# Module 1: Introducing SQL Server

Overview of the SQL Server platform, core engine and BI components

## Module Objectives

**1** Understand where SQL Server fits in the Microsoft data platform

**2** Explain the fundamentals of the relational database engine

**3** Recognize the key components of the SQL Server BI stack

**4** Identify core SQL Server tools and services used in this course

## Overview of the SQL Server Suite of Products

- SQL Server Database Engine for transactional and analytical workloads
- On-premises SQL Server, Linux support and container deployment options
- Cloud options such as Azure SQL Database and Azure SQL Managed Instance
- Business Intelligence components: Integration, Analysis and Reporting Services

## Fundamentals of the Relational Database Engine

Stores data in databases, schemas, tables, rows and columns

Uses Transact-SQL (T-SQL) to query and modify data

Implements keys, constraints and relationships between tables

Uses indexes to improve query performance on large tables

## Instances, Databases and Connections

A SQL Server instance can host multiple system and user databases

Each database uses data files and transaction log files on disk

Clients connect over supported network protocols such as TCP/IP

Authentication via Windows logins or SQL Server logins

## Benefits of the Business Intelligence Stack

Automates data movement and transformation between systems

Provides data warehouses and semantic models for reporting and analysis

Supports multidimensional and tabular analysis of large datasets

Transforms raw operational data into information and insight

## SQL Server Agent and Management Studio

- SQL Server Management Studio (SSMS) is the main GUI for SQL Server
- Create databases, write queries and manage security from SSMS
- SQL Server Agent runs scheduled jobs such as backups and maintenance
- Jobs can run T-SQL scripts, SSIS packages or operating system commands

## Integration Services (SSIS)

- Extract, Transform and Load (ETL) platform for data movement
- Connects to SQL Server, flat files, Excel and many other sources
- Graphical designers for control flow and data flow
- Commonly used to load and refresh data warehouses

SQL Server Integration Services (SSIS) is Microsoft's enterprise-grade platform for building Extract, Transform and Load (ETL) workflows. Its purpose is to move data efficiently between systems, apply business rules and deliver clean, structured information to data warehouses, data marts or downstream applications.

At its core, SSIS provides a visual development environment where developers design workflows by assembling tasks, data flow components and transformations. Data can be extracted from a wide range of sources including SQL Server, flat files, Excel, XML, web services and third-party databases. During the transformation stage, SSIS can cleanse, merge, split, sort or enrich data, ensuring that only high-quality and properly structured information is loaded into target systems.

A major advantage of SSIS is its ability to automate complex processes. Packages can run on demand, be triggered by events or be scheduled using SQL Server Agent. For organisations handling recurring data loads—daily sales imports, nightly warehouse refreshes, or periodic file transfers—SSIS ensures consistency and reliability.

Because SSIS supports parameters, configurations and logging, solutions can be adapted for different environments and monitored for performance or failures.
Overall, SSIS plays a critical role in BI architectures by integrating disparate data sources and laying the foundation for accurate analytics and reporting.

## Analysis Services (SSAS) and Reporting Services (SSRS)

- Analysis Services builds analytical models (cubes or tabular models)
- Provides fast slicing, dicing and aggregation of business data
- Reporting Services creates and serves paginated and web-based reports
- Reports can be deployed centrally on a report server for many users

SQL Server Analysis Services (SSAS) and Reporting Services (SSRS) form two key pillars of Microsoft's Business Intelligence ecosystem, each addressing a different part of the analytical workflow.

**Analysis Services (SSAS)** provides the analytical layer that allows organisations to explore data quickly and interactively. By building multidimensional cubes or tabular models, SSAS pre-aggregates and optimises data for fast slicing, dicing and filtering across large datasets. These models expose business-friendly structures such as hierarchies (year → quarter → month), measures, KPIs and calculated values. Because the computation work happens inside the model, tools like Excel, Power BI or custom dashboards can query the data extremely efficiently. SSAS is particularly useful when users need consistent definitions of metrics and a governed, high-performance analytical experience.

**Reporting Services (SSRS)** complements this by delivering highly formatted, operational and analytical reports. SSRS allows developers to design pixel-perfect, parameter-driven reports that can include tables, matrices, charts and drill-down interactions. Reports can be rendered in multiple formats, distributed by email subscription or accessed centrally through the web portal. SSRS excels in scenarios where regular, repeatable reports must be delivered to many users with consistent layout and strict control over data presentation.
Together, SSAS and SSRS help organisations move beyond raw data to structured models and clear, actionable reports that support informed decision making.

## Data Quality Services (DQS) and Master Data Services (MDS)

- Data Quality Services helps profile, cleanse and standardise data
- Master Data Services manages core business entities such as customers
- Improves consistency of key data across applications and reports
- Supports governance and controlled changes to master data values

Data Quality Services (DQS) and Master Data Services (MDS) address two essential aspects of enterprise information management: **data accuracy** and **data governance**.

With **Data Quality Services**, the focus is on identifying and correcting issues in raw data before it enters analytics, reporting or operational workflows. DQS profiles data to uncover inconsistencies such as misspellings, invalid values, duplicates or formatting problems. It uses a reusable knowledge base that learns over time, allowing organisations to apply consistent cleansing rules across multiple datasets. Typical use cases include standardising customer information, validating postal codes, or improving product descriptions before they are loaded into a warehouse.

**Master Data Services** builds on this by providing a structured environment for managing an organisation's most important business entities—customers, products, suppliers, cost centres and more. MDS enforces controlled changes through defined workflows, roles and security rules. This ensures that updates to critical data follow a formal approval process and that only authorised users can make modifications.

Together, DQS and MDS create a foundation of **trusted, consistent, and well-governed master data**. This improves reporting accuracy, strengthens integration between systems and ultimately enhances decision-making across the business.