

Database Performance Tuning: SQL Server Masterclass

AGILE LEADERS
Training Center

AGILE LEADERS
Training Center

Database Performance Tuning: SQL Server Masterclass

Overview

Enterprise database systems demand disciplined database performance tuning to eliminate bottlenecks, stabilize workload throughput, and optimize resource consumption across Microsoft SQL Server environments. This one-week masterclass provides database administrators and software engineers with structured methodologies to isolate bottlenecks and accelerate query throughput within relational data platforms. Participants examine query execution lifecycles, wait statistics, index architecture, and caching mechanisms to resolve severe latency across transactional and analytical workloads. Through disciplined troubleshooting protocols, attendees evaluate live server activity using native diagnostic tools such as Extended Events, Dynamic Management Views, and Query Store. This course is delivered by Agile Leaders Training Center.

Who Should Attend

- Database Administrators tasked with maintaining workload availability and throughput.
- Database Developers building stored procedures and complex relational queries.
- Data Engineers managing high-volume data ingestion and processing pipelines.
- IT System Analysts investigating enterprise application latency and data layer delays.
- Software Engineers architecting backend data models and relational transactions.
- Technical Project Leads overseeing performance-critical database operations.

Departments and Industries

This program supports technical teams responsible for data infrastructure reliability across transaction-heavy operational sectors.

- IT Infrastructure and Database Administration Teams
- Data Management and Data Architecture Groups
- Software Development and Application Engineering Units
- Enterprise Architecture and Cloud Modernization Teams
- DevOps and Reliability Engineering Divisions
- Application Performance Monitoring Units
- Banking, Financial Services, and Insurance Institutions
- Telecommunications and Healthcare Systems
- Government, Public Sector, and Energy Enterprises
- E-Commerce and Retail Platforms

AGILE LEADERS
Training Center

Learning Objectives

By the end of this course, participants will be able to:

- Analyze and interpret SQL Server execution plans to pinpoint inefficient operators.
- Apply SQL performance optimization techniques across complex relational workloads.
- Tune T-SQL statements to reduce resource consumption and execution latency.
- Use SQL Server Profiler and Extended Events for advanced diagnostic data collection.
- Implement indexing strategies and query rewriting to resolve high-cost table scans.
- Apply advanced tuning techniques for enterprise-grade transaction and reporting workloads.
- Resolve common performance bottlenecks involving CPU, memory, and disk I/O pressure.
- Monitor and optimize database workloads using native SQL Server administrative utilities.

Course Agenda

Day 1: SQL Server Architecture and Performance Foundations

- SQL Server Core Components and Relational Engine Architecture
- Execution Lifecycle and Query Processing Flow from Parser to Execution Engine
- SQL Server Configuration Settings That Impact Performance and Throughput
- Understanding Wait Types and Bottlenecks across Memory, Disk, and CPU
- Performance Impact of TempDB Configuration and System Resource Allocation
- Introduction to Execution Plans and Dynamic Management Views for Baseline Analysis

Day 2: Query Tuning and Optimization Techniques

- Writing High-Performance T-SQL Queries for Transactional Workloads
- Analyzing Query Plans and Identifying Costly Operators across Data Access Paths
- Avoiding Common Anti-Patterns in Query Design and Relational Expressions
- Understanding Parameter Sniffing and Query Recompilation Behaviors
- Optimizing Joins, Subqueries, and Complex Aggregations
- Leveraging Stored Procedures and Compiled Plans for Execution Efficiency

Day 3: Indexing and Execution Plan Mastery

- Index Types and Their Performance Impact on Clustered, Non-Clustered, and Filtered Structures
- Identifying Missing and Unused Indexes using Management Studio and DMVs
- Statistics and Index Maintenance Best Practices to Prevent Plan Regression
- Advanced Execution Plan Analysis and Query Store Usage for Historical Evaluation
- Balancing Reads vs. Writes with Workload-Aligned Index Strategies
- Understanding Seek vs. Scan Operations and Cardinality Estimation Mechanics

Day 4: Monitoring and Troubleshooting SQL Server Workloads

- Real-Time Monitoring with Activity Monitor and Dynamic Management Views
- Capturing Diagnostic Traces with Extended Events and SQL Server Profiler
- Troubleshooting Blocking, Deadlocks, and Concurrency Issues under Heavy Loads
- Diagnosing TempDB Allocation Contention and Storage I/O Latency Issues
- Isolating Resource Contention with Query Store and Resource Governor
- Building Performance Baselines and Operational Monitoring Dashboards

Day 5: Advanced Tuning, Automation, and Troubleshooting Lab

- Optimization Strategies for ETL Workflows, Reporting Queries, and Batch Operations
- Performance Tuning in Azure SQL and Cloud-Hosted Database Instances
- Automating Performance Monitoring Routines and Proactive Diagnostic Alerts
- Applied Troubleshooting Lab: End-to-End Slow Query Diagnosis and Resolution
- Applied Troubleshooting Lab: Resource Optimization and Deadlock Mitigation
- Formulating a Sustainable Database Tuning Strategy and Action Plan

Course Toolbox

Participants utilize practical technical resources and reference materials to support performance tuning activities.

- Sample SQL Server databases for practical troubleshooting exercises
- Query optimization checklists and execution plan review worksheets
- Execution plan templates and operator comparison sheets
- Troubleshooting flowcharts for Extended Events and SQL Server Profiler
- Reference guides for SQL Server configuration and optimization
- Tuning scripts and index creation templates
- Case-based performance diagnostic assignments and solution decks
- Diagnostic tool overview slides detailing native monitoring utilities

Frequently Asked Questions

What specific qualifications or prerequisites are needed for participants before enrolling in the course?

A basic understanding of relational database principles and SQL syntax is expected. Prior practical experience with Microsoft SQL Server administration or query development is recommended to gain full value from the technical sessions.

How long is each day's session, and is there a total number of hours required for the entire course?

Each day is structured for approximately 4 to 5 hours of instruction and hands-on diagnostic exercises. Across one week, the course spans approximately 20 to 25 instructional hours.

Can this course be applied in cloud-hosted or hybrid SQL Server environments?

Yes. The diagnostic frameworks, DMV monitoring methods, and query optimization techniques apply directly to on-premises servers, hybrid architectures, and cloud-hosted environments, including Azure SQL.

How This Course is Different from Other SQL Server Tuning Courses

Unlike broad administrative courses that address general database management, this masterclass concentrates specifically on performance diagnostics, query optimization, and structural index design. Participants work directly with native tools such as Extended Events, Dynamic Management Views, and Query Store to isolate root-cause latency rather than relying on generalized recommendations. The syllabus blends deep internal architecture insights with practical troubleshooting labs, enabling data professionals to diagnose deadlocks, resolve query regressions, and sustain high database throughput across production environments.

AGILE LEADERS
Training Center

Training Course Categories

- Agile PM and Project Management Training Courses
- Agribusiness & Food Security Training Courses
- Aviation Management and Operations Training Courses
- Certified Courses By International Bodies
- Communication and Public Relations Training Courses
- Crisis Management and Business Continuity Training Courses
- Data Analytics Training and Data Science Courses
- Digital Government & Public Service Training Courses
- Education and Learning Development Training Courses
- Environment & Sustainability Training Courses
- Facilities and Real Estate Training Courses
- Finance and Accounting Training Courses
- Governance, Risk and Compliance Training Courses
- Healthcare Management Training Courses
- Heritage Conservation and Museum Management Training Courses
- Hospitality and Tourism Training Courses
- Human Resources Training and Development Courses
- IT Security Training & IT Training Courses
- Leadership and Management Training Courses
- Legal Training, Procurement and Contracting Courses
- Maintenance Training and Engineering Training Courses
- Marketing, Customer Relations, and Sales Courses
- NGO, Humanitarian and Development Management Training Courses
- Occupational Health, Safety and Security Training Courses
- Oil & Gas Training and Other Technical Courses
- Personal & Self-Development Training Courses

AGILE LEADERS
Training Center

Training Course Categories

- Quality and Operations Management Training Courses
- Secretarial and Administration Training Courses
- Shipping, Maritime and Ports Training Courses

AGILE LEADERS
Training Center

Training Cities

Abu Dhabi UAE	**Accra** Ghana	**Addis Ababa** Ethiopia
Amman Jordan	**Amsterdam** Netherlands	**Athens** Greece
Baku Azerbaijan	**Bali** Indonesia	**Bangkok** Thailand
Barcelona Spain	**Berlin** Germany	**Cairo** Egypt
Cape town South Africa	**Casablanca** Morocco	**Chicago** USA
Doha Qatar	**Dubai** UAE	**Frankfurt** Germany
Geneva Switzerland	**Istanbul** Turkey	**Jakarta** Indonesia
Johannesburg South Africa	**Kuala Lumpur** Malaysia	**Kuwait** Kuwait
Lagos Nigeria	**Langkawi** Malaysia	**Lisbon** Portugal
London UK	**Madrid** Spain	**Manama** Bahrain
Marbella Spain	**Milan** Italy	**Montreux** Switzerland
Munich Germany	**Muscat** Oman	**Nairobi** Kenya

AGILE LEADERS
Training Center

Training Cities

New York USA	**Nice** France	**Paris** France
Phuket Thailand	**Port Louis** Mauritius	**Porto** Portugal
Prague Czech Republic	**Rome** Italy	**San Diego** USA
Seoul South Korea	**Sharm El-Sheikh** Egypt	**Singapore** Singapore
Tashkent Uzbekistan	**Tbilisi** Georgia	**Tokyo** Japan
Toronto Canada	**Trabzon** Turkey	**Vienna** Austria
Zanzibar Tanzania	**Zoom** Online Training	**Zurich** Switzerland