

KOENIG SOLUTIONS · COURSE OUTLINE

Performance Tuning and Managing MS SQL Server 2022

Learn to analyse SQL Server internals and tune performance using indexes, query plans, Query Store and Intelligent Query Processing.

16

MODULES

51

TOPICS

6

HANDS-ON LABS

COURSE OVERVIEW

This course covers SQL Server architecture, database internals, scheduling and waits, and index internals including columnstore indexes and fragmentation. It continues with statistics maintenance, memory management, In-Memory OLTP, locking, concurrency and execution plan analysis. Later modules address Query Store, plan cache internals, query recompilation, query optimization and Intelligent Query Processing. The final modules cover monitoring with Extended Events, automatic tuning in Azure SQL Database, and general performance improvement tips and tricks.

WHO THIS COURSE IS FOR

Database Administrators

Database Developers

Performance Engineers

SQL Server Consultants

System Administrators

LEARNING OBJECTIVES

- Describe SQL Server architecture and SQLOS components
- Explain database structures, data files and TempDB behaviour
- Analyse scheduling, waits and queues in SQL Server
- Compare index types including columnstore and clustered indexes
- Apply statistics management to resolve outdated or missing statistics
- Evaluate execution plans and query optimizer behaviour
- Configure Query Store for plan forcing and automatic tuning
- Identify causes of query recompilation and how to avoid it

16 Modules, 51 Topics

01

Lab

SQL Server Architecture

TOPICS

- SQL Server Components and SQLOS
- Thread management and Reduced buffer pool I/O promotions

02

Lab

Database Architecture Internal

TOPICS

SQLDB Structure · Data Files · TempDB and Virtual log file growth

03

Lab

Scheduling, and Waits

TOPICS

Windows Scheduling vs. SQL Server Scheduling · Waits and Queues

04

Lab

Index Internals

TOPICS

- Indexing and Its types
- Column store Indexes vs Clustered Index
- Index Fragmentation
- Ordered clustered columnstore index and Improved columnstore segment elimination

05

Statistics and Maintenance

TOPICS

Statistics and Data Distribution · Auto Create and Update Statistics · Manage Statistics Settings Manually · Resolving outdated and missing Statistics

06

Lab

SQL Server Memory

TOPICS

SQL Server Memory · In-Memory OLTP Concepts · Memory Optimized Tables and Procedures

07**Lab**

SQL Server Locking

TOPICS

Blocking/Deadlock and Locking Internals · Concurrency · Effect of Indexes on locking · Enhanced spinlock algorithms

08

Execution Plan Analysis

TOPICS

Query Optimizer · Estimated vs Actual Execution Plan · Analyzing Query Execution Plans · Adaptive Query Processing

09

Performance Improvement with Query Store

TOPICS

- Information Collected by Query Store
- Query Runtime Data and capture Mode
- Controlling Query Store and Query Store Reporting
- Plan Forcing
- Automatic Tuning

10

Execution Plan Cache and Its Internal

TOPICS

Plan Cache Discussion · Troubleshooting with Plan Cache · Execution Plan Caching and Reuse · Execution Plan Recommendation

11

Query Plan Recompilation and Execution

TOPICS

Pros and cons of Query Recompilation · Reason of Recompilation · Avoid Recompilation

12

Query Optimization

TOPICS

Optimal Table Joining Order · Sort operator and Tempdb spill

13

Intelligent Query Processing

TOPICS

Memory Grant Feedback · Approximate Count Distinct · Intelligent Query Processing · System page latch concurrency enhancements

14

Monitoring and Tracing

TOPICS

Extended Events core Concepts · Working with Extended Events

15

Automatic Tuning in Azure SQLDB

TOPICS

- Index Management in Azure SQLDB using Automatic Tuning
- Monitoring Azure SQLDB

16

Database Performance Improvement Tips and Tricks

TOPICS

- Tips to improve SQL Server performance & database design
- Improved virtual log file (VLF) algorithms
- Instant file initialization for transaction log file growth events

HANDS-ON LABS

Practise What You Learn

#	MODULE	ACTIVITY
01	SQL Server Architecture	SQL Server Architecture
02	Database Architecture Internal	Database Structures
03	Scheduling, and Waits	Scheduling, and Waits
04	Index Internals	Statistics and Indexing
06	SQL Server Memory	SQL Server In Memory Tables and Procedure
07	SQL Server Locking	Concurrency and Transactions

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

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