

MOC 10776 A Developing Microsoft SQL Server 2012 Databases

Course Summary

Description

This 5-day instructor-led course introduces SQL Server 2012 and describes logical table design, indexing and query plans. It also focuses on the creation of database objects including views, stored procedures, along with parameters, and functions. Other common aspects of procedure coding, such as transactions, concurrency, error handling, triggers, and SQL CLR are also covered in this course. Also this course helps you prepare for the Exam 70-464

Objectives

At the end of this course, students will be able to:

- Introduce the entire SQL Server platform and its major tools. It will cover editions, versions, basics of network listeners, and concepts of services and service accounts.
- Determine appropriate data types to be used when designing tables, convert data between data types, and create alias data types.
- Be aware of good design practices regarding SQL Server tables and be able to create tables using T-SQL. (Note: partitioned tables are not covered).
- Implement PRIMARY KEY, FOREIGN KEY, DEFAULT, CHECK and UNIQUE constraints, and investigate cascading FOREIGN KEY constraints.
- Determine appropriate single column and composite indexes strategies.
- Create tables as heaps and tables with clustered indexes. Also consider the design of a table and suggest an appropriate structure.
- Read and interpret details of common elements from execution plans.
- Design effective non-clustered indexes.
- Design and implement views
- Design and implement stored procedures.
- Work with table types, table valued parameters and use the MERGE statement to create stored procedures that update data warehouses.
- Design and implement functions, both scalar and table-valued. (Also describe where they can lead to performance issues).
- Perform basic investigation of a deadlock situation and learn how transaction isolation levels affect application concurrency.
- Use both traditional T-SQL error handling code and structured exception handling.
- Design and implement DML triggers
- Learn appropriate uses for SQL CLR integration and implement an existing .NET assembly within SQL Server.
- Store XML data and schemas in SQL Server.
- Perform basic queries on XML data in SQL Server.
- Work with the GEOGRAPHY and GEOMETRY data types
- Implement and query a full-text index.

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Course Summary (cont'd)

Topics

- Introduction to SQL Server 2012 and its Toolset
- Working with Data Types
- Designing and Implementing Tables
- Ensuring Data Integrity through Constraints
- Planning for SQL Server 2012 Indexing
- Implementing Table Structures in SQL Server 2012
- Reading SQL Server 2012 Execution Plans
- Improving Performance through Nonclustered Indexes
- Designing and Implementing Views
- Designing and Implementing Stored Procedures
- Merging Data and Passing Tables
- Designing and Implementing User-Defined Functions
- Creating Highly Concurrent SQL Server 2012 Applications
- Handling Errors in T-SQL Code
- Responding to Data Manipulation via Triggers
- Implementing Managed Code in SQL Server 2012
- Storing XML Data in SQL Server 2012
- Querying XML Data in SQL Server

Audience

The primary audience for this course is IT Professionals who want to become skilled on SQL Server 2012 product features and technologies for implementing a database.

Prerequisites

Before taking this course students should have knowledge of writing T-SQL queries and a basic relational database concepts. Students who attend this training can meet the prerequisites by attending the following courses, or obtaining equivalent knowledge and skills: 10774A: Writing T-SQL Queries for Microsoft SQL Server 2012.

Duration

Five days

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Course Outline

I. Introduction to SQL Server 2012 and its Toolset

This module stresses on the fact that before beginning to work with SQL Server in either a development or an administration role, it is important to understand the overall SQL Server platform. In particular, it is useful to understand that SQL Server is not just a database engine but it is a complete platform for managing enterprise data

- A. Introduction to the SQL Server Platform
- B. Working with SQL Server Tools
- C. Configuring SQL Server Services

Lab : Introduction to SQL Server and its Toolset

- Verifying SQL Server Component Installation
- Altering Service Accounts for New Instance
- Enabling Named Pipes Protocol for Both Instances
- Creating an Alias for AdvDev
- Ensuring SQL Browser is Disabled and Configure a Fixed TCP/IP Port (Only if time permits)

II. Working with Data Types

This module explains how to use and convert data types. Also it focusses on how to work with specialized data types, and character data types.

- A. Using Data Types
- B. Working with Character Data
- C. Converting Data Types
- D. Specialized Data Types

Lab : Working with Data Types

- Choosing Appropriate Data Types
- Writing Queries With Data Type Conversions
- Designing and Creating Alias Data Types (Only if time permits)

III. Designing and Implementing Tables

This module explains how to design, create, and alter tables. Also it focusses on working with schemas.

- A. Designing Tables
- B. Working with Schemas
- C. Creating and Altering Tables

Lab : Designing and Implementing Tables

- Improving the Design of Tables
- Creating a Schema
- Creating the Tables

IV. Ensuring Data Integrity through Constraints

This module explains how to enforce data integrity, and implement domain integrity to maintain high quality data.

Also it focuses on implementing Entity and Referential Integrity.

- A. Enforcing Data Integrity
- B. Implementing Domain Integrity
- C. Implementing Entity and Referential Integrity

Lab : Ensuring Data Integrity through Constraints

- Designing Constraints
- Testing the constraints

V. Planning for SQL Server 2012 Indexing

This module explains the core indexing concepts and effectiveness of each data type commonly used in indexes.

- A. Core Indexing Concepts
- B. Data Types and Indexes
- C. Single Column and Composite Indexes

Lab : Planning for SQL Server Indexing

- Exploring existing index statistics
- Designing column orders for indexes

VI. Implementing Table Structures in SQL Server 2012

This module explains how tables can be structured in SQL Server databases. Also it focusses on designing and working with clustered indexes.

- A. SQL Server Table Structures
- B. Working with Clustered Indexes
- C. Designing Effective Clustered Indexes

Lab : Implementing Table Structures in SQL Server

- Creating Tables as Heaps
- Creating Tables with Clustered Indexes
- Comparing the Performance of Clustered Indexes vs. Heaps

VII. Reading SQL Server 2012 Execution Plans

This module explains how to design additional indexes. Also it focusses on how to read and interpret execution plans.

- A. Execution Plan Core Concepts
- B. Common Execution Plan Elements
- C. Working with Execution Plans

Lab : Reading SQL Server Execution Plans

- Actual vs. Estimated Plans

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Course Outline (cont'd)

VIII. Improving Performance through Nonclustered Indexes

This module explains how nonclustered indexes have the potential to significantly enhance the performance of applications and how to use a tool that can help design these indexes appropriately. Lessons

- A. Designing Effective Nonclustered Indexes
- B. Implementing Nonclustered Indexes
- C. Using the Database Engine Tuning Advisor

Lab : Improving Performance through Nonclustered Indexes

- Nonclustered index usage review
- Improving nonclustered index designs
- Working with SQL Server Profiler and Database Engine Tuning Advisor
- Designing nonclustered index

IX. Designing and Implementing Views

This module introduces Views, and explains how to create and manage Views. Also it focusses on the performance consideration for Views.

- A. Introduction to Views
- B. Creating and Managing Views
- C. Performance Considerations for Views

Lab : Designing and Implementing Views

- Designing, Implementing and Testing the WebStock Views
- Designing and Implementing the Contacts View
- Modifying the AvailableModels View

X. Designing and Implementing Stored Procedures

This module describes the potential advantages of the use of stored procedures along with guidelines on creating them.

- A. Introduction to Stored Procedures
- B. Working With Stored Procedures
- C. Implementing Parameterized Stored Procedures
- D. Controlling Execution Context

Lab : Designing and Implementing Stored Procedures

- Creating stored procedures
- Creating a parameterized stored procedure
- Altering the execution context of stored procedures

XI. Merging Data and Passing Tables

This module reviews the techniques that provide the ability to process sets of data rather than individual rows. Also it focusses on how these techniques can be used in combination with TABLE parameter types to minimize the

number of required stored procedure calls in typical applications.

- A. Using the MERGE Statement
- B. Implementing Table Types
- C. Using TABLE Types As Parameters

Lab : Passing Tables and Merging Data

- Creating a Table Type
- Using a Table Type Parameter
- Using a Table Type with MERGE

XII. Designing and Implementing User-Defined Functions

This module explains how to design and implement user-defined functions that enforce business rules or data consistency, and modify and maintain existing functions written by other developers.

- A. Overview of Functions
- B. Designing and Implementing Scalar Functions
- C. Designing and Implementing Table-Valued Functions
- D. Implementation Considerations for Functions
- E. Alternatives to Functions

Lab : Designing and Implementing User-Defined Functions

- Formatting Phone Numbers
- Modifying an Existing Function
- Resolve a Function-related Performance Issue

XIII. Creating Highly Concurrent SQL Server 2012 Applications

This module explains how to use transactions and the SQL Server locking mechanisms to meet the performance and data integrity requirements of your applications.

- A. Introduction to Transactions
- B. Introduction to Locks
- C. Management of Locking
- D. Transaction Isolation Levels

Lab : Creating Highly Concurrent SQL Server Applications

- Detecting Deadlocks
- Investigating Transaction Isolation Levels

XIV. Handling Errors in T-SQL Code

This module explores T-SQL error handling, looks at how it has traditionally been implemented, and how structured exception handling can be used

- A. Understanding T-SQL Error Handling
- B. Implementing T-SQL Error Handling
- C. Implementing Structured Exception Handling

Lab : Handling Errors in T-SQL Code

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Course Outline (cont'd)

- Replacing @@ERROR based error handling with structured exception handling
- Adding deadlock retry logic to the stored procedure

XV. Responding to Data Manipulation via Triggers

This module, explains what DML triggers are and how they enforce data integrity. Also it focuses on the different types of triggers available, and how to define triggers in a database.

- A. Designing DML Triggers
- B. Implementing DML Triggers
- C. Advanced Trigger Concepts

Lab : Responding to Data Manipulation via Triggers

- Creating and Testing the Audit Trigger
- Improving the Audit Trigger

XVI. Implementing Managed Code in SQL Server 2012

This module explains how to use CLR integrated code to create user-defined database objects that are managed by the .NET Framework.

- A. Introduction to SQL CLR Integration
- B. Importing and Configuring Assemblies
- C. Implementing SQL CLR Integration

Lab : Designing and Implementing Views

- Assessing Proposed CLR Code
- Implementing a CLR Assembly
- Implementing a CLR User-defined Aggregate and CLR User-defined Data Type

XVII. Storing XML Data in SQL Server 2012

This module introduces XML and shows how XML data can be stored within SQL Server.

- A. Introduction to XML and XML Schemas
- B. Storing XML Data and Schemas in SQL Server
- C. Implementing the XML Data Type

Lab : Storing XML Data in SQL Server

- Appropriate Usage of XML Data Storage in SQL Server

- Investigating the Storage of XML Data in Variables
- Investigating the use of XML Schema Collections
- Investigating the Creation of Database Columns Based on XML

XVIII. Querying XML Data in SQL Server

This module shows how XML data can be queried, including queries written in a language called XQuery.

- A. Using the T-SQL FOR XML Statement
- B. Getting Started with XQuery
- C. Shredding XML

Lab : Querying XML Data in SQL Server

- Learning to query SQL Server data as XML
- Writing a stored procedure returning XML
- Writing a stored procedure that updates using XML

XIX. Working with SQL Server 2012 Spatial Data

This module introduces Spatial Data, and explains how to work with SQL Server Spatial Data Types.

- A. Introduction to Spatial Data
- B. Working with SQL Server Spatial Data Types
- C. Using Spatial Data in Applications

Lab : Working with SQL Server Spatial Data

- Familiarity With Geometry Data Type
- Adding Spatial Data to an Existing Table
- Business Application of Spatial Data

XX. Working with Full-Text Indexes and Queries

This module introduces Full-Text Indexing and how to implement Full-Text Indexes in SQL Server.

- A. Introduction to Full-Text Indexing
- B. Implementing Full-Text Indexes in SQL Server
- C. Working with Full-Text Queries

Lab : Working with Full-Text Indexes and Queries

- Implementing a full-text index
- Implementing a stoplist
- Creating a stored procedure to implement a full-text search