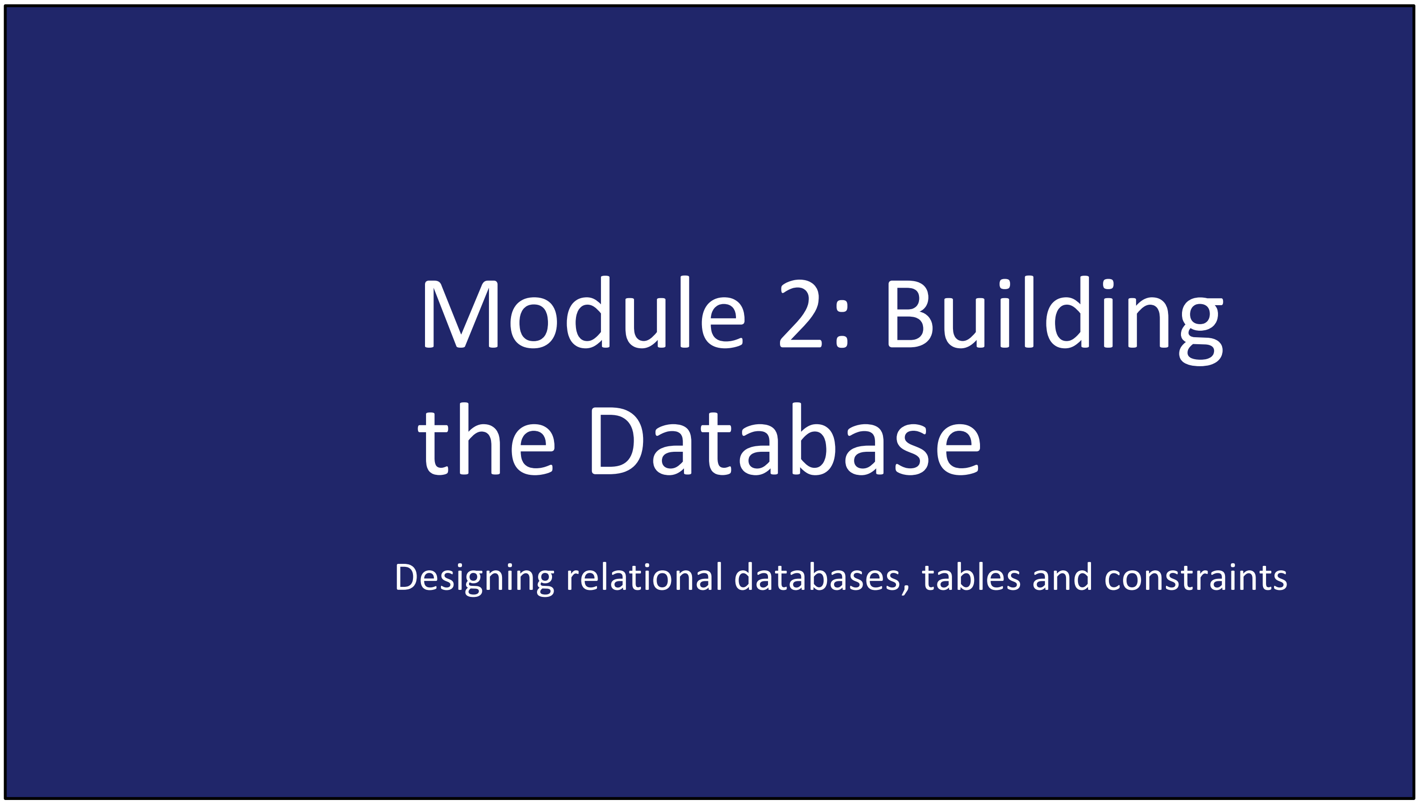
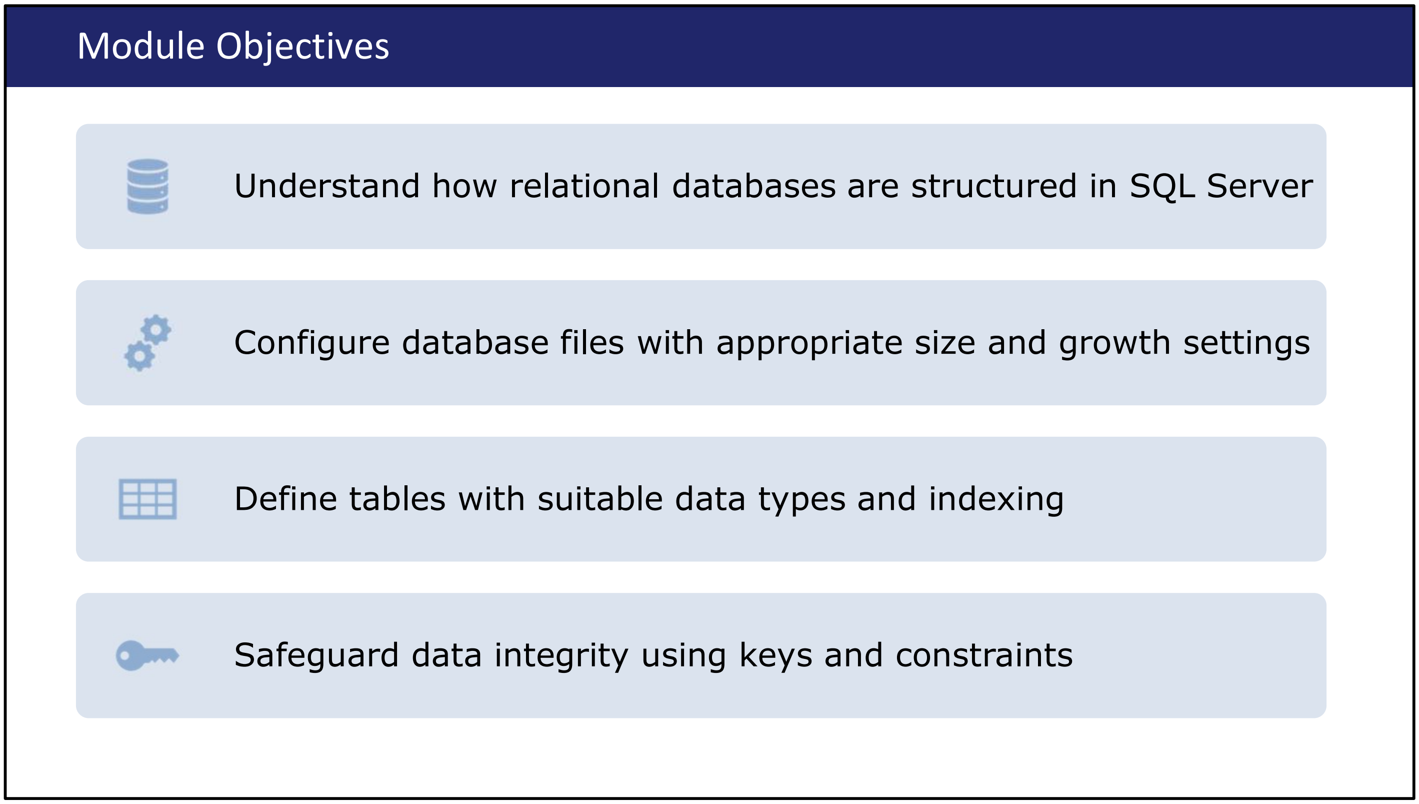


Module 2: Building the Database

Designing relational databases, tables and constraints

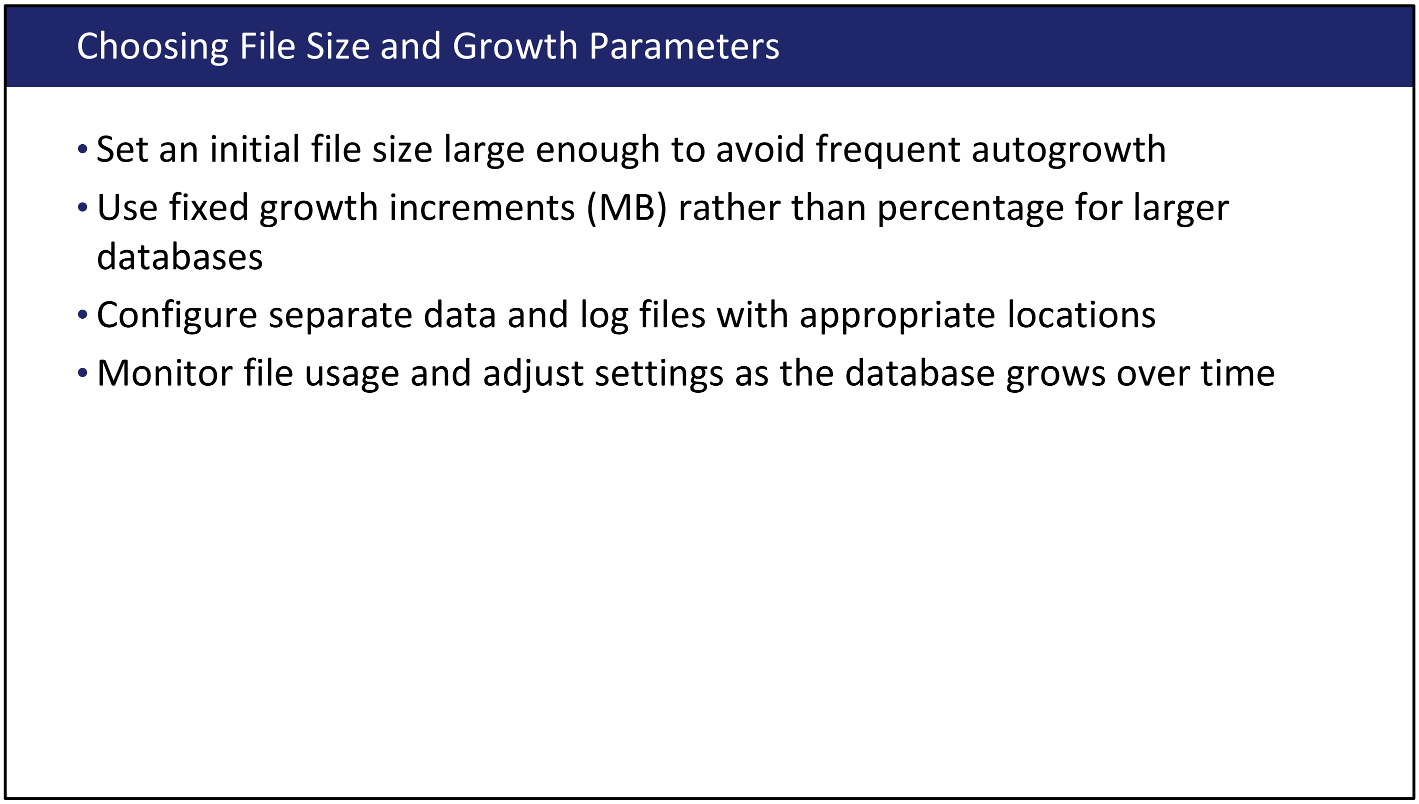


Module Objectives

- Understand how relational databases are structured in SQL Server
- Configure database files with appropriate size and growth settings
- Define tables with suitable data types and indexing
- Safeguard data integrity using keys and constraints

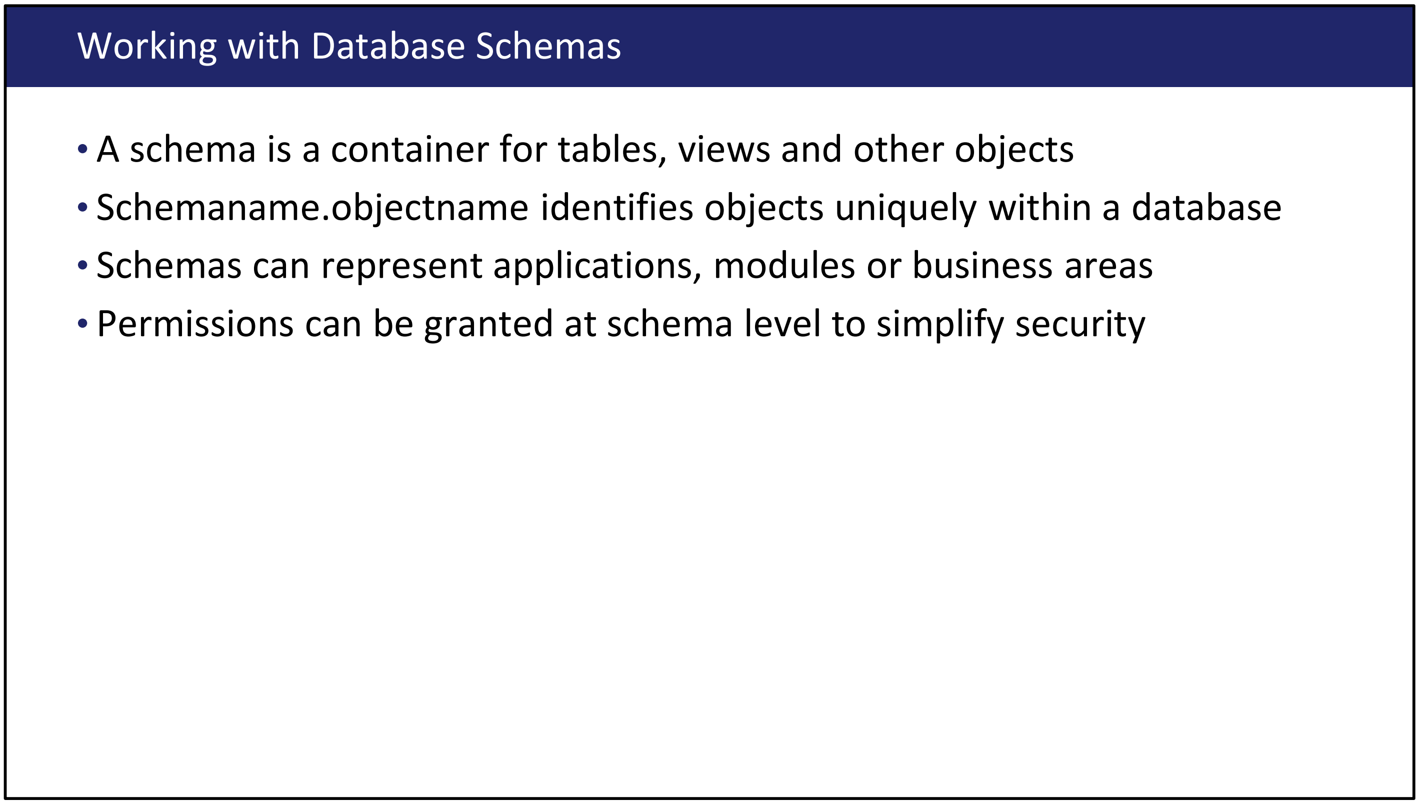
Constructing a Relational Database

- A database groups related tables, views and other objects
- Data is stored in data files and tracked in transaction log files
- File size and growth settings affect performance and manageability
- Schemas organise objects and help manage security and ownership



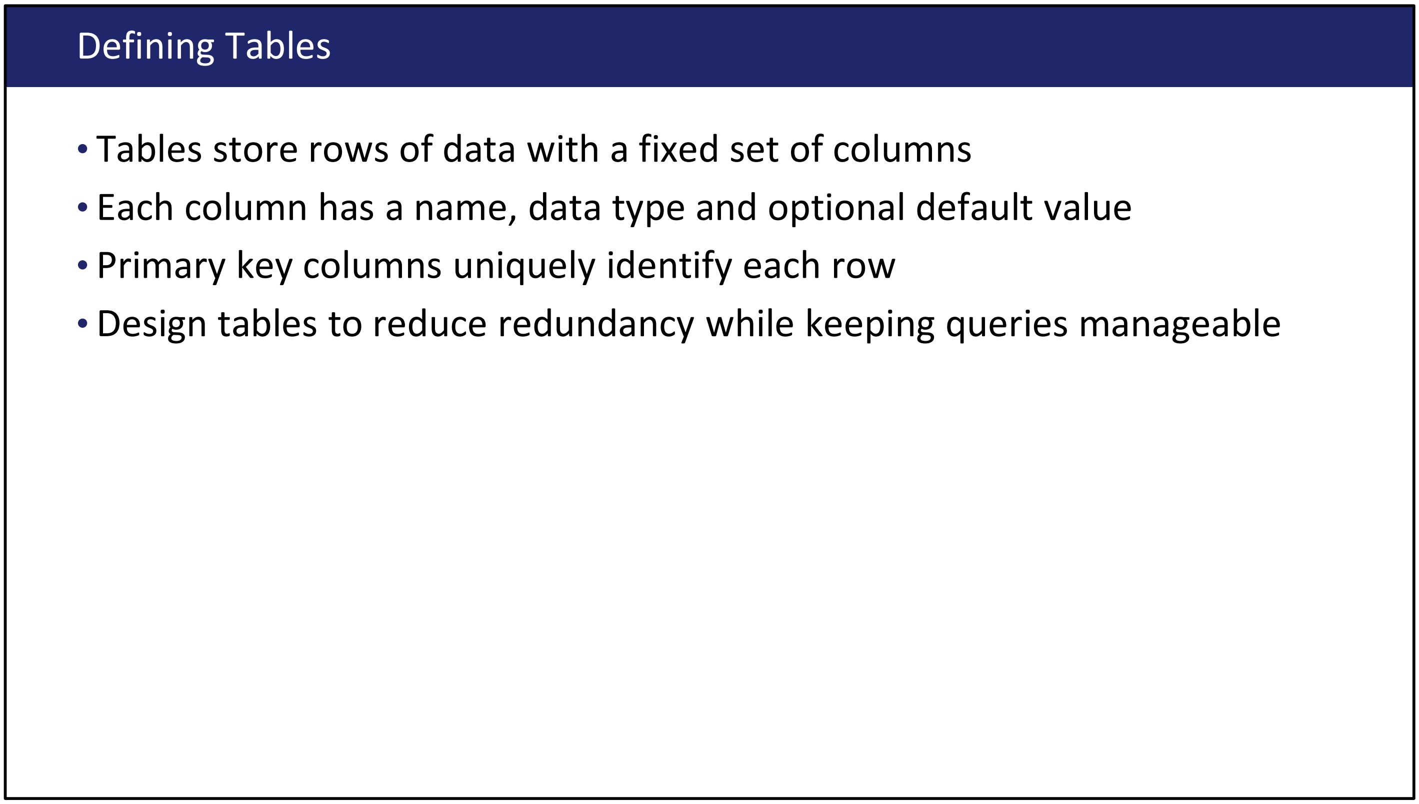
Choosing File Size and Growth Parameters

- Set an initial file size large enough to avoid frequent autogrowth
- Use fixed growth increments (MB) rather than percentage for larger databases
- Configure separate data and log files with appropriate locations
- Monitor file usage and adjust settings as the database grows over time



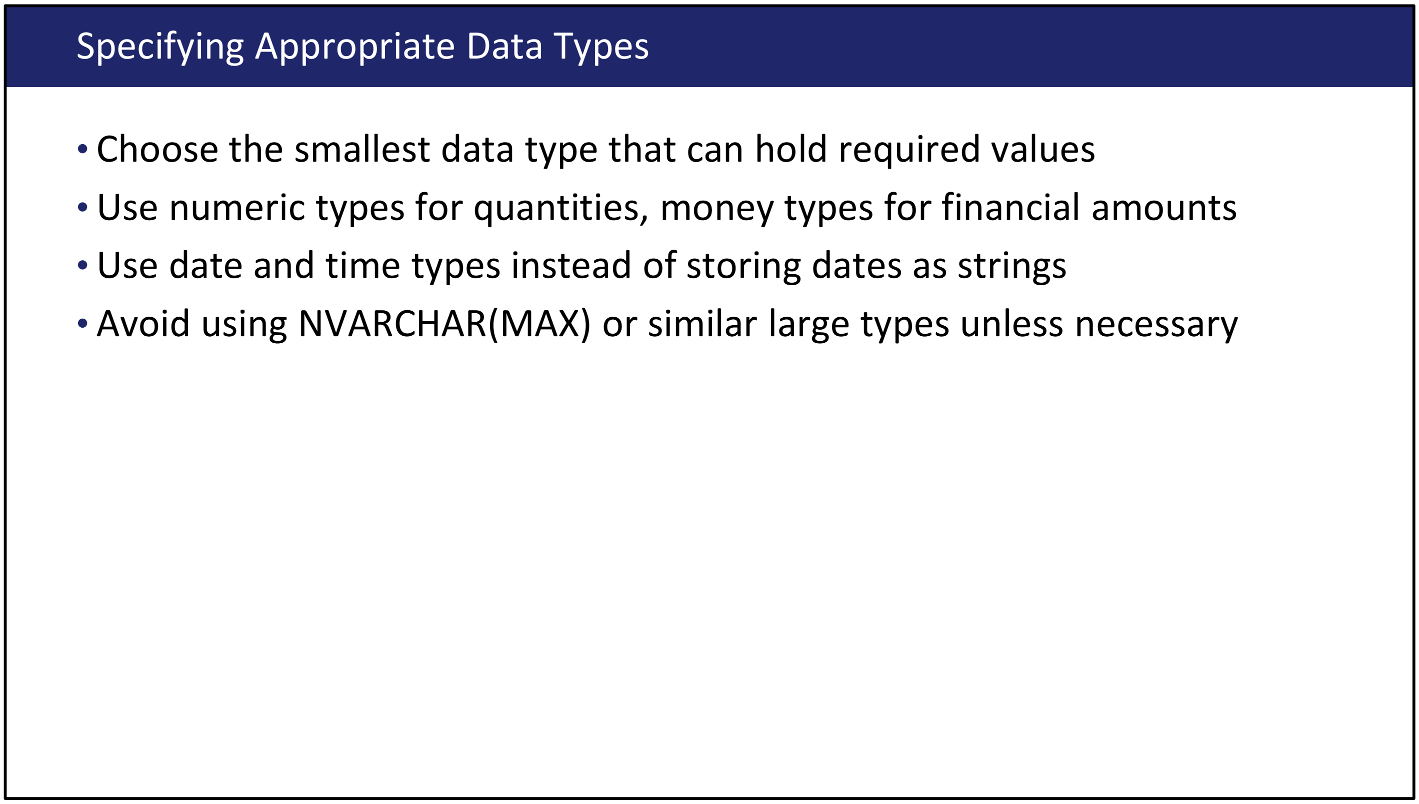
Working with Database Schemas

- A schema is a container for tables, views and other objects
- Schemaname.objectname identifies objects uniquely within a database
- Schemas can represent applications, modules or business areas
- Permissions can be granted at schema level to simplify security



Defining Tables

- Tables store rows of data with a fixed set of columns
- Each column has a name, data type and optional default value
- Primary key columns uniquely identify each row
- Design tables to reduce redundancy while keeping queries manageable

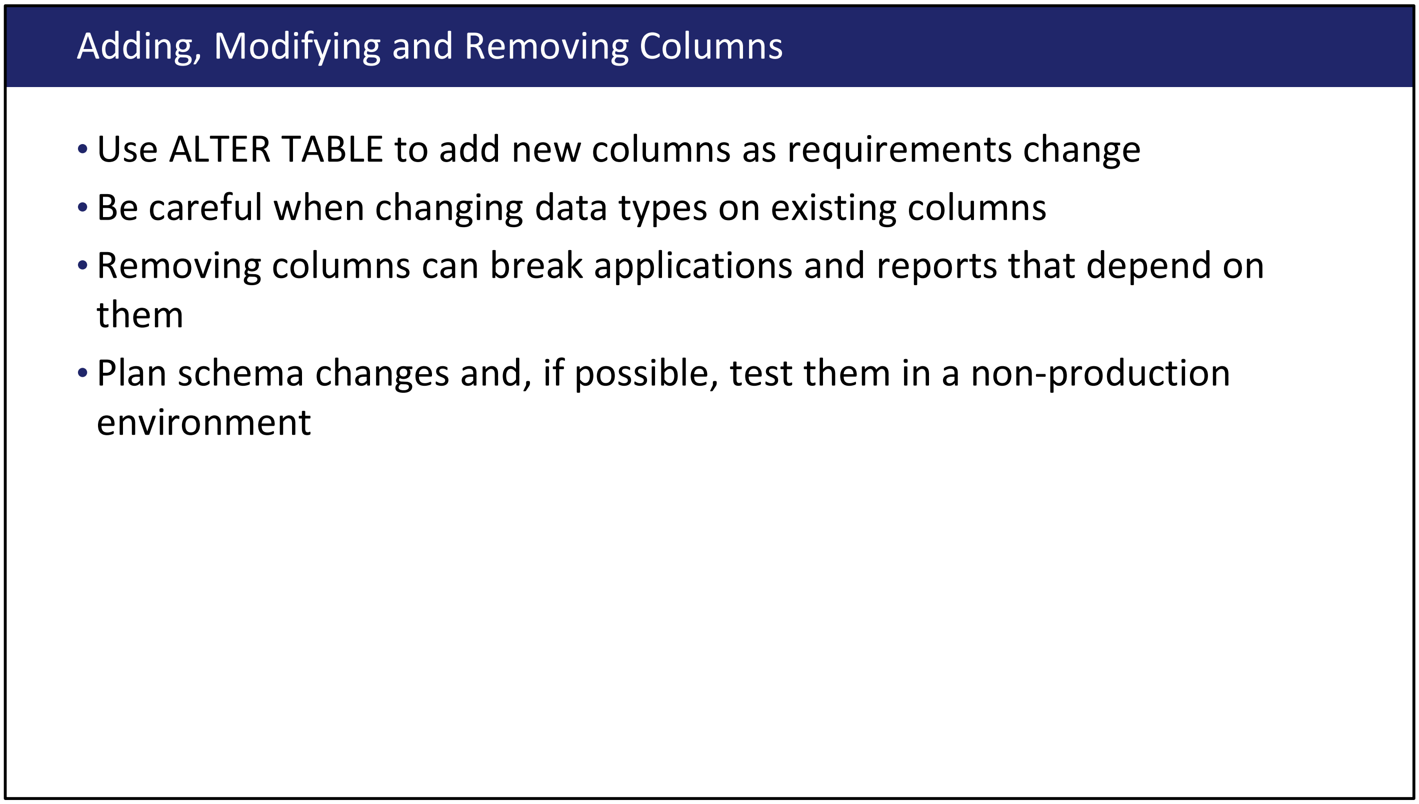


Specifying Appropriate Data Types

- Choose the smallest data type that can hold required values
- Use numeric types for quantities, money types for financial amounts
- Use date and time types instead of storing dates as strings
- Avoid using NVARCHAR(MAX) or similar large types unless necessary

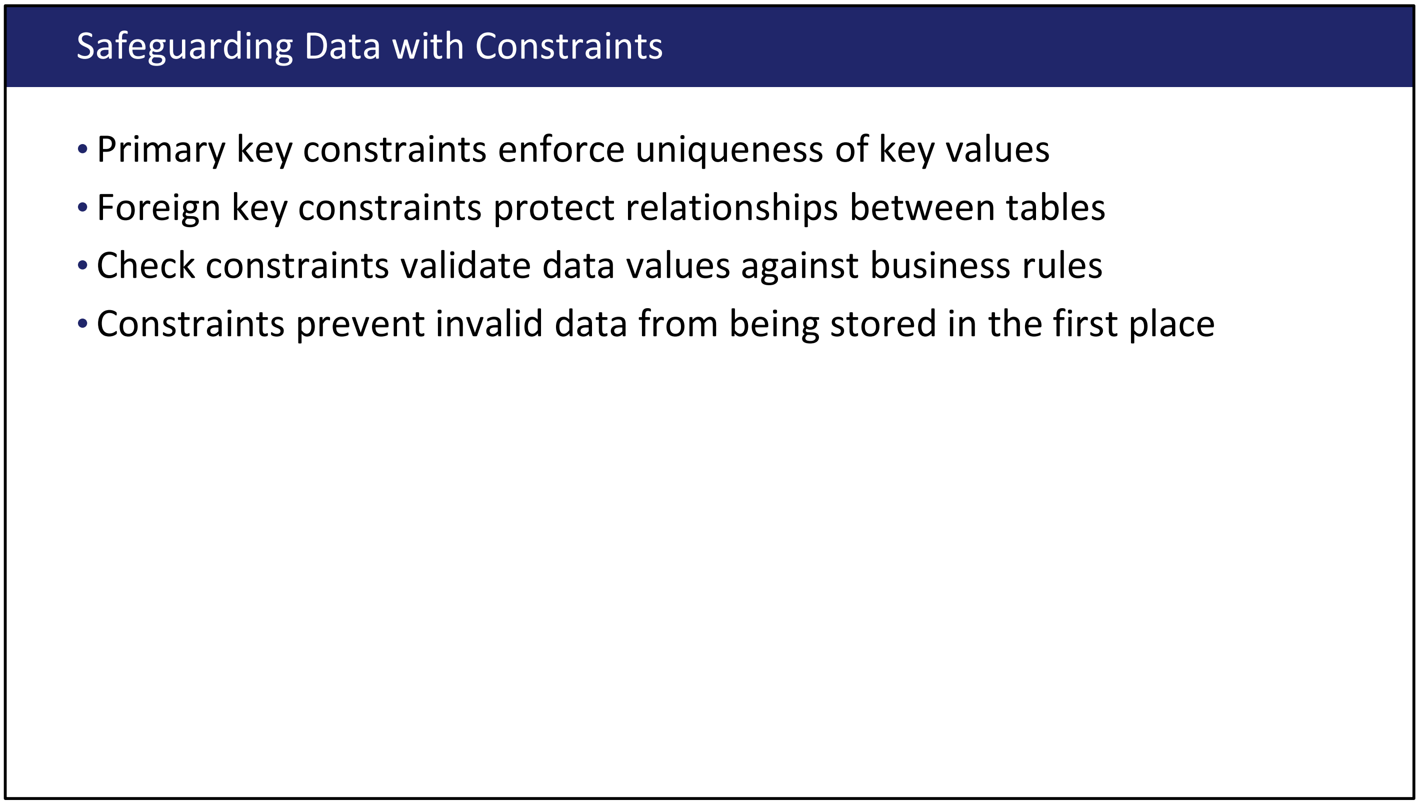
Indexing Tables with Management Studio

- Indexes help SQL Server find rows quickly without scanning entire tables
- Create clustered indexes on key columns used for range searches and ordering
- Create nonclustered indexes on frequently filtered or joined columns
- Use SSMS to design, create and inspect indexes graphically



Adding, Modifying and Removing Columns

- Use ALTER TABLE to add new columns as requirements change
- Be careful when changing data types on existing columns
- Removing columns can break applications and reports that depend on them
- Plan schema changes and, if possible, test them in a non-production environment



Safeguarding Data with Constraints

- Primary key constraints enforce uniqueness of key values
- Foreign key constraints protect relationships between tables
- Check constraints validate data values against business rules
- Constraints prevent invalid data from being stored in the first place