

Entity Framework Core 2: Getting Started

INTRODUCING MICROSOFT'S
MODERN DATA ACCESS FRAMEWORK



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MOST TRUSTED AUTHORITY ON ENTITY FRAMEWORK

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Who Is This Course For?



New to EF/EF Core



New to EF Core 2



Manager/CTO



Course Overview

EF Core 2 introduction and overview

**Creating a data model and database with
EF Core 2**

**Using EF Core 2 to interact with your
data**

Querying and Saving Related Data

Using EF Core 2 in Your Applications

EF Core: Code and Deploy Across Platforms

Visual Studio
Windows

Develop on:

Visual Studio Code
Windows/macOS/Linux

Visual Studio for Mac
macOS

Windows

Run on:

macOS

Linux



Module Overview



What is Entity Framework Core?

EF Core, .NET Framework and .NET Core

Target platforms and application types

Coding environment

Workflow of EF Core in your software

Path from EF6 to EF Core to EF Core 2

Highlights of new features in EF Core 2

What's coming in EF Core 2.1



What Is Entity Framework Core?



Entity Framework Core

Microsoft's official data access technology
for .NET development



“Entity Framework (EF) Core is a lightweight and extensible version of the popular Entity Framework data access technology.”

EF Core Documentation

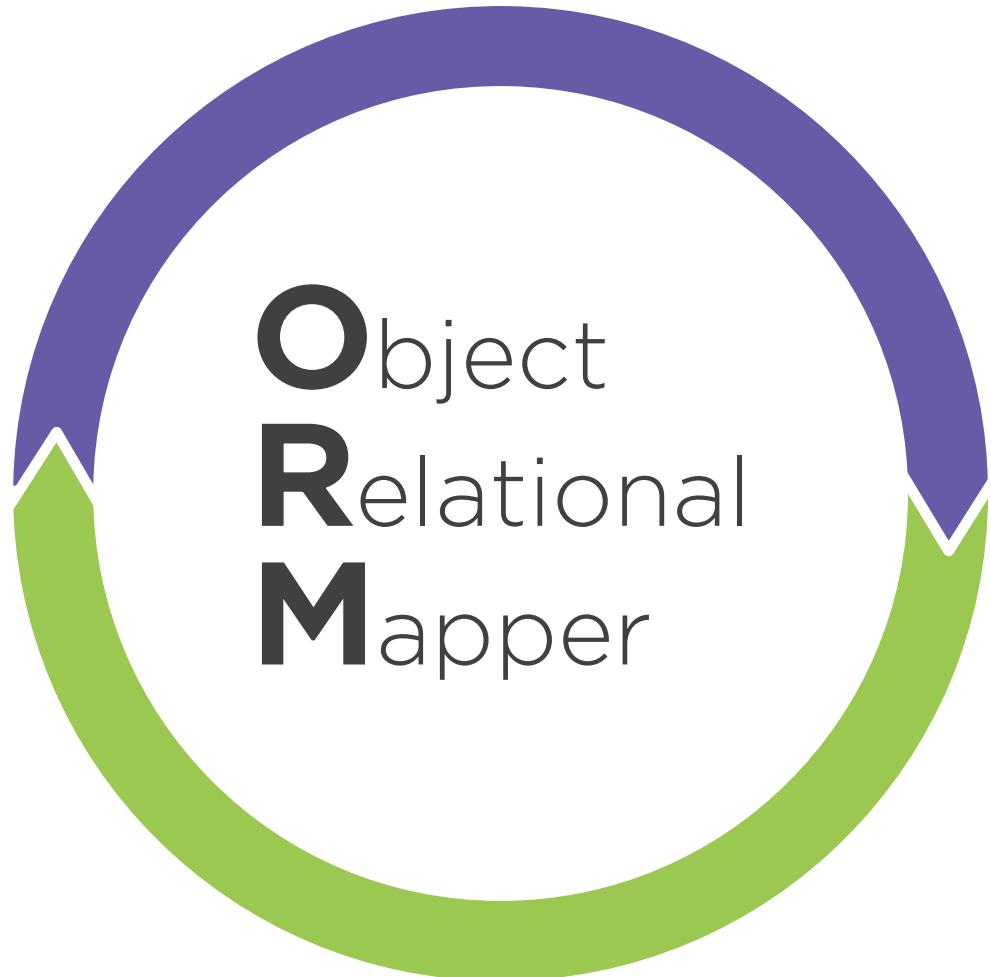
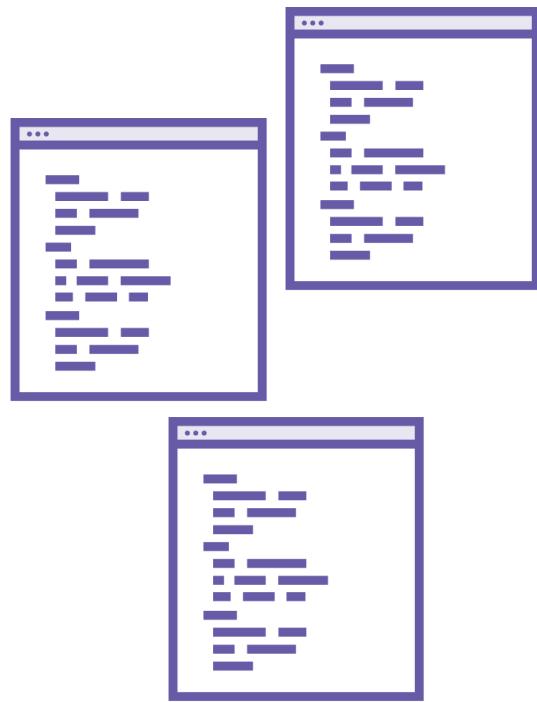


EF Core 1.0
June 2016
~1M downloads

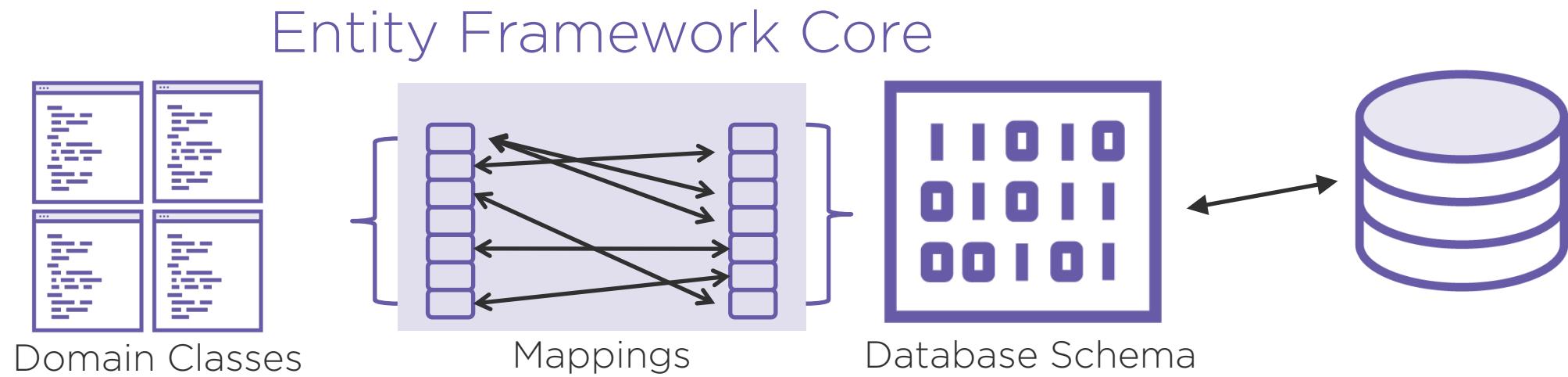
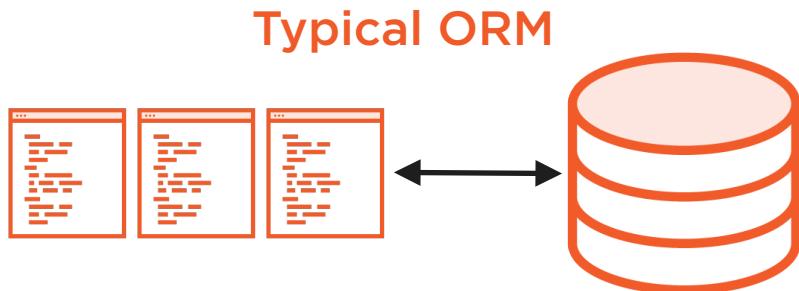
EF Core 2.0
Aug. 2017
~1M downloads

EF Core 2.1
May 2018
(Minor Update)

EF Is an ORM



EF Maps Differently Than Most ORMs



Why This ORM, EF Core?

Developer productivity

First class member
of
Microsoft .NET stack

Consistent query syntax
with
LINQ to Entities

Focus on domain,
not on DB, connections,
commands, etc.



Currently Available Providers for EF Core 2

SQL Server (Microsoft)

SQLite (Microsoft, Devart)

InMemory (Microsoft)

SQL Server Compact (Erik Eilskov Jensen (MVP))

MySQL (Oracle, Pomelo, Devart)

Oracle (Devart)

PostgreSQL (Npgsql/Shay Rojansky (MVP), Devart)

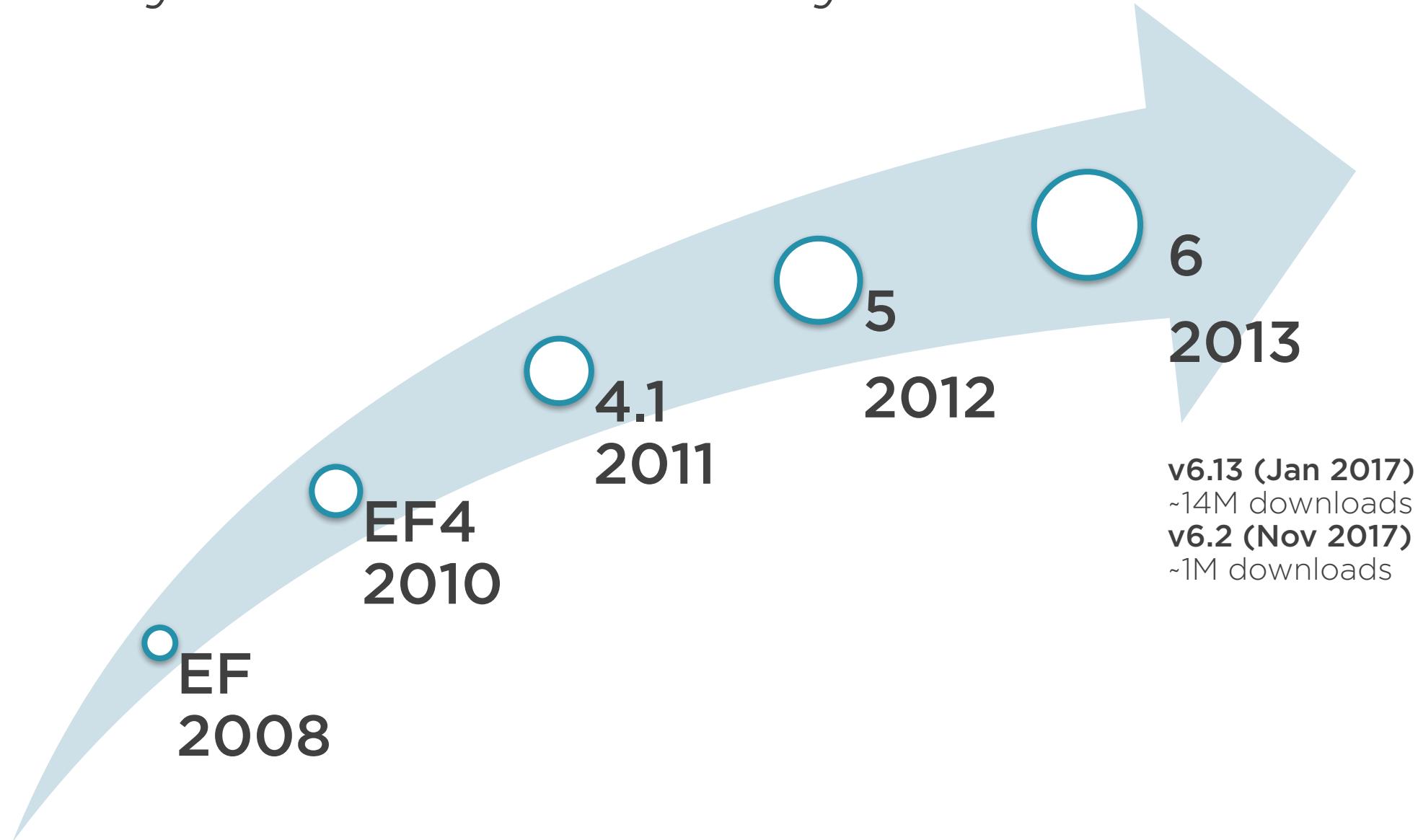
IBM Data Server DB2 (IBM, Devart)

MyCat (Pomelo)

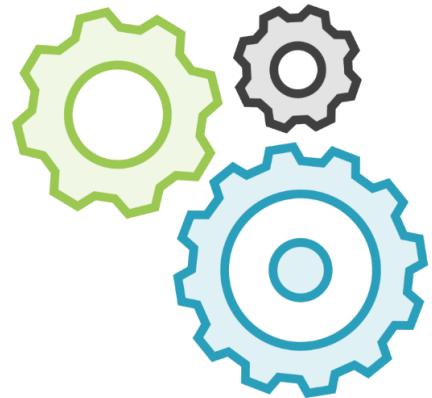
Firebird (Rafael Almeida)



Entity Framework History Before EF Core



.NET Core Themes



Composable APIs



Cross-Platform



Modern
Software Practices



Applications types for EF Core 2.0

	.NET 4.6.1+	.NET Core 2.x	UWP 6.5	Xamarin
OS	Windows	Windows, macOS, Linux	Windows 10 FCU	iOS Android
App Types	Console WinForms WPF ASP.NET 4 Web Forms etc..	ASP.NET Core Web Apps Web APIs Libraries Services Console Apps Docker	Mobile PC HoloLens Xbox Surface Hub IoT Devices	Mobile Tablet



Open Source

aspnet/EntityFrameworkCore

GitHub, Inc. [US] | https://github.com/aspnet/EntityFrameworkCore

Code Issues Pull requests Projects Wiki Insights

Entity Framework Core is a lightweight and extensible version of the popular Entity Framework data access technology
<https://docs.microsoft.com/ef/core>

entity-framework database c-sharp dotnet-core dotnet-standard dotnet-framework orm aspnet-product

4,880 commits 68 branches 31 releases 103 contributors

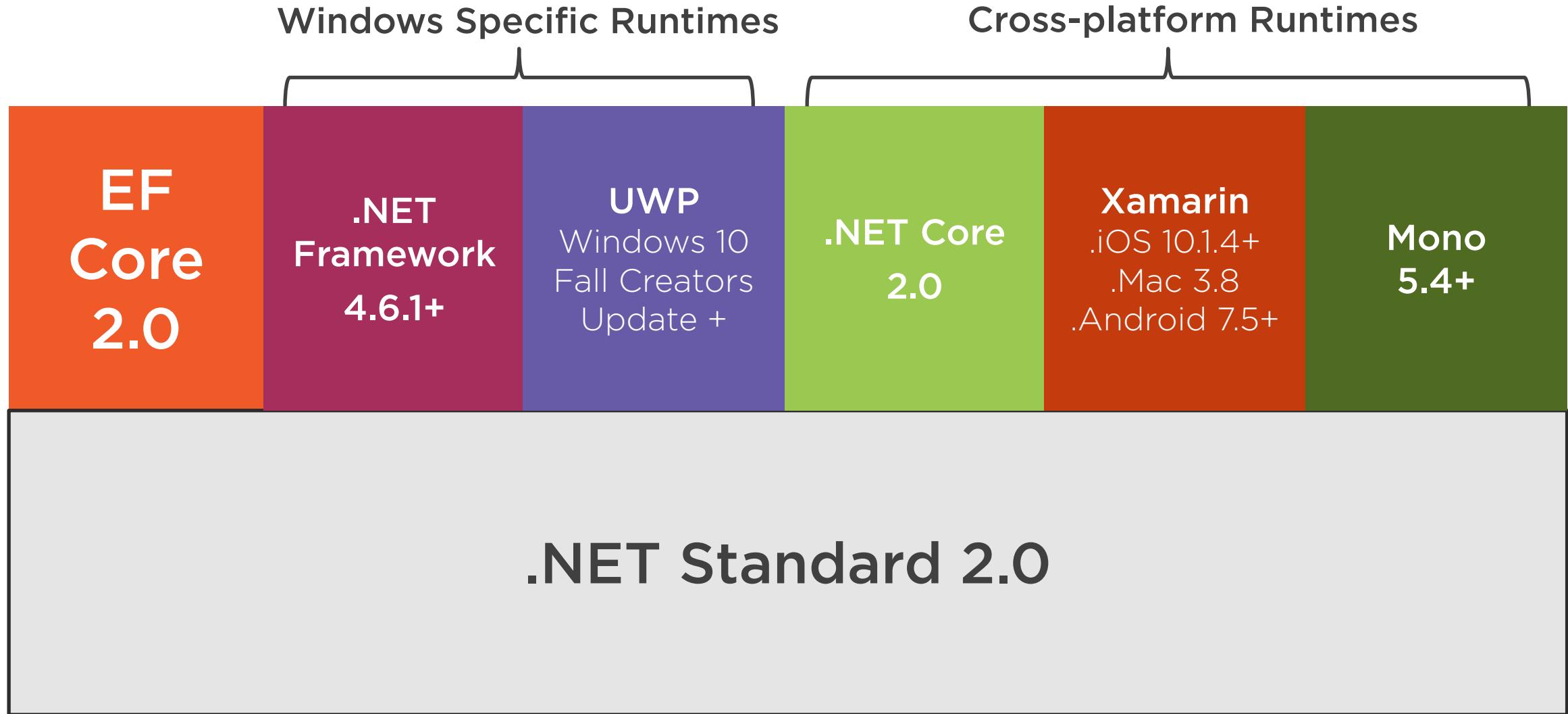
Branch: dev New pull request Create new file Upload files Find file Clone or download

bricelam Merge branch 'release/2.0.0' into dev ... Latest commit d7c350f 4 days ago

File / Commit	Description	Time Ago
.github	Update ISSUE_TEMPLATE.md (#10444)	2 months ago
benchmarks	Benchmarks: Remove coupling with aspnetci	a month ago
build	Update dependencies.props	16 days ago
samples	Consistently do a short-circuit check in logging extensions	5 days ago
src	Merge branch 'release/2.0.0' into dev	4 days ago
test	Consistently do a short-circuit check in logging extensions	5 days ago
tools	Add logging to ExecutionStrategy	26 days ago
.appveyor.yml	Benchmarks: Remove coupling with aspnetci	a month ago
.editorconfig	Code cleanup	2 months ago
.gitattributes	Update git artifacts	10 months ago
.gitignore	Pin tool and package versions to make builds more repeatable	3 months ago
.travis.yml	Benchmarks: Remove coupling with aspnetci	a month ago
CONTRIBUTING.md	Update Home master -> Home dev	3 years ago
Directory.Build.props	Import AspNetCoreSettings.props from root Directory.Build.props	2 months ago
Directory.Build.targets	Use MicrosoftNETCoreApp21PackageVersion to determine the runtime fram...	2 months ago
EFCore.Runtime.sln	Add Microsoft.EntityFrameworkCore.Attributes assembly	a month ago

Where You Can Build and Run Apps with EF Core 2





Applications types for EF Core 2.0

	.NET 4.6.1+	.NET Core 2.x	UWP 6.5	Xamarin
OS	Windows	Windows, macOS, Linux	Windows 10 FCU	iOS Android Windows macOS
App Types	Console WinForms WPF ASP.NET 4 Web Forms etc..	ASP.NET Core Web Apps Web APIs Libraries Services Console Apps Docker	Mobile PC HoloLens Xbox Surface Hub IoT Devices	Native Mobile Tablet



Environment for Coding EF Core 2.0

Install .NET Core 2.0 SDK

microsoft.com/net/download/core

.NET Framework
on Windows only

VS2015*

VS2017 15.3+

*Install NuGet 3.6.0

.NET Core

Windows

VS2017 15.3+

macOS

VS for Mac

Windows/macOS/Linux
Visual Studio Code

Environment for Coding EF Core 2.0

Install .NET Core 2.0 SDK

microsoft.com/net/download/core

UWP

Windows 10 FCU
VS2017 15.4+

Xamarin*

Native iOS, Android, Windows & macOS

Windows
VS2015, VS2017
macOS
VS for Mac

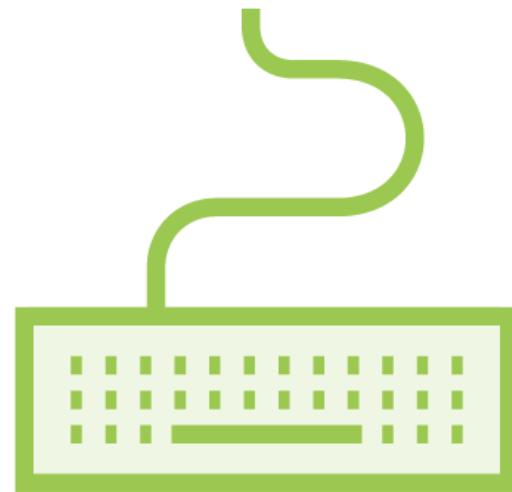
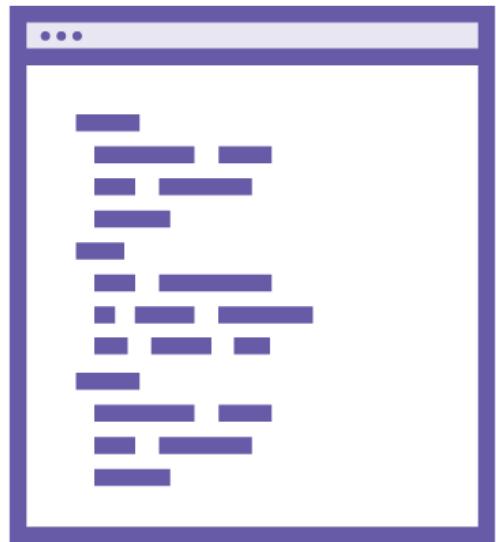
This course will use
Visual Studio 2017
on Windows



How EF Core Works



EF Puzzle Pieces



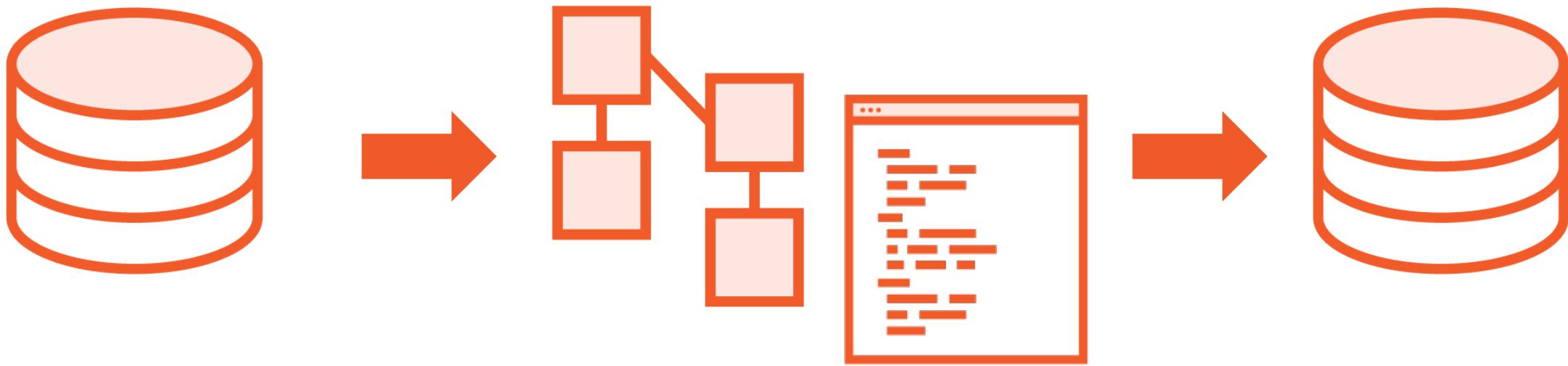
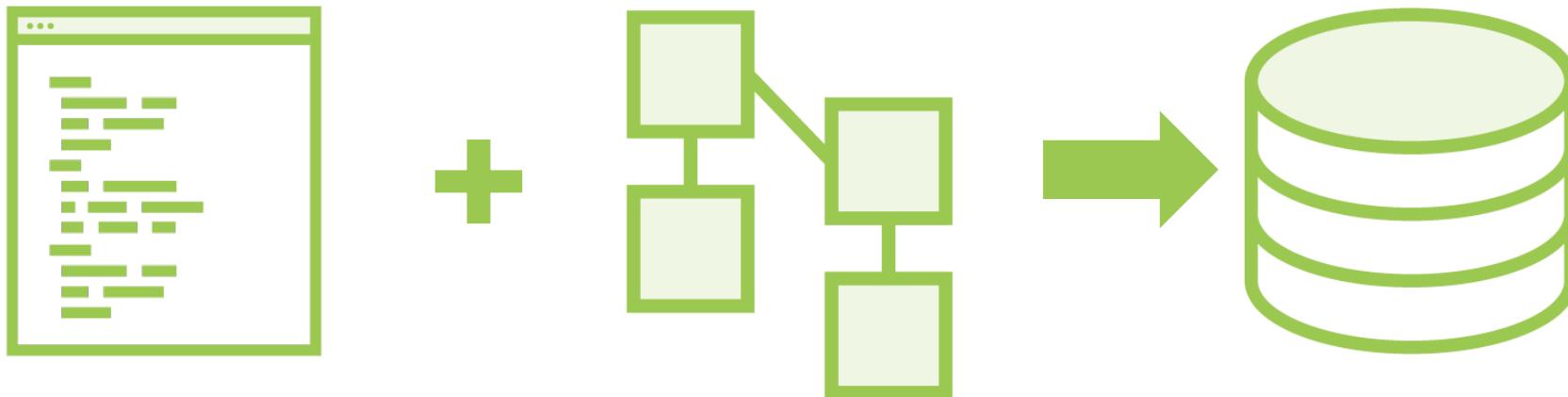
Data model
LINQ queries
Save changes



Track changes
Build SQL
Execute SQL
Create objects



Model Creation Options



Mapping Classes & Properties to Database

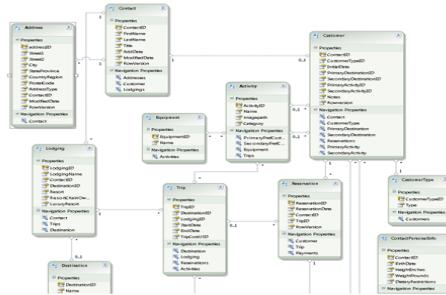


```
public class Customer {  
    ← Relies on Data Model/Custom → Table Name: Customers  
    public int Id {get;set;}           ← Convention → Id (PK, int, not null)  
    public string FirstName {get;set;} ← Custom Mapping → First_Name(nvarchar(30),not null)  
    public DateTime DateOfBirth {get;set;} ← Convention → DateOfBirth(date, not null)  
}
```



Basic Workflow

Define model



Express & execute query

(from p in people select p)
.ToList()

EF determines
& executes SQL

SELECT * from people

User modifies data



EF transforms results
into your types

3	Ms.	Donnie	F.	Carreras
4	Ms.	Janet	M.	Gates
5	Mr.	Lucy	NULL	Harrington
6	Mr.	Joop	X.	Carroll
7	Mr.	Dominic	P.	Gash
10	Ms.	Kathleen	M.	Garza
11	Ms.	Kathleen	NULL	Harding
12	Mr.	Johnny	A.	Caprio
16	Mr.	Christopher	R.	Beck
18	Mr.	David	J.	Liu
19	Mr.	John	A.	Beaver

Code triggers save

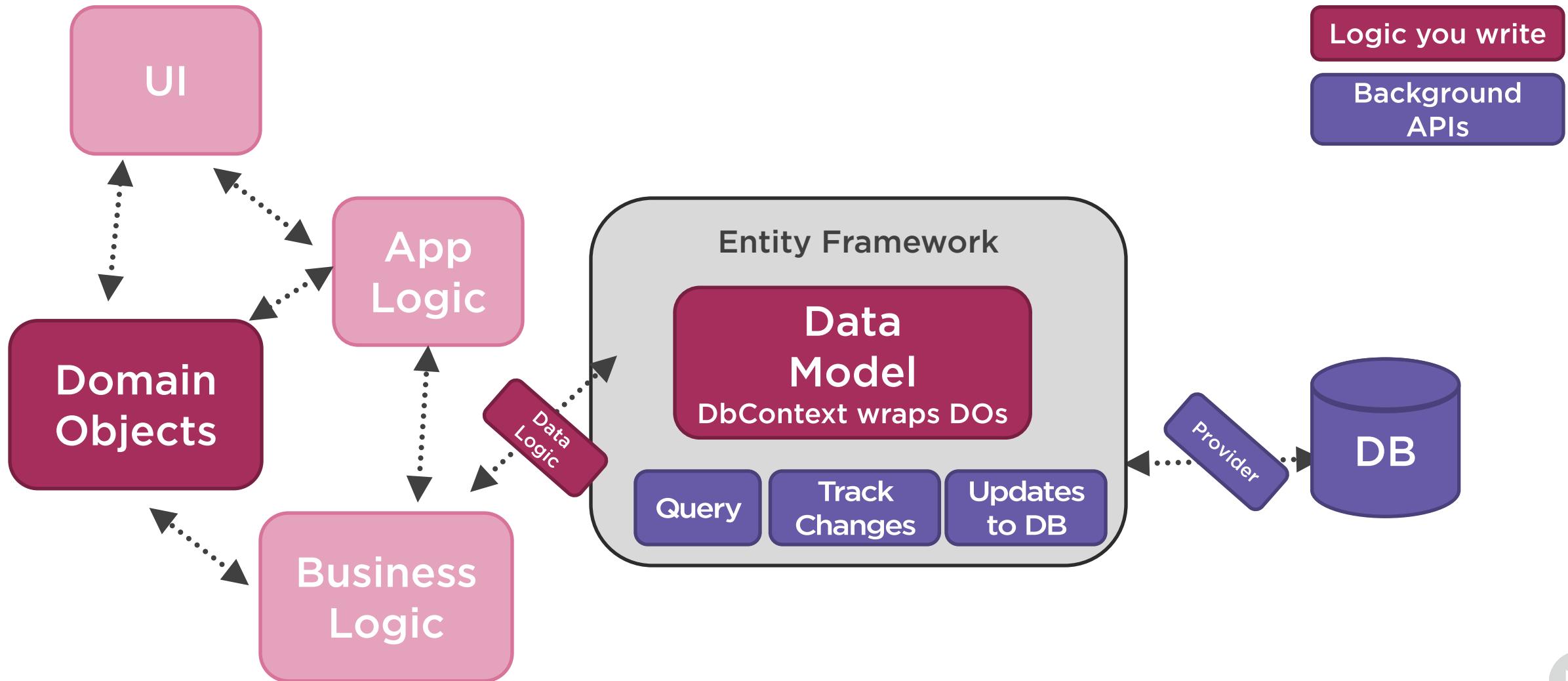
DbContext.SaveChanges

EF determines & executes SQL

UPDATE people
SET Firstname='Julie'
WHERE id=3



EF in Your Software Architecture



The Path From EF6 to EF Core to EF Core 2



EF Core Is Still Entity Framework

Data Model

DbContext API

Migrations

LINQ to Entities

Change Tracking

SaveChanges



EF Core 1.0 Enabled Long-Requested Features

Batch Insert,
Update, Delete

Unique
Constraints

Smarter
Queries

Smarter
Disconnected
Patterns

In-Memory
Provider for
Testing

Extensible &
IoC Friendly

Model-Only
Properties
("Shadow State")

Smarter & Simpler
Mapping

Map to
Backing
Fields

Opt out of
DB Transactions
at SaveChanges

Temporary
Properties for
run time, not DB

Simple Service
Replacement



github.com/aspnet/EntityFrameworkCore/releases



EF Core 2 New Features



New in EF Core 2.0

Querying

EF.Functions.Like()

Improved LINQ translation

Global query filters (per type)

Explicitly compiled queries*

GroupJoin SQL is better*

Mapping

Scalar UDF mapping*

Type Configuration*

Owned Entities*
(replaces EF6 Complex type/
value object support)

Table splitting*

Perf & more

DbContext pooling

String interpolation in raw SQL

Consolidate logging
& diagnostics

Easier service replacement

*Familiar EF6 feature



Looking Ahead to EF Core 2.1 and Beyond



EF Core 1.0
June 2016
~1M downloads

EF Core 2.0
Aug. 2017
~1M downloads

2.0.1 Nov '17
2.0.2 Mar '18
2.0.3 May '18
2.1.0 May '18
2.1.1 June '18
2.1.2 Aug '18
2.1.3 Sept '18

Entity Framework Core 2.1: What's New



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EF Core 2.1 Major Features

Querying

GroupBy*

Include for derived types

Lazy loading*

Migrations

Data seeding*

Column ordering changes

*Familiar EF6 feature

Mapping

Read-only query types

Map to database view

Value conversions

Code Analyzer

Raw SQL injection warning

Runtime

System.Transactions*

App Insights integration

Non-default constructors

Change Tracker events



Review

Benefits of an ORM and EF Core

EF Core in .NET Framework and cross-platform apps

How EF Core fits into your software

Guidance for those coming from EF6

Highlights of features new to EF Core 2

Highlights of what's coming to EF Core 2.1.0

Resources

Entity Framework Core on GitHub github.com/aspnet/entityframework

Entity Framework 6 on GitHub github.com/aspnet/entityframework6

EF Core Roadmap bit.ly/efcoreroadmap

EF Core Providers docs.microsoft.com/en-us/ef/core/providers

Data Points - EF Core Change-Tracking Behavior: Unchanged, Modified and Added, Aug 2016

<http://msdn.microsoft.com/magazine/mt767693>

Data Points - ASP.NET Core with EF6 article <http://msdn.microsoft.com/magazine/mt632269>

Data Points - DDD Friendlier EF Core 2 Sept & Oct 2017

msdn.microsoft.com/magazine/mt842503 , msdn.microsoft.com/magazine/mt826347

Some Insights into Features Being Dropped in the Move From EF6 to EF Core

thedatafarm.com/data-access/droppedfromefcore

Pluralsight: Entity Framework Core (1): Getting Started bit.ly/PS_EFCoreStart

Entity Framework in the Enterprise bit.ly/PS-EFEnt

Visual Studio downloads visualstudio.com/downloads



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