

SQL Server: Performance Tuning and Optimization

WorkshopPLUS

Focus Area: Performance and Scalability

Duration: 4 days

Difficulty: 300- Advanced

Overview

This course will provide you the knowledge to understand the key principles about the aspects of SQL Server that affect application performance. This course will cover the internals of the SQL Server engine such as the memory manager and the task scheduler, table and index structures, locking and concurrency, query optimization and programming efficiency. This workshop is targeted at database administrators and database developers.

Objectives

After completing this training, students will be able to:

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

Key Takeaways

Course Material

- Learn reliable methods of analyzing performance bottlenecks, designing effective index strategies, avoiding blocking and deadlocks, developing efficient queries and stored procedures.
- Take what you've learned in the classroom and apply it to your SQL Server environment at your organization.

Hands-on Labs

- Most of the concepts covered above will be supported by hands-on labs and demos.
- Attendees have access to resources and labs for up to 6 months after workshop completion.

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

Plan for four full days. Early departure on any day is not recommended.

Course Details

Module 1: SQL Server Architecture, Scheduling and Waits

- Introduction to SQL Operating System
- SQL Server Task Scheduling
- SQL Server Waits and Queues

Module 2: SQL Server I/O and Database Structure

- SQL Server Disk I/O
- Test Storage Subsystem with Diskspd
- Troubleshooting I/O Performance
- SQL Server Page Structure
- SQL Server Data File Structure
- SQL Server Log File Structure
- SQL Server TempDB File Structure
- Troubleshooting TempDB Performance

Module 3: SQL Server Memory

- Windows Memory Management
- SQL Server Memory Management
- Troubleshooting SQL Server memory

Module 4: SQL Server Concurrency and Transactions

- SQL Server Concurrency and Transactions
- SQL Server Isolation Levels
- SQL Server Locking
- Delayed Transaction Durability
- Troubleshooting Concurrency Performance

Module 5: SQL Server Index Structure

- Index Internals
- Index Strategy
- Partitioned Tables and Indexes
- Columnstore Indexes
- Index Monitoring and Fragmentation
- In-Memory OLTP

Recommended Qualifications

- Understanding of SQL Server Administration and Troubleshooting concepts

For more information

Contact your Microsoft Account Representative for further details.

Module 6: SQL Server Statistics Structure

- SQL Server Statistics Internals
- SQL Server Cardinality Estimation
- SQL Server Statistics Maintenance

Module 7: SQL Server Query Execution and Plans

- SQL Server Query Execution
- SQL Server Query Optimization
- SQL Server Query Plan Analysis
- SQL Server Intelligent Query Processing

Module 8: SQL Server Plan Caching and Query Store

- SQL Server Plan Cache
- SQL Server Query Store
- Troubleshooting SQL Server Performance with Query Store

Module 9: SQL Server Query Tuning

- Sargable Expressions
- Query Hints
- Query Troubleshooting

Module 10: SQL Server Performance Tools

- SQL Server Lightweight Query Profiler
- SQL Server Extended Events
- SQL Server Resource Governor

Hardware Requirements

- An Intel Core-i5-based PC
- USB port
- Microsoft/Windows Live ID to connect to the virtual environment
- 4 GB RAM
- 128 GB HDD
- Windows 7 SP1 or later
- Office 2013 Professional Plus
- Internet access with at least 1 Mbps bandwidth per student.