

COURSE CODE: DZODAP

COURSE TITLE: DB2 Database Administration & Performance

AUDIENCE: Database Administrators and System Administrators.

PREREQUISITES: At least nine (9) months of database administration related experience.

DURATION: 5 days

SUMMARY: Designed mainly for the DBA, this course focuses on the best practices, techniques, tips and guidelines for optimal database design and performance. Topics given rigorous treatment include:

- The design, creation and management of tables, table spaces and indexes
- The design creation and management of efficient DBDs
- How to optimise I/O
- How to control CPU cycles
- How to plan and implement backup/recovery strategies
- The use and optimisation of data management and recovery utilities
- How to tune the VP, RID and EDM pools
- How to exploit the DB2 optimizer and interpret EXPLAIN
- How to exploit parallelism
- How to optimise batch design
- How to optimise DB2 locks

OBJECTIVES: Upon completion of this course, the participant should be competent to improve availability, throughput and resource utilisation per the topics under 'Summary' above.

1. INTRODUCTION TO z/OS

- z/OS architecture (i.e., 64-bit memory)
- DB2 virtual storage considerations
- Buffer pool considerations
- EDM pool considerations
- Data space considerations

2. REVIEW OF DB2 ADDRESS SPACES & COMPONENTS

- Address spaces and dispatching priorities
- Catalog facility
- Logging facility
- Archiving facilities
- Recovery facilities
- Locking facilities
- Attachment facilities

3. REVIEW OF DB2 OBJECTS & DATA INTEGRITY

- Storage groups
- Databases
- Table spaces
- Tables
- Indexes
- Constraints (e.g., RI)

4. INTRODUCTION TO SYSTEM DEFINITION PARAMETERS (i.e., ZPARM)

- CTHREAD
- EDM pool
- Sort pool
- RID pool
- IRLM
- DSMAX
- Traces

5. DATABASE DESIGN CONSIDERATIONS & PERFORMANCE

- Logical design
- Physical design
- Choosing page size
- Choosing free space (data & index)
- Choosing PRIQTY & SECQTY
- Choosing clustering indexes
- Altering database design (indexes, tables, etc.)
- Using schemas
- When to consider compression
- DB2 physical page layout

6. DBD DESIGN & THE EDM POOL & PERFORMANCE

- EDM pool structure & contents
- Package/plan properties
- Space for plans & packages
- ACQUIRE/RELEASE bind parameter & performance
- Estimated space for each object (e.g., table, index)
- How to control fragmentation
- How to monitor and control DBD size
- Compiled Assignment Procedures (e.g., UPROC)

7. TABLE DESIGN CONSIDERATIONS & PERFORMANCE

- Identity columns and primary key
- Data types (CHAR vs. VARCHAR; INTEGER vs. DECIMAL, etc.)
- Column sequence and logging
- Partitioned vs. non-partitioned

8. INDEX DESIGN & PERFORMANCE

- When to choose an index
- When not to consider and index
- Free space considerations
- Composite index
- Matching vs. non-matching index scan
- Index screening
- Index lookaside
- When to reorganise
- Workshop

9. PREDICATE & I/O TYPES & PERFORMANCE

- Stage I vs. Stage II
- Sequential prefetch
- Sequential detection
- List prefetch
- Workshop

10. DISK STORAGE SIZE ESTIMATION

- Criteria
- How to estimate space for tables
- How to estimate space for compression dictionary
- How to estimate space for indexes
- Workshop

11. DATABASE BACKUP & RECOVERY

- Planning (e.g., Backup frequency)
- Table space recovery
- Index recovery
- Availability considerations
- Point-in-time recovery
- Recovery of page set vs. data set
- Disk failure recovery
- Application recovery
- Down-level page set
- Workshop

12. MONITORING & TUNING

- Planning for
- Introduction to traces
- How to reduce I/O
- How to reduce
- CPU consumption
- How to interpret response times
- Workshop

13. POOL TUNING

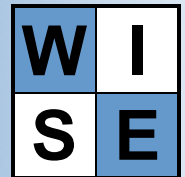
- EDM
- RID
- Sort
- Thresholds
- Workshop

14. RESOURCE UTILISATION TUNING

- Data set open/close
- Data set placement
- Logging
- Real storage usage
- Thread use optimisation
- Workshop

15. QUERY TUNING

- Guidelines general
- Efficient predicates
- Cursor operations
- Influencing the optimizer
- How to use and interpret EXPLAIN output



16. THE DB2 OPTIMIZER

- Optimizer inputs
- BIND/REBIND processes
- RUNSTATS utility
- I/O cost estimates (e.g., filter factors)
- CPU cost estimates (e.g., get pages)
- Access path selection
- Fooling the Optimizer (e.g., hints)
- Workshop – EXPLAIN

17. LOCKING & CONCURRENCY

- Definition
- IRLM options
- Claims and drains
- Deadlocks
- Table space locks
- Table locks
- Page locks
- Which isolation level?
- Commit considerations
- Workshop

18. CHECKPOINT RESTART CONSIDERATIONS