

## **Course WLC-SQL1105: SQL Server 2012: Performance Tuning – Design, Internals and Architecture**

### **Four (4) days, Instructor-Led**

SQL Server 2012: Performance Tuning – Design, Internals, and Architecture is a four day course that provides an in-depth study into the aspects of SQL Server 2012 that affect application performance. Students will learn about the internals of the SQL Server engine such as the memory manager and task scheduler, table and index structures, locking and concurrency, query optimization and programming efficiency.

Through lecture, demo and hands-on labs, students will discover the new performance-related features of SQL Server 2012. They will understand Dynamic Management Views (DMVs) and Extended Events, optimize queries, examine memory management and process scheduling, troubleshoot locking and blocking, and improve programming efficiency.

### **Audience**

To ensure the high-quality knowledge-transfer expected attendees of this four day workshop, class size is limited to a maximum of 16 students who meet the following criteria:

- Minimum of 2-3 years' experience with SQL Server (any version)

### **Job titles such as:**

- Database Administrators
- Database Developers
- Database Support Engineers

### **IT Requirements**

To participate in the course, students need to have access to a workstation that meets or exceeds the minimum hardware and software requirements listed below. If you are attending an open enrollment workshop, a workstation will be provided for you.

- Windows Server 2008 R2
- 6 gigabytes (GB) of RAM

- Minimum of 120-GB hard disk space

## Course Outline

### Module 1: Architecture

This module provides an overview of SQL Server engine internals such as memory management, I/O basics, process scheduling and synchronization with particular focus on performance tuning.

#### Lessons:

- Windows Memory Management
- SQL Server Operating System
- SQL Server Memory Management
- SQL Server Disk I/O
- SQL Server Process Scheduling

### Module 2: Table and Index Structure

This module details the underlying structure of database files, tables, and indexes and how they affect performance. Students will gain the required knowledge to design databases and implement efficient indexing strategies.

#### Lessons:

- SQL Server File and Page Architecture
- SQL Server Object Structures
- Data Access and Index Architecture
- Developing an Indexing Strategy
- Optimizing, Maintaining and Monitoring Indexes
- Filestream & File Table Storage

### Module 3: Locking and Concurrency

This module describes how SQL Server handles concurrency behind-the-scenes. Students will learn the basic concepts of locking, the various isolation levels of SQL Server, how different isolation levels affect concurrency, the effects of concurrency issues and how to identify and resolve them.

#### Technical Highlights:

After attending this workshop, students will be able to:

- Analyse Performance Bottlenecks
- Design an Effective Index Strategy
- Diagnose and Avoid Blocking and Deadlocks
- Database Architects
- ISV Developers
- Analyse Execution Plans
- Develop Efficient Queries and Stored Procedures

#### Lessons:

- Locking Concepts and Mechanics
- Isolation Levels
- Transactions
- Blocking and Deadlocks
- Latches and Spinlocks (Optional)

#### **Module 4: Query Optimization**

This module provides in-depth information for understanding the end results of query optimization and execution plan creation in SQL Server 2012. Students will learn how to understand query plans and identify queries that are not being executed efficiently. Factors and techniques for increasing query efficiency will also be covered.

##### **Lessons:**

- Query Processing
- Statistics
- Understanding Execution Plans
- Identifying Query Issues
- Query Performance
- Hints and Plan Freezing

#### **Module 5: Programming Efficiency**

This module provides an overview of Stored Procedure development, calling ad hoc queries and the proper use of cursors, temporary tables

and .NET objects. Students will develop actionable methods and skills to detect improper cache usage and some corrective actions to lessen those issues.

##### **Lessons:**

- Stored Procedure Considerations
- Caching and Query Considerations
- Performance Considerations
- New T-SQL in SQL 2012

##### **Course Inclusions:**

- Microsoft Official Curriculum (MOC) and/or Wizards Learning Courseware (WLC)
- Microsoft Certified Trainer (MCT)
- Lunch, AM and PM Snacks
- Certificate of Achievement
- Course Notes