Course Code: CV964G

Course Title: Db2 12 for z/OS SQL Performance and Tuning

Description:

This course is designed to teach the students how to prevent SQL performance problems and how to improve the performance of existing SQL.

Objectives:

After completing this course, students will be able to:

- Understand and design better indexes
- Determine how to work with the optimizer (avoid pitfalls, provide guidence)
- Optimize multi-table access
- Work with subqueries
- Avoid locking problems
- Use accounting traces and other tools to locate performance problems in existing SQL
- and more

Prerequisites:

- Familiarity with SQL
- Familiarity with Db2 12 for z/OS
- Familiarity with Db2 12 for z/OS application programming

Duration:

24 Hrs

Topics:

1. Introduction to SQL performance and tuning • Performance issues • Simple example • Visualizing the problem • Summary 2. Performance analysis tools • Components of response time • Time estimates with VQUBE3 • SQL EXPLAIN • The accounting trace • The bubble chart • Performance thresholds 3. Index basics • Indexes • Index structure • Estimating index I/Os • Clustering index • Index page splits 4. Access paths • Classification • Matching versus Screening • Variations • Hash access • Prefetch • Caveat 5. More on indexes • Include index • Index on expression • Random index • Partitioned and partitioning, NPSI and DPSI • Page range screening • Features and limitations 6. Tuning methodology and index cost • Methodology • Index cost: Disk space • Index cost: Maintenance • Utilities and indexes • Modifying and creating indexes • Avoiding sortsIndex design • Approach • Designing indexes 7. Advanced access paths • Prefetch • List prefetch • Multiple index access • Runtime adaptive index 8. Multiple table access • Join methods • Join types • Designing indexes for joins • Predicting table order 9. Subqueries • Correlated subqueries • Non-correlated subqueries • ORDER BY and FETCH FIRST with subqueries • Global query optimization • Virtual tables • Explain for subqueries 10. Set operations (optional) • UNION, EXCEPT, and INTERSECT • Rules • More about the set operators • UNION ALL performance improvements 11. Table design (optional) • Number of tables • Clustering sequence • Denormalization • Materialized query tables (MQTs) • Temporal tables • Archive enabled tables 12. Working with the optimizer • Indexable versus non-indexable predicates • Boolean versus non-Boolean predicates • Stage 1 versus stage 2 • Filter factors • Helping the optimizer • Pagination

13. Locking issues • The ACID test • Reasons for serialization • Serialization mechanisms • Transaction locking • Lock promotion, escalation, and avoidance 14. More locking issues (optional) • Skip locked data • Currently committed data • Optimistic locking • Hot spots • Application design • Analyzing lock waits 15. Massive batch (optional) • Batch performance issues • Buffer pool operations • Improving performance • Benefit analysis • Massive deletes

Audience:

This course is for Db2 12 for z/OS application developers, Db2 12 for z/OS DBAs, and anyone else with a responsibility for SQL performance and tuning in a Db2 12 for z/OS environment.