Advanced T-SQL Querying, Programming and Tuning for SQL Server (SQTSQL)

ID SQTSQL **Price** 2,850.— €(excl. tax) **Duration** 5 days

Course Objectives

In this course you will learn the details and capabilities of T-SQL in the following areas: Logical Query Processing; Query Tuning (Internals and Index Tuning, including Columnstore Indexes, Query Store, New Cardinality Estimator, Temporary Tables, Sets vs. Cursors, Query Tuning with Query Revisions); Subqueries and Table Expressions (Derived Tables, CTEs, Views, Inline Table-Valued Functions), Recursive Queries, APPLY Operator, Joins and Set Operators; Aggregating, Pivoting and Windowing (including Aggregate, Ranking and Offset Window Functions), Custom Aggregates and STRING_AGG; TOP and OFFSET-FETCH; Data Modification; Working with Date and Time (including System-Versioned Temporal Tables); Programmable Objects (Dynamic SQL, User Defined Functions, Stored Procedures, Triggers, Transactions and Concurrency, Exception Handling); In-Memory OLTP.

Along the course you will learn how to use T-SQL to solve practical problems such as: Relational Division, Missing and Existing Ranges (Gaps and Islands), Separating Elements, Pivoting and Unpivoting, Ranking and Offset, Running Totals, Moving Averages, YTD, Custom Aggregations, TOP and OFFSET-FETCH Problems, Paging, Top N Per Group, Median, Data De-Duplication, Handling Sequences, Merging Data, Treatment of Temporal Intervals (Intersection, Max Concurrent, Packing), Dynamic Search Condition (aka Dynamic Filtering), Migrating On-Disk to Memory Optimized Data, and more.

You will learn how to tune your queries, how to develop efficient routines including user defined functions, stored procedures and triggers, work in multi-user environments with transactions and isolation levels, and use dynamic SQL securely and efficiently.

The course provides a dedicated module focusing on query tuning. The module covers internals and index tuning, including coverage of Columnstore data, index access methods, cardinality estimations, query store, temporary tables, set vs. cursors, and query tuning using query revisions. Moreover, query tuning is in the heart of this course and is incorporated in the different modules throughout the course. With each querying/programming task the discussions will revolve around logical aspects, set-based vs. iterative/procedural programming and optimization of the solutions.

The course workbook also contains a bonus self-study appendix on Graphs and Recursive queries. This appendix covers graphs, trees and hierarchies. It explains how to model and query such structures. It also covers the HIERARCHYID datatype, and the SQL Graph feature.

Course Content

Module 01: Logical Query Processing

- Logical Query Processing Order
- Logical Query Processing Example
- Phase Details

Quiz

Module 02: Query Tuning

- Internals and Index Tuning

Quiz

- New Cardinality Estimator
- Temporary Tables
- Sets vs. Cursors
- Query Tuning with Query Revisions

Module 03 – Multi-Table Queries

- Subqueries and Table Expressions
- APPLY Operator
- Joins
- Set Operators

LAB 03

Module 04: Grouping, Pivoting and Windowing

- Window Functions
- Pivoting and Unpivoting Data
- Custom Aggregations
- STRING_AGG
- Grouping Sets (bonus self-study unit)

LAB 04

Module 05: TOP and OFFSET-FETCH

- TOP
- OFFSET-FETCH
- Top N Per Group

LAB 05

Module 06: Data Modification

- Inserting Data
- Sequences
- Deleting Data
- Updating Data
- Merging Data
- The OUTPUT Clause

LAB 06

Module 07 – Working with Date and Time

- Date and Time Datatypes
- Date and Time Functions
- Date and Time Challenges
- System-Versioned Temporal Tables
- Date and Time Querying Problems

LAB 07

Module 08: Programmable Objects

- Dynamic SQL
- User Defined Functions
- Stored Procedures
- Triggers
- Transactions and Concurrency
- Exception Handling

LAB 08

Module 09: In-Memory OLTP

- Intro to In-Memory OLTP
- Architecture
- Memory Optimized Tables and Indexes
- Natively Compiled Procedures
- Transaction Semantics

LAB 09

Appendix A: Graphs and Recursive Queries (Bonus Self-Study Material)

- Graphs, Described
- Materialized Paths
- Custom
- Using the HIERARCHYID datatype
- Nested Sets
- Nested Iterations
- Loops
- Recursive Queries
- SQL Graph

LAB A

About Fast Lane

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