SQL Server: Performance Tuning and Optimization

WorkshopPLUS

Duration: 4 Days [Remote / Onsite]
Difficulty Level: 300 - Advanced

Description

This offering is designed to provide you with the knowledge to understand the key principles of SQL Server that impact application performance. We present details about the internals of the SQL Server engine, including the memory manager, task scheduler, table and index structures, locking and concurrency, query optimization and programming efficiency.

Objectives

- Identify the components of SQL Server Operating System and Internals
- Review Performance Tuning and Optimization
- Understand the Query Compilation and Optimization Process
- Study the Query Execution Process
- Examine Recompilation Threshold Internals

Outcomes

Gain knowledge of reliable methods to analyze performance bottlenecks, design effective index strategies, avoid blocking and deadlocks, and develop efficient queries and stored procedures.

Methodology

Learn by example

Participate in group discussions and learn from presentations and demonstrations.

Hands-on

- Use a ready environment for a hands-on experience
- Access to resources and labs for up to six months after the workshop

Scope

This offering is scoped for On-Premises SQL Server performance.

Agenda

Day 1

- SQL Server Architecture, Scheduling and Waits
- SQL Server I/O and Database Structure
- SQL Server Memory

Day 2

- SQL Server Concurrency and Transactions
- SQL Server Index Structure

Day 3

- SQL Server Statistics Structure
- SQL Server Query Execution and Plans

Day 4

- SQL Server Plan Caching and Query Store
- SQL Server Query Tuning
- SQL Server Performance Tools

Microsoft

Delivery Outline

Requirements	
Participants ▪ SQL Server Architects, Database Administrators **Skill Requirements** ▪ Strong SQL performance troubleshooting knowledge **Time Commitment** ▪ Four full-day engagement with relevant roles	**Delivery Requirements** ▪ Computer with Windows 10 or later, audio equipment, internet access. Modern browser and at least 1 Mbps bandwidth per participant ▪ Microsoft/Windows Live ID to connect to the virtual environment ▪ Microsoft Teams for remote deliveries

Education		
Day 1	SQL Server Architecture, Scheduling and Waits	▪ Introduction to SQL Operating System ▪ SQL Server Task Scheduling, Waits, and Queues
Day 1	SQL Server I/O and Database Structure	▪ SQL Server Disk I/O Performance ▪ SQL Server Page, Data File, Log File and TempDB File Structure ▪ Troubleshooting TempDB Performance
Day 1	SQL Server Memory	▪ Windows and SQL Server Memory Management ▪ Troubleshooting SQL Server memory
Day 2	SQL Server Concurrency and Transactions	▪ SQL Server Concurrency and Transactions, Isolation Levels, and Locking ▪ ***Advanced**: Delayed Transaction Durability and Troubleshooting Concurrency Performance*
Day 2	SQL Server Index Structure	▪ Index Internals, strategy, monitoring and fragmentation ▪ ***Advanced**: Partitioned Tables and Indexes and Columnstore Indexes and In-Memory OLTP*
Day 3	SQL Server Statistics Structure	▪ SQL Server Statistics Internals and maintenance
Day 3	SQL Server Query Execution and Plans	▪ SQL Server Query Plan Analysis, Execution and Optimization ▪ ***Advanced**: SQL Server Intelligent Query Processing*
Day 4	SQL Server Plan Caching and Query Store	▪ SQL Server Plan Cache and Query Store ▪ ***Advanced**: Troubleshooting SQL Server Performance with Query Store*
Day 4	SQL Server Query Tuning	▪ Sargable Expressions ▪ Query Hints and Troubleshooting
Day 4	SQL Server Performance Tools	▪ SQL Server Lightweight Query Profiler and Extended Events ▪ ***Advanced**: SQL Server Resource Governor*

Note: Advanced lessons can be replaced with any other lessons.

For more information: Please contact your Microsoft Representative for more details.