

KOENIG SOLUTIONS · COURSE OUTLINE

Microsoft SQL Server 2019 Performance Tuning and Management

Learn to tune and manage SQL Server 2019 performance, from architecture and I/O to query optimisation and monitoring.

13

MODULES

34

TOPICS

13

HANDS-ON LABS

COURSE OVERVIEW

This course examines SQL Server 2019 architecture, scheduling, waits, I/O, database structures, memory, and concurrency and locking internals. It then covers statistics and index internals, query execution and plan analysis, plan caching and recompilation, extended events, and monitoring, tracing and baselining. The final modules address query optimisation, intelligent query processing features such as approximate count distinct and memory grant feedback, and general database performance improvement tips and tricks.

WHO THIS COURSE IS FOR

Database Administrators

Database Developers

Performance Tuning Specialists

System Administrators

Data Engineers

LEARNING OBJECTIVES

- Explain SQL Server architecture, scheduling and wait statistics
- Describe core I/O concepts and test storage performance
- Analyse database structure, data file and tempdb internals
- Assess SQL Server memory usage and In-Memory OLTP
- Explain concurrency, transactions and locking internals
- Interpret statistics, cardinality estimation and index internals
- Analyse query execution plans and adaptive query processing
- Apply query optimisation techniques and index tuning

13 Modules, 34 Topics

01

Lab

SQL Server Architecture, Scheduling, and Waits

TOPICS

- Lesson 1: SQL Server Components and SQLOS
- Lesson 2: Windows Scheduling vs. SQL Server Scheduling
- Lesson 3: Waits and Queues

02

Lab

SQL Server I/O

TOPICS

- Lesson 1: Core Concepts of I/O
- Lesson 2: Storage Solutions
- Lesson 3: I/O Setup and Testing

03

Lab

Database Structures

TOPICS

- Lesson 1: Database Structure Internals
- Lesson 2: Data File Internals
- Lesson 3: Tempdb Internals

04

Lab

SQL Server Memory

TOPICS

- Lesson 1: SQL Server Memory
- Lesson 2: In-Memory OLTP

05**Lab**

Concurrency and Transactions

TOPICS

- Lesson 1: Concurrency and Transactions
- Lesson 2: Locking Internals

06**Lab**

Statistics and Index Internals

TOPICS

- Lesson 1: Statistics Internals and Cardinality Estimation
- Lesson 2: Index Internals
- Lesson 3: Columnstore Indexes
- Lesson 4: Index Tuning, Index Maintenance

07**Lab**

Query Execution and Query Plan Analysis

TOPICS

- Lesson 1: Query Execution and Query Optimizer Internals
- Lesson 2: Query Execution Plans
- Lesson 3: Analysing Query Execution Plans
- Lesson 4: Adaptive Query Processing

08**Lab**

Caching and Recompilation

TOPICS

- Lesson 1: Plan Cache Internals
- Lesson 2: Troubleshooting with the Plan Cache
- Lesson 3: Automatic Tuning
- Lesson 4: Query Store

09**Lab**

Extended Events

TOPICS

- Lesson 1: Extended Events Core Concepts
- Lesson 2: Working with Extended Events

10**Lab**

Monitoring, Tracing, and Baselining

TOPICS

- Lesson 1: Monitoring and Tracing
- Lesson 2: Baselining and Benchmarking

11**Lab**

Query Optimization

TOPICS

- Lesson 1: Optimal Table Joining Order, Indexing Issue and performance improvement using Index
- Lesson 2: Sort operator and tempdb spill
- Lesson 3: Query tuning in SQL Server 2019 (Scalar UDF Inlining)

12**Lab**

Intelligent Query Processing

TOPICS

- Lesson 1: Approximate Count Distinct, Batch mode on Row store, Memory Grant Feedback (Row Mode)

13**Lab**

Database Performance Improvement Tips and Tricks

TOPICS

- Lesson 1: Tips to improve SQL Server performance & database design

Practise What You Learn

#	MODULE	ACTIVITY
01	SQL Server Architecture, Scheduling, and Waits	SQL Server Architecture, Scheduling, and Waits
02	SQL Server I/O	Testing Storage Performance
03	Database Structures	Database Structures
04	SQL Server Memory	SQL Server Memory
05	Concurrency and Transactions	Concurrency and Transactions
06	Statistics and Index Internals	Statistics and Index Internals
07	Query Execution and Query Plan Analysis	Query Execution and Query Plan Analysis
08	Caching and Recompilation	Plan Caching and Recompilation
09	Extended Events	Extended Events
10	Monitoring, Tracing, and Baselineing	Monitoring, Tracing, and Baselineing
11	Query Optimization	Query Optimization
12	Intelligent Query Processing	Intelligent Query Processing
13	Database Performance Improvement Tips and Tricks	Performance Improvement and Testing

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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