SQL Server 2019 Business Intelligence: Integration Services and Analysis Services

Duration: 35 hours

Prerequisites: Familiarity with database concepts

Course Description: The focus of this course is to familiarize developers with the SQL Server Database Engine and the use of SQL Server Integration Services (SSIS) and SQL Server Analysis Services (SSAS) for Business Intelligence purposes by creating and populating data warehouses through ETL processing. Students will design an OLAP database utilizing a star schema (Data Warehouse), and then populate it using ETL routines designed in SSIS. After the data warehouse has been populated, SSAS will be used to build both Multidimensional and Tabular models that will serve as data sources for reports.

Students will learn how to design and build data warehouses and marts using SQL Server Management Studio. In a series of exercises, students develop SSIS packages designed to maintain a data warehouse using the Data Flow control flow task. Also demonstrated are other control flow tasks that can interact with an NTFS file system, FTP server, execute Win32 processes, send emails, and run .NET scripts.

Based on the populated data warehouse they have created, students will then learn how to develop both Multidimensional and Tabular SSAS models using the languages Multidimensional Expressions (MDX) and Data Analysis Expressions (DAX). Cubes will be customized to include Key Performance Indicators (KPIs), Calculated Members, Named Sets, Navigational Hierarchies, and Perspectives.

Students Will Learn

- Structure and function of a data warehouse or data mart
- Data warehouse design to support enterprise reporting
- The role of SSIS within the business intelligence framework
- Developing SSIS Extract Transform Load (ETL) processes to populate data warehouses
- Functionality of all SSIS Control Flow tasks
- Deploying SSIS projects to SSIS Catalogs
- Configuring SSIS environments, runtime variables and parameters
- BI Semantic Model
- Multidimensional Expressions (MDX) syntax
- Developing SSAS Multidimensional models
- Data Analysis Expressions (DAX)
- Developing SSAS Tabular models
- Deploying and securing Multidimensional and Tabular models
- Implementing SSAS Data Mining models for predictive analysis
- Consuming the BI Semantic Model in reports and dashboards

Overview

Business Intelligence Framework Overview

- SQL Server Data Tools Overview
- Installation and Configuration
- Components of a BI Solution
- Introduction to the BI Semantic Model

Integration Services Architecture

- Architecture of the SSIS Data Engine
- Using Data Transformation Tasks
- Managing Connections to Sources and Destinations
- ADO.NET Data Source and Destination
- Understanding Data Buffers
- Control Flow Tasks and Containers

Common SSIS Tasks

- Executing SQL Statements
- Connecting to FTP Servers
- Sending E-mail
- Notifying Administrators of Errors
- Completing Bulk Inserts
- Copying, Moving and Deleting Files and Folders

Data Transformations

- Converting Data Types
- Merging Data from Multiple Sources
- Splitting Data to Multiple Destinations
- Counting Rows
- Sampling and Sorting Records
- Copying Columns

Advanced SSIS Tasks

- Executing .NET Scripts and Win32 Processes
- Using the Windows Management Instrumentation (WMI) Tasks
- Performing Database Maintenance and Backups During SSIS Routines
- Using Variables and Input Parameters
- Profiling Database Tables
- Comparing XML Files Against Schemas

Advanced Data Transformations

- Filling in Missing Data with Lookups
- Locating Near Duplicate Rows with Fuzzy Grouping
- Adding Audit Information to Results
- Counting the Occurrence of Keywords
- Sending Rows that Process Correctly and Incorrectly to Different Destinations
- Responding to Truncation Errors

SSIS Administration and Automation

- Deploying SSIS Projects
- Manually Running SSIS Tasks
- Automating SSIS Package Execution
- Configuring Notifications for Execution Success, Failure or Both
- SSIS Security
- Troubleshooting Techniques

Data Warehouse Design

- Understanding Fact and Dimension Tables
- Modeling Slowly Changing and Rapidly Changing Dimensions
- Modeling Fact Tables
- Using Star and Snowflake Schemas for Dimension Tables
- Implementing Surrogate Keys
- Defining Business Keys

Creating and Populating Data Warehouses

- Creating Data Warehouses (OLAP Databases)
- Adding Fact Tables
- Adding Dimension Tables and Joining Them to Fact Tables
- Loading Data into Fact and Dimension Tables
- Validation Techniques for Data Loads

Creating and Managing Cubes

- Creating Data Sources to Connect to Data Warehouses
- Using SSAS to Create Cubes
- Applying Friendly Names to Measures and Attributes
- Customizing Dimensions and Measures
- Setting up Navigational Hierarchies
- Optimizing Cubes with Attribute Relationships

Multidimensional (MDX) Essentials

- Using MDX Queries to Pull Data from Cubes
- Understanding Tuples and Sets
- MDX Expressions vs. Queries

MDX Functions

- Using MDX Aggregate Functions
- Using Navigations Functions to Move Though Hierarchies

- Grouping Attribute Values into Named Sets
- Adding Custom Calculations for Cubes Using MDX

Customizing Cubes

- Adding Key Performance Indicators (KPIs)
- Customizing Dimensions and Attributes
- Adding Translations to Support Multiple Languages
- Adding Custom Calculations
- Subdividing Cubes Using Perspectives

Creating and Customizing Tabular Models

- Creating Tabular Modules in SSDT
- Introducing DAX
- Customizing Tabular Models
- Refreshing Data in Tabular Models

Working with Data Mining Structures

- Adding Data Mining Structures
- Mining for Hidden Information
- Discovering Patterns in Data
- Creating Predictive Models
- Using the Data Mining Wizard
- Modifying Mining Structures with the Data Mining Designer

- Grouping, Filtering and Sorting Functions
- Time-Based MDX Functions

Cube Deployment and Administration

- Cube Storage Calculations
- Configuring Desired Aggregation
- Configuring Caching
- Deploying and Processing Cubes
- Connecting to Cubes from Excel and Other Clients
- Partitioning and Processing Cubes
- Backing Up and Restoring Options
- Securing Cubes

Understanding the Data Mining Process

- Types of Business Analysis Supported by Data Mining
- Data Mining Process Explained
- Understanding the Key Components of Data Mining
- Using Built-In Data Mining Algorithms
- Matching Mining Algorithms to Business Needs

Using the Semantic Models in the Presentation Layer

- Using SSAS Data Sources in Excel and Power View
- Using SSAS Data Sources in SSRS
- Using SSAS Data Sources in Power BI
- Using SSAS Data Sources in SharePoint Performance Point Services

Related Bootcamps

Track	Duration	Price
SQL Server Administrator	70 hours	$1,790
SQL Server Business Intelligence Analyst	112 hours	$3,580

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