



10987 Performance Tuning and Optimizing SQL Databases

Course ID #: 1401-806-16-W

Hours: 28

Course Content

Course Description:

This four-day instructor-led course provides students who manage and maintain SQL Server databases with the knowledge and skills to performance tune and optimize their databases.

At Course Completion:

After completing this course, students will be able to:

- Describe the high level architectural overview of SQL Server and its various components.
- Describe the SQL Server execution model, waits and queues.
- Describe core I/O concepts, Storage Area Networks and performance testing.
- Describe architectural concepts and best practices related to data files for user databases and TempDB.
- Describe architectural concepts and best practices related to Concurrency, Transactions, Isolation Levels and Locking.
- Describe architectural concepts of the Optimizer and how to identify and fix query plan issues.
- Describe architectural concepts, troubleshooting scenarios and best practices related to Plan Cache.
- Describe architectural concepts, troubleshooting strategy and usage scenarios for Extended Events.
- Explain data collection strategy and techniques to analyze collected data.
- Understand techniques to identify and diagnose bottlenecks to improve overall performance.

This course teaches you how to:

Target Student:

The primary audience for this course is individuals who administer and maintain SQL Server databases and are responsible for optimal performance of SQL Server instances that they manage. These individuals also write queries against data and need to ensure optimal execution performance of the workloads.

Delivery Method:

This course is delivered through a mix of instructor-led training (ILT) and hands-on labs.



10987 Performance Tuning and Optimizing SQL Databases

Course ID #: 1401-806-16-W

Hours: 28

Topics

Module 1: SQL Server Architecture, Scheduling, and Waits

This module covers high level architectural overview of SQL Server and its various components. It dives deep into SQL Server execution model, waits and queues.

Lessons

- SQL Server Components and SQL OS
- Windows Scheduling vs SQL Scheduling
- Waits and Queues

Completing this module, allows you to:

- Describe the SQL Server components and SQL OS
- Describe the differences between Windows Scheduling and SQL scheduling
- Describe waits and queues

Module 2: SQL Server I/O

This module covers core I/O concepts, Storage Area Networks and performance testing. It focuses on SQL Server I/O operations and how to test storage performance.

Lessons

- Core Concepts
- Storage Solutions
- I/O Setup and Testing

Completing this module, allows you to:

- Describe the core concepts of SQL I/O
- Describe storage solutions
- Setup and test I/O

Module 3: Database Structures

This module covers Database Structures, Data File and TempDB Internals. It focuses on architectural concepts and best practices

related to data files for user databases and TempDB.

Lessons

- Database Structure Internals
- Data File Internals
- TempDB Internals

Completing this module, allows you to:

- Describe the internal setup of database structures
- Describe the internal setup of data files.
- Describe the internal setup of TempDB

Module 4: SQL Server Memory

This module covers Windows and SQL Server Memory internals. It focuses on architectural concepts and best practices related to SQL Server Memory Configuration.

Lessons

- Windows Memory
- SQL Server Memory
- In-Memory OLTP

Completing this module, allows you to:

- Describe the components of Windows memory
- Describe the components of SQL Server memory
- Describe In-Memory OLTP

Module 5: SQL Server Concurrency

This module covers Transactions and Locking Internals. It focuses on architectural concepts and best practices related to Concurrency, Transactions, Isolation Levels and Locking.

Lessons

- Concurrency and Transactions
- Locking Internals



10987 Performance Tuning and Optimizing SQL Databases

Course ID #: 1401-806-16-W

Hours: 28

Completing this module, allows you to:

- Explain concurrency and transactions
- Describe locking

Module 6: Statistics and Index Internals

This module covers Statistics and Index Internals. It focuses on architectural concepts and best practices related to Statistics and Indexes.

Lessons

- Statistics Internals and Cardinality Estimation
- Index Internals
- Columnstore Indexes

Completing this module, allows you to:

- Describe statistics internals
- Explain cardinality estimation
- Describe why you would use Columnstore indexes and be able to implement one

Module 7: Query Execution and Query Plan Analysis

This module covers Query Execution and Query Plan Analysis. It focuses on architectural concepts of the Optimizer and how to identify and fix query plan issues.

Lessons

- Query execution and optimizer internals
- Query execution plans
- Analyzing query execution plans

Completing this module, allows you to:

- Describe query execution and optimizer
- Analyze query plans and resolve common issues

Module 8: Plan Caching and Recompilation

This module covers Plan Caching and Recompilation. It focuses on architectural

concepts, troubleshooting scenarios and best practices related to Plan Cache.

Lessons

- Plan cache internals
- Troubleshooting plan cache issues
- Query store

After completing this module, you will be able to:

- Describe plan cache
- Troubleshoot plan cache issues
- Describe query store and why you would use it

Module 9: Extended Events

This module covers Extended Events. It focuses on architectural concepts, troubleshooting strategy and usage scenarios for Extended Events.

Lessons

- Extended events core concepts
- Working with extended events

Completing this module, allows you to:

- Describe the core concepts of extended events
- Implement extended events

Module 10: Monitoring, Tracing, and Baselineing

This module covers tools and techniques to monitor, trace and baseline SQL Server performance data. It focuses on data collection strategy and techniques to analyze collected data.

Lessons

- Monitoring and tracing
- Baselineing and benchmarking

Completing this module, allows you to:

- Describe various options for monitoring and tracing
- Describe various options for benchmarking and baselineing