LINQ & Entity Framework Core

Lesson 02 : Introduction to Entity Framework Core

Capgemini

Lesson Objectives

- In this lesson we will cover the following
  - Overview of Entity Framework
  - Introduction to Entity Framework Core
  - Working with Entities
  - EF Core Database Providers

Need of Entity Framework

- Accessing data is one of the main activity almost every application must do
- The data for these application comes from different source i.e in memory data, XML Files, database ,text files etc.
- Developer need to write the code for accessing these data which is a very cumbersome task
- Developer need to write down .NET Classes which will be used access data from the database
- Writing these classes and mapping them to database makes the application complex and it’s timing consuming as well
- To overcome these problem Entity Framework was introduced as part of .NET Framework 3.5 sp1

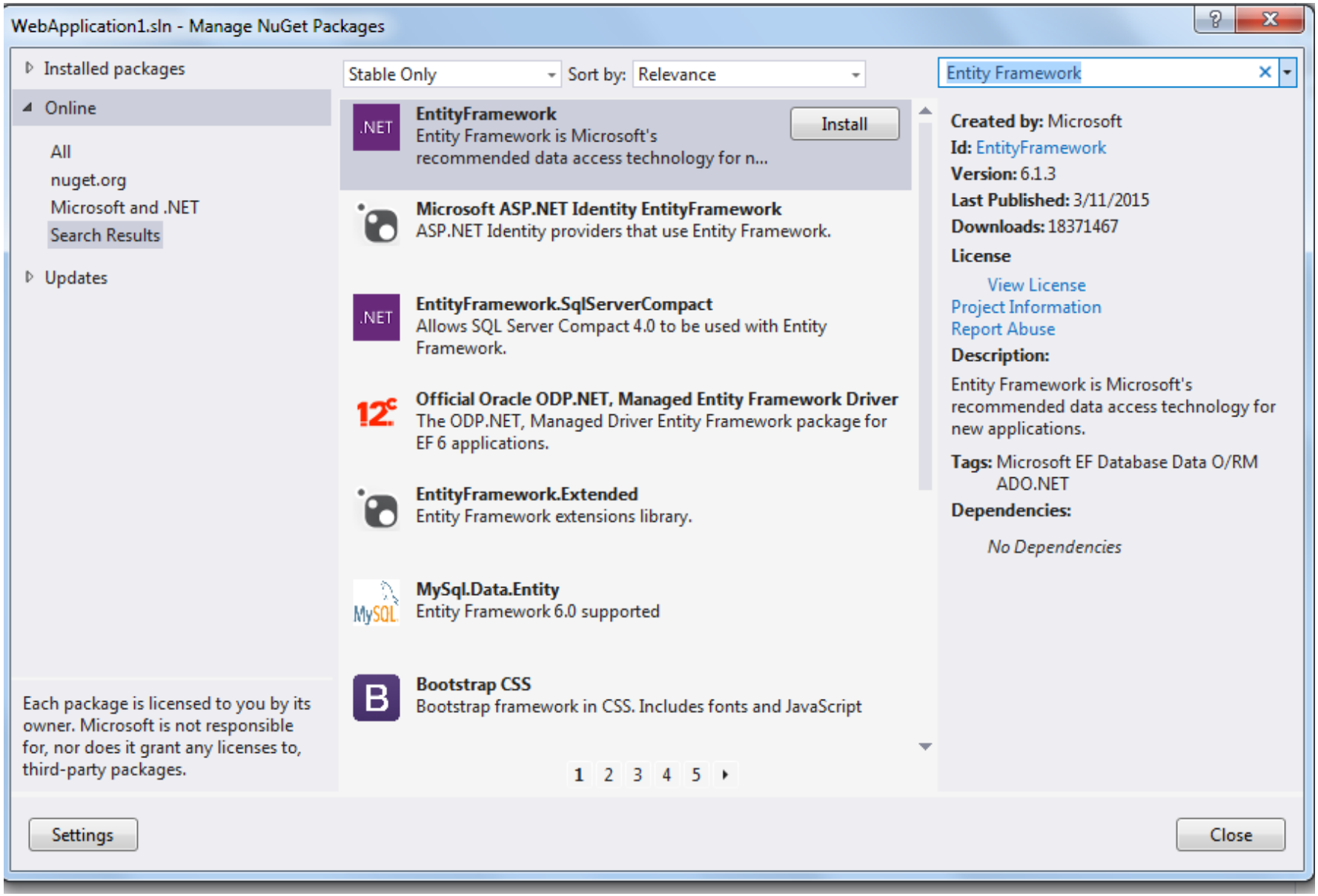
Entity Framework Overview

- Entity Framework or EF in an ORM framework for ADO.NET
  - ORM “Object Relation Mapping” is a Programming technique for converting data between incompatible type system.
  - It Creates a virtiual object database that can be used with in the programming language
- EF enables developer to work with relational data as a domain specific object .
- It Eliminates the need of most of the data access code usually which developer need to write.
- It works on top ADO.NET
- Latest Version of EF is Entity Framework 6 and EF Core

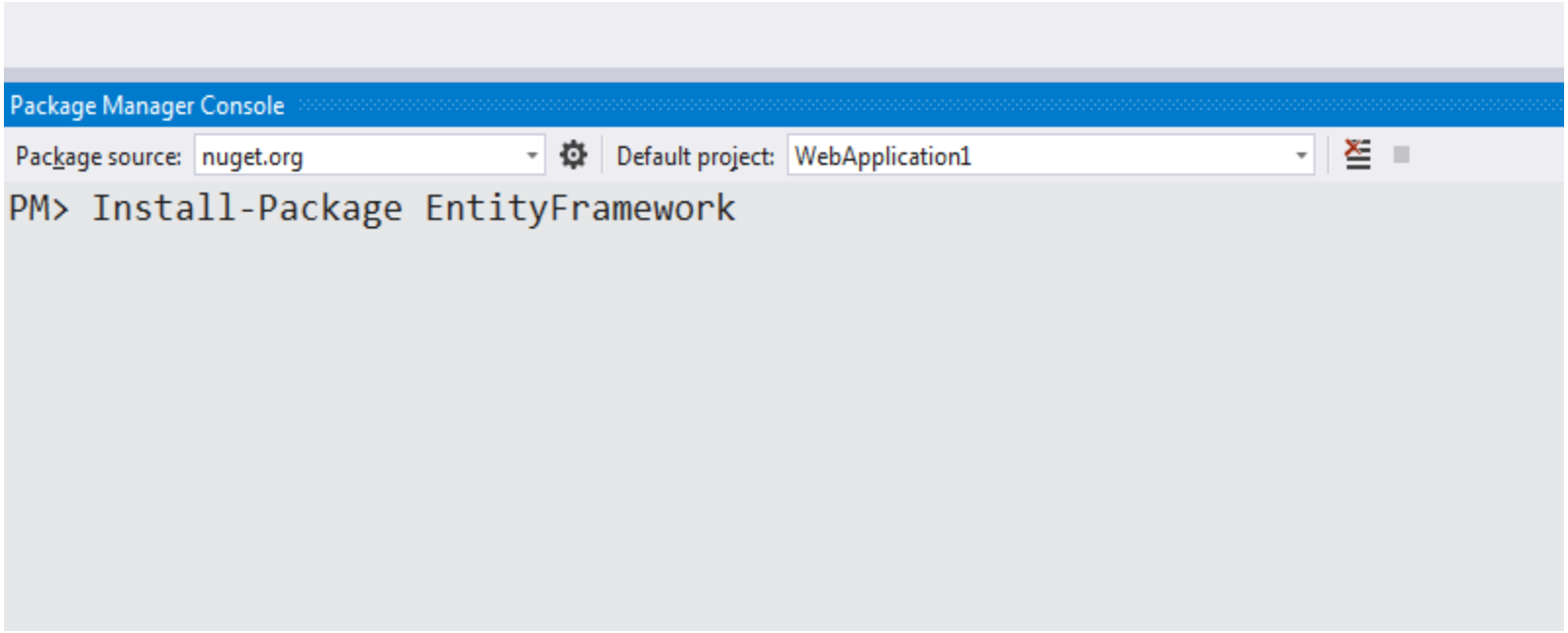
Entity Framework 6

- Entity Framework 6 is the latest release of Entity Framework
- Entity Framework 6.0 has introduced many new exciting features for Database-First (designer) and Code-First approaches.
- It can download from Nuget Packager Manager in visual studio.
- It can be used in Visual Studio 2012 and higher version of Visual Studio .

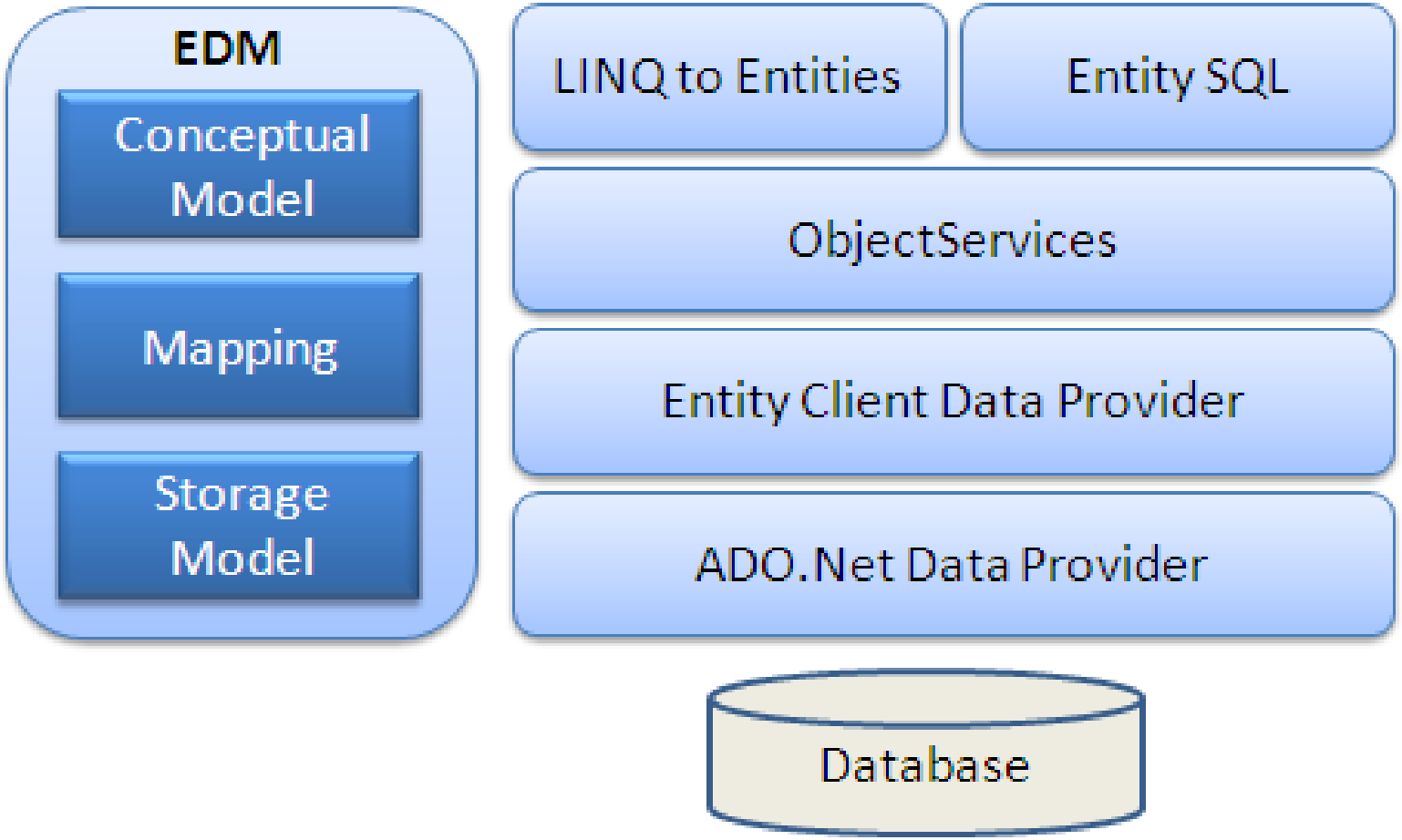
Adding EF 6.0 using Nuget Package Manager



Adding EF 6.0 using Nuget Package Manager



Architecture of Entity Framework 6.0



Entity Data Model

- Entity Framework uses the Entity Data Model (EDM) to describe the application-specific object or a conceptual model against which the developer programs
- It is an conceptual model of data as you want to represent it in your code.
- It usually consist of .NET Classes that can be manipulated as any other object in code.
- EDM Consist of three main parts
  - Conceptual Model
  - Storage Model
  - Logical Model

Working With Entities

- A key term any Entity framework developer need to know is the term entity
- Entity are like objects eg:-
  - Entities have a know type
  - Entities have properties and these properties can hold scalar values
  - Entity properties can hold to references to other entites
  - Each entity has a distinct identity
- Entities are extremely flexible
- Entities can have relationships between them

Entity Framework Core Introduction

- Entity Framework (EF) Core is a lightweight, extensible, open source and cross-platform version of the popular Entity Framework data access technology.
- EF Core can serve as an object-relational mapper (O/RM), enabling .NET developers to work with a database using .NET objects, and eliminating the need for most of the data-access code they usually need to write.
- EF Core is an object-relational mapper (ORM). Object-relational mapping is a technique that enables developers to work with data in object-oriented way by performing the work required to **map** between **objects** defined in an application's programming language and data stored in **relational** datasources.
- Latest Version of EF Core is EF Core 2.1 & EF Core 3.1

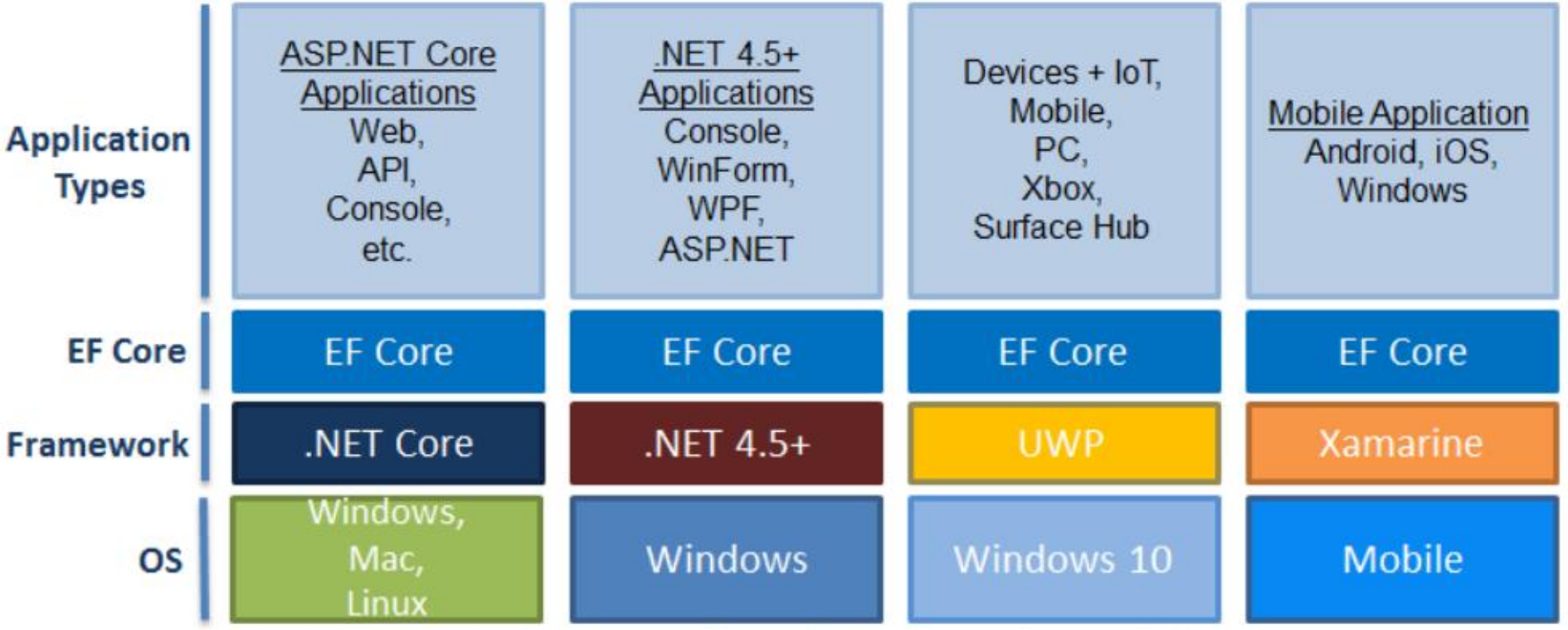
Overview

- History of Entity Framework Core

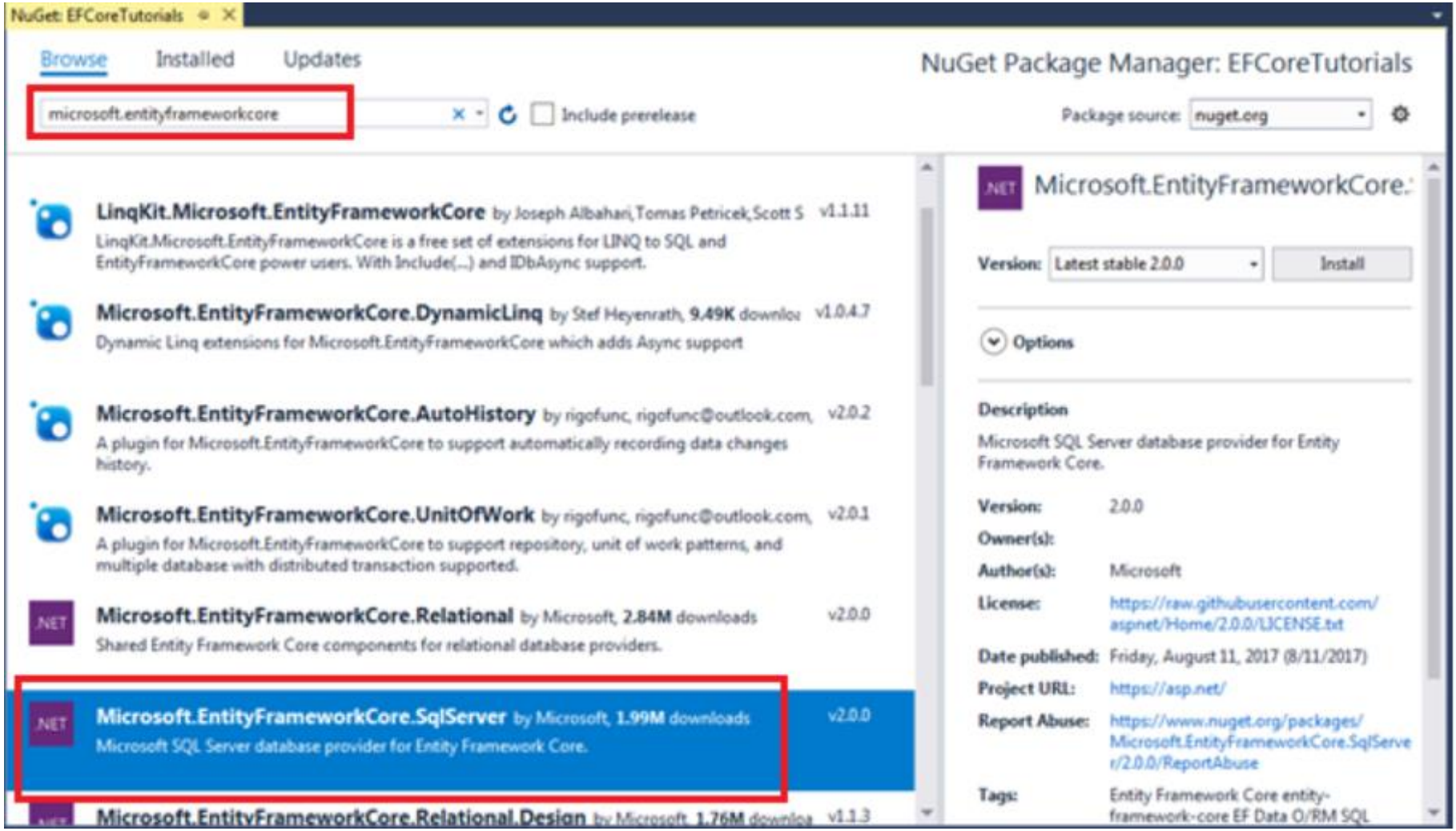
EF Core Version	Target Framework	Supported Until
EF Core 1.0	.NET Standard 1.3	Expired June 27 2019
EF Core 1.1	.NET Standard 1.3	Expired June 27 2019
EF Core 2.0	.NET Standard 2.0	Expired June 27 2019
EF Core 2.1	**.NET Standard 2.0**	**August 21, 2021**
EF Core 2.2	.NET Standard 2.0	Expired December 23, 2019
EF Core 3.0	.NET Standard 2.1	Expired March 3, 2020
EF Core 3.1	**.NET Standard 2.0**	**December 3, 2022**

EF Core Supportive App Types & OS

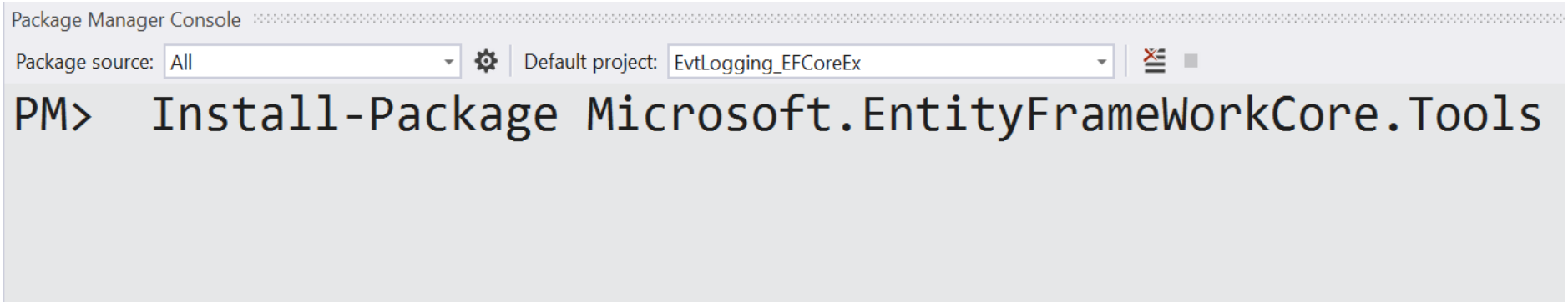
- EF Core is intended to be used with .NET Core applications.
- However, it can also be used with standard .NET 4.5+ framework based applications.
- Below image illustrates the supported application types, .NET Frameworks and OSs.



Add EF Core using Nuget Package for Solution

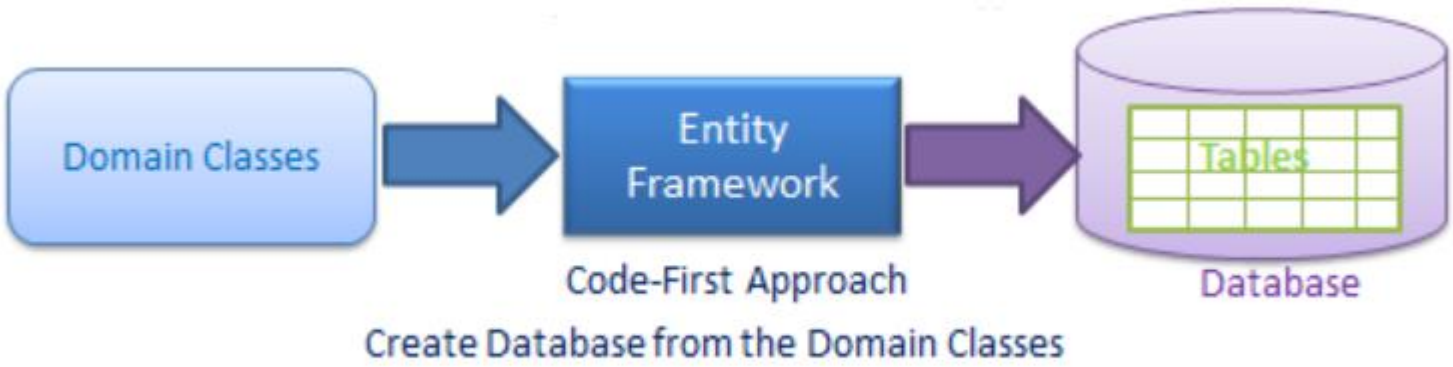


Add EF Core using Package Manager Console



Working With Entities in EF Core

- Entities can be created using the following strategies
  - Code First
  - Database First



EF Core Features

- DbContext & DbSet
- Data Model
- Querying using Linq-to-Entities
- Change Tracking
- SaveChanges
- Migrations
- Easy relationship configuration
- Batch INSERT, UPDATE, and DELETE operations
- Shadow properties
- Global query filter
- Field mapping
- DbContext pooling

EF Core Database Providers

- Entity Framework Core uses a provider model to access many different databases.
- EF Core includes providers as NuGet packages which you need to install.

Following table lists database providers and NuGet packages for EF Core

Database	NuGet Package
SQL Server	Microsoft.EntityFrameworkCore.SqlServer
MySQL	MySql.Data.EntityFrameworkCore
PostgreSQL	Npgsql.EntityFrameworkCore.PostgreSQL
SQLite	Microsoft.EntityFrameworkCore.SQLite
SQL Compact	EntityFrameworkCore.SqlServerCompact40
In-memory	Microsoft.EntityFrameworkCore.InMemory

Summary

- In this lesson you have learnt about:
  - Overview of Entity Framework
  - Introduction to Entity Framework Core
  - Working with Entities
  - EF Core Database Providers

Review Question

- Which of the following EDM consist of ?
  - Conceptual Model
  - Storage Model
  - Code Model
  - Logic Model

- Entity Framework works on top of ADO.NET?
  - True
  - False

- The _____ contains the classes and their relationships.
  - Logic Model
  - Storage Model
  - Conceptual Model

Review Question

- EF Core is lightweight, extensible, open source and cross-platform version
  - True
  - False

- Which of the following not supported by EF Core?
  - Change Tracking
  - SaveChanges
  - Migrations
  - Lazy Loading

- Entity Framework Core uses a provider model to access many different databases.
  - True
  - False