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Training & Outsourcing

Microsoft Partner
Silver Learning

AV-005: Administering and Implementing a Data Warehouse with SQL Server 2014

Career Details

Duration
105 hours

Prerequisites
This career requires that you meet the following prerequisites:

- Working knowledge of relational databases.
- Basic knowledge of the Microsoft Windows operating system and its core functionality

Career Modules:

I. **20461 Querying Microsoft SQL Server 2014**

Overview

About this Course

This 5-day instructor led course provides students with the technical skills required to write basic Transact-SQL queries for Microsoft SQL Server 2014. This course is the foundation for all SQL Server-related disciplines; namely, Database Administration, Database Development and Business Intelligence. This course helps people prepare for exam 70-461.

Note: This course is designed for customers who are interested in learning SQL Server 2012 or SQL Server 2014. It covers the new features in SQL Server 2014, but also the important capabilities across the SQL Server data platform.

Audience Profile

This course is intended for Database Administrators, Database Developers, and Business Intelligence professionals. The course will very likely be well attended by SQL power users who aren't necessarily database-focused or plan on taking the exam; namely, report writers, business analysts and client application developers.

At Course Completion

After completing this course, students will be able to:

- Describe the basic architecture and concepts of Microsoft SQL Server 2014.

- Understand the similarities and differences between Transact-SQL and other computer languages.
- Write SELECT queries
- Query multiple tables
- Sort and filter data
- Describe the use of data types in SQL Server
- Modify data using Transact-SQL
- Use built-in functions
- Group and aggregate data
- Use subqueries
- Use table expressions
- Use set operators
- Use window ranking, offset and aggregate functions
- Implement pivoting and grouping sets
- Execute stored procedures
- Program with T-SQL
- Implement error handling
- Implement transactions

Course Details

Course Outline

Module 1: Introduction to Microsoft SQL Server 2014
This module introduces the SQL Server platform and major tools. It discusses editions, versions, tools used to query, documentation sources, and the logical structure of databases.
Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio

Lab: Working with SQL Server 2014 Tools

- Working with SQL Server Management Studio
- Creating and Organizing T-SQL scripts
- Using Books Online

After completing this module, you will be able to:

- Describe the architecture and editions of SQL Server 2012.
- Work with SQL Server Management Studio.

Module 2: Introduction to T-SQL Querying
This module introduces Transact SQL as the primary querying language of SQL Server. It discusses the basic structure of T-SQL queries, the logical flow of a SELECT statement, and introduces concepts such as predicates and set-based operations.
Lessons

- Introducing T-SQL

- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements

Lab: Introduction to Transact-SQL Querying

- Executing Basic SELECT Statements
- Executing queries which filter data using predicates
- Executing queries which sort data using ORDER BY

After completing this module, you will be able to:

- Describe the elements of T-SQL and their role in writing queries
- Describe the use of sets in SQL Server
- Describe the use of predicate logic in SQL Server
- Describe the logical order of operations in SELECT statements

Module 3: Writing SELECT Queries

This module introduces the fundamentals of the SELECT statement, focusing on queries against a single table.

Lessons

- Writing Simple SELECT Statements
- Eliminating Duplicates with DISTINCT
- Using Column and Table Aliases
- Writing Simple CASE Expressions

Lab: Writing Basic SELECT Statements

- Write simple SELECT Statements
- Eliminate Duplicates Using Distinct
- Use Table and Column Aliases
- Use a Simple CASE Expression

After completing this module, you will be able to:

- Write simple SELECT statements.
- Eliminate duplicates using the DISTINCT clause.
- Use column and table aliases.
- Write simple CASE expressions.

Module 4: Querying Multiple Tables

This module explains how to write queries which combine data from multiple sources in SQL Server. The module introduces the use of JOINs in T-SQL queries as a mechanism for retrieving data from multiple tables.

Lessons

- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins

Lab: Querying Multiple Tables

- Writing Queries That Use Inner Joins
- Writing Queries That Use Multiple-Table Inner Join

- Writing Queries That Use Self Joins
- Writing Queries That Use Outer Joins
- Writing Queries That Use Cross Joins

After completing this module, you will be able to:

- Describe how multiple tables may be queried in a SELECT statement using joins.
- Write queries that use inner joins.
- Write queries that use outer joins.
- Write queries that use self-joins and cross joins.

Module 5: Sorting and Filtering Data

This module explains how to enhance queries to limit the rows they return, and to control the order in which the rows are displayed. The module also discusses how to resolve missing and unknown results.

Lessons

- Sorting Data
- Filtering Data with a WHERE Clause
- Filtering with the TOP and OFFSET-FETCH Options
- Working with Unknown and Missing Values

Lab: Sorting and Filtering Data

- Writing Queries That Filter Data Using a WHERE Clause
- Writing Queries That Filter Data Using an ORDER BY Clause
- Writing Queries That Filter Data Using the TOP Option
- Writing Queries That Filter Data Using the OFFSET-FETCH Clause

After completing this module, you will be able to:

- Filter data with predicates in the WHERE clause.
- Sort data using ORDER BY.
- Filter data in the SELECT clause with TOP.
- Filter data with OFFSET and FETCH.

Module 6: Working with SQL Server 2014 Data Types

This module explains the data types SQL Server uses to store data. It introduces the many types of numeric and special-use data types. It also explains conversions between data types, and the importance of type precedence.

Lessons

- Introducing SQL Server 2014 Data Types
- Working with Character Data
- Working with Date and Time Data

Lab: Working with SQL Server 2014 Data Types

- Writing Queries That Return Date and Time Data
- Writing Queries That Use Date and Time Functions
- Writing Queries That Return Character Data
- Writing Queries That Use Character Functions

After completing this module, you will be able to:

- Describe numeric data types, type precedence and type conversions.
- Write queries using character data types.

- Write queries using date and time data types.

Module 7: Using DML to Modify Data

This module describes the use of Transact-SQL Data Manipulation Language to perform inserts, updates, and deletes to your data.

Lessons

- Inserting Data
- Modifying and Deleting Data

Lab: Using DML to Modify Data

- Inserting Data
- Updating and Deleting Data

After completing this module, you will be able to:

- Insert new data into your tables.
- Update and delete existing records in your tables.

Module 8: Using Built-In Functions

This module introduces the use of functions that are built in to SQL Server Denali, and will discuss some common usages including data type conversion, testing for logical results and nullability.

Lessons

- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL

Lab: Using Built-In Functions

- Write queries which use conversion functions
- Write queries which use logical functions
- Write queries which test for nullability

After completing this module, you will be able to:

- Write queries with built-in scalar functions.
- Use conversion functions.
- Use logical functions.
- Use functions that work with NULL.

Module 9: Grouping and Aggregating Data

This module introduces methods for grouping data within a query, aggregating the grouped data and filtering groups with HAVING. The module is designed to help the student grasp why a SELECT clause has restrictions placed upon column naming in the GROUP BY clause as well as which columns may be listed in the SELECT clause.

Lessons

- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING

Lab: Grouping and Aggregating Data

- Write queries which use the GROUP BY clause
- Write queries which use aggregate functions

- Write queries which use distinct aggregate functions
- Write queries which filter groups with the HAVING clause

After completing this module, you will be able to:

- Write queries which summarize data using built-in aggregate functions.
- Use the GROUP BY clause to arrange rows into groups.
- Use the HAVING clause to filter out groups based on a search condition.

Module 10: Using Subqueries

This module will introduce the use of subqueries in various parts of a SELECT statement. It will include the use of scalar and multi-result subqueries, and the use of the IN and EXISTS operators.

Lessons

- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries

Lab: Using Subqueries

- Write queries which use self-contained subqueries
- Write queries which use scalar and multi-result subqueries
- Write queries which use correlated subqueries and EXISTS predicate

After completing this module, you will be able to:

- Describe the uses of queries which are nested within other queries.
- Write self-contained subqueries which return scalar or multi-valued results.
- Write correlated subqueries which return scalar or multi-valued results.
- Use the EXISTS predicate to efficiently check for the existence of rows in a subquery.

Module 11: Using Table Expressions

This module introduces T-SQL expressions which return a valid relational table, typically for further use in the query. The module discusses views, derived tables, common table expressions and inline table-valued functions.

Lessons

- Using Derived Tables
- Using Common Table Expressions
- Using Views
- Using Inline Table-Valued Functions

Lab: Using Table Expressions

- Write Queries Which Use Views
- Write Queries Which Use Derived Tables
- Write Queries Which Use Common Table Expressions
- Write Queries Which Use Inline Table-Valued Functions

After completing this module, you will be able to:

- Write queries which use derived tables.
- Write queries which use common table expressions.
- Create simple views and write queries against them.
- Create simple inline table-valued functions and write queries against them.

Module 12: Using Set Operators

This module introduces Microsoft SharePoint Server as a platform for BI, and then focuses on building BI dashboards and scorecards with PerformancePoint Services.

Lessons

- Writing Queries with the UNION Operator
- Using EXCEPT and INTERSECT
- Using APPLY

Lab: Using Set Operators

- Write queries which use UNION set operators and UNION ALL multi-set operators
- Write queries which use CROSS APPLY and OUTER APPLY operators
- Write queries which use EXCEPT and INTERSECT operators

After completing this module, you will be able to:

- Write queries which combine data using the UNION operator
- Write queries which compare sets using the INTERSECT and EXCEPT operators
- Write queries which manipulate rows in a table by using APPLY with the results of a derived table or function

Module 13: Using Window Ranking, Offset, and Aggregate Functions

This module introduces window functions including ranking, aggregate and offset functions. Much of this functionality is new to SQL Server 2012. It will cover the use of T-SQL functions such as ROW_NUMBER, RANK, DENSE_RANK, NTILE, LAG, LEAD, FIRST_VALUE and LAST_VALUE to perform calculations against a set, or window, of rows.

Lessons

- Creating Windows with OVER
- Exploring Window Functions

Lab: Using Window Ranking, Offset and Aggregate Functions

- Write queries which use ranking functions
- Write queries which use offset functions
- Write queries which use window aggregate functions

After completing this module, you will be able to:

- Describe the benefits to using window functions.
- Restrict window functions to rows defined in an OVER clause, including partitions and frames.
- Write queries which use window functions to operate on a window of rows and return ranking, aggregation and offset comparison results.

Module 14: Pivoting and Grouping Sets

This module discusses techniques for pivoting data in T-SQL as well to introduce the fundamentals of the GROUPING SETS clause. It will also cover the use of GROUP BY ROLLUP and GROUP BY CUBE syntax in SQL Server.

Lessons

- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets

Lab: Pivoting and Grouping Sets

- Write queries which use the PIVOT operator
- Write queries which use the UNPIVOT operator

- Write queries which use the GROUPING SETS subclause

After completing this module, you will be able to:

- Write queries which pivot and unpivot result sets.
- Write queries which specify multiple groupings with grouping sets.

Module 15: Executing Stored Procedures

This module introduces the use of existing stored procedures in a T-SQL querying environment. It discusses the use of EXECUTE, how to pass input and output parameters to a procedure, and how to invoke system stored procedures.

Lessons

- Querying Data with Stored Procedures
- Passing Parameters to Stored Procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab: Executing Stored Procedures

- Use the EXECUTE statement to invoke stored procedures
- Pass parameters to stored procedures
- Execute system stored procedures

After completing this module, you will be able to:

- Return results by executing stored procedures.
- Pass parameters to procedures.
- Create simple stored procedures which encapsulate a SELECT statement.
- Construct and execute dynamic SQL with EXEC and sp_executesql.

Module 16: Programming with T-SQL

This module provides a basic introduction to T-SQL programming concepts and objects. It discusses batches, variables, control of flow elements such as loops and conditionals, how to create and execute dynamic SQL statements, and how to use synonyms.

Lessons

- T-SQL Programming Elements
- Controlling Program Flow

Lab: Programming with T-SQL

- Declaring Variables and Delimiting Batches
- Using Control-of-Flow Elements
- Generating Dynamic SQL
- Using Synonyms

After completing this module, you will be able to:

- Describe the language elements of T-SQL used for simple programming tasks.
- Describe batches and how they are handled by SQL Server.
- Declare and assign variables and synonyms.
- Use IF and WHILE blocks to control program flow.

Module 17: Implementing Error Handling

This module introduces the use of error handlers in T-SQL code. It will introduce the difference between compile errors and run-time errors, and will cover how errors affect batches. The module will also cover

how to control error handling using TRY/CATCH blocks, the use of the ERROR class of functions, and the use of the new THROW statement.

Lessons

- Using TRY / CATCH Blocks
- Working with Error Information

Lab: Implementing Error Handling

- Redirecting Errors with TRY / CATCH
- Using THROW to Pass an Error Message Back to a Client

After completing this module, you will be able to:

- Describe SQL Server's behavior when errors occur in T-SQL code.
- Implement structured exception handling in T-SQL.
- Return information about errors from system objects.
- Raise user-defined errors and pass system errors in T-SQL code.

Module 18: Implementing Transactions

This module introduces the concepts of transaction management in SQL Server. It will provide a high-level overview of transaction properties, cover the basics of marking transactions with BEGIN, COMMIT and ROLLBACK.

Lessons

- Transactions and the Database Engine
- Controlling Transactions
- Isolation Levels

Lab: Implementing Transactions

- Controlling transactions with BEGIN, COMMIT, and ROLLBACK
- Adding error handling to a CATCH block

After completing this module, you will be able to:

- Describe transactions and the differences between batches and transactions.
- Describe batches and how they are handled by SQL Server.
- Create and manage transactions with transaction control language statements.
- Use SET XACT_ABORT to define SQL Server's handling of transactions outside TRY / CATCH blocks.
- Describe the effects of isolation levels on transactions.

Module 19: Improving Query Performance

This module presents several key guidelines for writing well-performing queries, as well as ways to monitor the execution of your queries and their impact on Microsoft SQL Server.

Lessons

- Factors in Query Performance
- Displaying Query Performance Data

Lab: Improving Query Performance

- Viewing Query Execution Plans
- Viewing Index Usage and Using SET STATISTICS Statements

After completing this module, you will be able to:

- Describe components of well-performing queries.
- Display and interpret basic query performance data

Module 20: Querying SQL Server Metadata

SQL Server provides access to structured metadata by using a variety of mechanisms, such as system catalog views, system functions, dynamic management objects, and system stored procedures. In this module, you will learn how to write queries to return system metadata using these mechanisms.

Lessons

- Querying System Catalog Views and Functions
- Executing System Stored Procedures
- Querying Dynamic Management Objects

Lab: Querying SQL Server Metadata

- Querying System Catalog Views
- Querying System Functions
- Querying System Dynamic Management Views

After completing this module, you will be able to:

- Write queries that retrieve system metadata using system views and functions.
- Execute system stored procedures to return system information.
- Write queries that retrieve system metadata and state information using system dynamic management views and functions.

II. 20462C: Administering Microsoft SQL Server Databases

Overview

About this Course

This five-day instructor-led course provides students with the knowledge and skills to maintain a Microsoft SQL Server 2014 database. The course focuses on teaching individuals how to use SQL Server 2014 product features and tools related to maintaining a database.

Note: This course is designed for customers who are interested in learning SQL Server 2012 or SQL Server 2014. It covers the new features in SQL Server 2014, but also the important capabilities across the SQL Server data platform.

Audience Profile

The primary audience for this course is individuals who administer and maintain SQL Server databases. These individuals perform database administration and maintenance as their primary area of responsibility, or work in environments where databases play a key role in their primary job.

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

At Course Completion

After completing this course, students will be able to:

- Describe core database administration tasks and tools.

- Install and configure SQL Server 2014.
- Configure SQL Server databases and storage.
- Plan and implement a backup strategy.
- Restore databases from backups.
- Import and export data.
- Monitor SQL Server.
- Trace SQL Server activity.
- Manage SQL Server security.
- Audit data access and encrypt data.
- Perform ongoing database maintenance.
- Automate SQL Server maintenance with SQL Server Agent Jobs.
- Configure Database Mail, alerts and notifications.

Course Details

Course Outline

Module 1: Introduction to SQL Server 2014 Database Administration
This module introduces the Microsoft SQL Server 2014 platform. It describes the components, editions, and versions of SQL Server 2014, and the tasks that a database administrator commonly performs for a SQL Server instance.
Lessons

- Database Administration Overview
- Introduction to the SQL Server Platform
- Database Management Tools and Techniques

Lab: Using SQL Server Administrative Tools

- Using SQL Server Management Studio
- Using the sqlcmd Utility
- Using Windows PowerShell with SQL Server

After completing this module, you will be able to:

- Describe the SQL Server platform.
- Describe common database administration tasks.
- Use SQL Server administration tools.

Module 2: Installing and Configuring SQL Server 2014
This module explains how to assess resource requirements for SQL Server 2014 and how to install it.
Lessons

- Planning SQL Server Installation
- Installing SQL Server 2014
- Post-Installation Configuration

Lab: Installing SQL Server 2014

- Preparing to Install SQL Server
- Installing SQL Server
- Performing Post-Installation Configuration

After completing this module, you will be able to:

- Plan a SQL Server 2014 installation.
- Install SQL Server 2014.
- Perform post-installation configuration tasks.

Module 3: Working with Databases and Storage

This module describes how data is stored in databases, how to create databases, how to manage database files, and how to move them. Other tasks related to storage, include managing the tempdb database and using fast storage devices to extend the SQL Server buffer pool cache, are also discussed.

Lessons

- Introduction to Data Storage with SQL Server
- Managing Storage for System Databases
- Managing Storage for User Databases
- Moving Database Files
- Configuring the Buffer Pool Extension

Lab: Managing Database Storage

- Configuring tempdb Storage
- Creating Databases
- Attaching a Database

After completing this module, you will be able to:

- Describe how SQL Server stores data.
- Manage storage for system databases.
- Manage storage for user databases.
- Move database files.
- Configure the buffer pool extension.

Module 4: Planning and Implementing a Backup Strategy

In this module, you will consider how to create a backup strategy that is aligned with organizational needs, and learn how to perform the backup operations required by that strategy.

Lessons

- Understanding SQL Server Recovery Models
- Planning a Backup Strategy
- Backing up Databases and Transaction Logs
- Using Backup Options
- Ensuring Backup Reliability

Lab: Backing Up SQL Server Databases

- Backing Up Database
- Performing Database, Differential, and Transaction Log Backups
- Performing a Partial Backup

After completing this module, you will be able to:

- Describe how database transaction logs function, and how they affect database recovery.
- Plan a backup strategy for a SQL Server database.
- Back up databases and transactions logs.
- Perform copy-only, compressed, and encrypted backups.

- Maximize backup reliability.

Module 5: Restoring SQL Server 2014 Databases

In this module, you will see how to restore user and system databases and how to implement point-in-time recovery.

Lessons

- Understanding the Restore Process
- Restoring Databases
- Advanced Restore Scenarios
- Working with Point-in-Time Recovery

Lab: Restoring SQL Server Databases

- Restoring a Database Backup
- Restoring Database, Differential, and Transaction Log Backups
- Performing a Piecemeal Restore

After completing this module, you will be able to:

- Explain the restore process.
- Restore databases.
- Perform advanced restore operations.
- Perform a point-in-time recovery.

Module 6: Importing and Exporting Data

In this module, you will briefly explore tools and techniques so that you can import and export data to and from SQL Server.

Lessons

- Introduction to Transferring Data
- Importing and Exporting Table Data
- Copying or Moving a Database

Lab: Importing and Exporting Data

- Using the SQL Server Import and Export Wizard
- Using the bcp Utility
- Using the BULK INSERT Statement
- Using the OPENROWSET Function

After completing this module, you will be able to:

- Describe tools and techniques for transferring data.
- Import and export data.
- Copy or move a database.

Module 7: Monitoring SQL Server 2014

This module explains how to use three of the most commonly used tools: Activity Monitor, dynamic management views and functions (DMVs and DMFs), and Performance Monitor.

Lessons

- Introduction to Monitoring SQL Server
- Dynamic Management Views and Functions
- Performance Monitor

Lab: Monitoring SQL Server 2014

- Collecting Baseline Metrics
- Monitoring a Workload

After completing this module, you will be able to:

- Describe considerations for monitoring SQL Server and use Activity Monitor.
- Use dynamic management views and functions to monitor SQL Server.
- Use Performance Monitor to monitor SQL Server.

Module 8: Tracing SQL Server Activity

This module describes how to use SQL Server Profiler and SQL Trace stored procedures to capture information about SQL Server, and how to use that information to troubleshoot and optimize SQL Server workloads.

Lessons

- Tracing SQL Server Workload Activity
- Using Traces

Lab: Tracing SQL Server Workload Activity

- Capturing a Trace in SQL Server Profiler
- Generating Database Tuning Recommendations
- Using SQL Trace

After completing this module, you will be able to:

- Trace activity in SQL Server.
- Use captured traces to test, troubleshoot, and optimize database performance.

Module 9: Managing SQL Server Security

In this module, you will be learn about the core concepts on which the SQL Server security architecture is based, and how to manage security at the server and database levels.

Lessons

- Introduction to SQL Server Security
- Managing Server-Level Security
- Managing Database-Level Principals
- Managing Database Permissions

Lab: Managing SQL Server Security

- Managing Server-Level Security
- Managing Database-Level Security
- Testing Database Access

After completing this module, you will be able to:

- Describe core security concepts in the SQL Server security architecture.
- Manage server-level security.
- Manage database-level security principals.
- Manage database permissions.

Module 10: Auditing Data Access and Encrypting Data

This module describes the available options for auditing in SQL Server, how to use and manage the SQL Server audit feature, and how to implement encryption.

Lessons

- Auditing Data Access in SQL Server
- Implementing SQL Server Audit
- Encrypting Databases

Lab: Auditing Data Access and Encrypting Data

- Implementing Auditing
- Implementing Transparent Database Encryption

After completing this module, you will be able to:

- Describe options for auditing data access.
- Implement SQL Server audit.
- Manage SQL Server audit.
- Implement Transparent Data Encryption.

Module 11: Performing Ongoing Database Maintenance

This module describes common database maintenance tasks that a DBA must perform, and demonstrates how to automate these tasks using maintenance plans.

Lessons

- Ensuring Database Integrity
- Maintaining Indexes
- Automating Routine Database Maintenance

Lab: Performing Ongoing Database Maintenance

- Managing Database Integrity
- Managing Index Fragmentation
- Implementing a Maintenance Plan

After completing this module, you will be able to:

- Ensure database integrity by using DBCC CHECKDB.
- Maintain indexes.
- Configure Database Maintenance Plans.

Module 12: Automating SQL Server 2014 Management

This module describes how to use SQL Server Agent to automate jobs, how to configure security contexts for jobs, and how to implement multi-server jobs.

Lessons

- Automating SQL Server Management
- Implementing SQL Server Agent Jobs
- Managing SQL Server Agent Jobs
- Managing Job Step Security Contexts
- Managing Jobs on Multiple Servers

Lab: Automating SQL Server Management

- Creating a Job
- Scheduling a Job
- Configuring Job Step Security Contexts

After completing this module, you will be able to:

- Describe methods for automating SQL Server management.
- Create jobs, job step types, and schedules.

- Manage SQL Server Agent jobs.
- Configure job security contexts.
- Configure master and target servers.

Module 13: Monitoring SQL Server 2014 by Using Alerts and Notifications
This module covers the configuration of database mail, alerts, and notifications.
Lessons

- Monitoring SQL Server Errors
- Configuring Database Mail
- Configuring Operators, Alerts, and Notifications

Lab: Monitoring SQL Server by Using Alerts and Notifications

- Configuring Database Mail
- Implementing Operators and Notifications
- Implementing Alerts

After completing this module, you will be able to:

- Configure Database Mail.
- Monitor SQL Server errors.
- Configure operators, alerts, and notifications

III. 20463C: Implementing a Data Warehouse with Microsoft SQL Server

Overview

About this Course
This course describes how to implement a data warehouse platform to support a BI solution. Students will learn how to create a data warehouse with Microsoft SQL Server 2014, implement ETL with SQL Server Integration Services, and validate and cleanse data with SQL Server Data Quality Services and SQL Server Master Data Services.
Note: This course is designed for customers who are interested in learning SQL Server 2012 or SQL Server 2014. It covers the new features in SQL Server 2014, but also the important capabilities across the SQL Server data platform.

Audience Profile
This course is intended for database professionals who need to create and support a data warehousing solution. Primary responsibilities include:

- Implementing a data warehouse.
- Developing SSIS packages for data extraction, transformation, and loading.
- Enforcing data integrity by using Master Data Services.
- Cleansing data by using Data Quality Services.

At Course Completion

After completing this course, students will be able to:

- Describe data warehouse concepts and architecture considerations.

- Select an appropriate hardware platform for a data warehouse.
- Design and implement a data warehouse.
- Implement Data Flow in an SSIS Package.
- Implement Control Flow in an SSIS Package.
- Debug and Troubleshoot SSIS packages.
- Implement an ETL solution that supports incremental data extraction.
- Implement an ETL solution that supports incremental data loading.
- Implement data cleansing by using Microsoft Data Quality Services.
- Implement Master Data Services to enforce data integrity.
- Extend SSIS with custom scripts and components.
- Deploy and Configure SSIS packages.
- Describe how BI solutions can consume data from the data warehouse.

Course Details

Course Outline

Module 1: Introduction to Data Warehousing
This module provides an introduction to the key components of a data warehousing solution and the high-level considerations you must take into account when you embark on a data warehousing project.
Lessons

- Overview of Data Warehousing
- Considerations for a Data Warehouse Solution

Lab: Exploring a Data Warehousing Solution

- Exploring Data Sources
- Exploring and ETL Process
- Exploring a Data Warehouse

After completing this module, you will be able to:

- Describe the key elements of a data warehousing solution
- Describe the key considerations for a data warehousing project

Module 2: Planning Data Warehouse Infrastructure
This module discusses considerations for selecting hardware and distributing SQL Server facilities across servers.
Lessons

- Considerations for Data Warehouse Infrastructure
- Planning Data Warehouse Hardware

Lab: Planning Data Warehouse Infrastructure

- Planning Data Warehouse Hardware

After completing this module, you will be able to:

- Describe key considerations for BI infrastructure.
- Plan data warehouse infrastructure.

Module 3: Designing and Implementing a Data Warehouse

This module describes the key considerations for the logical design of a data warehouse, and then discusses best practices for its physical implementation.

Lessons

- Data Warehouse Design Overview
- Designing Dimension Tables
- Designing Fact Tables
- Physical Design for a Data Warehouse

Lab: Implementing a Data Warehouse

- Implement a Star Schema
- Implement a Snowflake Schema
- Implement a Time Dimension

After completing this module, you will be able to:

- Describe a process for designing a dimensional model for a data warehouse
- Design dimension tables for a data warehouse
- Design fact tables for a data warehouse
- Design and implement effective physical data structures for a data warehouse

Module 4: Creating an ETL Solution with SSIS

This module discusses considerations for implementing an ETL process, and then focuses on Microsoft SQL Server Integration Services (SSIS) as a platform for building ETL solutions.

Lessons

- Introduction to ETL with SSIS
- Exploring Data Sources
- Implementing Data Flow

Lab: Implementing Data Flow in an SSIS Package

- Exploring Data Sources
- Transferring Data by Using a Data Flow Task
- Using Transformations in a Data Flow

After completing this module, you will be able to:

- Describe the key features of SSIS.
- Explore source data for an ETL solution.
- Implement a data flow by using SSIS

Module 5: Implementing Control Flow in an SSIS Package

This module describes how to implement ETL solutions that combine multiple tasks and workflow logic.

Lessons

- Introduction to Control Flow
- Creating Dynamic Packages
- Using Containers
- Managing Consistency

Lab: Implementing Control Flow in an SSIS Package

- Using Tasks and Precedence in a Control Flow
- Using Variables and Parameters
- Using Containers

Lab: Using Transactions and Checkpoints

- Using Transactions
- Using Checkpoints

After completing this module, you will be able to:

- Implement control flow with tasks and precedence constraints
- Create dynamic packages that include variables and parameters
- Use containers in a package control flow
- Enforce consistency with transactions and checkpoints

Module 6: Debugging and Troubleshooting SSIS Packages

This module describes how you can debug packages to find the cause of errors that occur during execution. It then discusses the logging functionality built into SSIS that you can use to log events for troubleshooting purposes. Finally, the module describes common approaches for handling errors in control flow and data flow.

Lessons

- Debugging an SSIS Package
- Logging SSIS Package Events
- Handling Errors in an SSIS Package

Lab: Debugging and Troubleshooting an SSIS Package

- Debugging an SSIS Package
- Logging SSIS Package Execution
- Implementing an Event Handler
- Handling Errors in a Data Flow

After completing this module, you will be able to:

- Debug an SSIS package
- Implement logging for an SSIS package
- Handle errors in an SSIS package

Module 7: Implementing a Data Extraction Solution

This module describes the techniques you can use to implement an incremental data warehouse refresh process.

Lessons

- Planning Data Extraction
- Extracting Modified Data

Lab: Extracting Modified Data

- Using a Datetime Column
- Using Change Data Capture
- Using the CDC Control Task
- Using Change Tracking

After completing this module, you will be able to:

- Plan data extraction
- Extract modified data

Module 8: Loading Data into a Data Warehouse

This module describes the techniques you can use to implement data warehouse load process.

Lessons

- Planning Data Loads
- Using SSIS for Incremental Loads
- Using Transact-SQL Loading Techniques

Lab: Loading a Data Warehouse

- Loading Data from CDC Output Tables
- Using a Lookup Transformation to Insert or Update Dimension Data
- Implementing a Slowly Changing Dimension
- Using the MERGE Statement

After completing this module, you will be able to:

- Describe the considerations for planning data loads
- Use SQL Server Integration Services (SSIS) to load new and modified data into a data warehouse
- Use Transact-SQL techniques to load data into a data warehouse

Module 9: Enforcing Data Quality

This module introduces Microsoft SQL Server Data Quality Services (DQS), and describes how you can use it to cleanse and deduplicate data.

Lessons

- Introduction to Data Quality
- Using Data Quality Services to Cleanse Data
- Using Data Quality Services to Cleanse Data

Lab: Cleansing Data

- Creating a DQS Knowledge Base
- Using a DQS Project to Cleanse Data
- Using DQS in an SSIS Package

After completing this module, you will be able to:

- Describe how Data Quality Services can help you manage data quality
- Use Data Quality Services to cleanse your data
- Use Data Quality Services to match data

Module 10: Master Data Services

Master Data Services provides a way for organizations to standardize data and improve the quality, consistency, and reliability of the data that guides key business decisions. This module introduces Master Data Services and explains the benefits of using it.

Lessons

- Introduction to Master Data Services
- Implementing a Master Data Services Model
- Managing Master Data
- Creating a Master Data Hub

Lab: Implementing Master Data Services

- Creating a Master Data Services Model
- Using the Master Data Services Add-in for Excel
- Enforcing Business Rules
- Loading Data Into a Model

- Consuming Master Data Services Data

After completing this module, you will be able to:

- Describe key Master Data Services concepts
- Implement a Master Data Services model
- Use Master Data Services tools to manage master data
- Use Master Data Services tools to create a master data hub

Module 11: Extending SQL Server Integration Services

This module describes the techniques you can use to extend SSIS. The module is not designed to be a comprehensive guide to developing custom SSIS solutions, but to provide an awareness of the fundamental steps required to use custom components and scripts in an ETL process that is based on SSIS.

- Lessons
- Using Scripts in SSIS
- Using Custom Components in SSIS

Lab: Using Custom Scripts

- Using a Script Task

After completing this module, you will be able to:

- Include custom scripts in an SSIS package
- Describe how custom components can be used to extend SSIS

Module 12: Deploying and Configuring SSIS Packages

In this module, students will learn how to deploy packages and their dependencies to a server, and how to manage and monitor the execution of deployed packages.

Lessons

- Overview of SSIS Deployment
- Deploying SSIS Projects
- Planning SSIS Package Execution

Lab: Deploying and Configuring SSIS Packages

- Creating an SSIS Catalog
- Deploying an SSIS Project
- Running an SSIS Package in SQL Server Management Studio
- Scheduling SSIS Packages with SQL Server Agent

After completing this module, you will be able to:

- Describe considerations for SSIS deployment.
- Deploy SSIS projects.
- Plan SSIS package execution.

Module 13: Consuming Data in a Data Warehouse

This module introduces business intelligence (BI) solutions and describes how you can use a data warehouse as the basis for enterprise and self-service BI.

Lessons

- Introduction to Business Intelligence
- Enterprise Business Intelligence
- Self-Service BI and Big Data

Lab: Using a Data Warehouse

- Exploring an Enterprise BI Solution
- Exploring a Self-Service BI Solution

After completing this module, you will be able to:

- Describe BI and common BI scenarios
- Describe how a data warehouse can be used in enterprise BI scenarios
- Describe how a data warehouse can be used in self-service BI scenarios