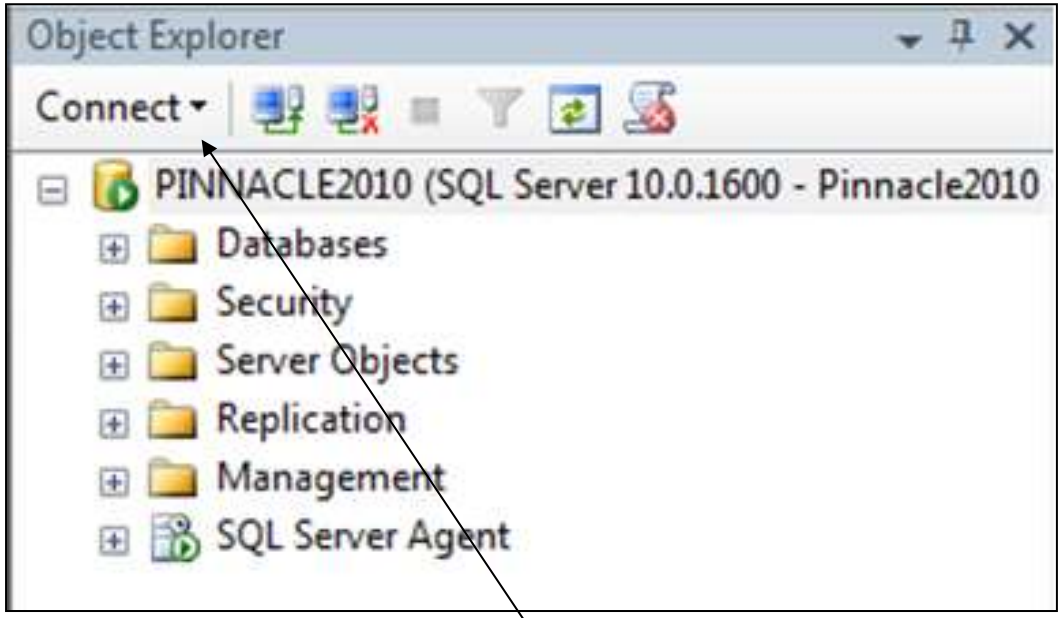
MS SQL 2008 R2

Lecture 2 | Databases and Tables

Learning objectives

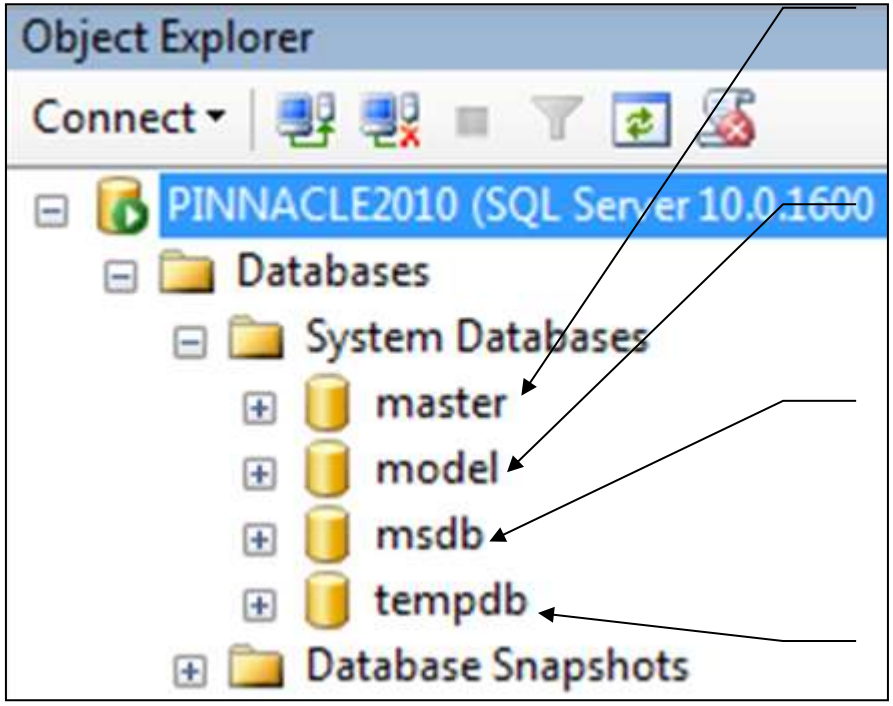
- Design and create databases, and the associated objects
- Design and create schemas and tables

Databases



Be sure you are connected to the Database engine and NOT any other services (eg Analysis, Integration…). If you are, connect to the DB engine.

The System Databases



info about the core objects with an instance

template for creating new databases

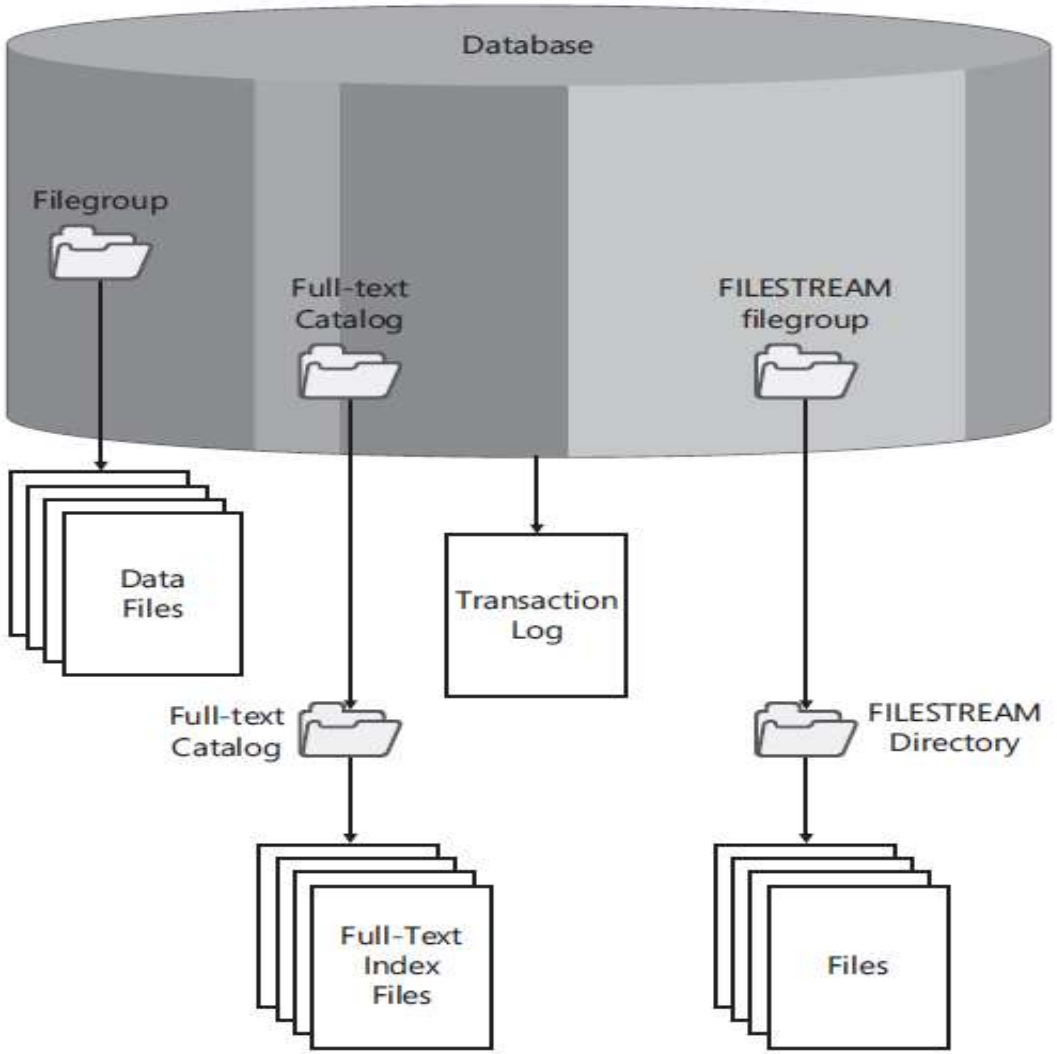
used in development environment to store and schedule SQL jobs

Holds all temporary tables, temporary stored procedures, and any other temporary storage requirements generated by SQL Server

Important definitions

- Database schema
  - A way to logically group objects such as tables, views, stored procedures etc.
- Database structure
  - Elements that define the database e.g. the files on the OS, the database files etc
- Database files
  - The files that support the databases primarily 3 file types

A Database Structure



Filegroup types

- Data files
  - For storing data
- Full-text files
  - For storing indexing data
- FILESTREAM files
  - These are unstructured data such as documents, images and videos stored as part of the database aka BLOB (binary large objects) data

Creating the database

CREATE DATABASE *database_name*

[ON

[PRIMARY] [<filespec> [,...*n*]

[, <filegroup> [,...*n*]]

[LOG ON { <filespec> [,...*n*] }]]

[COLLATE *collation_name*]

[WITH <external_access_option>]]

[;]

Defining database files

- Database files needs to be defined when created especially for size, growth rate and the type

<filespec> ::=
{
(NAME = *logical_file_name* ,
FILENAME = { '*os_file_name*' | '*filestream_path*' }
[, SIZE = *size* [KB | MB | GB | TB]]
[, MAXSIZE = { *max_size* [KB | MB | GB | TB] | UNLIMITED }]
[, FILEGROWTH = *growth_increment* [KB | MB | GB | TB | %]]
) [,...*n*]
}

.mdf = Primary file
.ndf = Secondary file
.ldf = Transaction log file

Schemas

- Schemas provide a framework in which objects are stored in a group in the database
  - Logically group objects such as tables, views, stored procedures
  - Also provides a security mechanism

CREATE SCHEMA *schema_name_clause* AUTHORIZATION *owner_name*

For example:

CREATE SCHEMA Customer AUTHORIZATION dbo

Data types

- Numeric data : from *tinyint* to *float(n)*
- Character data
- Date and Time data (now preferable to use *datetime2*)
- Binary data (avoid using *image*)
- XML
- FILESTREAM data
- SPATIAL data
- HierarchyID data

Creating Tables

- SQL functions fit into two broad categories:
  - Data definition language (Create, Update and Delete)
  - Data manipulation language (Read)
- DDL SQL statements are:
  - CREATE
  - ALTER
  - DROP
- DML SQL statement:
  - SELECT

Syntax for creating a table

CREATE TABLE [*database_name* . [*schema_name*] . | *schema_name* .]
table_name
({ <column_definition> | <computed_column_definition> | <column_set_definition> }
[<table_constraint>] [,...*n*])
[ON { *partition_scheme_name* (*partition_column_name*) | *filegroup* | "default" }]
[{ TEXTIMAGE_ON { *filegroup* | "default" }]
[FILESTREAM_ON { *partition_scheme_name* | *filegroup* | "default" }]
[WITH (<table_option> [,...*n*])]
[;]

For example to create Table Employee

```
CREATE TABLE Employees.Employee
(EmployeeID     INT         IDENTITY(1,1),
FirstName       VARCHAR(50) NULL,
LastName        VARCHAR(50) NULL,
DateEmployed DATETIME2 NOT NULL)
GO
```

Alter Table Employee to Add Column

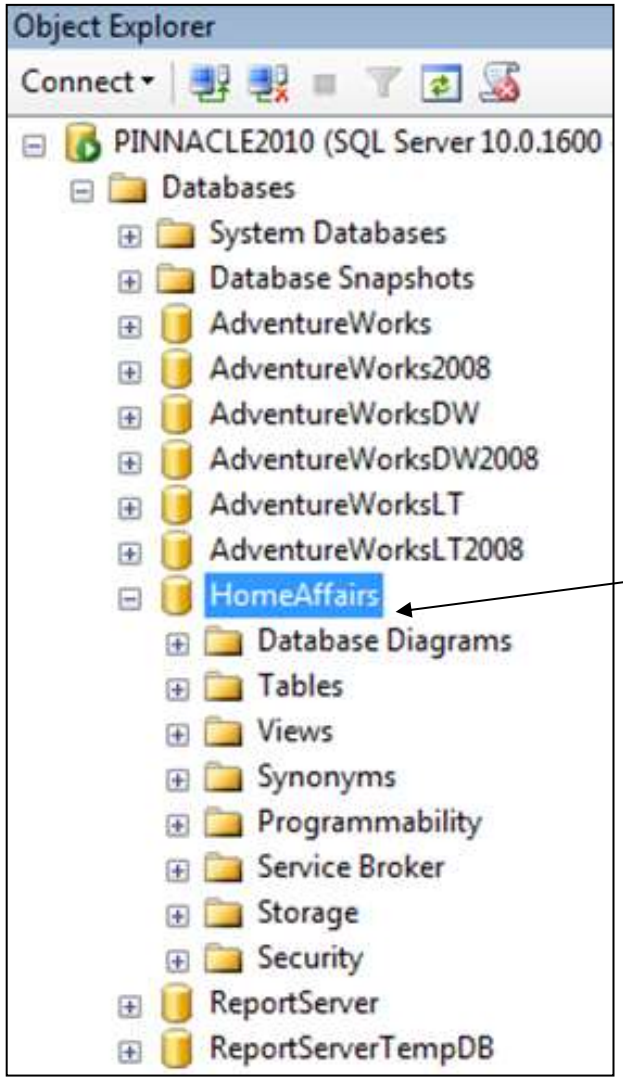
```
ALTER TABLE Employees.Employee
ADD SalaryScale HierarchyID NULL
GO
```

Constraints (Foreign, Unique and Primary)

- Constraints enforce entity and referential integrity
- Syntax
  - CONSTRAINT *constraint_name*] DEFAULT *constant_expressio*n
  - For example
  - CONSTRAINT pk_employee PRIMARY KEY (EmployeeID)

```
ALTER TABLE Employees.Employee
ADD CONSTRAINT pk_employee PRIMARY KEY (EmployeeID)
GO
```

Database diagram



- A tool that allows a view of the database or portions of the database with the accompanying relationships

Right-click Database Diagram to create a new diagram

Practical Exercise

- A Database Diagram is provided (as the ERD)

- Create the Home Affairs database with the FILESTREAM capability
  - Specify the primary and transaction log files
  - Use SIZE = 10MB, MAXSIZE = 50MB and FILEGROWTH=5
  - See example on Page 58

Practical Exercise

- Create the following 3 schemas
  - Location
  - Registrations
  - People
- Create the corresponding 5 Tables as shown in the ERD with the appropriate constraints and attributes
- Create the corresponding Database Diagram – should look similar to the ERD provided

Admin

- The ISO image for MS SQL Server 2008 R2 is quite big and at times does not download well.
- MS SQL Server 2008 R2 is available on ClickUP
- First 30 minutes – discussion & overview
- Rest of session - helping students with current practical and mark the previous practical exercise