIMIZE FOR n ROWS
- OPTIMIZE FOR FIRST n ROWS
- Controlling sorts
- Workshop

14. THE DB2 OPTIMIZER

- Definition (e.g., its inputs)
- Function during BIND/REBIND
- Use of filter factors
- Role of RUNSTATS
- I/O time estimation
- Processor time estimation
- Access path selection
- Fooling the Optimizer

15. VISUAL EXPLAIN (VE) – INTRODUCTION

- Purpose, scope and limits
- Installation
- Control Center plug-ins
- Prerequisites
- Inter-DB2 subsystem dependencies
- Statistics Advisor
- Tune SQL
- List static SQL
- View External Explain tables
- List cache statements
- Detail ZPARMs
- Stored procedures used by VE
- How to invoke
- Workshop

16. VISUAL EXPLAIN (VE) TERMS & CONCEPTS

- Access plan
- Query blocks
- Nodes
- Node plane
- Diagrams
- Canvas
- Workshop

17. HOW TO TUNE SQL VIA VE

- SQL statement source
- VE's menu and tools
- How to read/interpret VE's access plan graph
- How to tune predicate processing and filtering
- How to tune joins
- How to tune sorts
- How to analyse parallel queries
- How to generate reports
- How to use the Statistics Advisor
- Detailed workshop

18. WHAT'S NEW IN DB2 V9 (FOR DEVELOPERS)