



Implementing a Data Warehouse with Microsoft SQL Server 2012

Course 10777: 4 days; Instructor-Led

Introduction

Data warehousing is a solution organizations use to centralize business data for reporting and analysis. This four-day instructor-led course focuses on teaching individuals how to create a data warehouse with SQL Server 2012, implement ETL with SQL Server Integration Services, and validate and cleanse data with SQL Server Data Quality Services and SQL Server Master Data Services. This course helps people prepare for exam 70-463.

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 SSIS solution that supports incremental data warehouse loads and changing data.
- Integrate cloud data into a data warehouse ecosystem infrastructure.
- 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 information workers can consume data from the data warehouse.

Audience

This course is intended for database professionals who need to fulfill a Business Intelligence Developer role. They will need to focus on hands-on work creating BI solutions including Data Warehouse implementation, ETL, and data cleansing. Primary responsibilities include:

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

Prerequisites

Before attending this course, student should have:

- At least 2 years' experience of working with relational databases, including:
 - Designing a normalized database.
 - Creating tables and relationships.
 - Querying with Transact-SQL.
- Some exposure to basic programming constructs (such as looping and branching).
- An awareness of key business priorities such as revenue, profitability, and financial accounting is desirable.

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 starting 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 an ETL solution
- Exploring a data warehouse

After completing this module, students will be able to:

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

Module 2: Data Warehouse Hardware

This module describes the characteristics of typical data warehouse workloads, and explains how you can use reference architectures and data warehouse appliances to ensure you build the system that is right for your organization.

Lessons

- Considerations for Building a Data Warehouse
- Data Warehouse Reference Architectures and Appliances

After completing this module, students will be able to:

- Describe the main hardware considerations for building a data warehouse.
- Explain how to use reference architectures and data warehouse appliances to create a data warehouse.

Module 3: Designing and Implementing a Data Warehouse

In this module, you will learn how to implement the logical and physical architecture of a data warehouse based on industry-proven design principles.

Lessons

- Logical Design for a Data Warehouse
- Physical Design for a Data Warehouse

Lab: Implementing a Data Warehouse Schema

- Implementing a Star Schema
- Implementing a Snowflake Schema
- Implementing a Time Dimension Table

After completing this module, students will be able to:

- Implement a logical design for a data warehouse.
- Implement a physical design 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 SQL Server Integration Services (SSIS) as a platform for building ETL solutions.

Lessons

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

Lab: Implementing Data Flow in a SSIS Package

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

After completing this module, students will be able to:

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

Module 5: Implementing Control Flow in an SSIS Package

Control flow in SQL Server Integration Services packages enables you to implement complex ETL solutions that combine multiple tasks and workflow logic. This module covers how to implement control flow, and design robust ETL processes for a data warehousing solution that coordinate data flow operations with other automated tasks.

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, students 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 SQL Server Integration Services (SSIS) packages to find the cause of errors that occur during execution. Then module then covers the logging functionality built into SSIS 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, students will be able to:

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

Module 7: Implementing an Incremental ETL Process

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

Lessons

- Introduction to Incremental ETL
- Extracting Modified Data
- Loading Modified Data

Lab: Extracting Modified Data

- Using a DateTime Column to Incrementally Extract Data
- Using a Change Data Capture
- Using Change Tracking

Lab: Loading Incremental Changes

- Using a Lookup Transformation to Insert Dimension Data
- Using a Lookup Transformation to Insert or Update Dimension Data
- Implementing a Slowly Changing Dimension
- Using a MERGE Statement to Load Fact Data

After completing this module, students will be able to:

- Describe the considerations for implementing an incremental extract, transform, and load (ETL) solution.
- Use multiple techniques to extract new and modified data from source systems.
- Use multiple techniques to insert new and modified data into a data warehouse.
- Debugging an SSIS Package
- Logging SSIS Package Execution
- Implementing an Event Handler
- Handling Errors in a Data Flow

Module 8: Incorporating Data from the Cloud into a Data Warehouse

In this module, you will learn about how you can use cloud computing in your data warehouse infrastructure and learn about the tools and services available from the Microsoft Azure Marketplace.

Lessons

- Overview of Cloud Data Sources
- SQL Server Database
- The Windows Azure Marketplace

Lab: Using Cloud Data in a Data Warehouse Solution

- Creating a SQL Azure Database
- Extracting Data from a SQL Azure Database
- Obtaining Data from the Windows Azure Marketplace

After completing this module, students will be able to:

- Describe cloud data scenarios.
- Describe SQL Azure.
- Describe the Windows Azure Marketplace.

Module 9: Enforcing Data Quality

Ensuring the high quality of data is essential if the results of data analysis are to be trusted. This module explains how to use the SQL Server 2012 Data Quality Services (DQS) to provide a computer assisted process for cleansing data values and identifying and removing duplicate data entities.

Lessons

- Introduction to Data Quality

- Using Data Quality Services to Cleanse Data
- Using Data Quality Services to Match Data

Lab: Cleansing Data

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

Lab: Deduplicating Data

- Creating a Matching Policy
- Using a DQS Project to Match Data

After completing this module, students 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: Using Master Data Services

This module introduces Master Data Services and explains the benefits of using it in a data warehousing context. The module also describes the key configuration options for Master Data Services, and explains how to import and export data. Finally, the module explains how to apply rules that help to preserve data integrity, and introduces the new Master Data Services Add-in for Excel.

Lessons

- Introduction to Master Data Services
- Implementing a Master Data Services Model
- Using the Master Data Services Add-in for Excel

Lab: Implementing Master Data Services

- Creating a Basic Model
- Editing a Model by Using the Master Data Services Add-in for Excel
- Loading Data into a Model
- Enforcing Business Rules
- Consuming Master Data Services Data

After completing this module, students will be able to:

- Describe key Master Data Services concepts.
- Implement a Master Data Services model.
- Use the Master Data Services Add-in for Excel to view and modify a model.

Module 11: Extending SQL Server Integration Services

This module describes the techniques you can use to extend SQL Server Integration Services (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 Custom Components in SSIS
- Using Scripts in SSIS

Lab: Using Custom Components and Scripts

- Using a Custom Component
- Using a Script Task

After completing this module, students will be able to:

- Describe how custom components can be used to extend SSIS.
- Describe how you can include custom scripts in an SSIS package

Module 12: Deploying and Configuring SSIS Packages

SQL Server Integration Services provides tools that make it easy to deploy packages to another computer. The deployment tools also manage any dependencies, such as configurations and files that the package needs. In this module, you will learn how to use these tools to install packages and their dependencies on a target computer.

Lessons

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

Lab: Deploying and Configuring SSIS Packages

- Create a SSIS Catalog
- Deploy an SSIS Project
- Create Environments for an SSIS Solution
- Running an SSIS Package in SQL Server Management Studio
- Scheduling SSIS Packages with SQL Server Agent

After completing this module, students will be able to:

- Describe SSIS deployment.
- Explain how to deploy SSIS projects using the project deployment model.
- Plan SSIS package execution.

Module 13: Consuming Data in a Data Warehouse

This module introduces Business Intelligence (BI), describes the components of SQL Server that you can use to create a BI solution, and the client tools that users can use to create reports and analyze data.

Lessons

- Introduction to Business Intelligence

- Introduction to Reporting
- Introduction to Data Analysis

Lab: Using Business Intelligence Tools

- Exploring a Reporting Services Report
- Exploring a PowerPivot Workbook
- Exploring a Power View Report

After completing this module, students will be able to:

- Describe BI and common BI scenarios.
- Explain the key features of SQL Server Reporting Services.
- Explain the key features of SQL Server Analysis Services.