



.NET Core 2.2 Superpowers Tour

Brisbane, Melbourne & Sydney - November 2018

Join the Conversation #DotNetCoreSuperpowers @SSW_TV



House Keeping

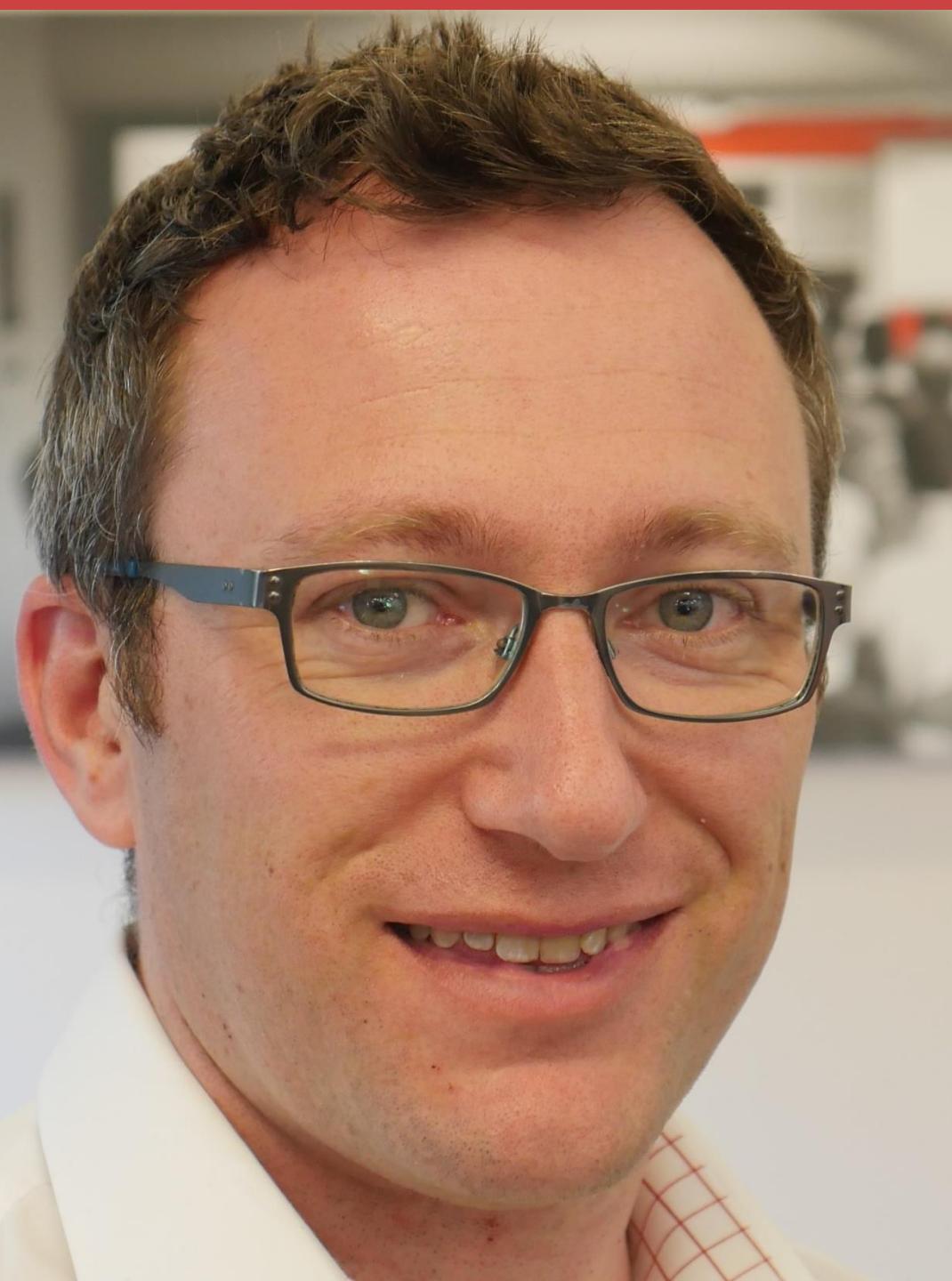
Code & Slides

bit.ly/netcore-superpowers

Timetable

09:00	Start
10:30 – 10:45	Morning Tea
13:00 – 13:45	Lunch
15:30 – 15:45	Afternoon Tea
16:45 – 17:00	Feedback, Q & A
17:00	Finish

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Brendan Richards

 @brendanssw @ssw_tv

- Solution Architect @ SSW
- Linux User since 1995
- .NET Developer since 2004
- .NET Core Since Beta 2

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Jason Taylor

SSW Solution Architect

Started programming with BASIC on C64,
Keeping it simple since 1994!

 jasongtau

 codingflow.net

 github.com/jasongt

 youtube.com/jasongt

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Agenda

Getting Started

Clean Architecture

Domain Layer

Application Layer

Automated Testing ...

Agenda

Persistence Layer

Infrastructure Layer

Presentation Layer

DevOps

What's Next

Agenda



Getting Started

Clean Architecture

Domain Layer

Application Layer

Automated Testing ...

History

2002 - .NET Framework 1.0

The “Stuff you, Sun Microsystems” Edition

2004 - .NET Framework 1.1

Shipped with windows

2006 - .NET Framework 2.0

Generics and other new features

History

2006 - .NET Framework 3.0

Adds to the 2.0 runtime – WPF, WCF

2006 - .NET Framework 3.5

Still on 2.0 framework, Adds LINQ

2006 - .NET Framework 4.0

New Runtime. Async/Await

History

2012 - .NET Framework 4.5

UWP, The UI style formerly known as Metro

2013 - .NET Framework 4.5.1

2014 - .NET Framework 4.5.2

2015 - .NET Framework 4.6

Why .NET Core?

Simple Answer: Azure

Cross platform

Open source (MIT License)

Optimised for server / cloud / containers

Faster

Release history [edit]

Version Number	Release Date	Support Ended	Development Tool
1.0	2016-06-27	2019-06-27	Visual Studio 2015, 2017
1.1	2016-11-18	2019-06-27	Visual Studio 2015, 2017
2.0	2017-08-14	2018-10-01	Visual Studio 2017
2.1	2018-05-30	2021-08-21 ^[3]	Visual Studio 2017
2.2	in development		Visual Studio 2017,2019
3.0	in development		Visual Studio 2017,2019

Introducing .NET Standard

Formal specification of .NET APIs

Establishes greater uniformity in the .NET ecosystem

Implemented by .NET Core, .NET Framework, Mono, ...

bit.ly/2ys2Jvx

The following table lists the minimum platform versions that support each .NET Standard version.

.NET Standard	1.0	1.1	1.2	1.3	1.4	1.5	1.6	2.0
.NET Core	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
.NET Framework 1	4.5	4.5	4.5.1	4.6	4.6.1	4.6.1	4.6.1	4.6.1
Mono	4.6	4.6	4.6	4.6	4.6	4.6	4.6	5.4
Xamarin.iOS	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.14
Xamarin.Mac	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.8
Xamarin.Android	7.0	7.0	7.0	7.0	7.0	7.0	7.0	8.0
Universal Windows Platform	10.0	10.0	10.0	10.0	10.0	10.0.16299	10.0.16299	10.0.16299

Search for packages...

Newtonsoft.Json

12.0.1-beta1



Json.NET

Json.NET is a popular high-performance JSON framework for .NET

This is a prerelease version of Newtonsoft.Json.

Requires NuGet 2.12 or higher.

[Package Manager](#)[.NET CLI](#)[Paket CLI](#)

```
PM> Install-Package Newtonsoft.Json -Version 12.0.1-beta1
```

[Info](#) [last updated 22 days ago](#) [Project Site](#) [Source Code](#) [License Info](#) [Contact owners](#) [Report](#) [Download Package \(3.24 MB\)](#)[Dependencies](#)[Statistics](#) [163,264,397 total downloads](#) [20,988 downloads of latest](#)

Dependencies

.NETFramework 2.0

No dependencies.

.NETFramework 3.5

No dependencies.

.NETFramework 4.0

No dependencies.

.NETFramework 4.5

No dependencies.

.NETStandard 1.0

Microsoft.CSharp (>= 4.3.0)

NETStandard.Library (>= 1.6.1)

System.ComponentModel.TypeConverter (>= 4.3.0)

System.Runtime.Serialization.Primitives (>= 4.3.0)

.NETStandard 1.3

Microsoft.CSharp (>= 4.3.0)

NETStandard.Library (>= 1.6.1)

System.ComponentModel.TypeConverter (>= 4.3.0)

System.Runtime.Serialization.Formatters (>= 4.3.0)

System.Runtime.Serialization.Primitives (>= 4.3.0)

System.Xml.XmlDocument (>= 4.3.0)

.NETStandard 2.0

No dependencies.

↓ 163,264,397 total downloads

⬇ 20,988 downloads of latest version

⬆ 56,787 downloads per day (avg)

[View full stats](#)

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jamesnk



newtonsoft

Authors

James Newton-King

Copyright

Copyright © James Newton-King
2008

Tags

json

Dotnet version switching

dotnet –list-sdks

Use global.json to switch dotnet sdk versions.

```
{  
  "sdk": { "version": "1.0.0-preview2-003133" }  
}
```

When not to use .NET Core

Windows App (WPF etc)

No Webforms (probably a good thing)

Windows – specific APIs

Windows compatibility pack

<https://blogs.msdn.microsoft.com/dotnet/2017/11/16/announcing-the-windows-compatibility-pack-for-net-core/>

Recent

Installed

Visual C#

Get Started

Windows Universal

Windows Desktop

Web

Previous Versions

.NET Core

.NET Standard

Android

Apple TV

Annie Watch

Not finding what you are looking for?

[Open Visual Studio Installer](#)

Name: ConsoleApp1

Location: C:\Users\brendanrichards\Documents\Visual Studio 2017\Projects

[Browse...](#)

Solution: Create new solution

Solution name: ConsoleApp1

 Create directory for solution Create new Git repository[OK](#)[Cancel](#)

Sort by: Default



Search (Ctrl+E)



Console App (.NET Core)

Visual C#



Class Library (.NET Core)

Visual C#



MSTest Test Project (.NET Core)

Visual C#



xUnit Test Project (.NET Core)

Visual C#

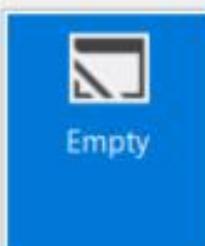


ASP.NET Core Web Application

Visual C#

Type: Visual C#

A project for creating a command-line application that can run on .NET Core on Windows, Linux and MacOS.

[.NET Core](#)[ASP.NET Core 2.1](#)[Learn more](#)

Empty



API



Blazor



Blazor (Server-side in ASP.NET Core hosted)



Blazor (Client-side in ASP.NET Core)



Web Application



Web Application (Model-View-Controller)



Razor Class Library



Angular



React.js



React.js and Redux

An empty project template for creating an ASP.NET Core application. This template does not have any content in it.

[Learn more](#)

Author: Microsoft
Source: SDK 2.1.403

 Enable Docker Support

Authentication: **No Authentication**

OS:

Requires [Docker for Windows](#)

Docker support can also be enabled later [Learn more](#)

 Configure for HTTPS

Demo: Getting Started



Creating an app using .NET Core in Visual Studio and
using the .NET Core CLI

Demo: ASP .NET Core Bootstrap



.csproj

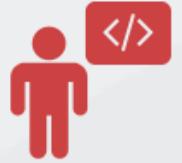
Program.cs

Configuration

Startup.cs

Installing and configuring Nuget Packages

Demo: Customising configuration



Add a local config file.

Strong-typed configuration objects

Built-in Dependency Injection

ASP.NET Core supports and leverages dependency injection

The default implementation provides a minimal feature set
and services basic needs

Developers can integrate the built-in container with their
preferred container

Libraries will often register themselves

Service Lifetimes

Transient – Created each time they're requested

Scoped – Created once per request (Http)

Singleton – Created once when they're requested,
subsequent requests use the same instance

Demo: Adding Autofac



Add Autofac to your project – integrated with Standard
DI

Key Points

- ✓ .NET Core is the future of .NET
- ✓ Open Source and Cross-Platform
- ✓ ASP.NET Core is the Web implementation on top of .NET
- ✓ Not dependent on IIS
- ✓ .NET Standard ensures compatibility
- ✓ Reboot of the framework – more consistent core features

Agenda

Getting Started

Clean Architecture

Domain Layer

Application Layer

Automated Testing ...

Overview

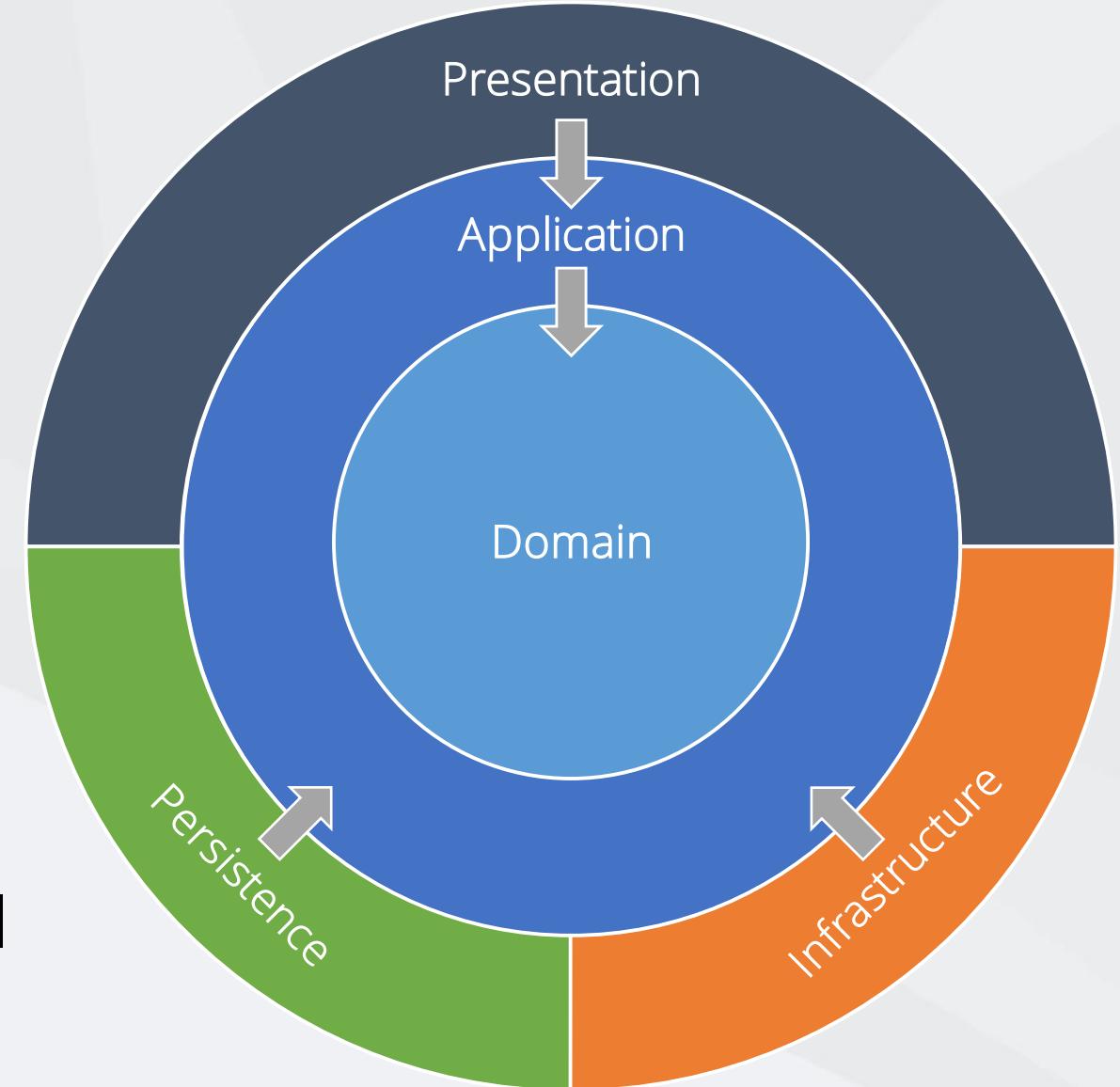
Independent of frameworks

Testable

Independent of UI

Independent of database

Independent anything external



Northwind Traders



Cross Platform

.NET Core

Entity Framework Core

Code First

Data Seeding



Prerequisites

.NET Core 2.2 Preview 3

bit.ly/netcoresdk-2-2

Node.js (8.11 or higher)

nodejs.org

npm (5.6 or higher)

(Included with Node.js)

Visual Studio Code / 2017 (Preview)

visualstudio.com/downloads



Visual Studio Code



Visual Studio



Visual Studio for Mac

Key Points

- ✓ Domain contains enterprise-wide types and logic
- ✓ Application contains application-specific types and logic
- ✓ Infrastructure (including Persistence) contain all external concerns
- ✓ Presentation and Infrastructure depend only on Application
- ✓ Infrastructure and Presentation components can be replaced with minimal effort

Agenda

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Overview

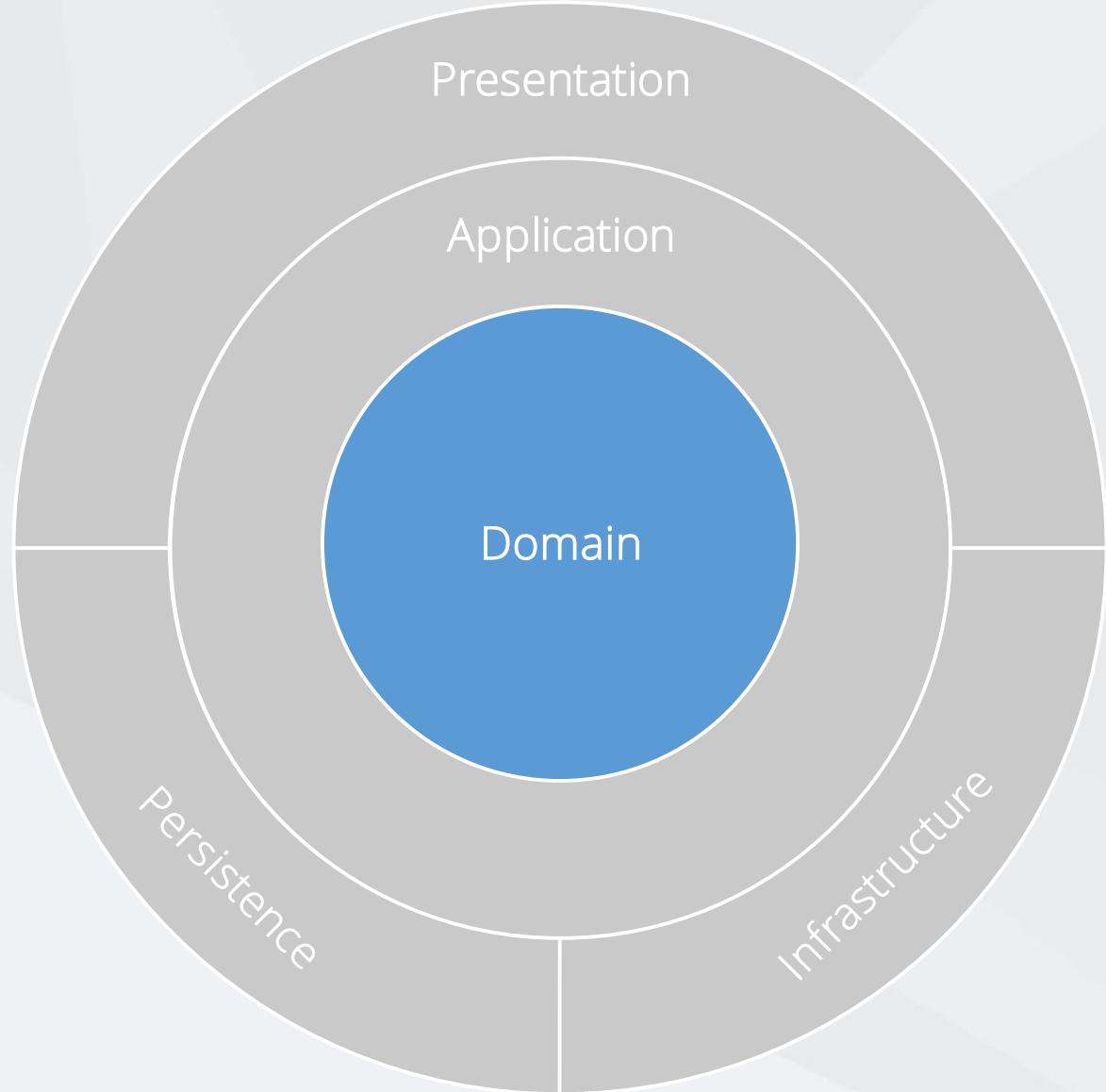
Entities

Value Objects

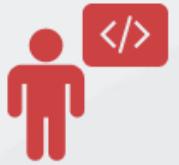
Enumerations

Logic

Exceptions



Demo



Reviewing the Domain layer

Key Points

- ✓ Use data annotations sparingly
- ✓ Use value objects when appropriate
- ✓ Initialise all collections & use private setters
- ✓ Create custom domain exceptions

Agenda

Getting Started

Clean Architecture

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Application Layer

Automated Testing ...

Overview

Interfaces

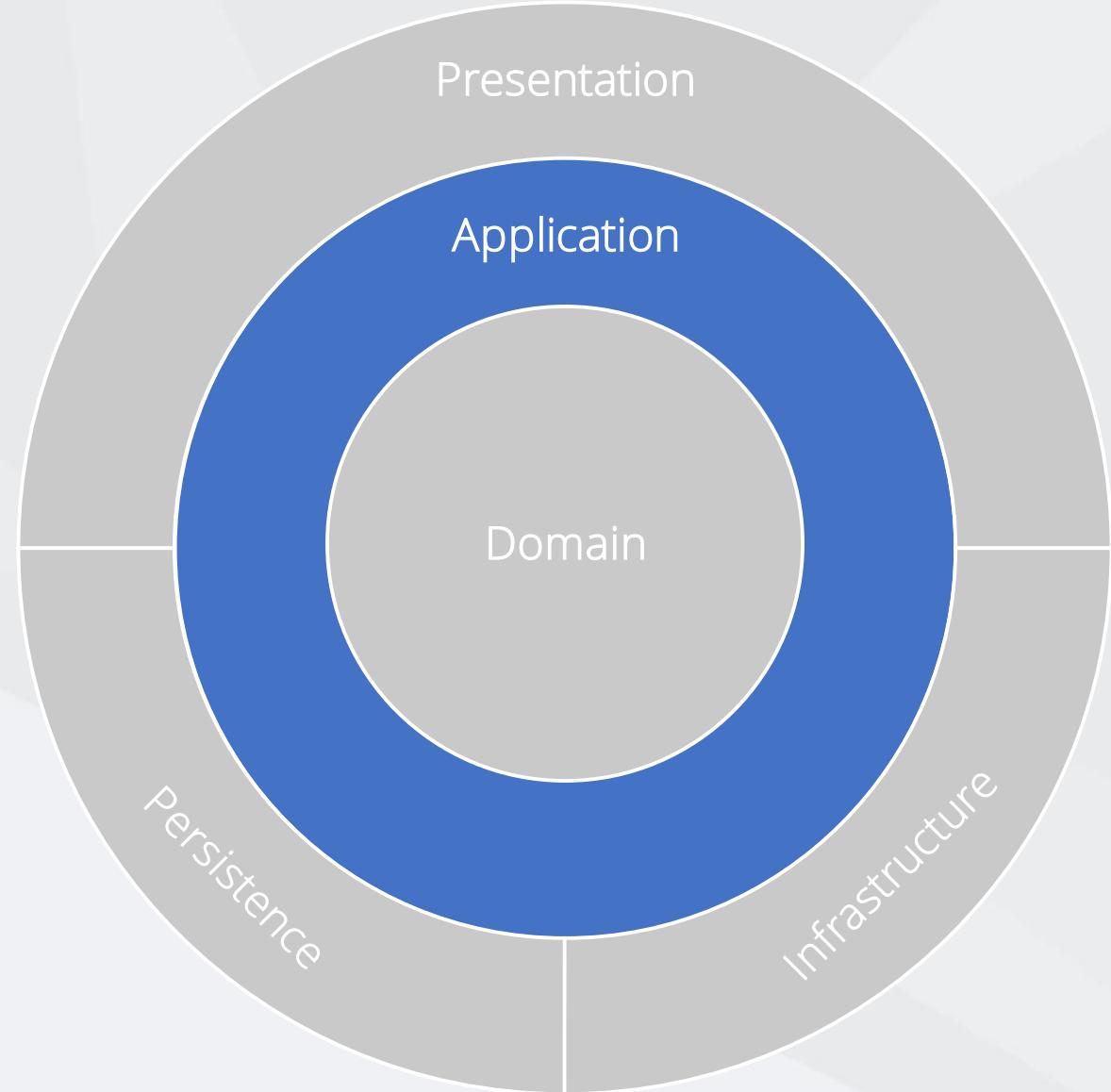
Models

Logic

Commands / Queries

Validators

Exceptions



CQRS

Command Query Responsibility Segregation

Separate reads (queries) from writes (commands)

Can maximise performance, scalability, and simplicity

Can simplify your over all design

Easy to add new features, just add a new query or command

Easy to maintain, changes only affect one command or query

MediatR + CQRS = ❤

Define commands and queries as requests

Application layer is just a series of request / response objects

Ability to attach additional behaviour before and / or after each request, e.g. logging, validation, caching, authorisation and so on

Demo



Reviewing the Application layer



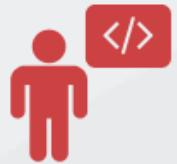
Client-Side Validation

Demo: Using Fluent Validation



Installing and configuring Fluent Validation

Demo: Cross-Cutting Concerns



Validating Requests

Logging Requests

Monitoring Performance

Key Points

- ✓ Using CQRS + MediatR simplifies your overall design
- ✓ Fluent Validation is useful for simple and complex validation scenarios
- ✓ MediatR simplifies cross cutting concerns such as logging and validation
- ✓ Independent of infrastructure and data access concerns

Agenda

Getting Started

Clean Architecture

Domain Layer

Application Layer

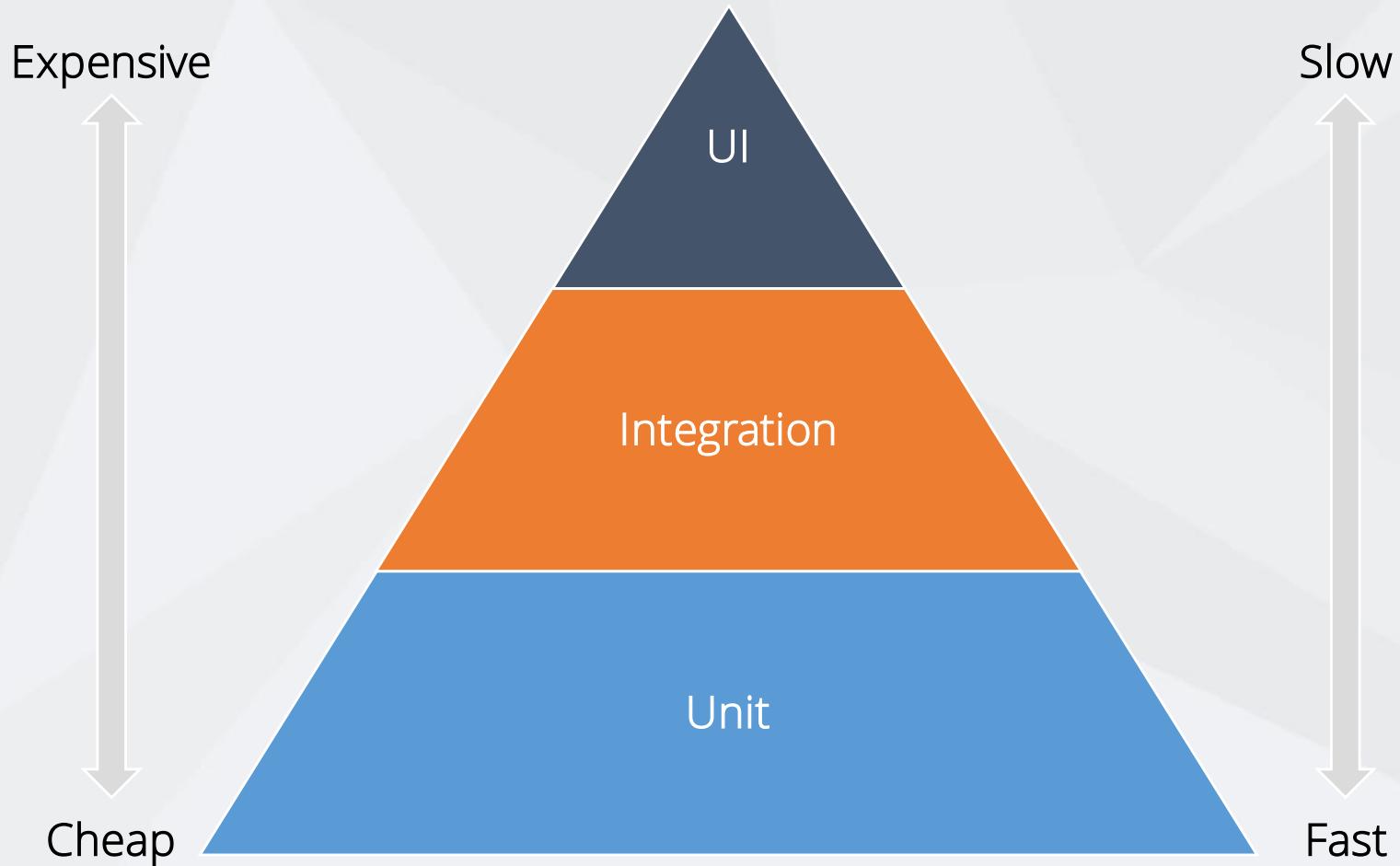
Automated Testing ...

The First User



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Testing Pyramid



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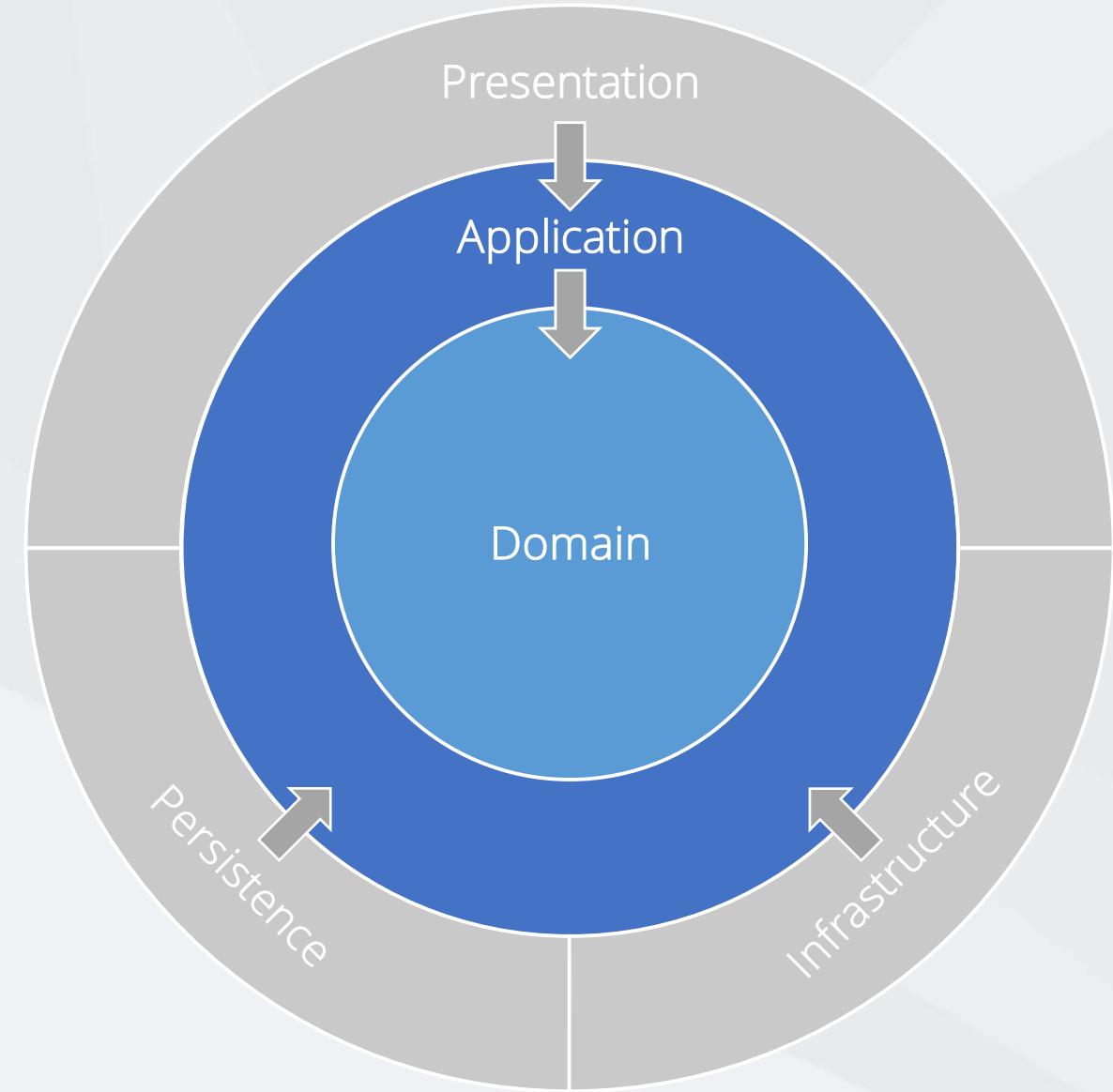
Unit Tests

xUnit.net

EF Core InMemory

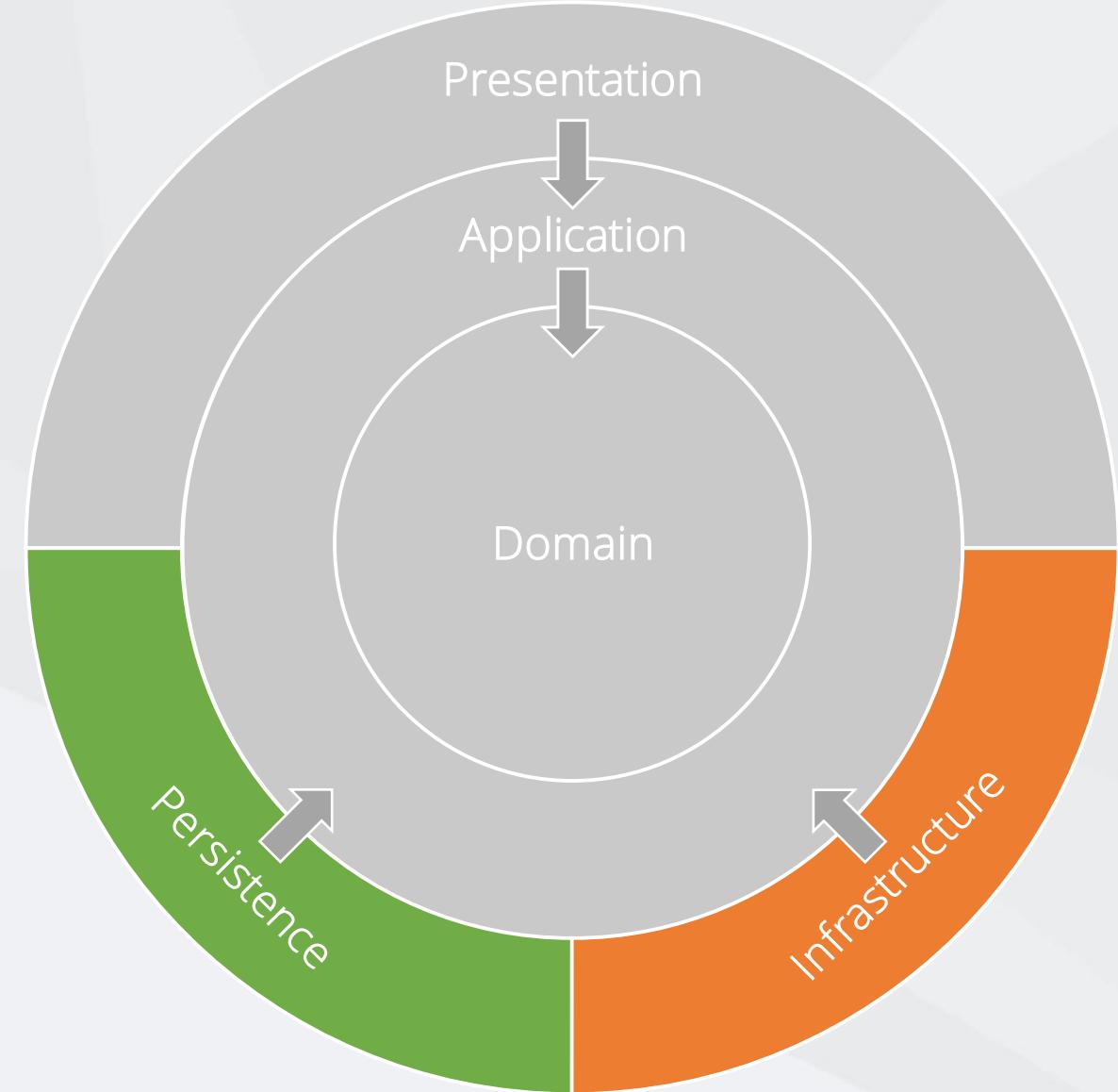
Moq or similar

Live Unit Testing



Integration Tests

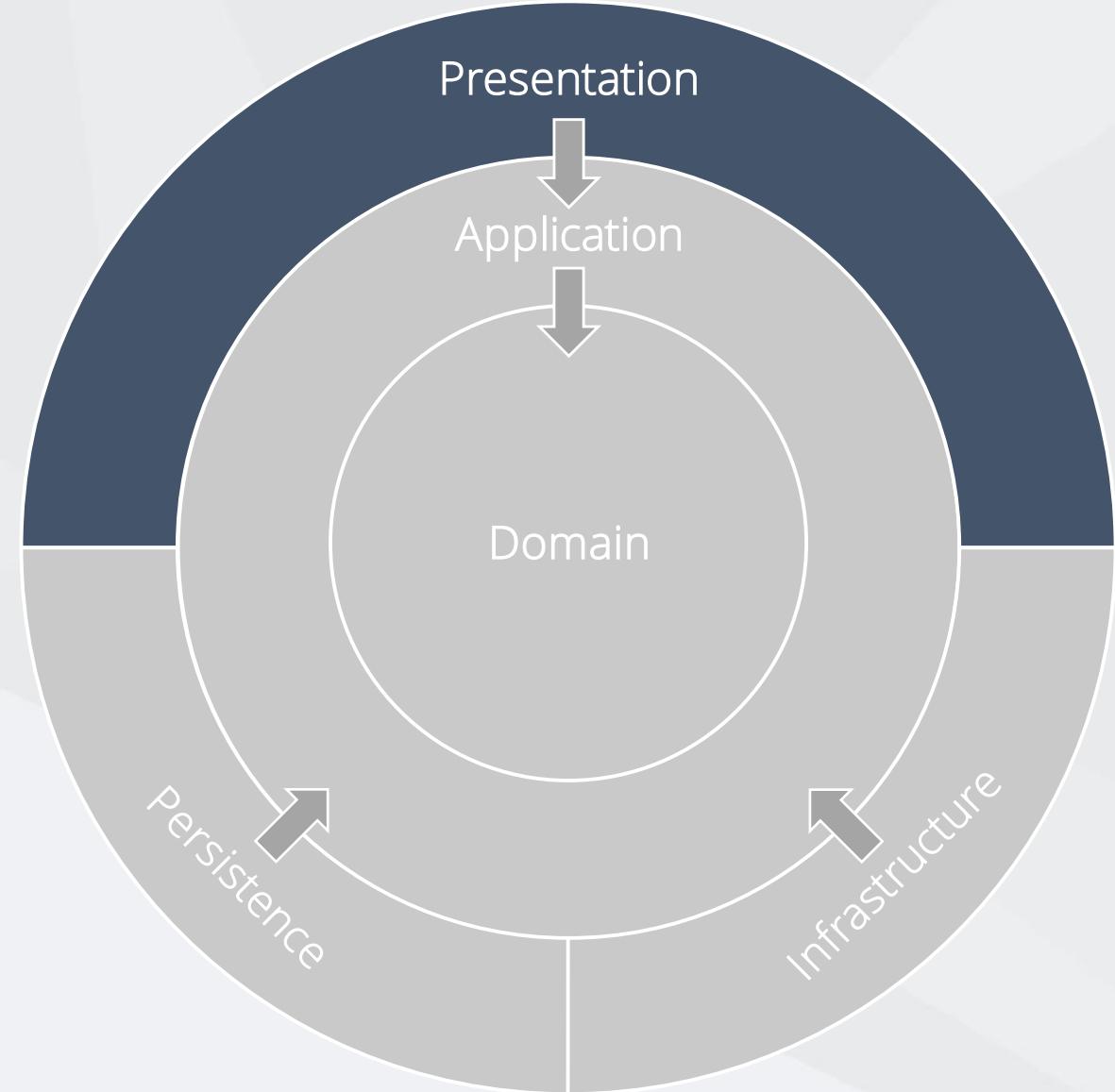
xUnit.net



UI Tests

Coded UI

Selenium



Test-Driven Development (TDD)

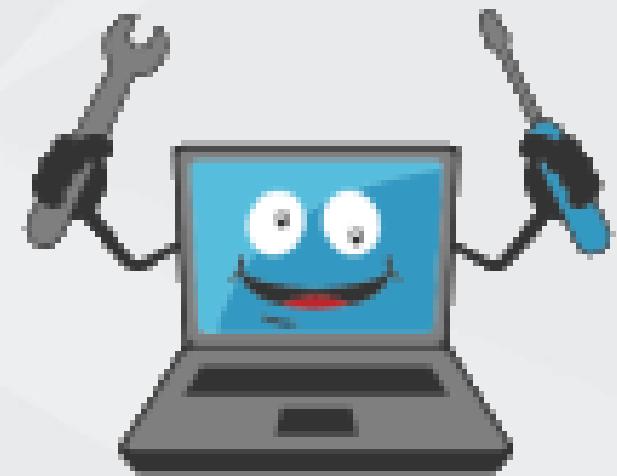
A workflow for writing test first unit tests

The general cycle is

1. Add a failing test
2. Run all tests and see the new one fail (Red)
3. Write some code
4. Run all tests again and see the new one pass (Green)
5. Refactor changed code (Refactor)

Why is import to write a failing test first?

Testing Frameworks



MSTest

Demo: .NET Core CLI



Creating and running tests using the .NET Core CLI

Demo: Visual Studio 2017



Creating and running tests using Visual Studio 2017

Demo: Unit Testing Logic

Getting started with xUnit, Moq, and Shouldly

Unit Testing

Unit Testing in .NET Core (bit.ly/testing-dotnet-core)

The Bowling Game Kata (bit.ly/bowing-game-kata)

Test-Driven Development (bit.ly/tdd-beck)

The Art of Unit Testing (bit.ly/aut-osheroe)

Key Points

- ✓ Write your tests first
- ✓ Unit tests for Core layers (very high coverage)
- ✓ Integration tests for Infrastructure layers
- ✓ UI Tests (sparingly) for Presentation layers
- ✓ Use EF Core InMemory Provider

Agenda

Persistence Layer

Infrastructure Layer

Presentation Layer

DevOps

What's Next

Overview

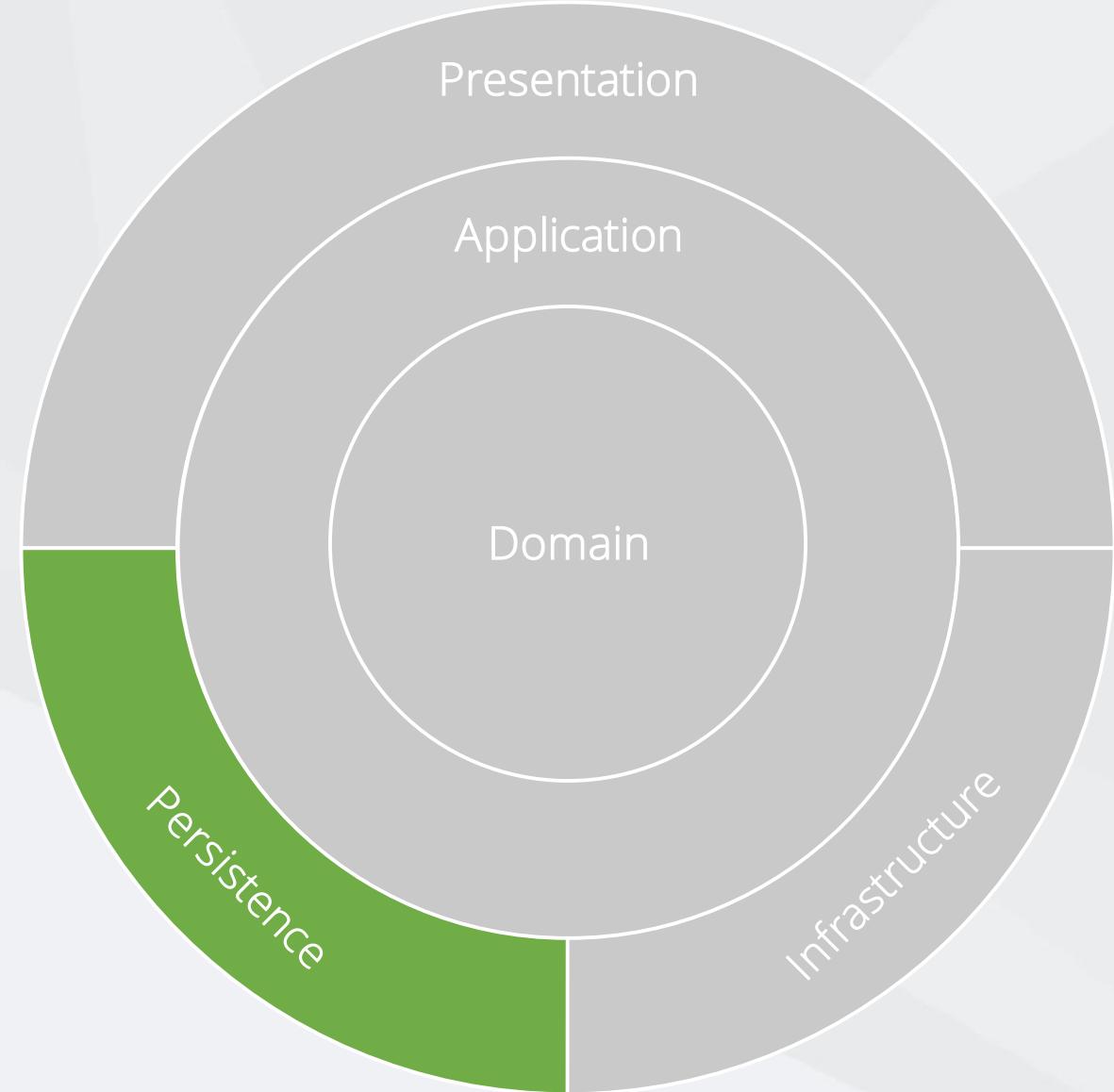
Entity Framework

Repository Pattern

Specification Pattern

Projections and Query Types

Migrations



Entity Framework Core

ORM – Object Relational Mapping

Impedance mismatch

Lightweight, extensible, and cross-platform, open source

Part of .NET Core – with versioning in sync

Runs on .NET Core or .NET Framework

Improve productivity when working with SQL

All ORMs can be dangerous / slow when misused

Entity Framework Concepts

DbContext – “Heavyweight” ORM that tracks changes

States: Added, Unchanged, Modified, Deleted, Detached

“Code First” Only – but you can Scaffold

Migrations – Used to generate and publish schema changes

Unit of Work and Repository Patterns

Should we implement these patterns?



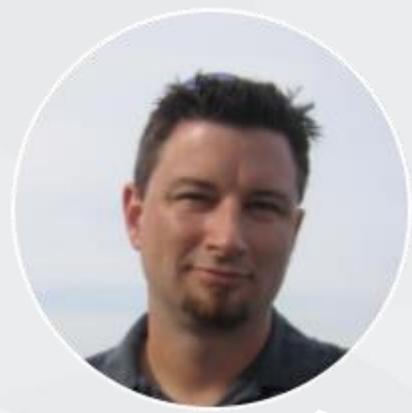
It isn't always the best choice, because:

- ✓ EF Core insulates your code from database changes
- ✓ DbContext acts as a unit of work
- ✓ DbSet acts as a repository
- ✓ EF Core has features for unit testing without repositories

What do the experts think?



I'm over Repositories, and definitely over abstracting your data layer.



No, you don't *need* a repository. But there are many benefits and you should consider it!



No, the repository/unit-of-work pattern isn't useful with EF Core.

Unit of Work and Repository Patterns

“Leaky abstractions” - but I can write Ad-Hoc queries.

“No Leaky abstractions” - but then is verbose.

Injecting Repositories into Controllers?

CQRS commands and queries provide a better abstraction.

Revisiting CQRS

~~Event Sourcing~~

~~Separate data stores for read and writes~~

Clearly separated command and query operations

Specific view models from our read operations

Freedom to change or evolve our persistence

CQRS and EF Core

Read Operations

- Select / Project into View Models

- Use Query Types

- No Change Tracking

Write Operations

- Work with entities

- Change Tracking, Relationship management etc.

The Purist

- ✓ My application layer should contain no persistence dependencies
- ✓ I can mock the persistence layer for unit tests
- ✓ I can change the persistence layer without changing the application.

The Pragmatist

- ✓ I consider EF Core to be part of the .NET Framework
- ✓ I can be more productive
- ✓ EF Core in-memory provider is a mock provider.
- ✓ CQRS commands and queries in the application layer is a better abstraction.

Demo



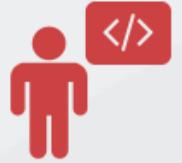
Reviewing the Persistence layer

Demo: Projecting to ViewModels



Managing data with DTOs and ViewModels

Demo: Using Query Types



Using Query Types for complex read queries

Key Points

- ✓ Independent of the database
- ✓ Prefer conventions over configuration
- ✓ Use Fluent API Configuration over Data Annotations
- ✓ Automatically apply all entity type configurations

Agenda

Persistence Layer

Infrastructure Layer

Presentation Layer

DevOps

What's Next

Overview

Implementations, e.g.

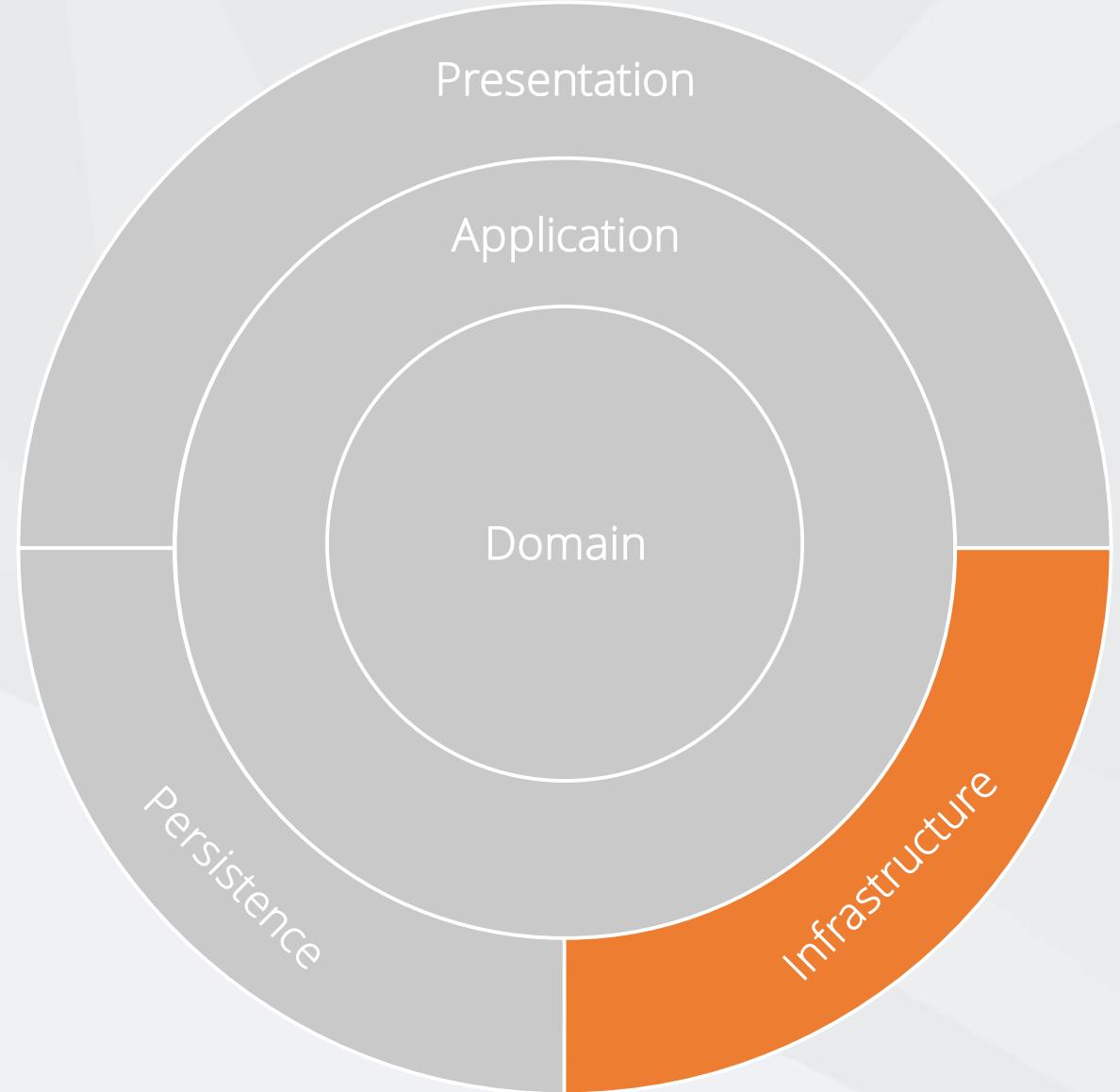
API Clients

File System

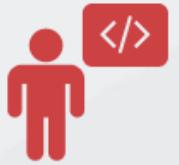
Email / SMS

System Clock

Anything external



Demo



Reviewing the Infrastructure layer

Security Choices

No Security

Windows Authentication

ASP.NET Core Identity

Identity Server 4

Windows Authentication

Easy to Implement (Hosted on windows)

Good option for Intranet

Can use reverse proxy such as F5 to publish to internet

System.DirectoryServices – windows only via compatibility pack

ADFS can support OIDC and OAuth2

Windows Authentication: Startup.cs

```
public void ConfigureServices(IServiceCollection services)
{
    services.Configure<IISSOptions>(options => options.ForwardWindowsAuthentication = true);
    // Add framework services.
    services.AddMvc();
}
```

Windows Authentication: web.config

```
<?xml version="1.0" encoding="utf-8"?>
<configuration>
    <system.webServer>
        <aspNetCore forwardWindowsAuthToken="true" processPath="%LAUNCHER_PATH%" arguments="%LAUNCHER_ARGS%" />
        <handlers>
            <add name="aspNetCore" path="*" verb="*" modules="AspNetCoreModule" resourceType="Unspecified" />
        </handlers>
    </system.webServer>
</configuration>
```

ASP.NET Core Identity

Membership provider: Registration, Reset Password,
Attempt Limits

Support for 2FA – interfaces for Email & SMS Senders

Persistence to SQL Server (Via EF Core) or your own
persistence store

Support for external providers via OAuth & OpenID

ASP.NET Core Identity - Startup.cs

```
public void ConfigureServices(IServiceCollection services)
{
    // Add framework services.
    services.AddDbContext<ApplicationContext>(options =>
        options.UseSqlServer(Configuration.GetConnectionString("DefaultConnection")));

    services.AddIdentity<ApplicationUser, IdentityRole>()
        .AddEntityFrameworkStores<ApplicationContext>()
        .AddDefaultTokenProviders();
}
```

Startup.cs – Configure(IApplicationBuilder app)

```
app.UseStaticFiles();

app.UseIdentity();

app.UseMvc(routes =>
```

```
// Configure Identity
services.Configure<IdentityOptions>(options =>
{
    // Password settings
    options.Password.RequireDigit = true;
    options.Password.RequiredLength = 8;
    options.Password.RequireNonAlphanumeric = false;
    options.Password.RequireUppercase = true;
    options.Password.RequireLowercase = false;

    // Lockout settings
    options.Lockout.DefaultLockoutTimeSpan = TimeSpan.FromMinutes(30);
    options.Lockout.MaxFailedAccessAttempts = 10;

    // Cookie settings
    options.Cookies.ApplicationCookie.ExpireTimeSpan = TimeSpan.FromDays(150);
    options.Cookies.ApplicationCookie.LoginPath = "/Account/LogIn";
    options.Cookies.ApplicationCookie.LogoutPath = "/Account/LogOut";

    // User settings
}
```

Identity Server 4

Full Single Sign On solution

Service that provides OpenId Connect and OAuth 2.0

Implemented in .NET Core

Example: JS application with .NET Core WebAPI

ASP.NET Core WebAPI

Identity Server

JavaScript SPA

Browser

ASP.NET Core WebAPI

Identity Server

Login Form

oidc-client.js

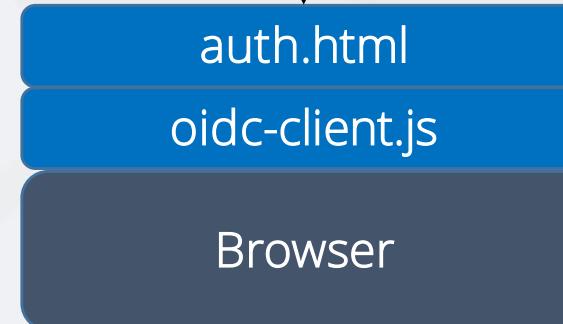
JavaScript SPA

Browser

OIDC client redirects browser to a login page on the Identity Server.
User Logs in.

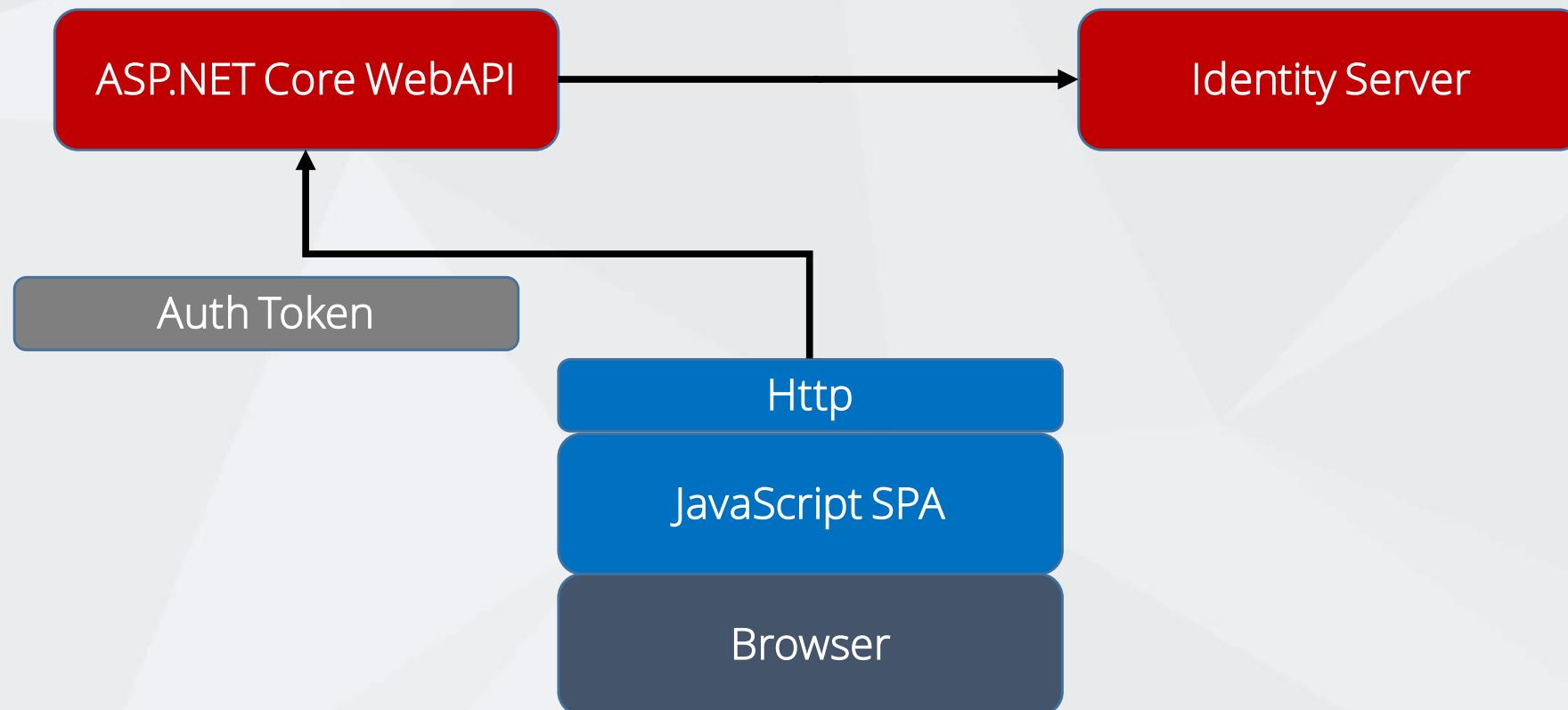
ASP.NET Core WebAPI

Identity Server



Identity Server redirects back with an Authorization Token

Token is saved on the browser



Send the Auth Token as a HTTP header with all API requests

The API server checks the token against the Identity Server

```
app.UseIdentityServerAuthentication(new IdentityServerAuthenticationOptions
{
    Authority = "https://[REDACTED]", //Configuration
    RequireHttpsMetadata = false,
    ApiName = "https://[REDACTED]", //grants
    NameClaimType = "name",
    RoleClaimType = "role",
    AllowedScopes = { "offline_access", "profile", "openid" },
});
```

Demo: Add Google Auth



Add Google Auth to a Webapp

Secrets manager for local keys

<https://docs.microsoft.com/en-us/aspnet/core/security/app-secrets?view=aspnetcore-2.1&tabs=windows>

Key Points

- ✓ Contains classes for accessing external resources
- ✓ Such as file systems, web services, SMTP and so on
- ✓ Implements abstractions / interfaces defined within the Application layer
- ✓ No layers depend on Infrastructure layer, e.g. Presentation layer

Agenda



Persistence Layer

Infrastructure Layer

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What's Next

Overview

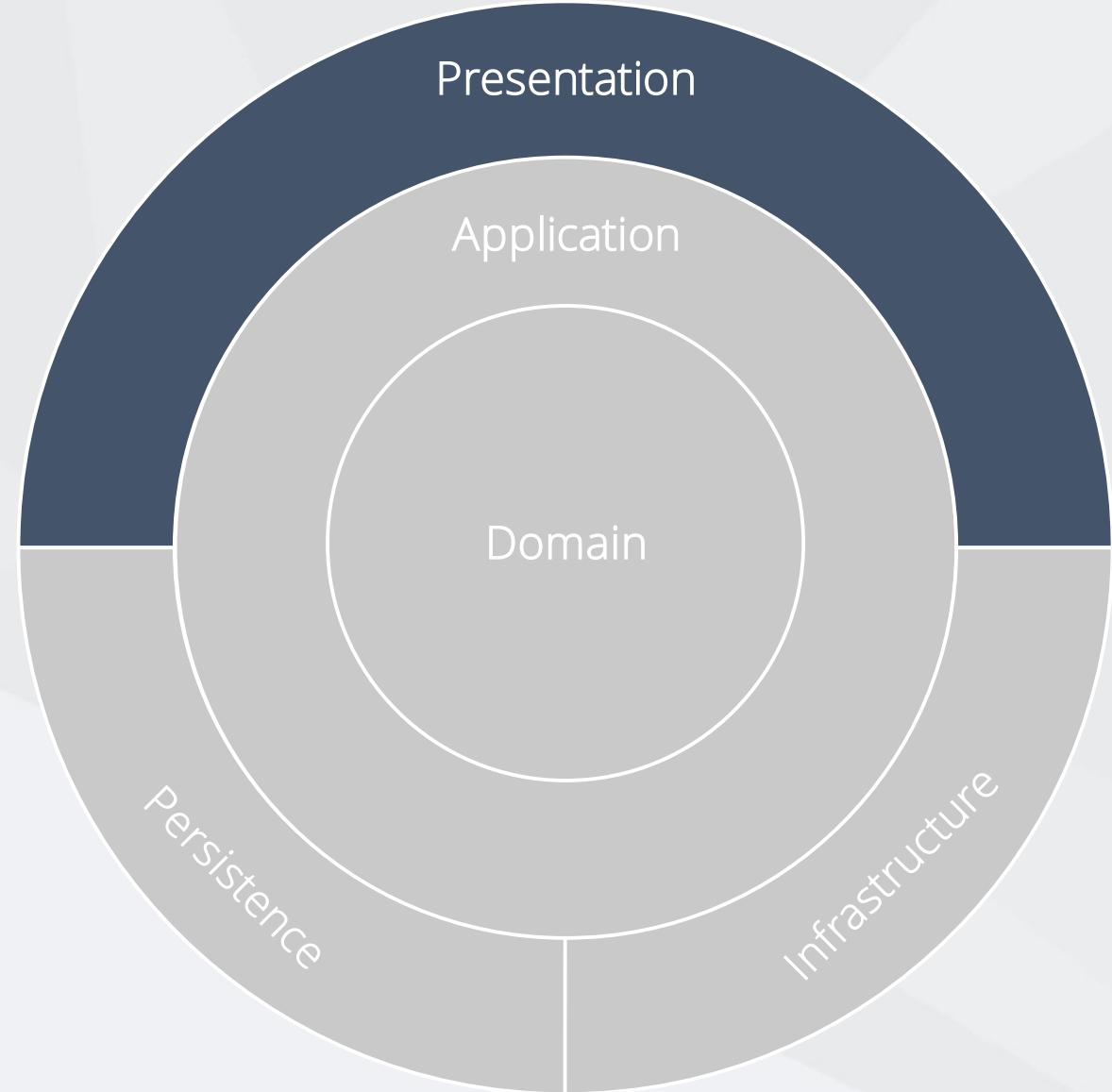
SPA – Angular or React

Web API

Razor Pages

MVC

Web Forms



Demo: Evolution of the Controller



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Controller Features

Model Binding

Result Functions & HTTP Status Codes

Routing – Conventions or Attributes

Content Negotiation & Custom formatters

ASP.NET Core Middleware

Low level pipeline for Request -> Response

All features are explicitly added (including static files)

You can write your own middleware

Similar to OWIN (from previous Web API projects)

ASP.NET Core Middleware

```
app.UseHttpsRedirection();
app.UseStaticFiles();
app.UseSpaStaticFiles();

app.UseSwaggerUi3(settings =>
{
    settings.SwaggerUiRoute = "/api";
    settings.SwaggerRoute = "/api/specification.json";
});

app.UseMvc(routes =>
{
    routes.MapRoute(
        name: "default",
        template: "{controller}/{action=Index}/{id?}");
});
```

ASP.NET Core Middleware

```
public class Startup
{
    public void Configure(IApplicationBuilder app)
    {
        app.Run(async context =>
        {
            await context.Response.WriteAsync("Hello, World!");
        });
    }
}
```

ASP.NET Core Middleware

```
public class Startup
{
    public void Configure(IApplicationBuilder app)
    {
        app.Use(async (context, next) =>
        {
            // Do work that doesn't write to the Response.
            await next.Invoke();
            // Do logging or other work that doesn't write to the Response.
        });

        app.Run(async context =>
        {
            await context.Response.WriteAsync("Hello from 2nd delegate.");
        });
    }
}
```

ASP.NET Core Middleware

```
private static void HandleMapTest2(IApplicationBuilder app)
{
    app.Run(async context =>
    {
        await context.Response.WriteAsync("Map Test 2");
    });
}

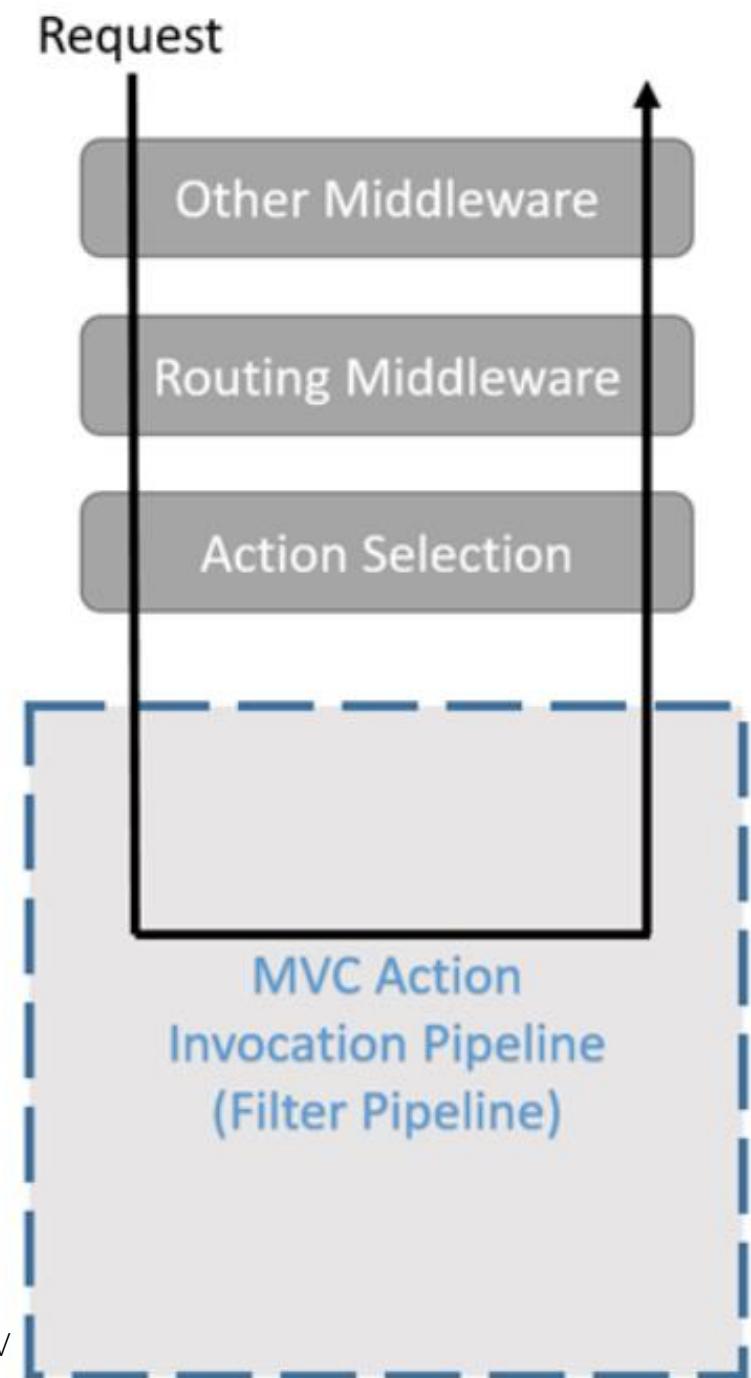
public void Configure(IApplicationBuilder app)
{
    app.Map("/map1", HandleMapTest1);

    app.Map("/map2", HandleMapTest2);

    app.Run(async context =>
    {
        await context.Response.WriteAsync("Hello from non-Map delegate. <p>");
    });
}
```

ASP.NET Core Filters

Authorization
Resource
Action
Exception
Result



[AttributeUsage(AttributeTargets.Class | AttributeTargets.Method)]

1 reference | Jason Taylor, 95 days ago | 1 author, 1 change

```
public class CustomExceptionFilterAttribute : ExceptionFilterAttribute
{
    public override void OnException(ExceptionContext context)
    {
        if (context.Exception is ValidationException)
        {
            context.HttpContext.Response.ContentType = "application/json";
            context.HttpContext.Response.StatusCode = (int) HttpStatusCode.BadRequest;
            context.Result = new JsonResult(
                ((ValidationException)context.Exception).Failures);
        }
    }
}
```

Single Page Applications

ASP.NET Core has built-in support for SPA

Supports all major client-side frameworks

Cross-platform Windows, Mac, or Linux

Host SPA & API from one domain (no CORS)

URL Rewrite included for SPA client-side routing

Prerequisites



2.2 Preview 2

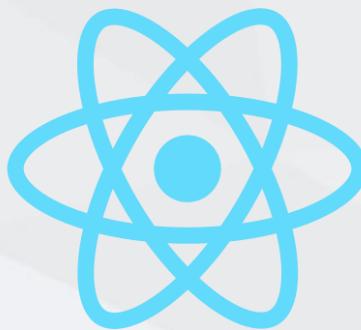


6+

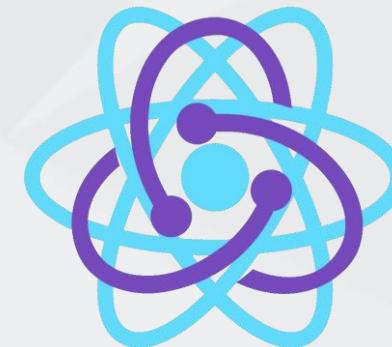
Options



Angular

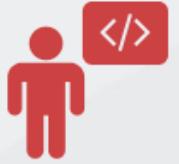


React



React + Redux

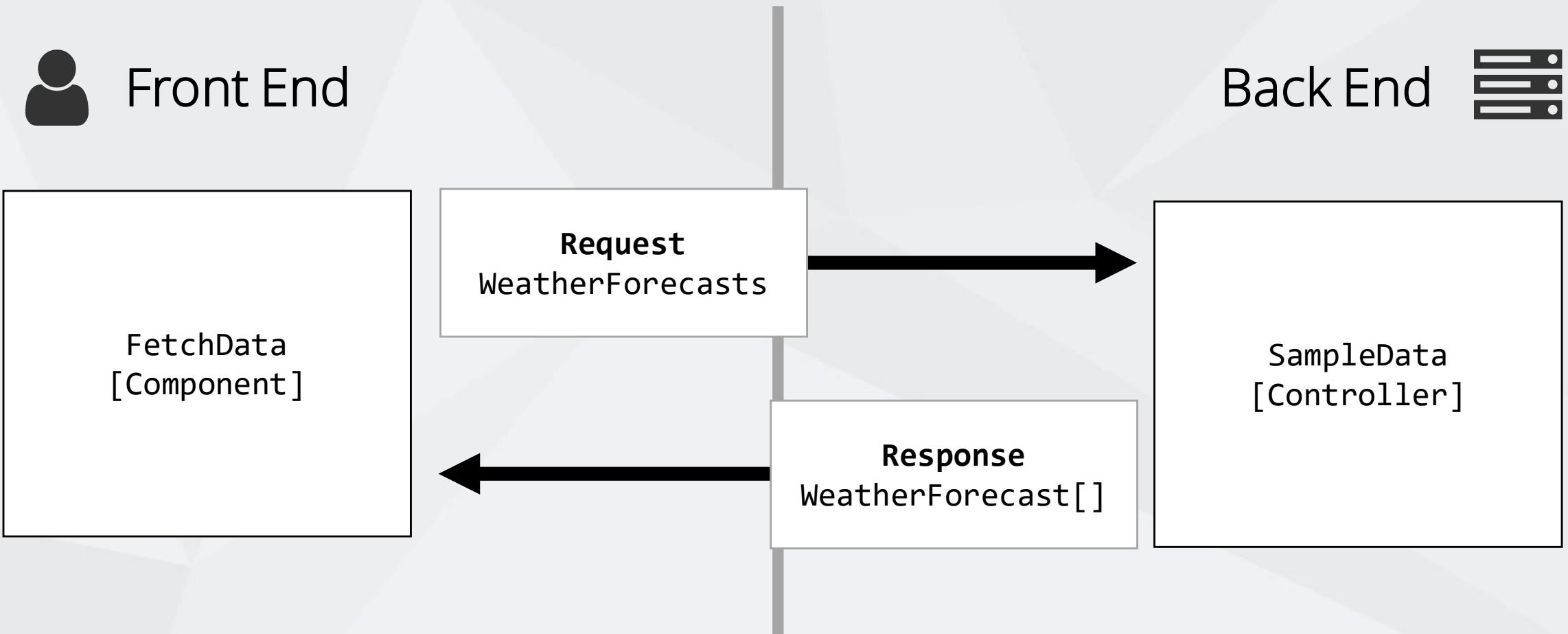
Demo: Create a SPA



Create from .NET Core CLI

Create from Visual Studio 2017

Fetch Data Sample



```
@Component({
  selector: 'app-fetch-data',
  templateUrl: './fetch-data.component.html'
})
export class FetchDataComponent {
  public forecasts: WeatherForecast[];

  constructor(http: HttpClient, @Inject('BASE_URL') baseUrl: string) {
    http.get<WeatherForecast[]>(baseUrl + 'api/SampleData/WeatherForecasts')
      .subscribe(result => {
        this.forecasts = result;
      }, error => console.error(error));
  }
}
```

```
interface WeatherForecast {
  dateFormatted: string;
  temperatureC: number;
  temperatureF: number;
  summary: string;
}
```

- ✖ Requires knowledge of API
- ✖ Hard-coded URLs
- ✖ Duplication of back end types
- ✖ Breaking changes are hard to detect

Demo: Implementing Open API



Generating a specification document

Adding Swagger UI

Generating a TypeScript client

Automation with MSBuild

```
import { Component } from '@angular/core';
import { WeatherForecast, SampleDataClient } from '../awesome-spa-api.generated';

@Component({
  selector: 'app-fetch-data',
  templateUrl: './fetch-data.component.html'
})
export class FetchDataComponent {
  public forecasts: WeatherForecast[];

  constructor(client: SampleDataClient) {
    client.weatherForecasts().subscribe(result =>
      this.forecasts = result,
      error => console.error(error));
  }
}
```

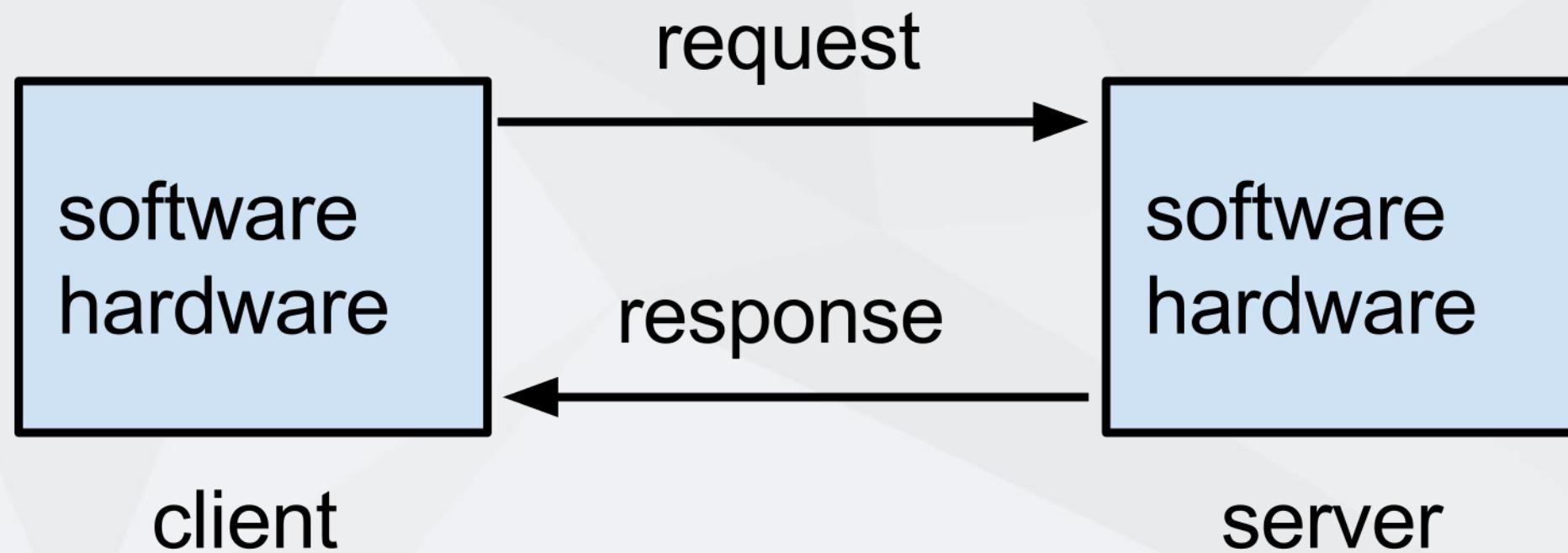
- ✓ Can explore API endpoints
- ✓ No hard-coded URLs
- ✓ No duplication of back end types
- ✓ Breaking changes are easy to detect

Realtime Push Notifications with SignalR

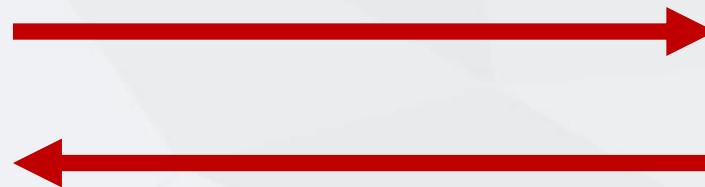


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Client- Server Communication



Two – way Communication



Web Sockets



SignalR

```
import { Injectable } from '@angular/core';
import { HubConnection } from '@aspnet/signalr';
import { Store } from '@ngxs/store';
import { CustomerListPushedAction } from '../ngxs/CustomerListActions';
import { Customer } from '../ngxs/Customer';
import { CustomerPushedAction } from '../ngxs/CustomerEditActions';
```

```
@Injectable()
export class CustomersHubService {
  public hubConnection: HubConnection;
```

```
openCustomer(customerId: string) {
  console.log('hub invoking OpenCustomer ', customerId);
  this.hubConnection.invoke('OpenCustomer', customerId);
}
```

```
this.hubConnection.on('PushCustomerList', msg => {
  console.log('PushCustomerList', msg);
  this.store.dispatch(new CustomerListPushedAction(msg));
});
```

```
using Microsoft.AspNetCore.SignalR;
using System.Threading.Tasks;

namespace SignalRChat.Hubs
{
    public class ChatHub : Hub
    {
        public async Task SendMessage(string user, string message)
        {
            await Clients.All.SendAsync("ReceiveMessage", user, message);
        }
    }
}
```

Demo: SignalR



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Key Points

- ✓ Controllers should not contain any application logic
- ✓ Create and consume well defined view models
- ✓ Utilising Open API bridges the gap between the front end and back end

Agenda

Persistence Layer

Infrastructure Layer

Presentation Layer

DevOps

What's Next

What is DevOps?

DevOps = Development + Operations

DevOps is the union of people, process, and products
to enable continuous delivery of value to our end users

Replace siloed Development and Operations to create
multidisciplinary teams that now work together

Essential Practices

Agile Planning

Version Control

Continuous Integration (CI)

Continuous Delivery (CD)

Monitoring & Logging

Agile Planning

Plan and isolate work into iterations

Manage team capacity

Quickly adapt to changing requirements

Version Control

Enables teams located anywhere to communicate effectively

Integrate with development tools for monitoring and deployments

Continuous Integration (CI)

Ongoing merging and testing of code

Finding defects early

Less time fighting merge issues

Rapid feedback for development teams

Continuous Delivery (CD)

Continuously deliver solutions to test and production

CI starts the CD process

Quickly fix bugs and respond to changing requirements

Issues found in production and fixed by rolling forward

Resulting in continuous stream of customer value

Monitoring & Logging

Monitoring of running applications and production environments

Application health as well as customer usage

Help organisations validate or disprove strategies

Rich data captured and store in various logging formats

Azure DevOps Project

Built-in support for popular application frameworks

Automatic full CI/CD pipeline integration

Build-in monitoring with Application Insights

Deployment to the platform of your choice

Dashboard - Microsoft Azure

https://portal.azure.com/#@brendanrichardsmsdnhotmail.onmicrosoft.com/dashboard/private/a2bf4464-455b-4364-a366-cbba49b70018

Microsoft Azure

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All services

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Virtual machines

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allianzbrendanstorage Storage account

allianz-brendan Endpoint

allianz CDN profile

See more...

What's new

Marketplace

Service Health

Personalized guidance and support when issues in Azure services affect you. [Learn more](#)

Tour

Help + support

Portal settings

Feedback

Azure classic...

Everything - Microsoft Azure

https://portal.azure.com/#blade/Microsoft_Azure_Marketplace/GalleryFeaturedMenuItemBlade/selectedMenuItemId/home/searchQuery/DevOps

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Everything

Filter

DevOps

Results

NAME	PUBLISHER	CATEGORY
DevOps Project	Microsoft	Developer tools
ElectricFlow - DevOps Release Automation	Electric Cloud	Compute
IKAN ALM 5.7 demo	IKAN Development	Compute
RLCatalyst3.0	Relevance Lab	Compute
Actifio Sky Virtual Appliance	Actifio	Compute
Chef Compliance (25 Node License)	Chef Software, Inc	Compute
Chef Compliance (250 Node License)	Chef Software, Inc	Compute
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IKAN Development	Compute
Relevance Lab	Compute
Actifio	Compute
Chef Software, Inc	Compute
Chef Software, Inc	Compute
Chef Software, Inc	Compute

DevOps Project

Microsoft

Launch an app running in Azure in a few quick steps

DevOps Project makes it easy to get started on Azure. It helps you launch an app on the Azure service of your choice in a few quick steps. DevOps Project set you up with everything you need for developing, deploying and monitoring your app.

Creating a DevOps Project provisions Azure resources and comes with a Git code repository, Application Insights integration and a continuous delivery pipeline setup to deploy to Azure. The DevOps Project dashboard lets you monitor code commits, builds and, deployments, from a single view in the Azure portal.

Key benefits of DevOps Project:

- Get up and running with a new app and a full DevOps pipeline in just a few minutes
- Support for a wide range of popular frameworks such as .NET, Java, PHP, Node, and Python
- Start fresh or bring your own application from Github
- Built-in Application Insights integration for instant analytics and actionable insights
- Cloud-powered CI/CD using Azure Pipelines and Azure Repos

DevOps Projects are powered by Azure Pipelines and gives you a head start in developing and deploying your applications. From the initial starting point a DevOps Project provides, you can very easily:

Create

DevOps Project - Microsoft Azure +

https://portal.azure.com/#create/Microsoft.AzureProject

Microsoft Azure

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DevOps Project

Create

Launch an app running in Azure in a few quick steps

Everything you need, created and ready to go: code repository, CI/CD pipeline, and the necessary Azure resources.

New to DevOps Projects? Check out our tutorials

Start fresh with a new application

.NET

.NET

New Web App using ASP.NET or ASP.NET Core

Java

New Web App using Spring or JSF

Static Website

HTML

New static website using HTML, CSS, and JavaScript

Node.js

JS

New Web App using Node.js, Express.js or Sails.js

Previous

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DevOps Project

Create

Runtime Framework Service Create

Choose an application framework

ASP.NET

Open source web framework for building modern web apps and services

ASP.NET Core

Cross-platform, open-source framework for building modern web apps and services

Add a database

SQL Database

A relational database-as-a service

Previous Next

The screenshot shows the Microsoft Azure portal interface for creating a DevOps Project. The left sidebar contains various service links like App Services, Virtual machines, and SQL databases. The main area shows a step-by-step wizard for creating a DevOps Project. Step 2, 'Framework', is currently selected, indicated by a blue circle with the number '2'. The 'ASP.NET Core' option is highlighted with a red box and has a checked checkbox. Below it, there's a section for adding a database with a toggle switch and a 'SQL Database' option. At the bottom, there are 'Previous' and 'Next' buttons, with 'Next' being highlighted by a red box.

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https://portal.azure.com/#create/Microsoft.AzureProject

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Home > New > Marketplace > Everything > DevOps Project > DevOps Project

DevOps Project

Create

Kubernetes Service

Fully managed Kubernetes container orchestration service for managing containers without container expertise.

Service Fabric Cluster

A distributed systems platform to deploy and manage scalable and reliable microservices and containers.

Web App Windows

Fully managed compute platform on Windows for web applications and websites.

Web App Linux

Fully managed compute platform on Linux for web applications and websites.

Web App for Containers

Fully managed compute platform on Linux for deploying and running containerized web applications.

Virtual machine Windows

Windows virtual machine to run your app

Previous

Next

DevOps Project - Microsoft Azure +

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DevOps Project

Create

Windows.

DevOps Project

Change

Azure DevOps for building and deploying your app

* Organization

Create new Use existing

Northwind-Global-Devops ✓

https://dev.azure.com/Northwind-Global-Devops

* Project name

Northwind-Global-Devops ✓

Azure

Change

Azure resources required for running your app

* Subscription

Visual Studio Premium with MSDN

* Web app name

Previous Done

Red boxes highlight the 'Organization' dropdown and the 'Project name' input field. A large red arrow points downwards towards the bottom right corner of the page.

DevOps Project - Microsoft Azure +

https://portal.azure.com/#create/Microsoft.AzureProject

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DevOps Project

Create

https://dev.azure.com/Northwind-Global-Devops

* Project name
Northwind-Global-Devops ✓

Azure Change

Azure resources required for running your app

* Subscription
Visual Studio Premium with MSDN

* Web app name
Northwind-Global-Devops ✓ .azurewebsites.net

* Location
Australia East

Pricing tier: S1 Standard

By continuing, you agree to the [Terms of Service](#) and the [Privacy Statement](#). The new app code is published under the MIT license.

Previous Done

Microsoft Azure

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Home > Deploy_DevOps_Project_Northwind-Global-Devops - Overview

Deploy_DevOps_Project_Northwind-Global-Devops - Overview

Deployment

Search (Ctrl+ /)

Delete Cancel Redeploy Refresh

... Your deployment is underway

Check the status of your deployment, manage resources, or troubleshoot deployment issues. Pin this page to your dashboard to easily find it next time.

Deployment name: Deploy_DevOps_Project_Northwind-Global-Devops
Subscription: Visual Studio Premium with MSDN
Resource group: VstsResourceGroup-Northwind-Global-Devops

DEPLOYMENT DETAILS [\(Download\)](#)

Start time: 9/17/2018, 7:11:37 PM
Duration: 11 seconds
Correlation ID: b3baa814-6619-425a-b0fa-0989ea4e25ac

RESOURCE	TYPE	STATUS	OPERATION DET...
No results.			

Additional Resources

- Windows Server 2016 VM Quickstart tutorial
- Cosmos DB Quickstart tutorial
- Web App Quickstart tutorial
- SQL Database Quickstart tutorial
- Storage Account Quickstart tutorial

Helpful Links

Get started with Azure

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Deploy DevOps Project_Northwind-Global-Devops

Microsoft Azure

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Home > Deploy_DevOps_Project_Northwind-Global-Devops - Overview

Deploy_DevOps_Project_Northwind-Global-Devops - Overview

Deployment

Search (Ctrl+)

Delete Cancel Redeploy Refresh

Overview Outputs Inputs Template

✓ Your deployment is complete

Go to resource

Deployment name: Deploy_DevOps_Project_Northwind-Global-Devops
Subscription: Visual Studio Premium with MSDN
Resource Group: VstsResourceGroup-Northwind-Global-Devops

DEPLOYMENT DETAILS (Download)
Time: 2018-07-16T21:12:39Z
Duration: 1 minute 11 seconds
ID: b3baa814-6619-425a-b0fa-0989ea4e25ac

RESOURCE	TYPE	STATUS	OPERATION DET...
Northwind-Global-	microsoft.visuals...	OK	Operation details
Northwind-Global-	microsoft.visuals...	OK	Operation details

Additional Resources

- Windows Server 2016 VM Quickstart tutorial
- Cosmos DB Quickstart tutorial
- Web App Quickstart tutorial
- SQL Database Quickstart tutorial
- Storage Account Quickstart tutorial

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Home > Northwind-Global-Devops

Northwind-Global-Devops

Refresh Project homepage Repositories Build pipelines Release pipelines Agile backlogs Users & groups Delete

CI/CD pipeline

Code
Northwind-Global-Devops master ↗
0e196717 ↗ First commit azuredavopsproject 5 d ago

Build
Northwind-Global-Devops - CI ↗
Build 20180917.1 ↗ Succeeded 2 min ago

dev
Northwind-Global-Devops - CD ↗
Release-1 ↗ In progress 1 min ago

Azure resources

Application endpoint
<http://northwind-global-devops.azurewebsites.net> Browse ↗

App Service
Northwind-Global-Devops
✓ Running

Application Insights

Northwind-Global-Devops

SERVER REQUEST ↗

Create a resource All services FAVORITES Dashboard Resource groups All resources Recent App Services Virtual machines (classic) Virtual machines SQL databases Cloud services (classic) Subscriptions Disks (classic) Azure Active Directory Monitor Security Center Cost Management + Billi...

Microsoft Azure

Search resources, services, and docs

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Northwind-Global-Devops

DevOps Projects

Refresh Project homepage Repositories Build pipelines Release pipelines Agile backlogs Users & groups Delete

Build

- Northwind-Global-Devops - CI Succeeded 2 min ago
- Build 20180917.1 Succeeded 2 min ago

dev

- Northwind-Global-Devops - CD In progress 1 min ago
- Release-1 In progress 1 min ago

Repository

- Northwind-Global-Devops 1 commits in past 7 days

Code

Application Insights

Northwind-Global-Devops

2 PM 3 PM 4 PM 5 PM 6 PM 7 PM

SERVER REQUEST -
 FAILED REQUEST -

Create a resource All services FAVORITES Dashboard Resource groups All resources Recent App Services Virtual machines (classic) Virtual machines SQL databases Cloud services (classic) Subscriptions Disks (classic) Azure Active Directory Monitor Security Center Cost Management + Billi...

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DevOps Projects

Refresh Project homepage Repositories Build pipelines Release pipelines Agile backlogs Users & groups Delete

Build

- Northwind-Global-Devops - CI
- Build 20180917.1 Succeeded 2 min ago

dev

- Northwind-Global-Devops - CD
- Release-1 In progress 1 min ago

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- Northwind-Global-Devops 1 commits in past 7 days

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Northwind-Global-Devops Running

Application Insights

Northwind-Global-Devops

2 PM 3 PM 4 PM 5 PM 6 PM 7 PM

SERVER REQUEST -

FAILED REQUEST -

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Key Points

- ✓ Agile Planning
- ✓ Version Control
- ✓ Continuous Integration (CI)
- ✓ Continuous Delivery (CD)
- ✓ Monitoring & Logging
- ✓ Azure DevOps Project

A close-up photograph of a person's hand gripping a white rope. The hand is dark-skinned and the fingers are tightly wrapped around the rope. The rope is wrapped twice around the forearm, which is also dark-skinned. The background is blurred, showing a blue fabric.

If it hurts, do it more often.

Agenda

Persistence Layer

Infrastructure Layer

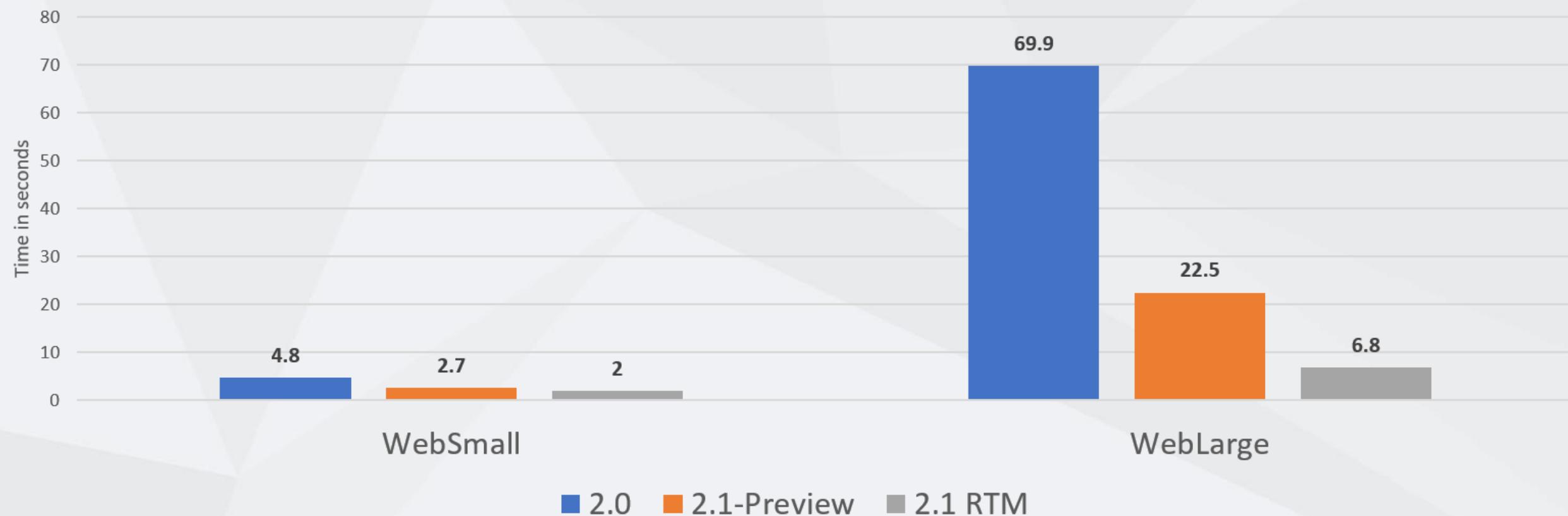
Presentation Layer

DevOps

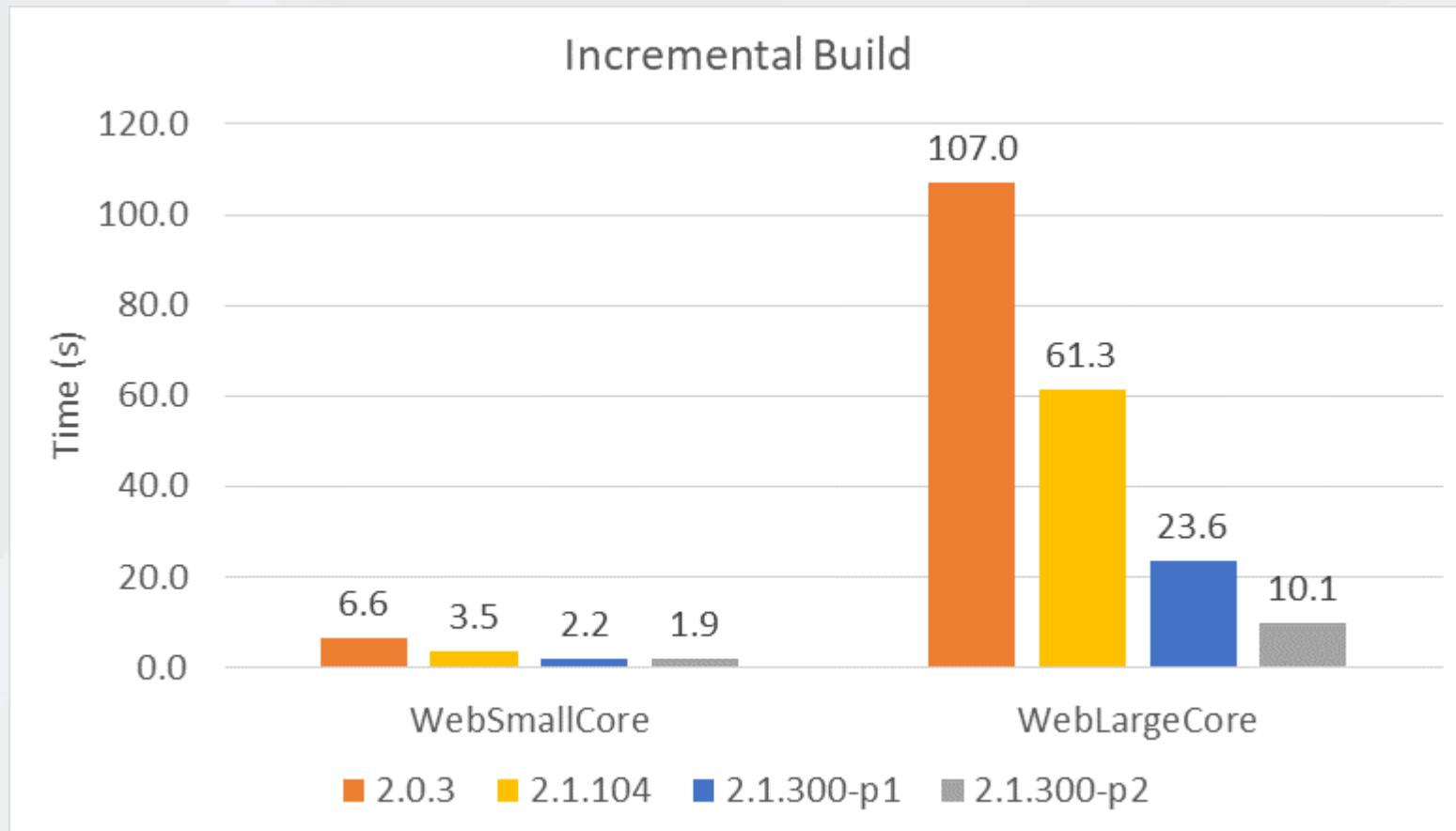
What's Next

Build Performance Improvements

Incremental Build Time for .NET Core SDK



Build Performance Improvements



What's New in .NET Core 2.1

Windows Compatibility Pack

e.g. System.Drawing, Directory Services

HttpClient – 10x performance improvement

Smaller runtime install size

What's New in ASP.NET Core 2.2

API Controller Conventions – (Better OpenAPI)

OpenAPI: spec & code generation

Health Checks

HTTP/2 support in Kestrel and HttpClient

SignalR – C++ and Java clients

What's New in Entity Framework Core 2.1

Lazy Loading

Entity Constructor Parameters

Group By Support

Query Types

What's New in Entity Framework Core 2.2

Spatial Data Support

Owned Collections

Query Tags (inject comments into SQL)

OwnedAttribute (one-to-one)

Data Seeding

What's Coming in .NET Core 3.0

Windows Desktop

WPF, WinForms, UWP

ASP.NET Core 3.0 will no longer support “full-framework”

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Early Access to Visual Studio Preview

Download Visual Studio 2017 Preview to get the latest features not yet in Visual Studio 2017. Be the first to try and give feedback to make Visual Studio even better.

[Download Visual Studio Preview](#)[Try Preview in Azure VM](#)[Check out the Release Notes](#) >

visualstudio.com/vs/preview/
[Learn about the new release rhythm](#) >

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About the presenter

Thiago Passos

Thiago Passos joined SSW in 2014 as a Senior Software Architect. He's specialized in SharePoint and .NET, preferring C#.NET over VB.NET, working on windows and web applications and web services.

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Thiago Passos

Thiago Passos joined SSW in 2014 as a Senior Software Architect. He's specialized in SharePoint and .NET, preferring C#.NET over VB.NET, working on windows and web applications and web services.

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About the presenters



Brendan Richards

Throughout his career, Brendan has been a big user and proponent of Open Source software.

This has been applied to a broad variety of projects spanning the last 12 years.

Brendan has worked with an eclectic mix of languages, platforms and technologies including .Net, Java, PHP, Ruby and Perl.

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About the presenters



Brendan Richards

Throughout his career, Brendan has been a big user and proponent of Open Source software.

This has been applied to a broad variety of full-time roles, open source projects, and consulting work spanning the last 12 years.

Brendan has worked with an eclectic mix of languages, platforms and technologies including .Net, Java, PHP, Ruby and Perl.

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Sydney, Sunday, 25th March 2019 – All Day Event

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About the presenters



Brendan Richards

Throughout his career, Brendan has been a big user and proponent of Open Source software.

This has been applied to a broad variety of projects, from learning projects spanning the last 12 years.

Brendan has worked with an eclectic mix of languages, platforms and technologies including .Net, Java, PHP, Ruby and Perl.



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What is Angular Hack Day?

AngularJS Hack Days are community run events for Angular Developers or people who want to learn AngularJS for free.

There will be something for everyone. Experienced AngularJS developers can share ideas with other experienced developers. If you're a beginner then there's plenty to learn on the day.

When and where?

Many cities around the world. [Look for dates on a venue near you.](#)

Event Organizers

Brisbane Saturday, 1st June 2019 All Day Event Free <http://angularhackday.com/register>
played with AngularJS before it would be good to do a little bit of learning before the day but it's not a requirement as all are welcome.

Adam Stenløsen, Duncan Hunter, Ben Cull, Eric Phan and Adam Cogan from [SSW Consulting](#). You can contact them via this [form](#).



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When and where?

Many cities around the world. [Look for dates on a venue near you.](#)

Event Organizers

Adam Stephensen, Duncan Hunter, Ben Cull, Eric Phan and Adam Cogan from [SSW Consulting](#). You can contact them via [this form](#).

Melbourne Saturday, 22nd June 2019 – All Day Event – Free – <http://angularhackday.com/register>
played with AngularJS before it would be good to do a little bit of learning before the day but it's not a requirement as all are welcome.



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Event Organizers

Adam Stephensen, Duncan Hunter, Ben Cull, Eric Phan and Adam Cogan from [SSW Consulting](#). You can contact them via [this form](#).

Sydney Saturday, 2nd March 2019 – All Day Event Free <http://angularhackday.com/register>
played with AngularJS before it would be good to do a little bit of learning before the day but it's not a requirement as all are welcome.

Thank you!

Feedback + Q & A
Code & Slides bit.ly/netcore-superpowers

info@ssw.com.au

www.ssw.com.au

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