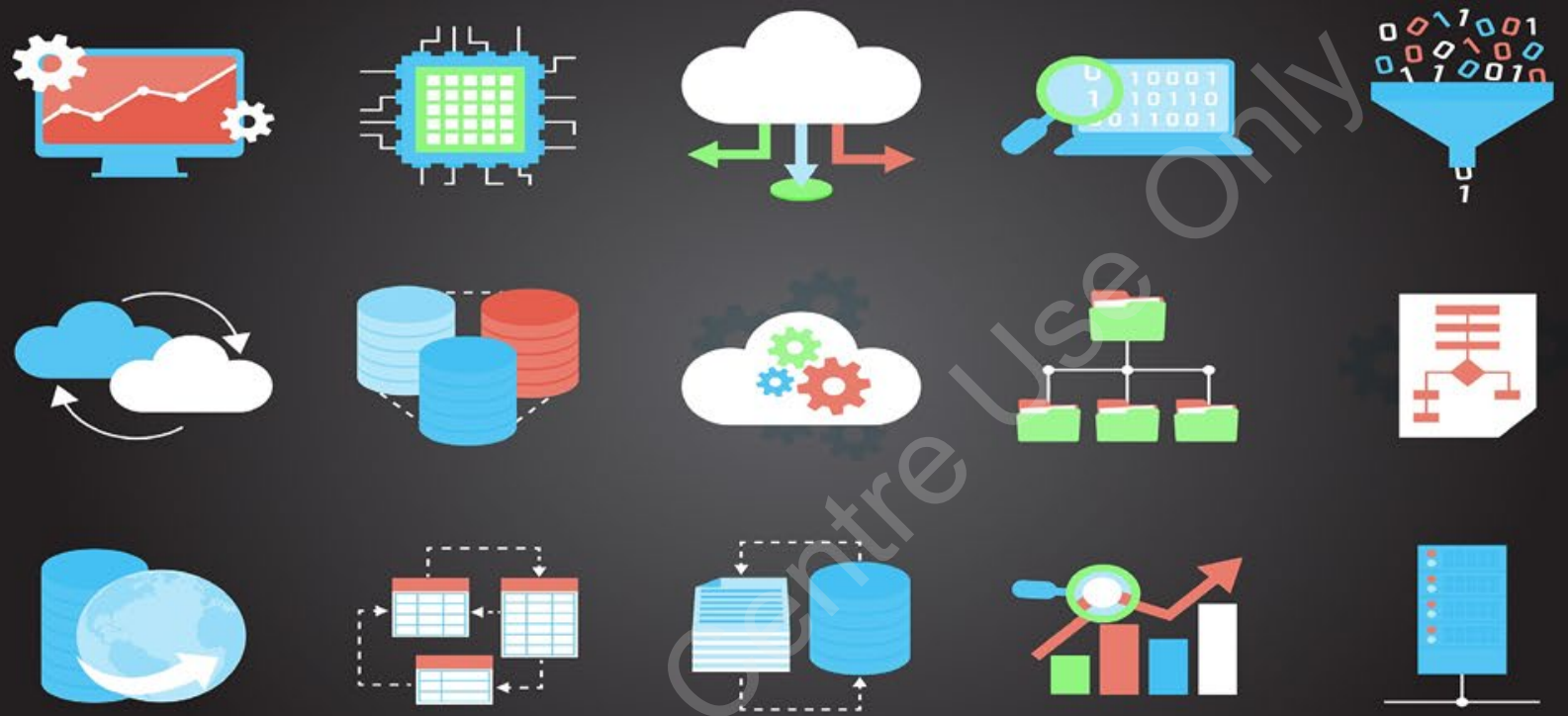


Session 05:
Data Access Using Entity Framework

Objectives

- Describe Entity Framework (EF)
- Define Language Integrated Query (LINQ)
- Define database operations in entities
- Explain Query Data and complex queries in LINQ

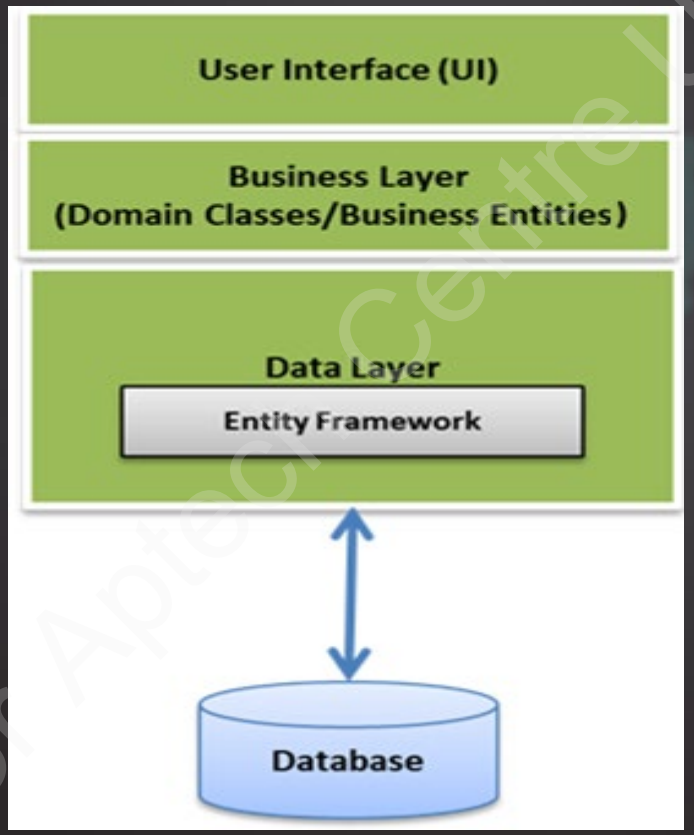
Introduction to Data Access Using Entity Framework [1-2]

Entity Framework

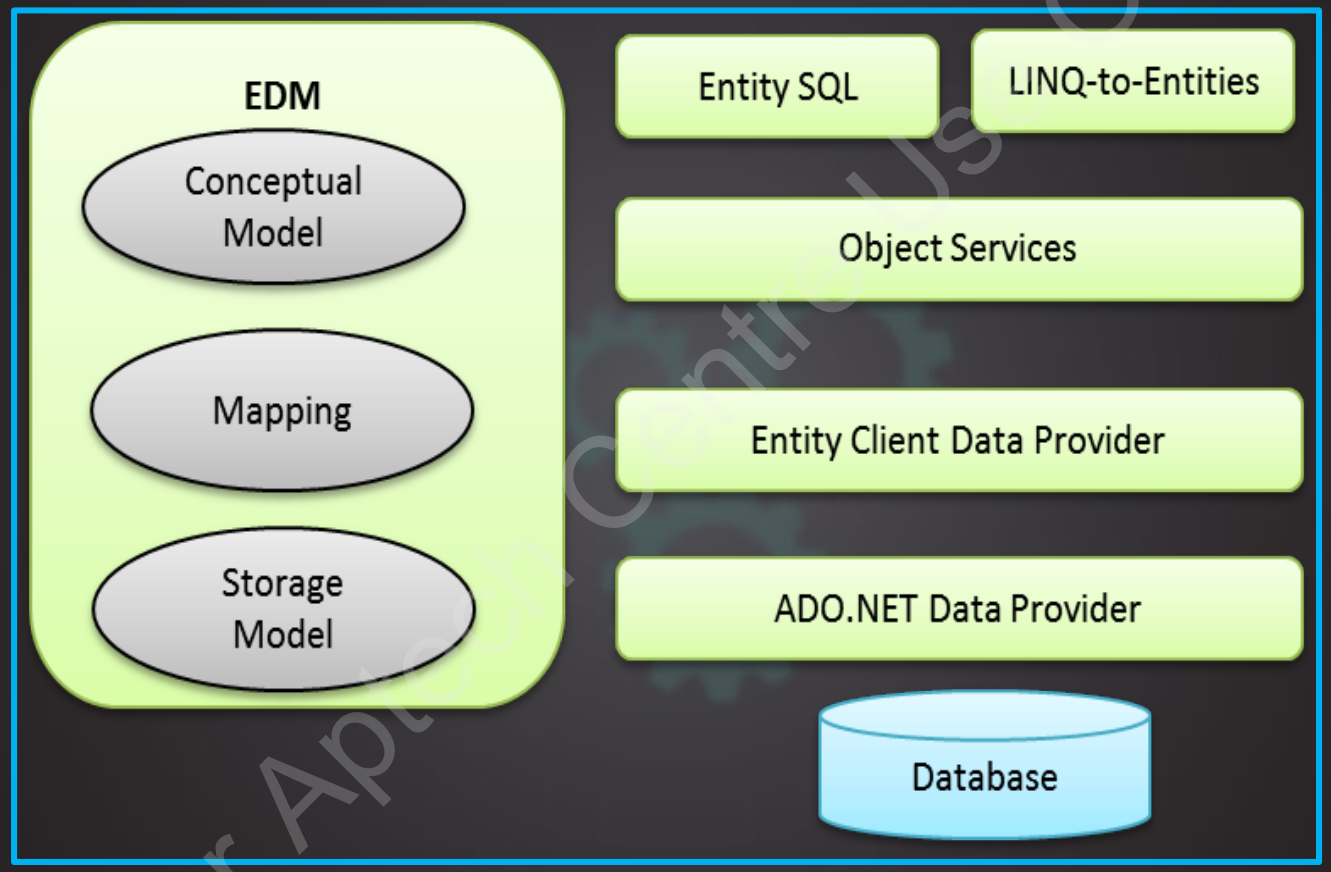
- Is a set of technologies in ADO.NET supporting development of data-oriented software applications.
- Was introduced with Visual Studio 2008 SP1 and .NET Framework 3.5 SP1.
- Makes mapping easier between software objects and a relational database's tables and columns.
- Increases productivity by reducing the task of tracking data utilized in applications.

Introduction to Data Access Using Entity Framework [2-2]

Figure shows how EF manages interaction between .NET applications and relational databases:



Entity Framework Architecture



Design Approach in Entity Framework

EF supports three design approaches:

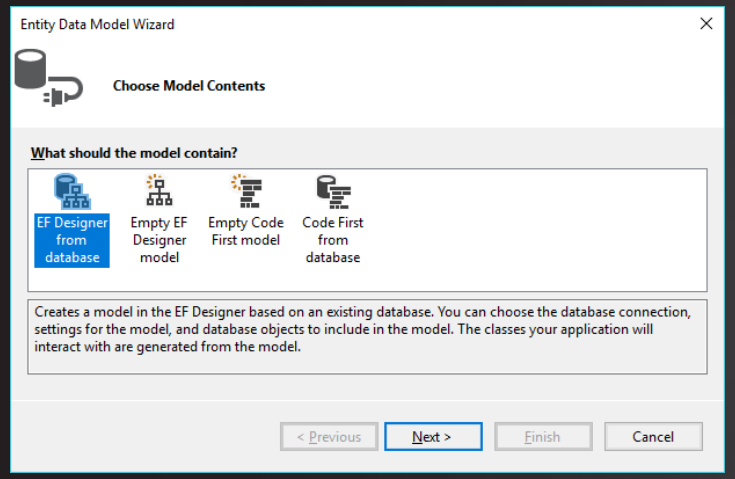
Code-First Approach	• Database is generated from the entity class. A Model Designer is not required for this approach. When entity classes are ready to use `DbContext` object, the database is generated depending on entity and relationship between them.
Model-First Approach	• EF Designer is used for the Model-First approach. Using this approach, a user can build entity models and relationship between them. The database is created from the models depending on relationship between them.
Database-First Approach	• On using Database-First approach, model or entity is generated based on the database. The database is designed before anything is created. Database-First approach is recommended for projects where the database already exists.

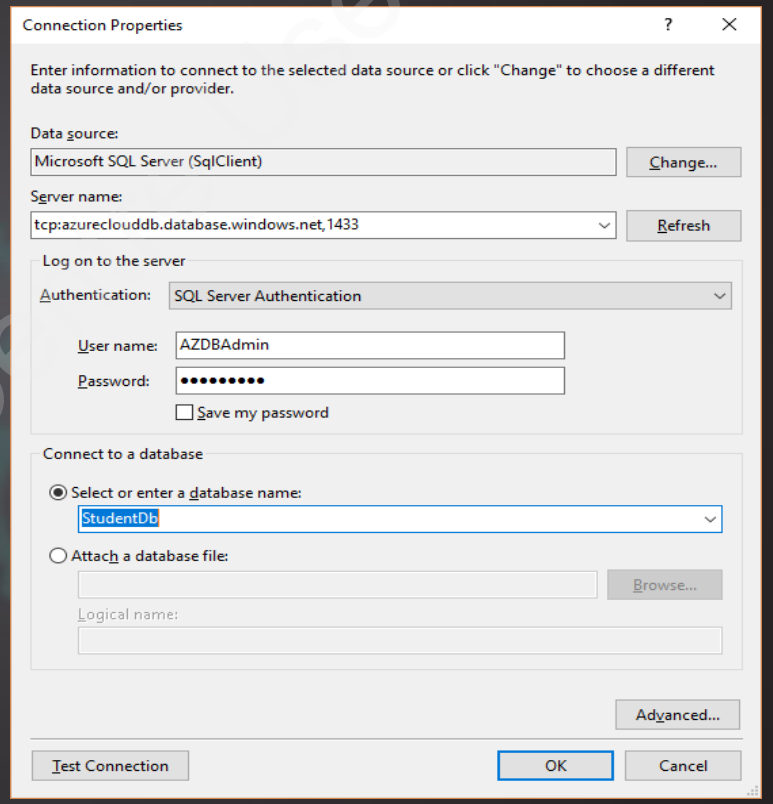
Database Operation in Entity Framework

EF implements rich mapping capabilities, including support for:

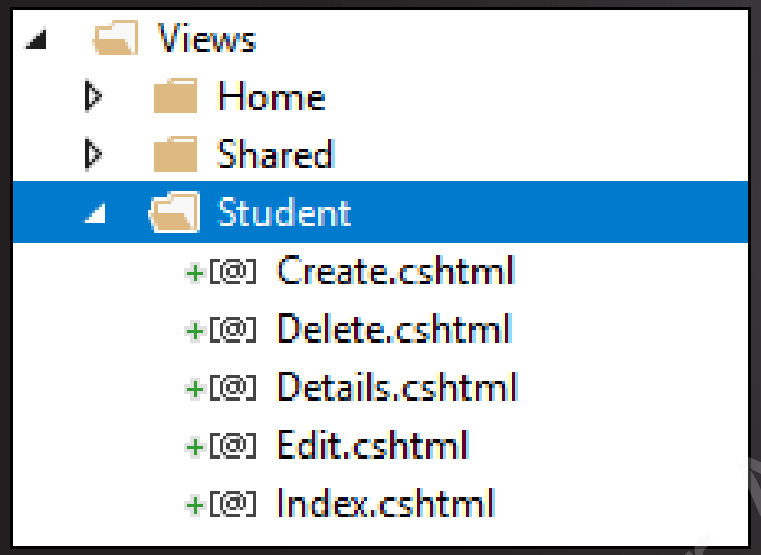
- Complex types.
- One-to-one relationships, one-to-many relationships, and many-to-many relationships.
- Stored procedures.
- Inheritance - table per type, table per concrete class, and table per hierarchy.

Connecting to a Database and Creating an Entity Data Model

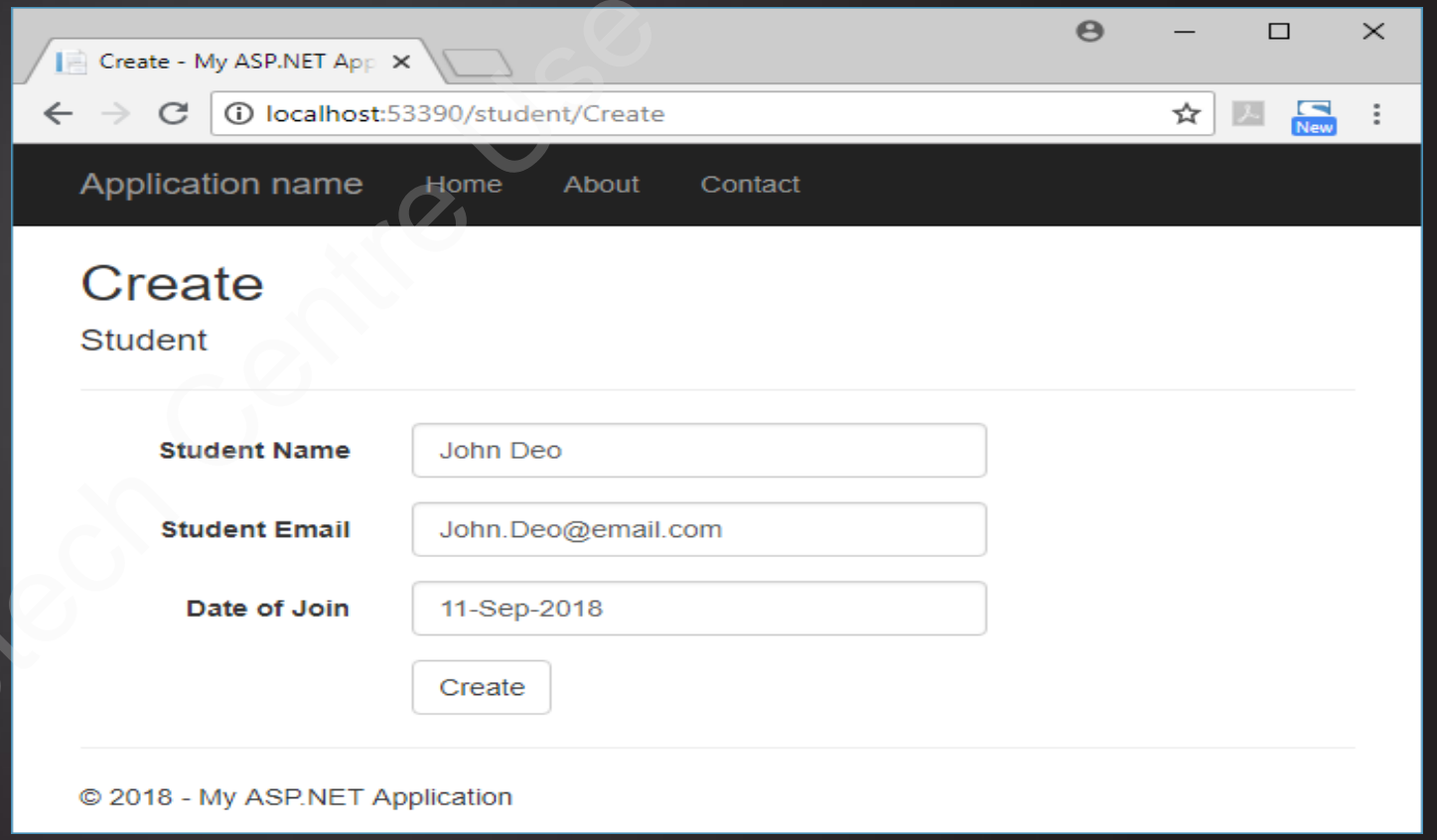




Inserting a Record Using DbContext



Auto-generated Views



Output

Executing a Command

Following code snippet depicts a LINQ-to-Entities query, which retrieves information from the Student table in the database.

Snippet

```
var query = _context.Students
     .Where(s => s.StudentName == "John Dill")
     .FirstOrDefault<Student>();
```

Eager Loading and Lazy Loading in Entity Framework

Eager loading

- Eager loading is the method in which a specific type of entity also loads entities that are related as a part of the query.

Lazy loading

- Lazy loading is the process wherein a specific entity or a group of entities are loaded from database automatically. This is done once a property which indicates the entity/entities is accessed for the first time.

Complex Query in LINQ

Standard Query Operators

Operation	Standard Query Operators
Set	Distinct, Except, Intersect, Union
Quantifiers	All, Any, Contains
Elements	ElementAt, ElementAtOrDefault, First, FirstOrDefault, Last, LastOrDefault, Single, SingleOrDefault
Filtering	Where, OfType
Sorting	OrderBy, OrderByDescending, ThenBy, ThenByDescending, Reverse
Aggregation	Aggregate, Average, Count, LongCount, Max, Min, Sum
Join	GroupJoin, Join
Grouping	GroupBy, ToLookup
Projection	Select, SelectMany
Equality	SequenceEqual
Concatenation	Concat
Generation	DefaultEmpty, Empty, Range, Repeat
Conversion	AsEnumerable, AsQueryable, Cast, ToArray, ToDictionary, ToList
Partitioning	Skip, SkipWhile, Take, TakeWhile

Summary

- EF is an ORM that improves developer productivity as it automatically generates database commands for data manipulation.
- EF offers three varieties of design approach depending on the requirement, which are: Code-First, Database-First, and Model-First.
- Developers can write C# code to specify a LINQ query which automatically generates an SQL query by EF.
- LINQ also supports complex queries such as aggregate functions, joins, and paging which can be achieved by writing C# code.