

## 10987 Performance Tuning and Optimizing SQL Databases

### Overview

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.

### Prerequisite Comments

In addition to their professional experience, students who attend this training should already have the following technical knowledge: Basic knowledge of the Microsoft Windows operating system and its core functionality; Working knowledge of database administration and maintenance; Working knowledge of Transact-SQL.

### Target Audience

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. The secondary audiences for this course are individuals who develop applications that deliver content from SQL Server databases.

### Course Objectives

- 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

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### Schedule

Class Length: 4 Days

G2R = "Guaranteed to Run" | OLL = "Online LIVE"  
 ILT = "Instructor-Led-Training" | HDL = "Hosted Distance Learning"

11/16/20	G2R	8:00AM - 4:00PM	HDL - All Locations (Pacific Time)	HDL	\$2,380.00
11/16/20	G2R	8:00AM - 4:00PM	Online LIVE - Remote Learning (Pacific Time)	OLL	\$2,380.00
01/05/21	G2R	6:00AM - 2:00PM	HDL - All Locations (Pacific Time)	HDL	\$2,380.00
01/05/21	G2R	6:00AM - 2:00PM	Online LIVE - Remote Learning (Pacific Time)	OLL	\$2,380.00
02/23/21	G2R	8:00AM - 4:00PM	Online LIVE - Remote Learning (Pacific Time)	OLL	\$2,380.00
02/23/21	G2R	8:00AM - 4:00PM	HDL - All Locations (Pacific Time)	HDL	\$2,380.00
05/11/21	G2R	6:00AM - 2:00PM	Online LIVE - Remote Learning (Pacific Time)	OLL	\$2,380.00
05/11/21	G2R	6:00AM - 2:00PM	HDL - All Locations (Pacific Time)	HDL	\$2,380.00

overall performance.

## Course Outline

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### 1 - SQL Server Architecture, Scheduling, & Waits

SQL Server Components and SQL OS  
Windows Scheduling vs SQL Scheduling  
Waits and Queues  
Lab: SQL Server Architecture, Scheduling, and Waits

### 2 - SQL Server I/O

Core Concepts  
Storage Solutions  
I/O Setup and Testing  
Lab: Testing Storage Performance

### 3 - Database Structures

Database Structure Internals  
Data File Internals  
TempDB Internals  
Lab: Database Structures

### 4 - SQL Server Memory

Windows Memory  
SQL Server Memory  
In-Memory OLTP  
Lab: SQL Server Memory

### 5 - Concurrency & Transactions

Concurrency and Transactions  
Locking Internals  
Lab: Concurrency and Transactions

### 6 - Statistics & Index Internals

Statistics Internals and Cardinality Estimation  
Index Internals  
Column Store Indexes  
Lab: Statistics and index Internals

## 7 - Query Execution & Query Plan Analysis

Query execution and optimizer internals  
Analyzing query plans  
Lab: Query execution and query plan analysis

## 8 - Plan Caching & Recompilation

Plan cache internals  
Troubleshooting plan cache issues  
Query store  
Lab: Plan caching and recompilation

## 9 - Extended Events

Extended events core concepts  
Implementing extended events  
Lab: Extended events

## 10 - Monitoring, Tracing, & Baselineing

Monitoring and tracing  
Baselineing and benchmarking  
Lab: Monitoring, Tracing and Baselineing

## 11 - Troubleshooting Common Performance Issues

Troubleshoot CPU performance  
Troubleshoot memory performance  
Troubleshoot I/O performance  
Troubleshoot Concurrency performance  
Troubleshoot TempDB performance  
Lab: Troubleshooting common performance issues

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