



Enterprise Software Development

Join the Conversation #DotNetCoreSuperpowers @SSW_TV

.NET Core Superpowers Tour

Brisbane

Join the Conversation #DotNetCoreSuperpowers @SSW_TV



House Keeping

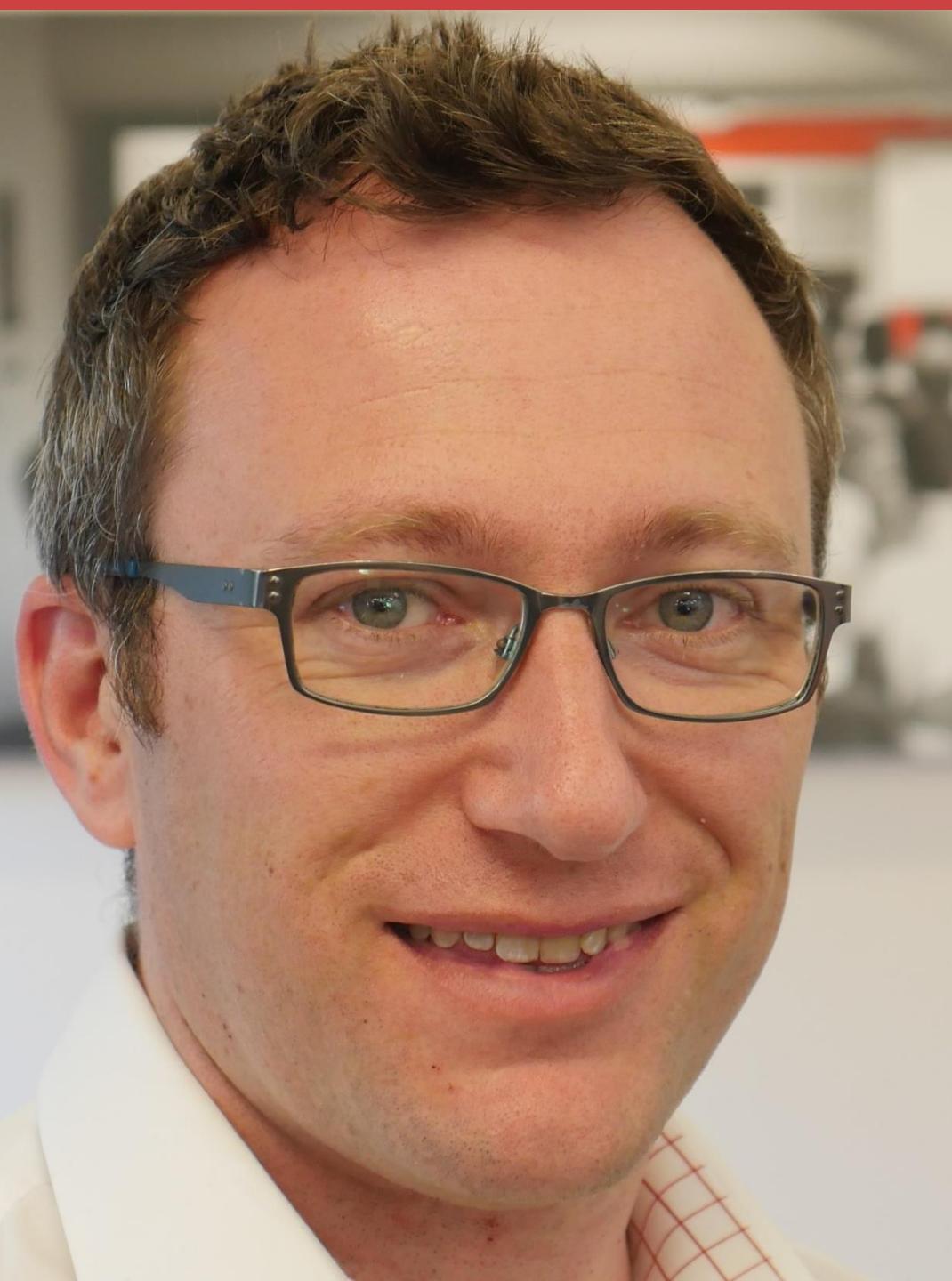
Code & Slides bit.ly/dotnetcoretour

Internet MSFTGUEST / msevent38oz

Timetable

09:00	Start
10:30 – 10:45	Morning Tea
12:00 – 12:45	Lunch
15:00 – 15:15	Afternoon Tea
16:30 – 17:00	Feedback, Q & A
17:00	Finish

Join the Conversation #DotNetCoreSuperpowers @SSW_TV



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

Master of Information Technology

Microsoft Certified Solutions Developer

Certified Scrum Master (CSM)

 @JasonGtAu

 codingflow.net

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Agenda

What's New in Visual Studio 2017 and VS Code

Getting Started

Entity Framework Core

Clean Architecture

Swashbuckle ...

Agenda

Validation

Unit Testing

Logging & Exceptions

Security

Deployment



What's New in Visual Studio 2017 and VS Code

Dev Superpowers Tour

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Why .NET Core?

Biggest update since .NET 1.1

- Performance
- Cross Platform Development
- Cross Platform Deployment
- Open Source
- ?



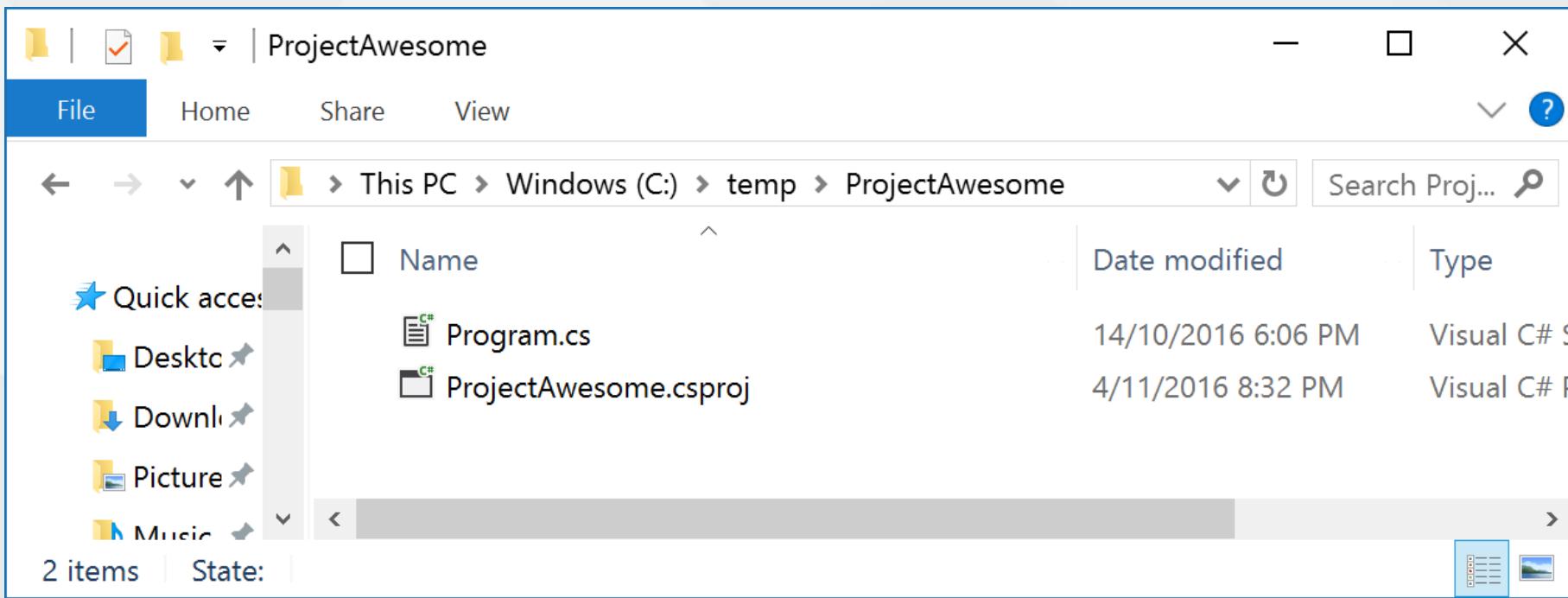
Microsoft ❤️ Linux

Microsoft ❤️ OpenSource

dotnet new

- Creates a new console application project

```
C:\temp\ProjectAwesome>dotnet new  
Created new C# project in C:\temp\ProjectAwesome.
```



dotnet restore

- Restores the NuGet packages defined in the csproj file

```
C:\temp\ProjectAwesome>dotnet restore
Restoring packages for C:\temp\ProjectAwesome\ProjectAwesome.csproj...
Writing lock file to disk. Path: C:\temp\ProjectAwesome\obj\project.assets.json
Generating MSBuild file
C:\temp\ProjectAwesome\obj\ProjectAwesome.csproj.nuget.g.targets.
Generating MSBuild file
C:\temp\ProjectAwesome\obj\ProjectAwesome.csproj.nuget.g.props.
Restore completed in 3037.8165ms for C:\temp\ProjectAwesome\ProjectAwesome.csproj.
```

NuGet Config files used:

```
C:\Users\ericphan\AppData\Roaming\NuGet\NuGet.Config
C:\Program Files (x86)\NuGet\Config\Microsoft.VisualStudio.Offline.config
```

Feeds used:

```
https://api.nuget.org/v3/index.json
C:\Program Files (x86)\Microsoft SDKs\NuGetPackages\
```

dotnet run

- Builds and runs the project

```
C:\temp\ProjectAwesome>dotnet run  
Hello World!
```

What about web apps?

- dotnet new **mvc**
- dotnet restore
- dotnet run



Join the Conversation #VS2017 @AdamCogan #NDCSydney

Summary - ASP.NET Core

- Fast – 1.5 million requests per second
- Runs on Windows, Linux, MacOS
- `dotnet new -t web`
`dotnet restore`
`dotnet run`



Cool now what? #1

- Angular + .Net Core Services
- React + .Net Core Services
- Vue + .Net Core Services
- Aurelia + .Net Core Services

?

Cool now what? #2 The Numbers

- Angular + .Net Core Services 1.5 m *not AngularJS
- React + .Net Core Services 4.5 m
- Vue + .Net Core Services 0.5 m
- Aurelia + .Net Core Services 0.025 m aka 25K

?

Cool now what? #3

1. Get up and running in VS Code
2. Get up and running in Visual Studio 2017

?

VS Code - Features

- ✓ Really lightweight and fast – 30MB download
- ✓ Runs on Windows and Mac
- ✓ 30+ languages supported out of the box: C#, JS, TypeScript, HTML, CSS, LESS, SASS
- ✓ Git built in
- ✓ Extensions
- ✓ Visual Studio goodness like:
 - Intellisense...
 - Peek Definition...
 - Debugging...

Intellisense

As good as
Visual Studio

```
6 |  
7 var server = express();  
8 server.use(bodyParser.json());  
9 |  
10 server|  
11 |  
12 |  
13 |  
14 |  
15 |  
16 |  
17 |  
18 |  
19 |  
20 |
```

Peek
Quickly
see the
definition
without
opening a
new file

InvoiceServiceTests.cs

```
14     [TestMethod()]
15     0 references
16     public void CalculateTotalTest()
17     {
18         var n = new InvoiceService();
19         var i = new Invoice()
20         {
21             Items = new[]
22             {
23                 new LineItem { Quantity = 1, UnitPrice = 100M },
24                 new LineItem { Quantity = 2, UnitPrice = 50M },
25             }
26         };
27         Assert.AreEqual(200M, n.CalculateTotal(i));
28     }
29
30     [TestMethod()]
31     0 references
32     public void CalculateTotalWithGstTest()
33     {
34         var n = new InvoiceService();
35         var i = new Invoice()
36         {
37             Items = new[]
38             {
39                 new LineItem { Quantity = 1, UnitPrice = 100M, TaxRate = 0.1M },
40                 new LineItem { Quantity = 2, UnitPrice = 50M, TaxRate = 0.1M },
41             }
42         };
43         Assert.AreEqual(220M, n.CalculateTotal(i));
44     }
}
```

HomeController.cs - ProjectAwesome - Visual Studio Code - Insiders

File Edit Selection View Go Help

EXPLORER

OPEN EDITORS

HomeController.cs Controllers

PROJECTAWESOME

- bin
- Controllers
- HomeController.cs
- obj
- Views
- wwwroot
- .bowerrc
- appsettings.json
- bower.json
- bundleconfig.json
- Program.cs
- ProjectAwesome.csproj
- Startup.cs
- web.config

HomeController.cs

```
7 namespace MvcApp.Controllers
8 {
9     public class HomeController : Controller
10    {
11        public IActionResult Index()
12        {
13            return View();
14        }
15
16        public IActionResult About()
17        {
18            ViewData["Message"] = "Your application description page.";
19
20        }
21    }
22
23    public IActionResult Contact()
24    {
25        ViewData["Message"] = "Your contact page.";
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

Updating C# dependencies...
Platform: win32, x86_64 (win7-x64)

Downloading package 'OmniSharp (.NET 4.6 / x64)' (17539 KB) .

Auto detects that we need OmniSharp for Intellisense when we open the *.cs file

Ln 1, Col 1 Spaces: 4 UTF-8 with BOM CRLF C# Downloading packages

HomeController.cs - ProjectAwesome - Visual Studio Code - Insiders

File Edit Selection View Go Help

EXPLORER

OPEN EDITORS

HomeController.cs Controllers

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19
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21        }
22
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24        {
25            ViewData["Message"] = "Your contact page.";
```

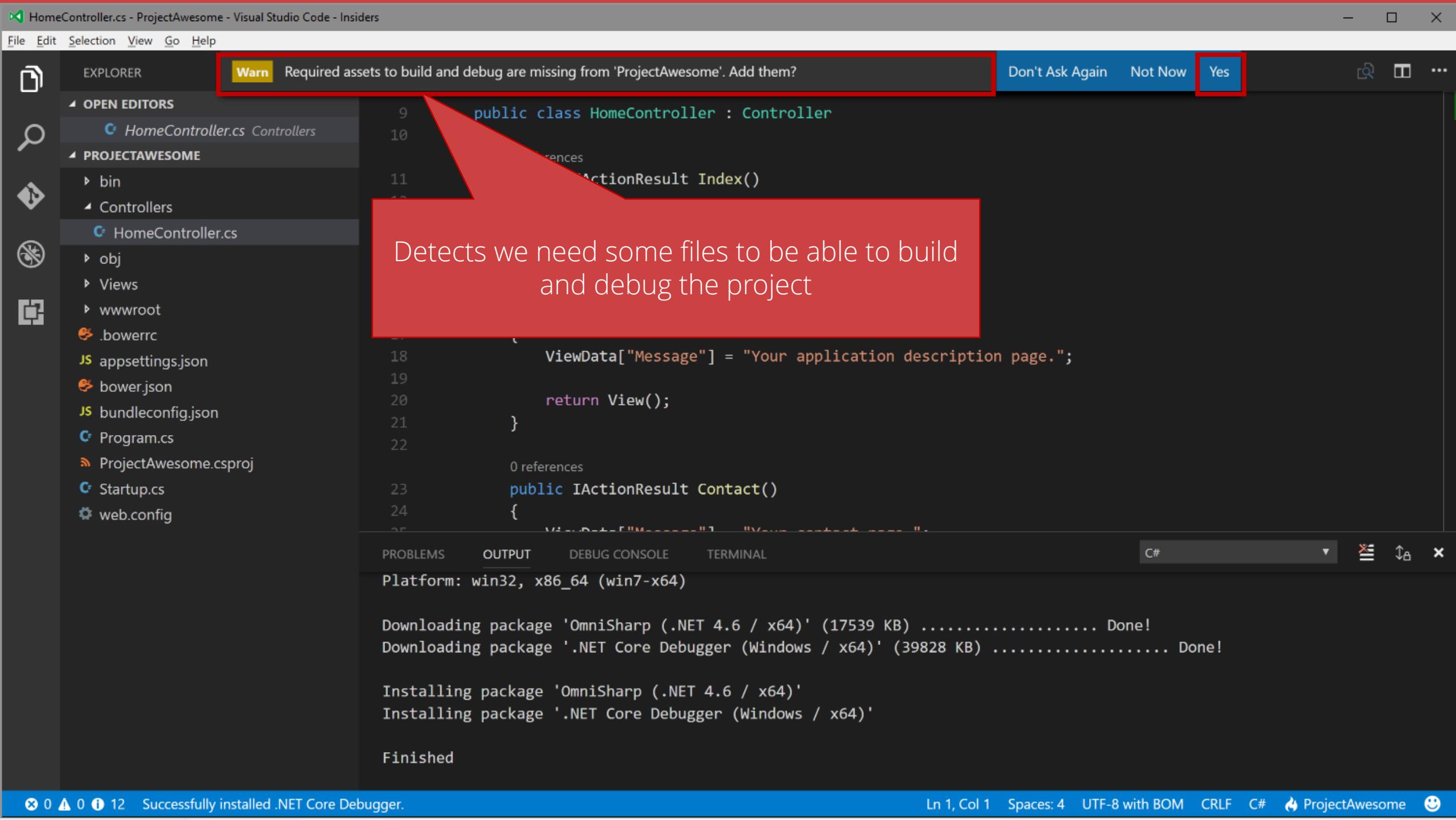
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

Updating C# dependencies...
Platform: win32, x86_64 (win7-x64)

Downloading package 'OmniSharp (.NET 4.6 / x64)' (17539 KB) Done!
Downloading package '.NET Core Debugger (Windows / x64)' (39828 KB)

Ln 1, Col 1 Spaces: 4 UTF-8 with BOM CRLF C# Downloading packages

Knows we need the .NET Core Debugger too



HomeController.cs - ProjectAwesome - Visual Studio Code - Insiders

File Edit Selection View Go Help

EXPLORER HomeController.cs

OPEN EDITORS HomeController.cs Controllers

PROJECTAWESOME .vscode

JS launch.json JS tasks.json

bin

Controllers

HomeController.cs

obj

Views

wwwroot

.bowerrc

JS appsettings.json

JS bower.json

JS bundleconfig.json

C# Program.cs

ProjectAwesome.csproj

C# Startup.cs

web.config

```
public class HomeController : Controller
{
    public IActionResult Index()
    {
        return View();
    }

    public IActionResult About()
    {
        return View("About");
    }
}
```

Creates the launch.json and tasks.json files

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

C#

Platform: win32, x86_64 (win7-x64)

Downloading package 'OmniSharp (.NET 4.6 / x64)' (17539 KB) Done!

Downloading package '.NET Core Debugger (Windows / x64)' (39828 KB) Done!

Installing package 'OmniSharp (.NET 4.6 / x64)'

Installing package '.NET Core Debugger (Windows / x64)'

Finished

0 0 12 Successfully installed .NET Core Debugger.

Ln 1, Col 1 Spaces: 4 UTF-8 with BOM CRLF C# 🔥 ProjectAwesome 😊

launch.json - ProjectAwesome - Visual Studio Code - Insiders

File Edit Selection View Go Help

EXPLORER

OPEN EDITORS

JS launch.json .vscode

PROJECTAWESOME

- .vscode
 - JS launch.json
 - JS tasks.json
- bin
- Controllers
 - HomeController.cs
 - obj
 - Views
 - wwwroot
- .bowerrc
- JS appsettings.json
- JS bower.json
- JS bundleconfig.json
- C Program.cs
- R ProjectAwesome.csproj
- C Startup.cs
- web.config

JS launch.json x

```
1 {
2     "version": "0.2.0",
3     "configurations": [
4         {
5             "name": ".NET Core Launch (console)",
6             "type": "coreclr",
7             "request": "launch",
8             "preLaunchTask": "build",
9             "program": "${workspaceRoot}\\bin\\Debug\\netcoreapp1.0\\ProjectAwesome.dll",
10            "args": [],
11            "cwd": "${workspaceRoot}",
12            "externalConsole": false,
13            "stopAtEntry": false,
14            "internalConsoleOptions": "openSession"
15        },
16    ]
}
```

Add Configuration...

Auto fills in the path to the DLL

Platform: win32, x86_64 (win7-x64)

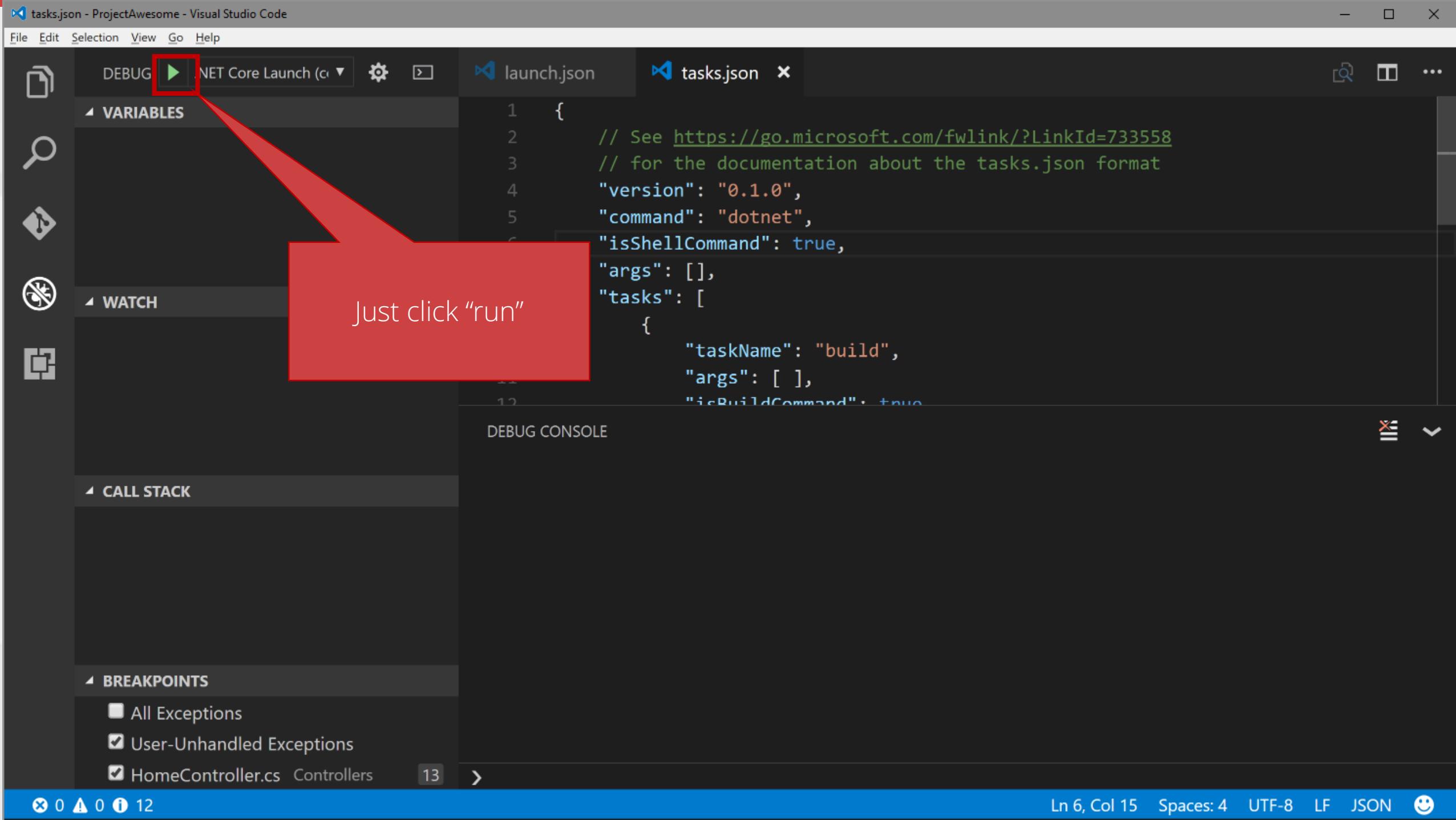
Downloading package 'OmniSharp (.NET 4.6 / x64)' (17539 KB) Done!
Downloading package '.NET Core Debugger (Windows / x64)' (39828 KB) Done!

Installing package 'OmniSharp (.NET 4.6 / x64)'
Installing package '.NET Core Debugger (Windows / x64)'

Finished

x 0 ▲ 0 i 12 Successfully installed .NET Core Debugger.

Ln 11, Col 39 Spaces: 4 UTF-8 LF JSON



ASP.NET Core

Windows Linux OSX

< >

Learn how to build ASP.NET apps that can run anywhere. [Learn More](#)

● ○ ○ ○

Application uses

- Sample pages using ASP.NET Core MVC
- Bower for managing client-side libraries
- Theming using Bootstrap

How to

- Add a Controller and View
- Add an appsetting in config and access it in app.
- Manage User Secrets using Secret Manager.
- Use logging to log a message.
- Add packages using NuGet.
- Add client packages using Bower.
- Target development, staging or production environment.

Overview

- Conceptual overview of what is ASP.NET Core
- Fundamentals of ASP.NET Core such as Startup and middleware.
- Working with Data
- Security
- Client side development
- Develop on different platforms
- Read more on the documentation site

Run & Deploy

- Run your app
- Run tools such as EF migrations and more
- Publish to Microsoft Azure Web Apps



EXPLORER



OPEN EDITORS

launch.json .vscode

tasks.json .vscode

C# HomeController.cs Controllers



PROJECTAWESOME

.vscode

launch.json

tasks.json

bin

Controllers

C# HomeController.cs



obj

Views

wwwroot

.bowerrc

{ } appsettings.json

bower.json

{ } bundleconfig.json

C# Program.cs

ProjectAwesome.csproj

C# Startup.cs

</> web.config

launch.json

tasks



0 references

```
11
12
13     return View();
14
15
16
```

0 references

```
public IActionResult About()
```

Breakpoints work!

"Your application description page."

DEBUG CONSOLE

```
200 application/font-woff2
info: Microsoft.AspNetCore.Hosting.Internal.WebHost[1]
      Request starting HTTP/1.1 GET http://localhost:5000/
Microsoft.AspNetCore.Hosting.Internal.WebHost:Information: Request starting HTTP/1.1 GET
http://localhost:5000/
info: Microsoft.AspNetCore.Mvc.Internal.ControllerActionInvoker[1]
      Executing action method MvcApp.Controllers.HomeController.Index (ProjectAwesome) wi
      th arguments () - ModelState is Valid
Microsoft.AspNetCore.Mvc.Internal.ControllerActionInvoker:Information: Executing action m
ethod MvcApp.Controllers.HomeController.Index (ProjectAwesome) with arguments () - Models
state is Valid
```

VS Code - Insiders

- Preview version with latest features
(Like Windows 10 insiders)
- The experience is better
- Only for “real developers”



Join the Conversation #VS2017 @AdamCogan #NDCSydney

Source: <http://leveleleven.com/wp-content/uploads/2014/05/Chuck5.png>



Summary - VS Code Insiders

- ✓ Insiders Version – A much nicer experience
- ✓ Bleeding edge features
- ✓ Daily releases
- ✓ Grab the right extensions...



Grab all the right extensions

Eg. For Angular

The screenshot shows the Visual Studio Code Extensions Marketplace. The search bar at the top contains the text "Search Extensions in Marketplace". Below the search bar, there is a list of extensions related to Angular. The extensions listed are:

- Angular Language Service** 0.1.3 - Editor services for Angular templates by Angular (32K installs, 5 stars)
- Angular v4 TypeScript Snippets** 2.3.2 - Angular with TypeScript snippets by johnpapa (592K installs, 5 stars)
- angular2-inline** 0.0.17 - Visual Studio Code language extension for javascript... by Nate Wallace (25K installs, 4.5 stars)
- angular2-switcher** 0.1.4 - Easily navigate to component's files in angular2 projec... by infinity1207 (14K installs, 5 stars)
- Bracket Pair Colorizer** 0.10.7 - A customizable extension for colorizing matching brac... by Coenraads (41K installs, 5 stars)
- Colonize** 2.2.2 - Adds semicolon at the end of the line and optionally n... by vmsynkov (2K installs, 5 stars)
- Git History (git log)** 0.2.0 - View git log, file or line History by Don Jayamanne (592K installs, 4.5 stars)
- Quokka.js** 1.0.34 - The Live Scratchpad for JavaScript by Wallaby.js (35K installs, 5 stars)
- Settings Sync** 2.8.1 - Synchronize Settings, Snippets, Themes, File Icons, L... by Shan Khan (340K installs, 4.5 stars)
- TSLint** 0.15.0 - TSLint for Visual Studio Code by egamma (696K installs, 5 stars)
- TypeScript Importer** 1.2.14 - Automatically searches for TypeScript definitions in w... by pmneo (32K installs, 4.5 stars)
- vscode-icons** 7.9.0 - Icons for Visual Studio Code by Roberto Huertas (2.1M installs, 5 stars)
- Wallaby.js** 1.0.50 - (green bar icon) (57K installs, 4 stars)

One extension to get all the best extensions for angular from John Papa

The screenshot shows the Angular Essentials extension page in the Visual Studio Code Marketplace. The extension icon is a red hexagon with a white Angular logo (a stylized 'A'). The name 'Angular Essentials' is displayed in bold, along with the developer name 'johnpapa' and the identifier 'johnpapa.angular-essentials'. It has a rating of 5 stars and 5115 installs. A description below states 'Essential extensions for Angular developers'. A green 'Install' button is visible. The top navigation bar shows icons for file, search, and other marketplace functions. Below the main card, there's a section titled 'Angular Essentials - Extension Pack for VS Code' with a description, a 'Beta' status indicator, a link to the CHANGELOG, and a note about the extension pack being a collection of useful extensions for Angular development.

This extension pack for Visual Studio Code adds extensions that are amazingly useful for Angular development.

Beta

See the [CHANGELOG](#) for the latest changes

I am often asked, "What are you favorite VS Code extensions for Angular?". I decided it was time to share them via an extension pack.

Introducing my [Angular Essentials extension pack for VS Code](#). By installing this extension pack you get a set of great extensions that are helpful with Angular development. You can check out the initial list below.

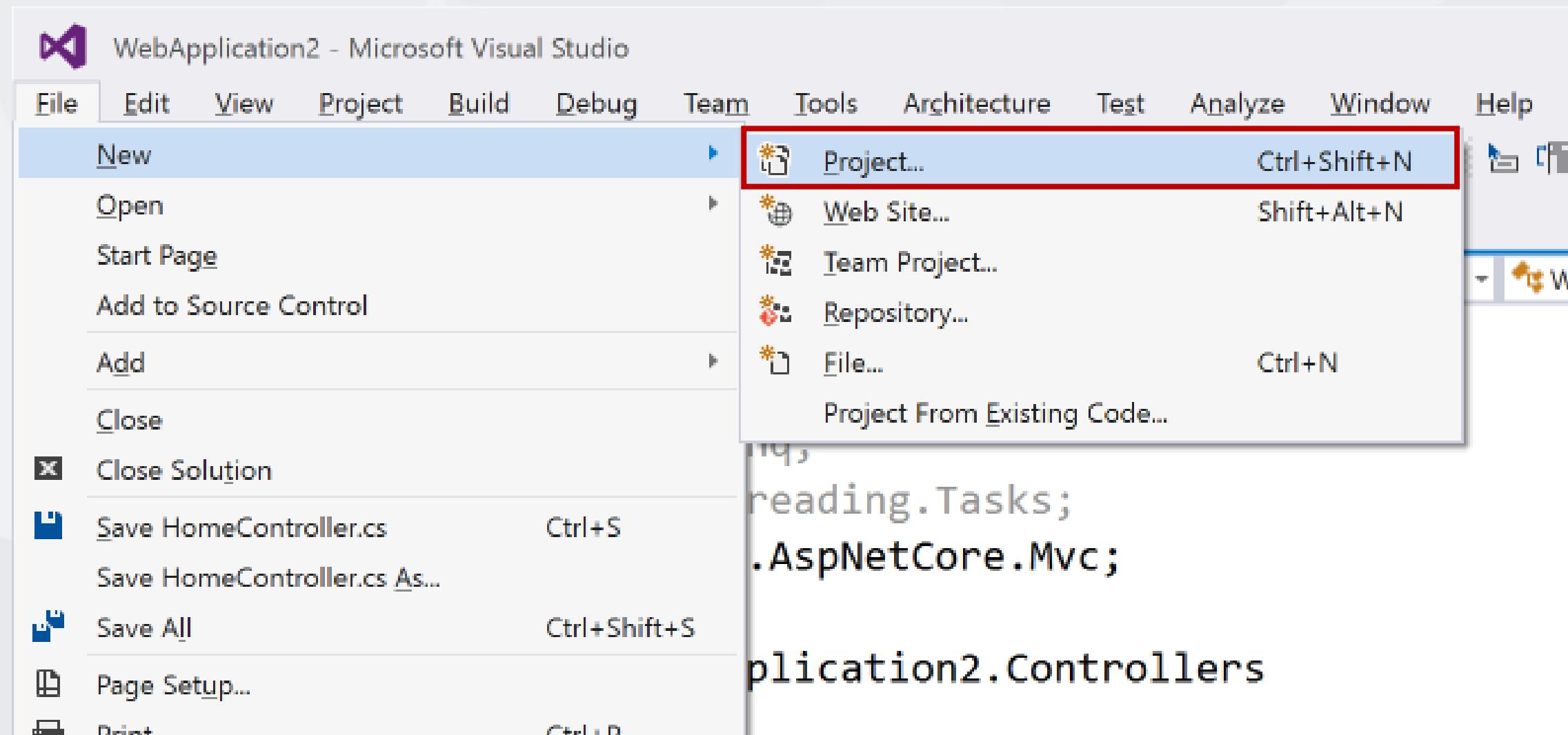
As web tools evolve, the usefulness of extensions come and go. I reserve the right to update the extension pack's contents up to my own discretion.

Let's try this in Visual Studio 2017

Join the Conversation #VS2017 @AdamCogan #NDCSydney



File | New | Project



Recent

.NET Framework 4.6.1

Sort by: Default

Search Installed Templates (Ctrl+E)



Installed

Templates

Visual C#

Classic Desktop

Web

.NET Core

Cloud

Test

WCF

Visual Basic

Visual C++

SQL Server

JavaScript

PowerShell

TypeScript

Other Project Types

Modeling Projects

Samples

Recent files: webapplication1.csproj (Locally modified)

Online

Name:

WebApplication2

Location:

c:\users\ericphan\documents\visual studio 2017\Projects

Browse...

Solution:

Create new solution

Solution name:

WebApplication2

 Create directory for solution Create new Git repository

OK

Cancel

The screenshot shows the 'New Project' dialog in Visual Studio. The 'Installed' tab is selected, and under the 'Visual C#' section, the 'ASP.NET Core Web Application (.NET Core)' template is highlighted with a red box. A large red callout box with a triangular arrow points from the bottom left towards this highlighted item. The callout box contains the text: 'NOTE: Icon is wrong. Don't get your hopes up. You can't do .NET Core with VB.NET'. Other templates listed include 'Class Library (.NET Framework)', 'Project', 'ASP.NET Web Application (.NET Framework)', and 'Azure Mobile App'. The 'Type: Visual C#' filter is applied.

Type: Visual C#

Project templates for creating ASP.NET Core applications for Windows, Linux and OS X using .NET Core.

Select a template:

ASP.NET Core Templates



Empty



Web API

Web
Application

A project template for creating an ASP.NET Core application with example ASP.NET MVC Views and Controllers. This template can also be used for RESTful HTTP services.

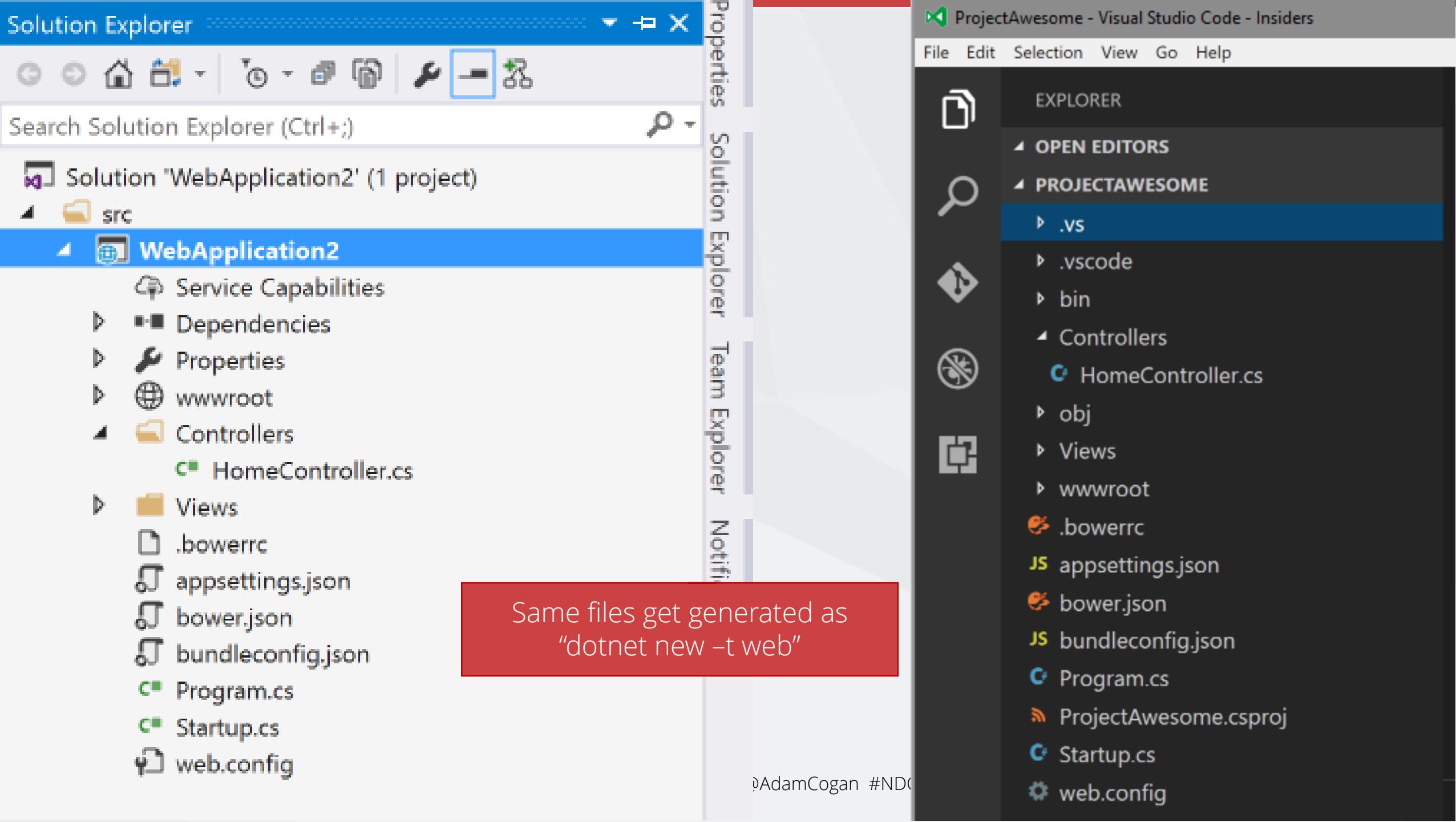
[Learn more](#)

[Change Authentication](#)

Authentication: **No Authentication**

OK

Cancel



Same files get generated as
"dotnet new -t web"

Time to Debug

F5

ASP.NET Core

Windows Linux OSX

< >

Learn how to build ASP.NET apps that can run anywhere. [Learn More](#)

● ○ ○ ○

Application uses

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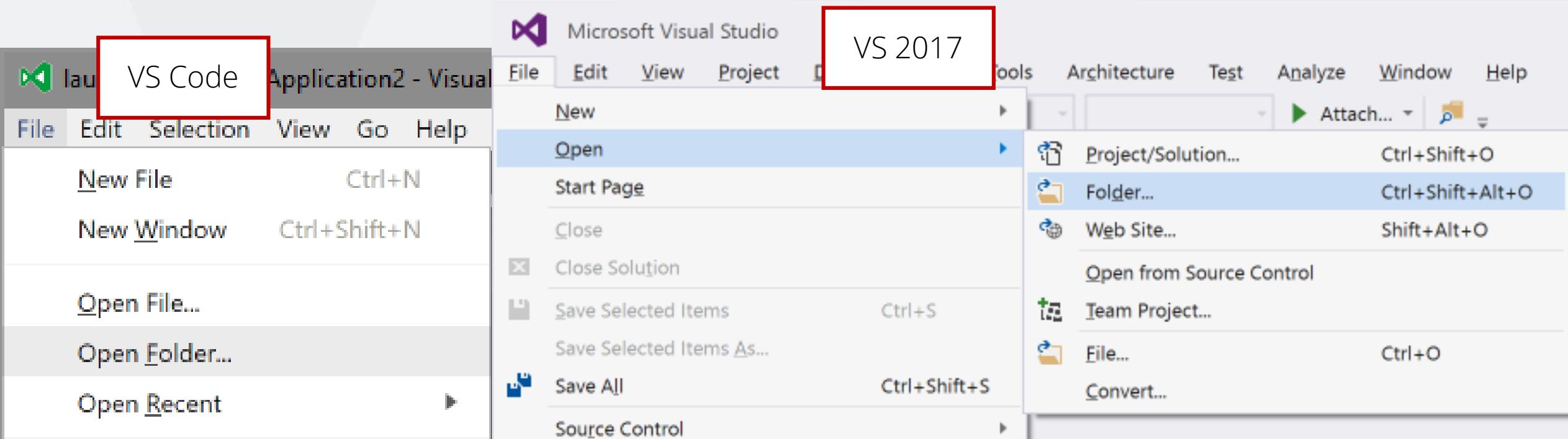
Run & Deploy

- Run your app
- Run tools such as EF migrations and more
- Publish to Microsoft Azure Web Apps

VS Code and VS 2017

Choose your favourite IDE

Eg. “Open Folder”



#2 VS 2017 - Open Folder

- ✓ Open anything you like...not just .NET Solutions
- ✓ Supports 20+ languages e.g PHP, Go, Java
- ✓ Add more languages by installing for 'workloads' e.g. R

"Just because you can doesn't mean you should"

@AdamCogan #NDCSydney



KEEP
CALM
I'M
A
DEVELOPER

10 New Developer Goodies

www.adamcogan.com

1. .NET Core built in
2. Open as folder
3. Quicker Installer + Roaming Extension Manager
4. Lightweight solution loading
5. Better Intellisense, refactoring and code analysis
6. Better Debugging + DevOps
7. Javascript/TypeScript debugging in Chrome
8. Live Unit Testing
9. Code Styling - EditorConfig
10. C# 7.0 Language Extensions

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#3 Quicker installer



Visual Studio

X

By continuing, you agree to the [License Terms](#).

To learn more about privacy, see the [Microsoft Privacy Statement](#).

Continue

#3 Quicker installer



Give us a minute. We'll be done soon...



Cancel

Visual Studio

Modifying - Visual Studio Enterprise 2017 RC (15.0.25909.2)

Workloads

Individual components

Language packs

Windows (3)



Universal Windows Platform development

Create applications for Windows 10 with the Universal Windows Platform.



.NET desktop development

Build WPF, Windows Forms and console applications using the .NET Framework.



Desktop development with C++

Build classic Windows-based applications using the power of MFC, ATL, and the Microsoft C++ toolset.

Web & Cloud (8)



Web development

Build web applications using ASP.NET and HTML, JavaScript, and CSS.



Azure development

Azure SDK for .NET and tools for developing cloud apps and resources.



Python development (Preview)

Editing, debugging, interactive development and source control for Python.



Node.js development

Build scalable network applications using Node.js, an asynchronous event-driven JavaScript runtime.



Data storage and processing



Data science and analytical applications (Preview)

Location

C:\Program Files (x86)\Microsoft Visual Studio\2017\Enterprise

Installation nickname

Install size: -2.47 GB

Modify

Summary

- > Visual Studio core editor
- > .NET desktop development
- > Web development
- > Azure development
- > Node.js development
- > Data storage and processing
- > .NET Core and Docker (Preview)

Included

- ✓ .NET Core 1.0.1 development tools
- ✓ .NET Framework 4.6.1 development tools
- ✓ Web development tools
- ✓ Docker Tools
- ✓ Developer Analytics tools
- ✓ Continuous Delivery Tools for Visual Studio...

By proceeding with this installation, you agree to the [download and license terms](#) for the software you have selected.



Modifying - Visual Studio Enterprise 2017 RC (15.0.26127.3)



Workloads

Individual components

Language packs

Mobile & Gaming (5)



Mobile development with .NET (Preview)

Build cross-platform applications for iOS, Android or Windows using Xamarin.



Game development with Unity

Create 2D and 3D games with Unity, a powerful cross-platform development environment.



Mobile development with JavaScript

Build Android, iOS and UWP apps using Tools for Apache Cordova.



Mobile development with C++

Build cross-platform applications for iOS, Android or Windows using C++.



Game development with C++

Use the full power of C++ to build professional games powered by DirectX, Unreal, or Cocos2d.



Other Toolsets (3)



Visual Studio extension development

Create add-ons and extensions for Visual Studio, including new commands, code analyzers and tool windows.



Linux development with C++

Create and debug applications running in a Linux environment.



Location

C:\Program Files (x86)\Microsoft Visual Studio\2017\Enterprise

Install size: - 1.23 GB

Modify

Summary

ASP.NET and web development ...

› Azure development

› Node.js development

› Data storage and processing

› Mobile development with .N...

› Mobile development with ... *

› .NET Core cross-platform ... *

Included

✓ .NET Core 1.0 - 1.1 development tools

✓ .NET Framework 4.6.1 development ...

✓ ASP.NET and web development tools

✓ Developer Analytics tools

Optional

Container development tools

By proceeding with this installation, you agree to the [download and license terms](#) for the software you have selected.

Workloads

Workloads are just a quick groups of components targeting certain type of developer e.g.

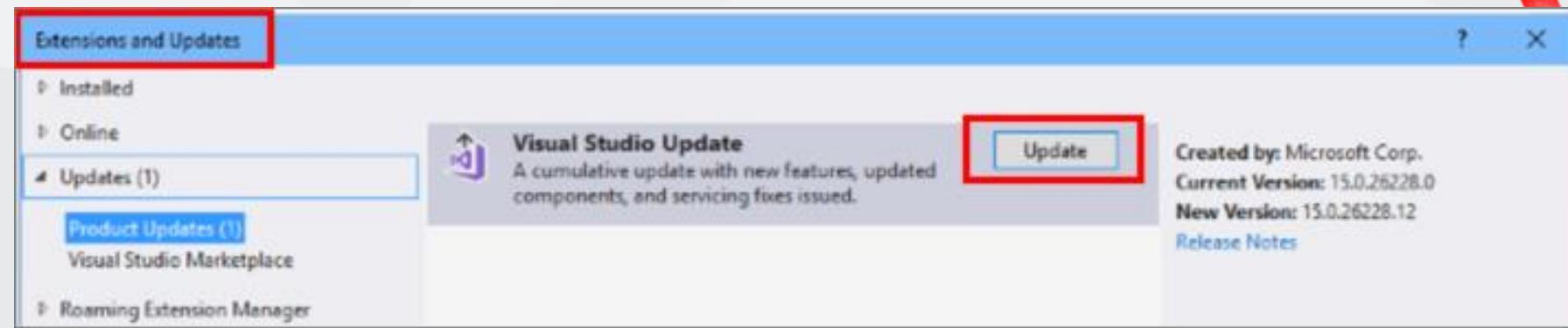
- UWP / .NET Desktop development
- Azure Development
- Web Development



Make the installation of Visual Studio light-weight and fast

<https://visualstudio.uservoice.com/forums/121579-visual-studio-ide/suggestions/4750782-make-the-installation-of-visual-studio-light-weigh>

1945 votes



Problem #4.1 - Getting up and running quick

- Fresh PC | Install VS 2017
- Reinstall your favourite extensions – the big 3:
 - ReSharper
 - Productivity Power Tools
 - Web Essentials

New Roaming Extensions Manager

Extensions and Updates

Sort by: Not Installed

Search Roaming Extension Manager (C)

Created by: JetBrains
Version: 7.0
[More Information](#)

Installed

Online

Updates

Roaming Extension Manager

All

ReSharper Ultimate
JetBrains ReSharper Ultimate 2016.3.1 , an extension for Microsoft Visual Studio 15.0.
[Stop Roaming](#)

Roslyn Expression Evaluators
Roslyn Expression Evaluators

Roslyn Interactive Components
Interactive Roslyn components for Visual Studio.

Roslyn Language Services
C# and VB.NET language services for Visual Studio.

Roslyn Language Services for Visual Studio 15
C# and VB.NET language services for Visual Studio 15.

TaskStatusCenter
Task Status Center

TypeScript for Microsoft Visual Studio
Language service for TypeScript

Visual F# Tools
Deploy Visual F# Tools templates to Visual Studio

Scheduled For Install:
None

Scheduled For Update:
None

Scheduled For Uninstall:
None

Change your Extensions and Updates settings

Close

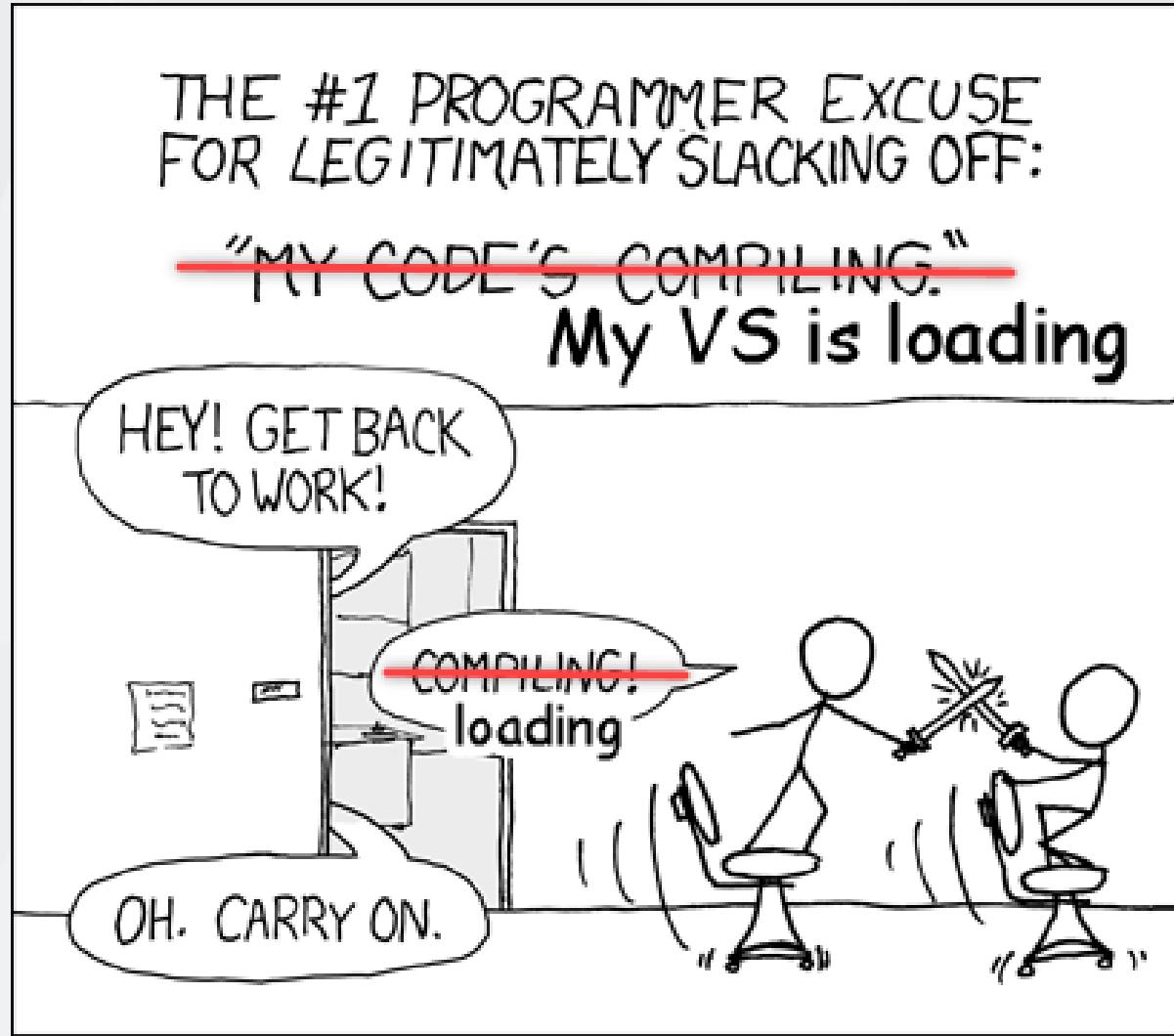
Summary - Online Syncing

- VS2015 – Settings, Themes, Text Editor,
Team Explorer Servers for TFS/VisualStudio.com
- VS2017 - Extensions



Join the Conversation #VS2017 @AdamCogan #NDCSydney

Problem #4.2 - Lightweight solution loading



Loading SSWTimePRO.com

- 39 Projects, a mix of Web Projects & Class Libraries
- VS 2015
 - Load VS – 11 seconds
 - Load Solution - 36 seconds
- VS 2017
 - Load VS – 5 seconds
 - Load Solution – 26 seconds
 - ...

Search Options (Ctrl+E) 

- ▲ Environment
 - General
 - AutoRecover
 - Documents
 - Extensions and Updates
 - Find and Replace
 - Fonts and Colors
 - Import and Export Settings
 - International Settings
 - Keyboard
 - Notifications
 - Quick Launch
 - Startup
 - Synchronized Settings
 - Tabs and Windows
 - Task List
 - Web Browser
- ▷ Projects and Solutions

- ▷ Source Control
- ▷ Work Items
- ▷ Text Editor
- ▷ Debugging
- ▷ IntelliTrace
- ▷ Performance Tools
- ▷ Database Tools
- ▷ Dependency Validation
- ▷ F# Tools
- ▷ Live Unit Testing
- ▷ Node.js Tools
- ▷ NuGet Package Manager
- ▷ PowerShell Tools
- ▷ SQL Server Tools
- ▷ Text Templating
- ▷ Web

Projects location:

C:\Users\ericphan\Documents\Visual Studio 2017\Projects



User project templates location:

C:\Users\ericphan\Documents\Visual Studio 2017\Templates\ProjectTemplates



User item templates location:

C:\Users\ericphan\Documents\Visual Studio 2017\Templates\ItemTemplates



- Always show Error List if build finishes with errors
- Track Active Item in Solution Explorer
- Show advanced build configurations
- Always show solution
- Save new projects when created
- Warn user when the project location is not trusted
- Show Output window when build starts
- Prompt for symbolic renaming when renaming files
- Lightweight Solution load

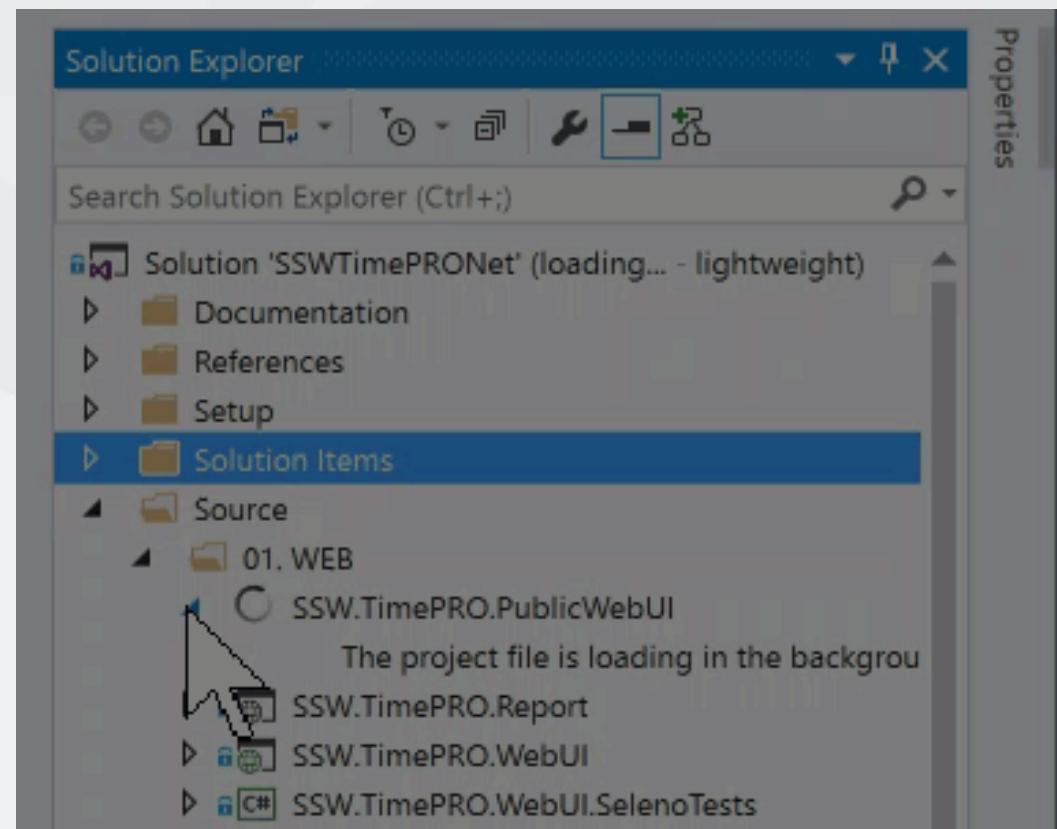
OK

Cancel

VS 2017 – Lightweight solution loading

- VS 2015
 - Load VS – 11 seconds
 - Load Solution - 36 seconds
- VS 2017
 - Load VS – 5 seconds – 55% faster
 - Load Solution – 26 seconds – 27% faster
- With lightweight solution load on
 - Load VS – 5 seconds – **55% faster**
 - Load Solution – 15 seconds – **58% faster**

Lazy loads projects ...
....more like background loading
....issues with Live Unit Testing + nCrunch etc.



Make solutions load faster

<https://visualstudio.uservoice.com/forums/121579-visual-studio-ide/suggestions/2197975-make-solutions-load-faster>

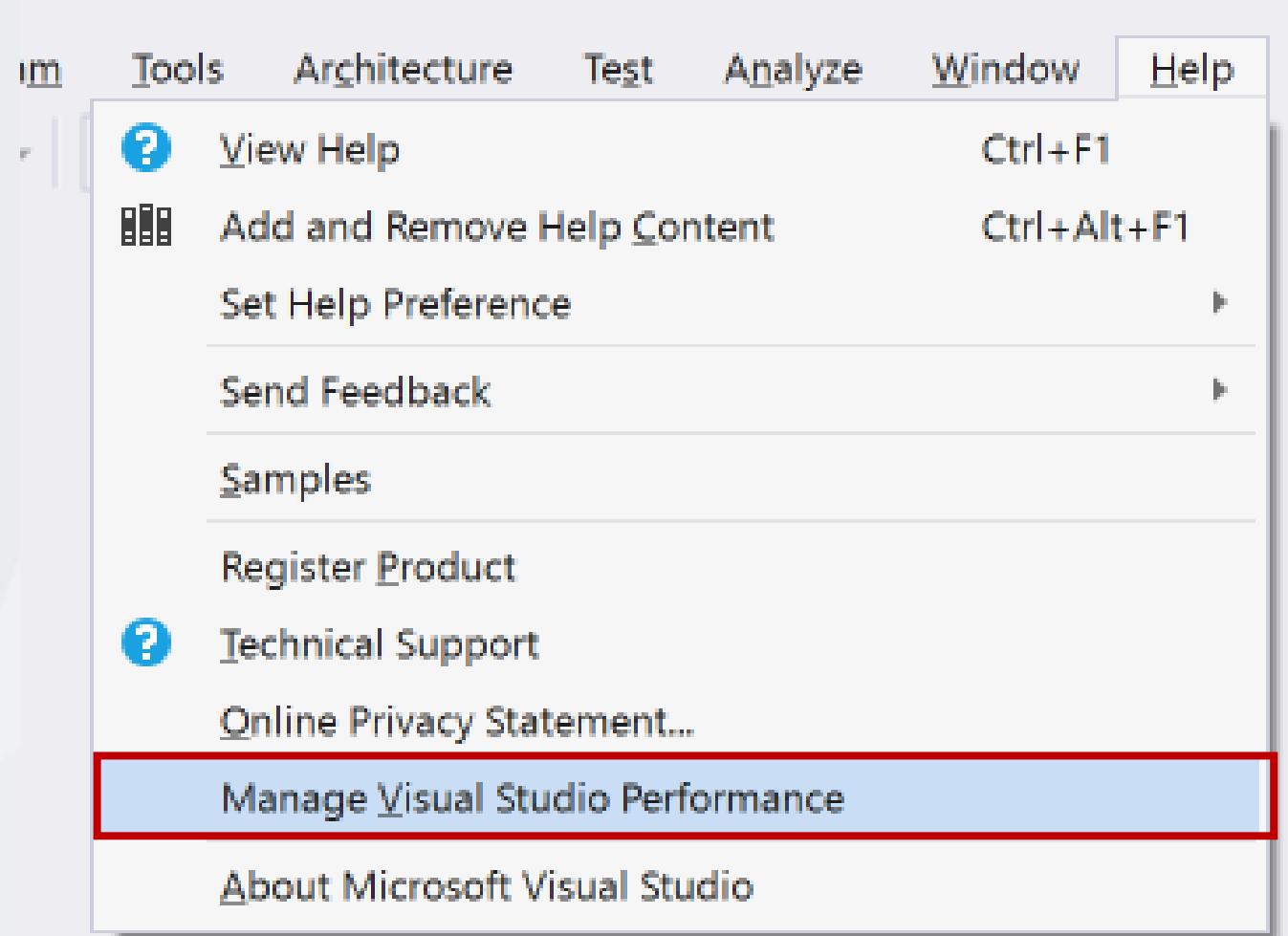
1435 votes



Join the Conversation #VS2017 @AdamCogan #NDCSydney



New “Manage Visual Studio Performance”



 Extensions

Sort by: Default

 Tool Windows

Startup (2)

**Error List**

Adds 2 seconds on average.

Impact:

Adds 2 seconds to IDE startup on average.

**Team Explorer**

Adds 4 seconds on average.

Override startup behavior:

- Use default behavior
- Do not show window at startup
- Auto hide window at startup

Close



RavenDB - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Test ReSharper Analyze Window Help



Debug

Any CPU

Tryouts

We've noticed that extension 'ReSharper Ultimate' is slowing Visual Studio. [Manage Visual Studio Performance](#)

Toolbox

Tree.Stream.cs

PosixSodium.cs

AttachmentResult.cs

BlittableJsonTextWriterExtensions.cs

c# Raven.Server

Raven.Server.Documents.AttachmentsSt

"We've noticed that a tool window 'Error List' is slowing Visual Studio."

Visual Studio Task Manager

<https://visualstudio.uservoice.com/forums/121579-visual-studio-ide/suggestions/2627855-visual-studio-task-manager>

1736 votes

ReSharper says “Thanks”



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#5 Better Intellisense, Refactoring and Code Analysis

```
var returnedViewModel = new TimesheetDetailViewModel()
{
    EmpTime = new EmpTime()
    {
        EmpID = correctemployeeid,
        DateCreated = correctdate
    }
};

_timesheetDetailViewModelBuilder.Setup(builder => builder.Build(null, id)).Returns(returnedViewModel);

var result = _controller.Edit(employeeid, date, id); // EmpID, DateCreated, id

Assert.IsType<RedirectToRouteResult>(result);
Assert.Equal(correctemployeeid, ((RedirectToRouteResult)result).RouteValues["employeeid"]);
Assert.Equal(correctdate.ToString("yyyy-MM-dd"), ((RedirectToRouteResult)result).RouteValues["date"]);
Assert.Equal(id, ((RedirectToRouteResult)result).RouteValues["id"]);
}
```

#5 Better Intellisense, Refactoring and Code Analysis

Code Analysis

- New C# 7.0 language features (later)

#5 Better Intellisense, Refactoring and Code Analysis

<https://visualstudio.uservoice.com/forums/121579-visual-studio-ide/suggestions/2627391-buy-resharper-and-make-it-a-built-in-part-of-vs>

1009 votes



#6 Better Debugging + DevOps

- Run to Click
- New Exception Helper
- Better NULL reference messages
- Attach to Process filter
- Reattach to Process
- Go to All
- Better Find All References
- CodeLens integration with Application Insights + RayGun.io

Traditional Debugging

- ✖ Set temporary breakpoints
- ✖ Hit F10 (Step over code) a lot

ConsoleApp2 (Debugging) - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

Process: [21240] vstest.executionengine.x8 Any CPU Continue

Fingers are getting tired!

Program.cs + X InvoiceServiceTests.cs

C# ConsoleApp2

ConsoleApp2.InvoiceService

26 references

```
16 public class InvoiceService
17 {
18     public decimal CalculateTotal(Invoice invoice)
19     {
20         var total = 0M; ≤ 1ms elapsed
21         foreach (var item in invoice.Items)
22         {
23             if (item.TaxRate.HasValue)
24             {
25                 total += item.Quantity * item.UnitPrice * (1 + item.TaxRate.Value);
26             } else
27             {
28                 total += item.Quantity * item.UnitPrice;
29             }
30         }
31         return total;
32     }
}
```

Call Stack Breakpoints Exception Settings Command Window Immediate Window Output Autos Locals Watch 1 Find Symbol Results

Ln 20 Col 13 Ch 13 INS

Add to Source Control

Run to Click

? Do you ever forget to clean up the breakpoints you set?

```
static void Main(string[] args)
{
    int x = 0;
    
    x++;
    x = x * 2;
}
```

ConsoleApp2 (Debugging) - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

Process: [21240] vstest.executionengine.x86 Lifecycle Events Thread: [22600] <No Name> Stack Frame: ConsoleApp2.InvoiceService.CalculateTotal

Program.cs □ X InvoiceServiceTests.cs

C# ConsoleApp2

ConsoleApp2.InvoiceService

CalculateTotal(Invoice invoice)

26 references

```
16 public class InvoiceService
17 {
18     public decimal CalculateTotal(Invoice invoice)
19     {
20         var total = 0M;
21         foreach (var item in invoice.Items)
22         {
23             if (item.TaxRate.HasValue)
24             {
25                 total += item.Quantity * item.UnitPrice * (1 + item.TaxRate.Value);
26             } else
27             {
28                 total += item.Quantity * item.UnitPrice;
29             }
30         }
31         return total; ≤ 1ms elapsed
32     }
}
```

Test Explorer Solution Explorer Team Explorer Diagnostic Tools

Call Stack Breakpoints Exception Settings Command Window Immediate Window Output Autos Locals Watch 1 Find Symbol Results

Ready Ln 20 Col 13 Ch 13 INS Add to Source Control

Summary - Run to Click

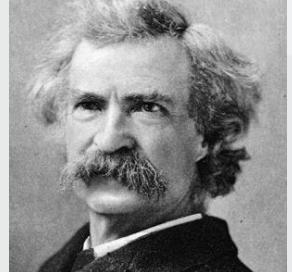
- ✓ No need to set temporary breakpoints or hitting F10 (Step over)
- ✓ Just click to where you want the debugger to execute code to



New Exception Helper

Join the Conversation #VS2017 @AdamCogan #NDCSydney

VS 2015



```
[assembly: OwinStartupAttribute(typeof(WebApplication2))]
namespace WebApplication2
{
    public partial class Startup {
        public void Configuration(IAppBuilder app)
        {
            ConfigureAuth(app);
        }

        string something = "aa";
        string.Format("{1}", something);
    }
}
```

⚠ FormatException was unhandled by user code

An exception of type 'System.FormatException' occurred in System.dll

Additional information: Index (zero based) must be between 0 and the size of the string minus one.

Troubleshooting tips:

- When converting a string to DateTime, parse the string correctly.
- Make sure your method arguments are in the right order.
- Get general help for this exception.

[Search for more Help Online...](#)

Exception settings:

Break when this exception type is user-unhandled

Actions:

[View Detail...](#)

[Enable editing](#)

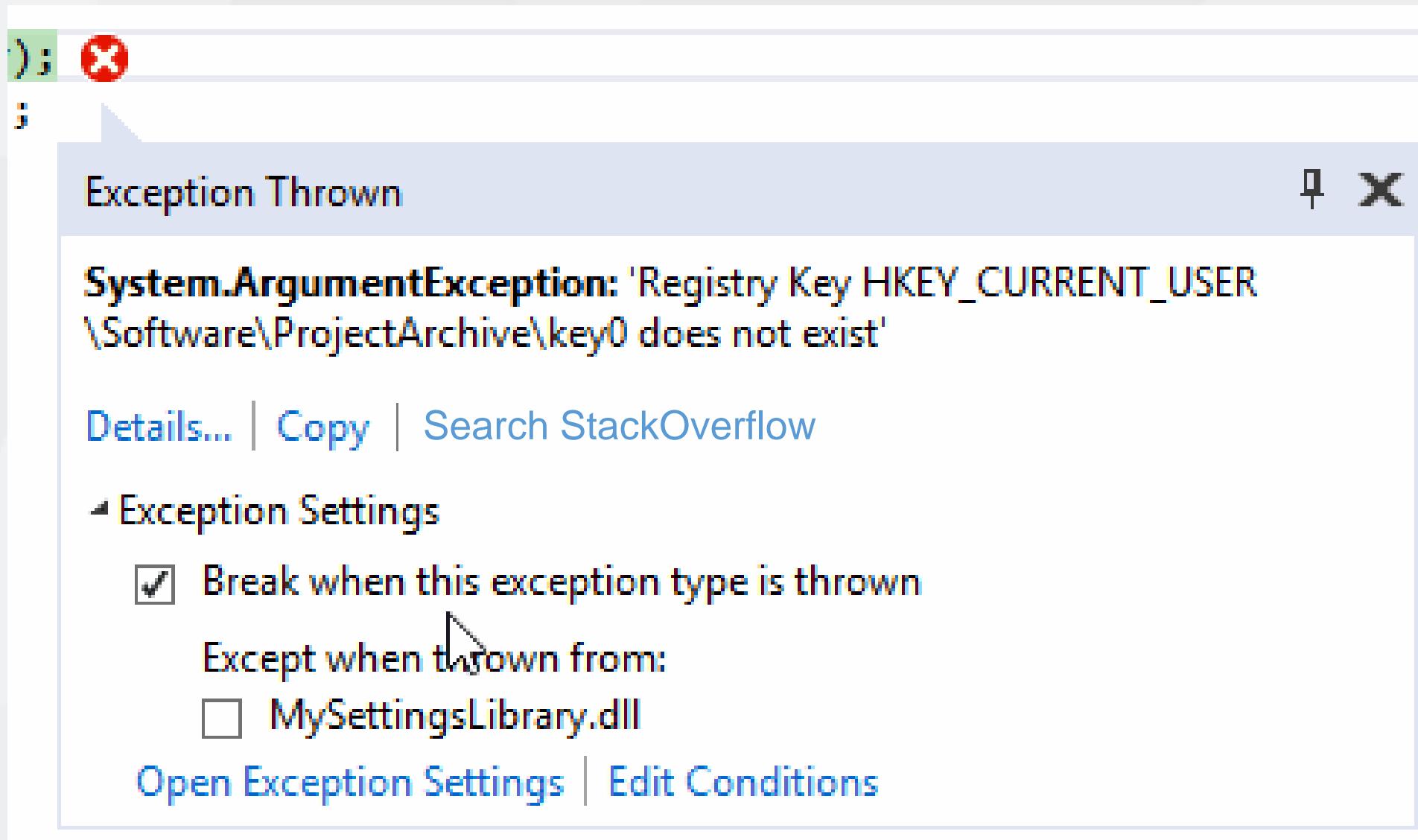
[Open exception settings](#)

"If I had more time, I would have written you a shorter letter."

Do you expect me to
read all this shit?



VS 2017



Search Stack Overflow

<https://visualstudio.uservoice.com/forums/121579-visual-studio-ide/suggestions/18013423-vs2017-exception-dialog-is-missing-one-button-pl>

<https://twitter.com/AdamCogan/status/831626914791989248>

1

vote

Vote

VS2017 exception dialog is missing one button - please add a "Search Stack Overflow" button

The new exception dialog in VS2017 is much neater. Thank you.

It only needs a "Search StackOverflow" button to be perfect!

-a

www.adamcogan.com



CleanerExceptionDialog.png

51 KB



Adamcogan shared this idea · February 10, 2017 · [Flag idea as inappropriate...](#)

Visual Studio IDE: Debug

[Post a new idea...](#)

All ideas

My feedback

.NET 430

Accessibility 83

Blend for Visual Studio 27

Cloud 73

Debugging and Diagnostics

Developer Community 17

Extensibility 101

Games 23

IDE and Editor 2044

Summary - New Exception Helper

- ✓ Cleaner
- ✓ Lets you quickly add a condition to ignore the exception if thrown by a certain DLL

<https://visualstudio.uservoice.com/forums/121579-visual-studio-ide/suggestions/18013423-vs2017-exception-dialog-is-missing-one-button-pl>

Better NULL reference message

Object reference not set to an instance of an object.

?

Penny

Join the Conversation #VS2017 @AdamCogan #NDCSydney

VS 2015



Or



```
    padCells(checklistTable);
    checklistTable.WidthPercentage = widthPercentage;
    checklistTable.SplitLate = false;
    checklistTable.SplitRows = true;
    doc.Add(checklistTable);
```

```
// Close document
doc.Close();
memory.Flush();
memory.Position = 0;

return memory;
}
```

```
//
```

NullReferenceException was unhandled by user code

Object reference not set to an instance of an object.

Troubleshooting tips:

- Use the "new" keyword to create an object instance.
- Check to determine if the object is null before calling the method.
- Get general help for this exception.

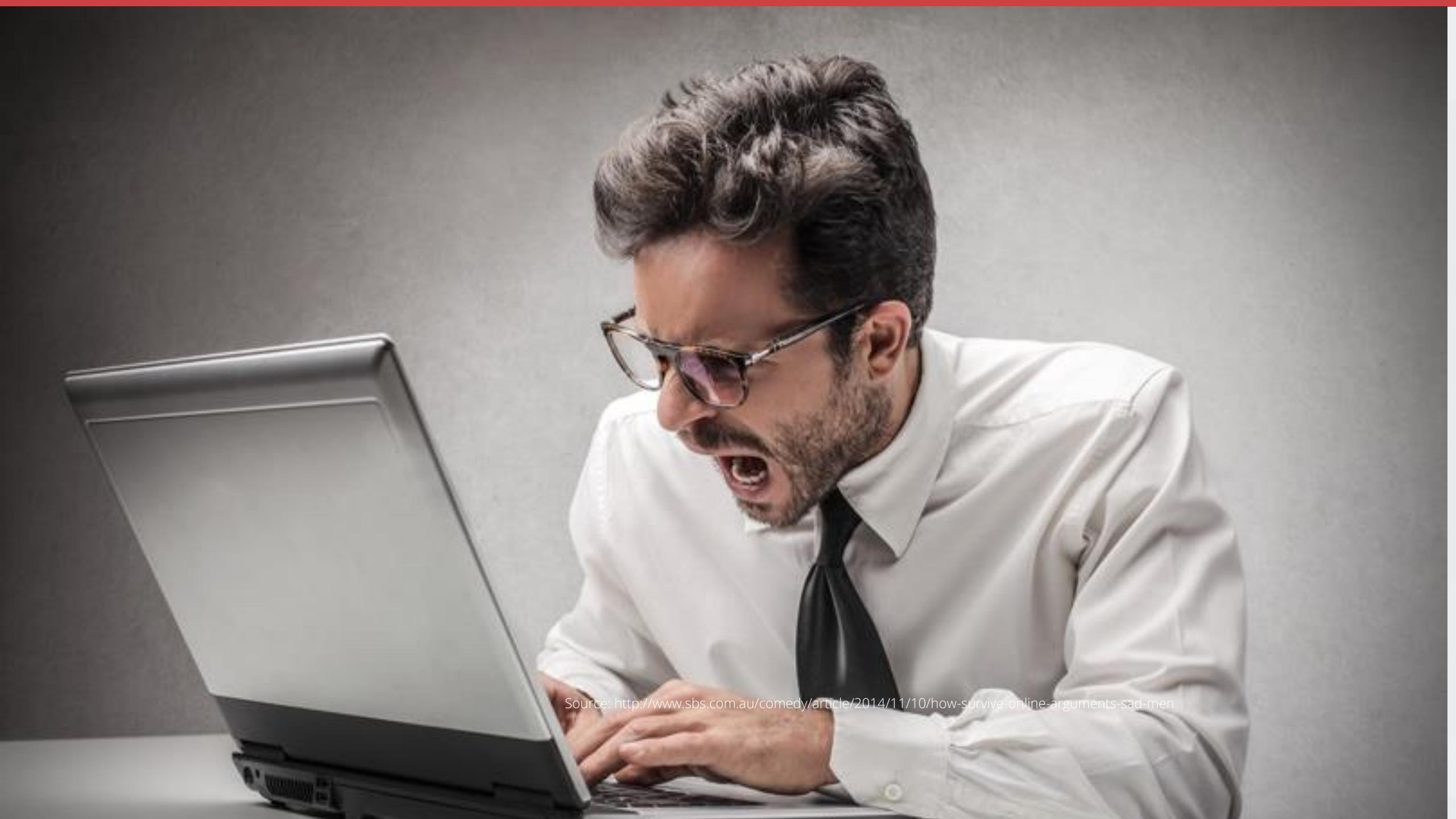
[Search for more Help Online...](#)

Actions:

- [View Detail...](#)
- [Enable editing](#)
- [Copy exception detail to the clipboard](#)

	Value
	{"Object reference not set to an instance of an object."}
	{BigYOperationsConsole.Models.ChecklistTable}
	{iTextSharp.text.Document}

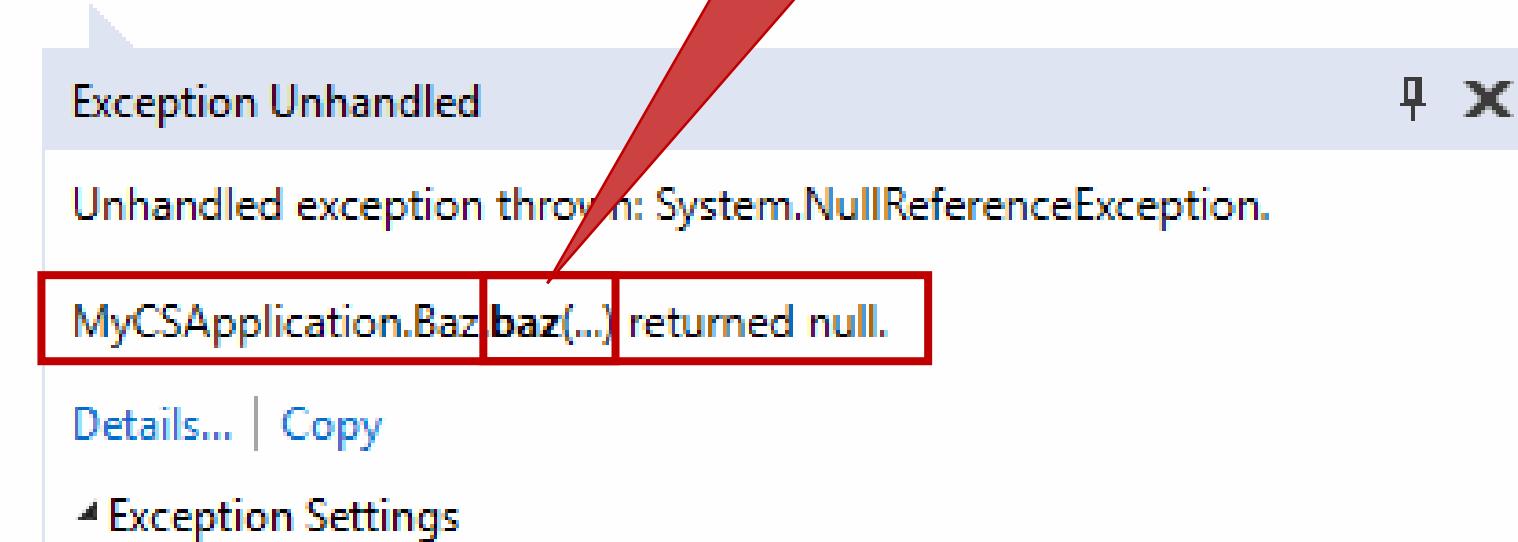
WEDEV.WEDEVWEBSITE (managed) (v)



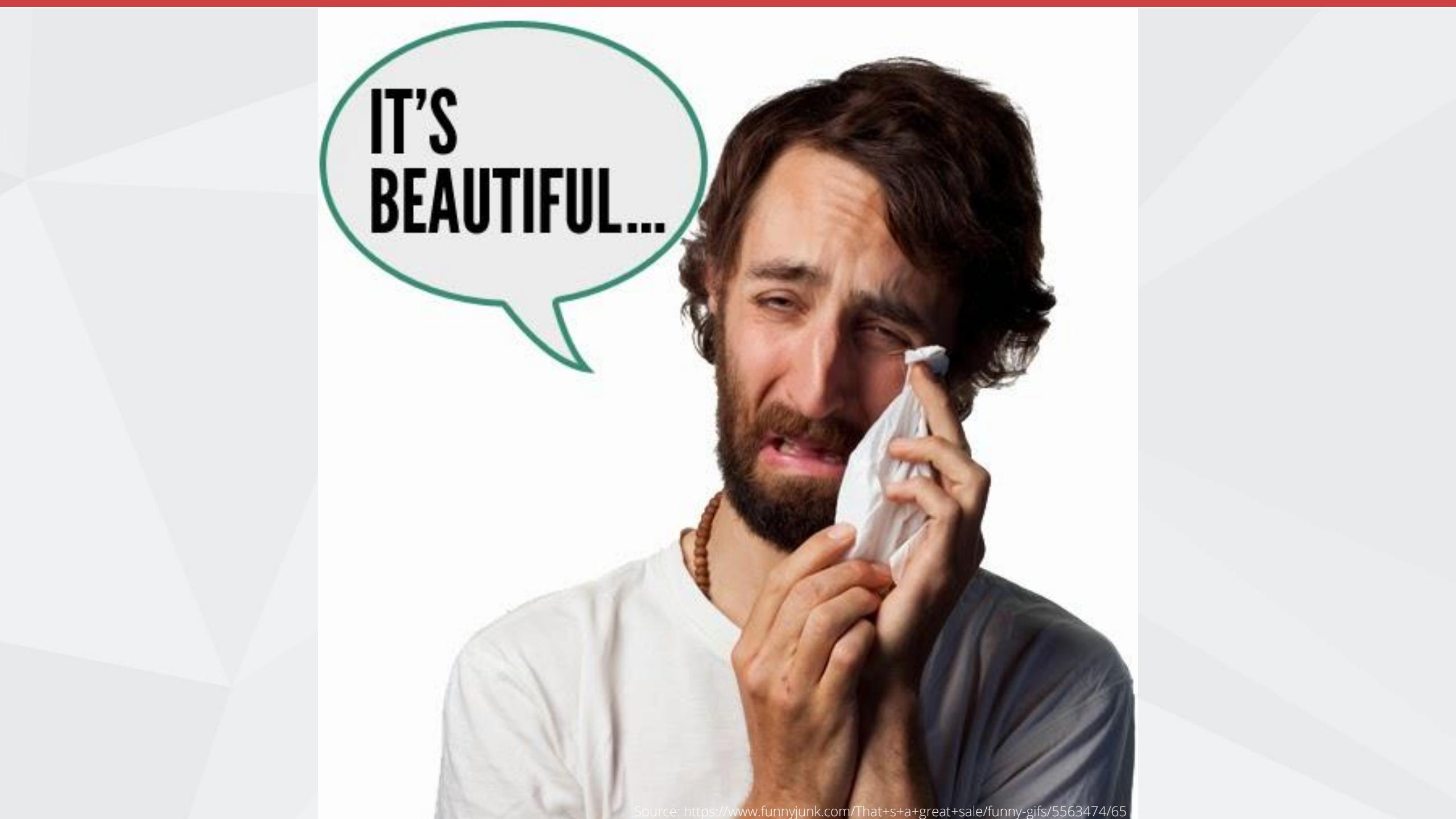
Source: <http://www.sbs.com.au/comedy/article/2014/11/10/how-survive-online-arguments-sad-men>

VS 2017

```
int v = f.foo().bar().baz().GetValue(); 
```



The NULL is ***bolded***



**IT'S
BEAUTIFUL...**

Better NullPointerException Error message

<https://visualstudio.uservoice.com/forums/121579-visual-studio-ide/suggestions/2371587-better-nullpointerexception-error-message>

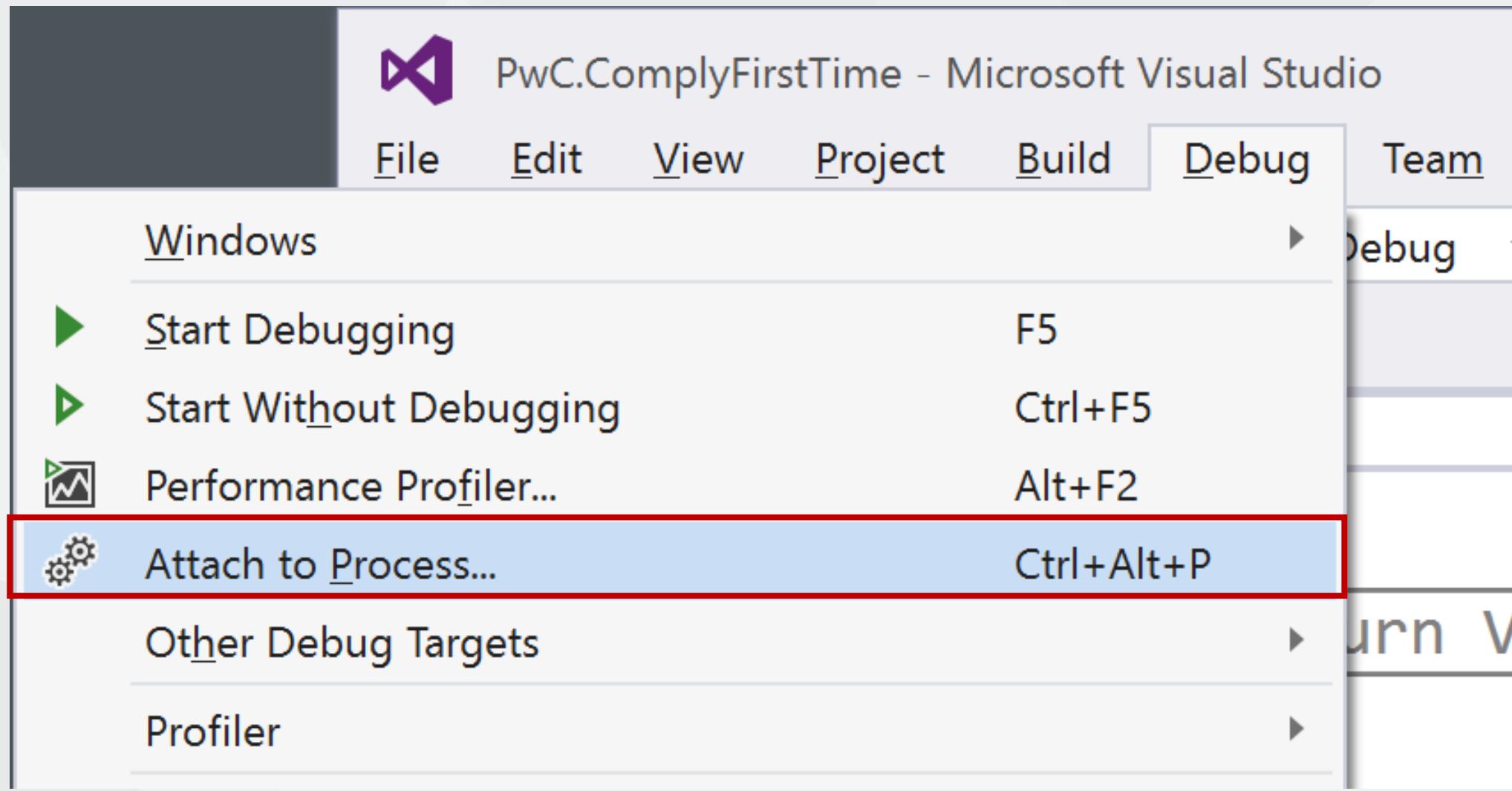
2687 votes



Join the Conversation #VS2017 @AdamCogan #NDCSydney



“Attach to Process” gets a filter (1 of 2)



Transport: Default

Qualifier: ARCHON

Transport Information

The default transport lets you select processes on this computer or a remote computer running the Visual Studio Remote Debugger (MSVSMON.EXE).

Attach to: Automatic: Native code

Available Processes

Filter Processes 

Process	ID	Title	Type	User Name	Session
ApplicationFrameHost.exe	14544	Home Page - WebApplication2 - Microsoft Edge	x64	SSW2000\ericphan	1
browser_broker.exe	8320		x64	SSW2000\ericphan	1
chrome.exe	7680		WebKit, x64	SSW2000\ericphan [u...]	1
chrome.exe	10080		WebKit, x64	SSW2000\ericphan [u...]	1
chrome.exe	18540		WebKit, x64	SSW2000\ericphan [u...]	1
chrome.exe	19396		WebKit, x64	SSW2000\ericphan [u...]	1
chrome.exe	15380		WebKit, x64	SSW2000\ericphan [u...]	1
chrome.exe	19716		WebKit, x64	SSW2000\ericphan [u...]	1
chrome.exe	17072		WebKit, x64	SSW2000\ericphan [u...]	1
chrome.exe	7000		WebKit, x64	SSW2000\ericphan [u...]	1
chrome.exe	6468		WebKit, x64	SSW2000\ericphan [u...]	1

Show processes from all users

Transport:

Default

Qualifier:

ARCHON

[Find...](#)

Transport Information

The default transport lets you select processes on this computer or a remote computer running the Visual Studio Remote Debugger (MSVSMON.EXE).

Attach to:

Automatic: Managed (v4.6, v4.5, v4.0) code

[Select...](#)

Available Processes

 [X](#) [▼](#)

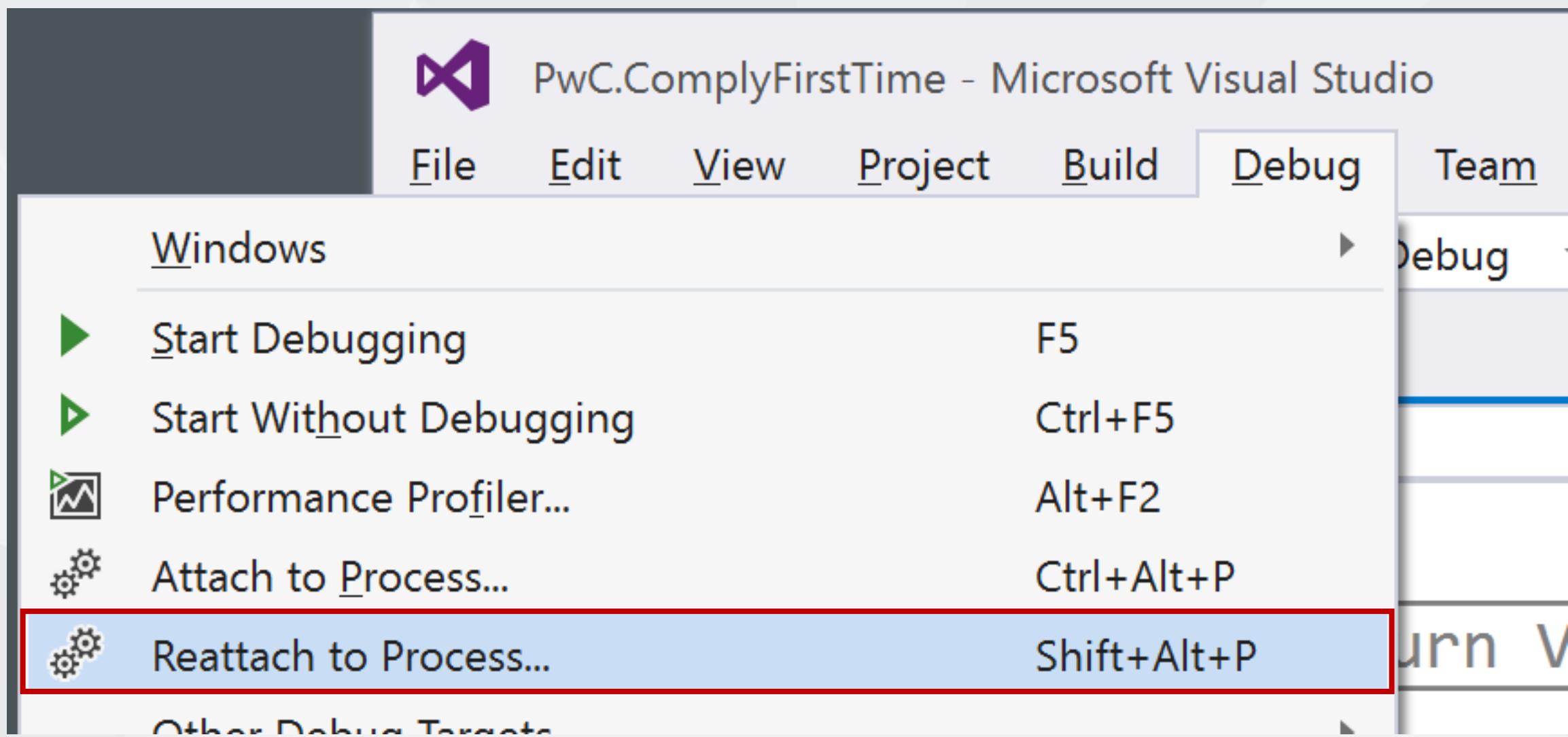
Process	ID	Title	Type	User Name	Session
iisexpress.exe	14712		Managed (v4....	SSW2000\ericphan	1
iisexpressstray.exe	18044		Managed (v4....	SSW2000\ericphan	1

 Show processes from all users[Refresh](#)[Attach](#)[Cancel](#)

Attach to process filter

- Quickly narrow down the process you're after
- Suggestion to Microsoft
 - Auto filter based on project type/output
 - E.g. if Web app then iisexpress.exe
 - E.g. If Windows app, look into the selected startup project's output settings

Reattach to Process (2 of 2)



Reattach to Process

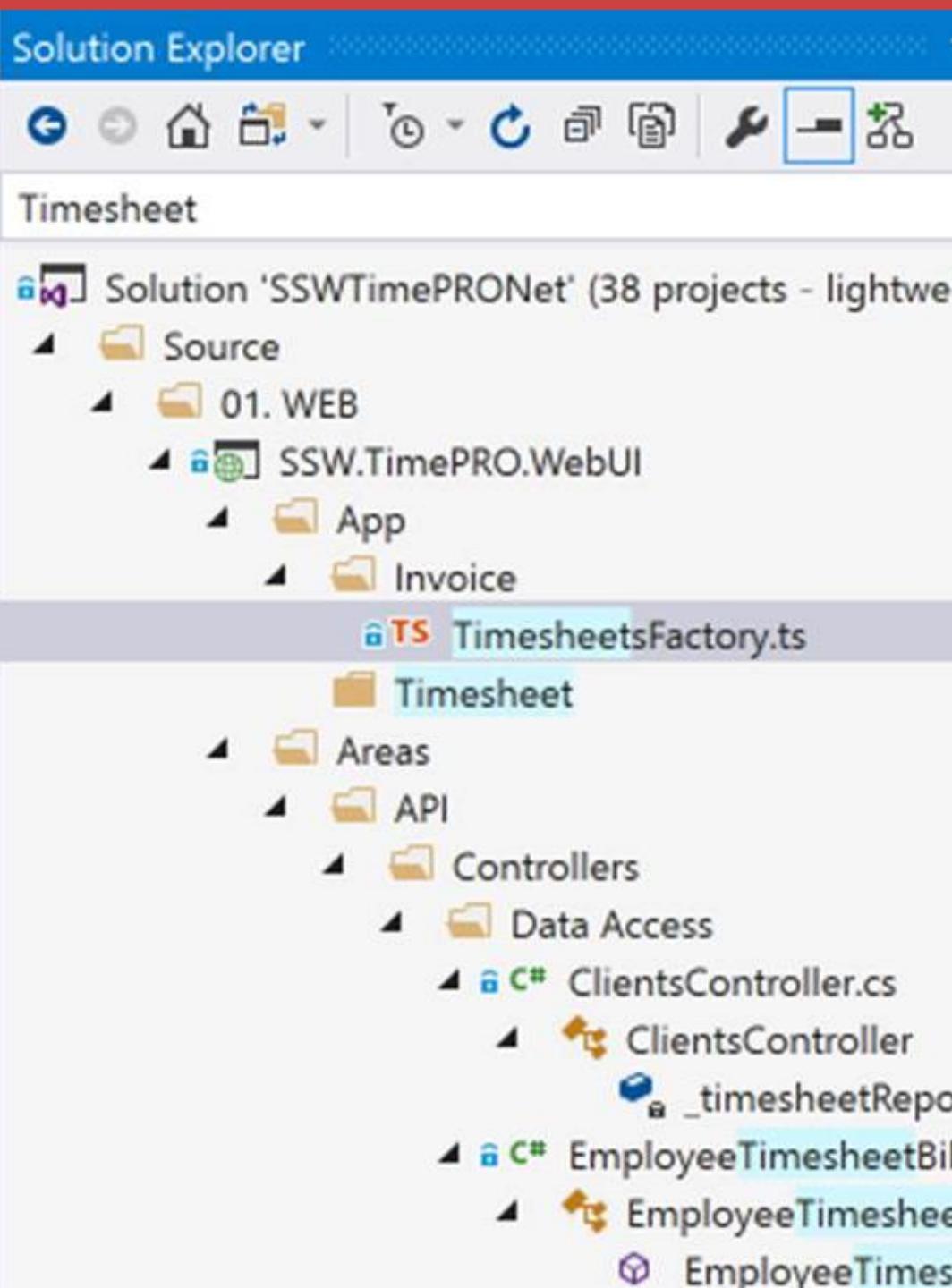
- ✖ In VS 2015, it had Alzheimer's
- ✓ In VS 2017, it remembers and gives you the option to reattach



Go to All

Quickly navigate to the code you're after

- VS 2001 – CTRL + F or scroll
- ReSharper – CTRL + T – Go To Everything
- VS 2013 – CTRL + ; - Solution Explorer Search

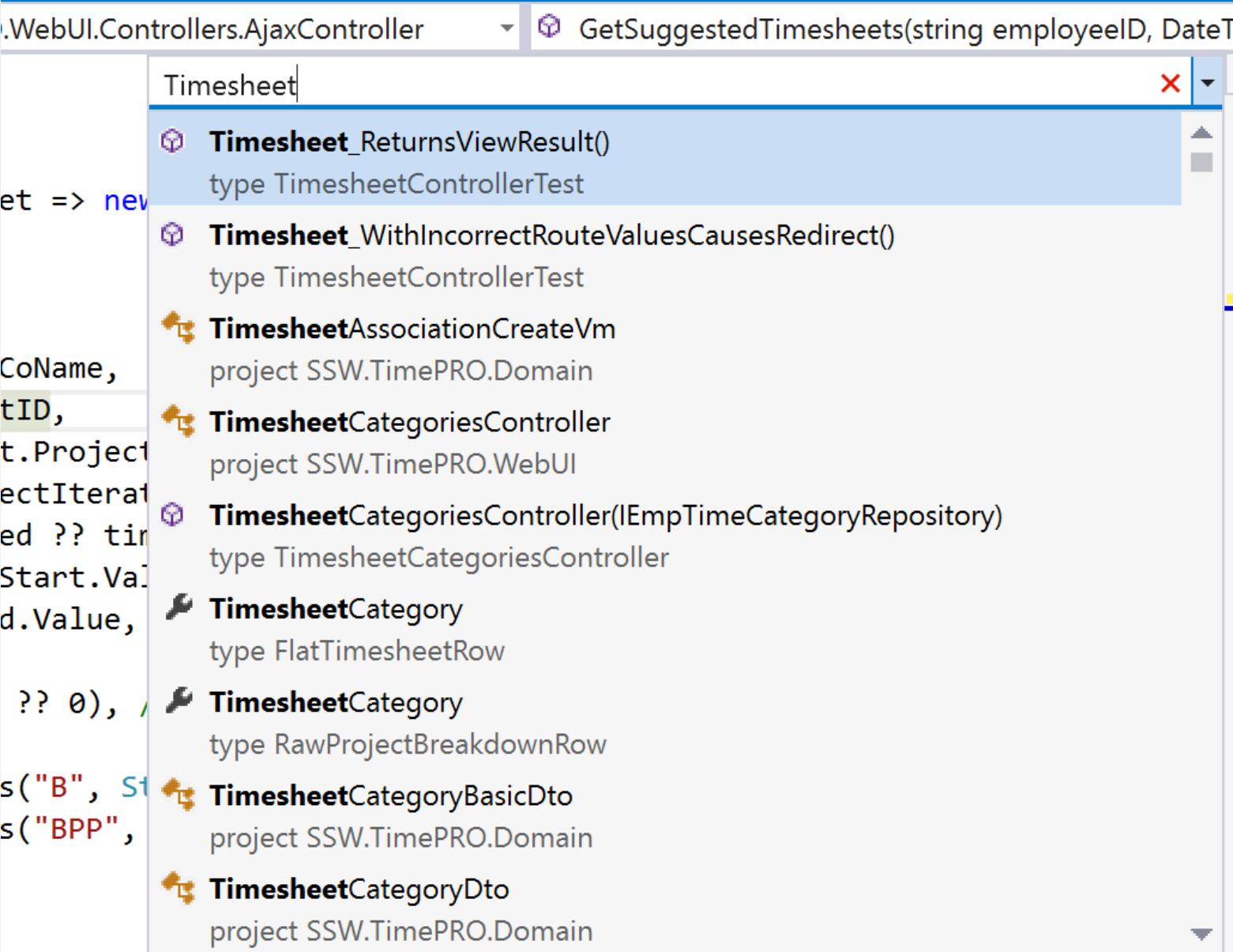


VS 2013

- CTRL + ;
- Filters the Solution Explorer
- Finds
 - Files
 - Classes
 - Properties
 - Methods
- Scroll scroll scroll

VS 2015

- **CTRL + ,**
- Finds
 - Files
 - Classes
 - Properties
 - Methods



The screenshot shows the Visual Studio 2015 interface with the Intellisense feature active. The code editor window displays a partial class definition:

```
    et => new
```

The cursor is positioned over the word "Timesheet". A dropdown menu titled "Timesheet" lists several suggestions:

- Timesheet_ReturnsViewResult() type TimesheetControllerTest
- Timesheet_WithIncorrectRouteValuesCausesRedirect() type TimesheetControllerTest
- TimesheetAssociationCreateVm project SSW.TimePRO.Domain
- TimesheetCategoriesController project SSW.TimePRO.WebUI
- TimesheetCategoriesController(IEmpTimeCategoryRepository) type TimesheetCategoriesController
- TimesheetCategory type FlatTimesheetRow
- TimesheetCategory type RawProjectBreakdownRow
- TimesheetCategoryBasicDto project SSW.TimePRO.Domain
- TimesheetCategoryDto project SSW.TimePRO.Domain



Quick Launch (Ctrl+Q)



Eric

VS 2017 – Go To All #1

- CTRL + T (CTRL + ,)
- Finds
 - Files
 - Classes
 - Properties
 - Methods
- Can filter like Intellisense...

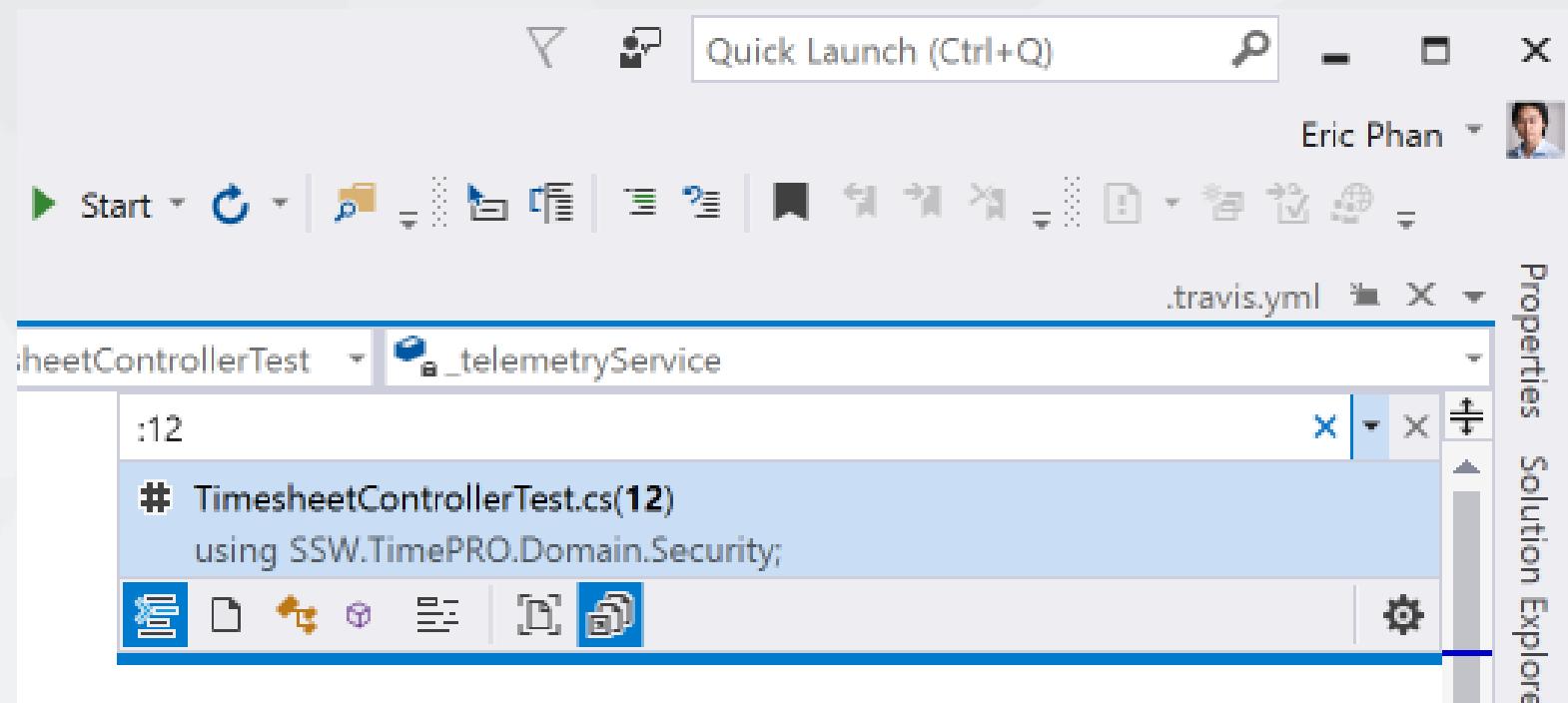
Timesheet

- Timesheet_ReturnsViewResult()
type TimesheetControllerTest
- Timesheet_WithIncorrectRouteValuesCausesRedirect()
type TimesheetControllerTest
- TimesheetAssociationCreateVm
project SSW.TimePRO.Domain
- TimesheetCategoriesController
project SSW.TimePRO.WebUI
- TimesheetCategoriesController(IEmpTimeCategoryRepository)
type TimesheetCategoriesController
- TimesheetCategory
type FlatTimesheetRow
- TimesheetCategory
type RawProjectBreakdownRow
- TimesheetCategoryBasicDto
project SSW.TimePRO.Domain
- TimesheetCategoryDto



VS 2017 – Go To All #2

- CTRL + G
- VS2017 also triggers
Go To All
- Go to line number
:<line number>
m<member>
t<types>



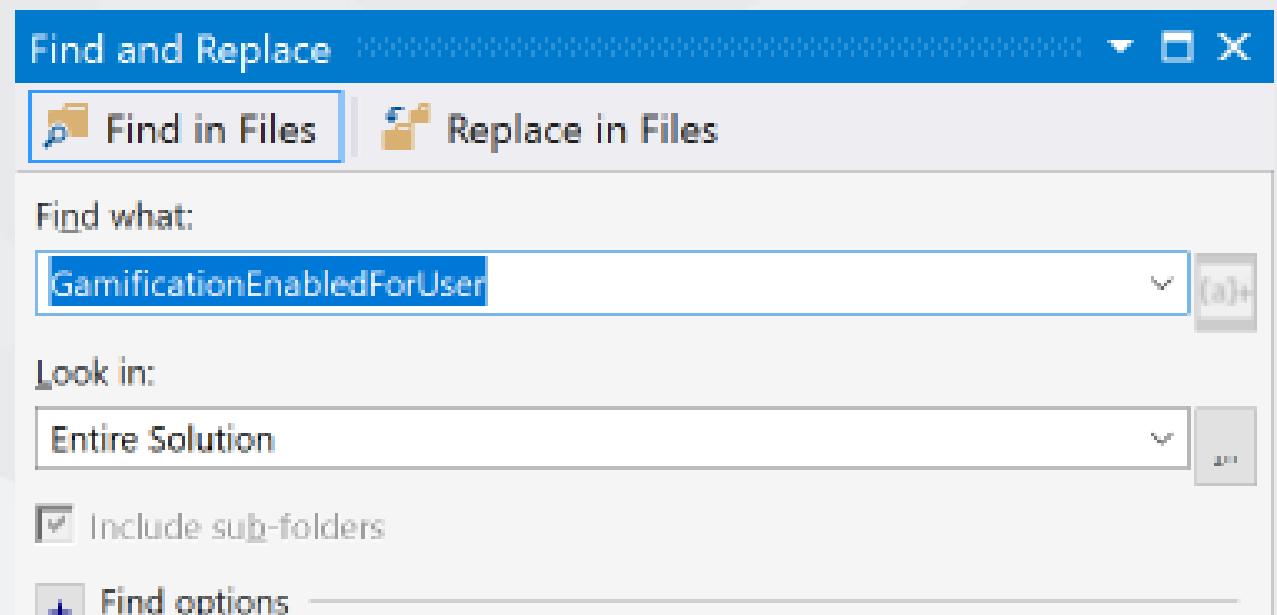
Better Find All References

e.g. I want to see where **GamificationEnabledForUser** is used in code

```
public interface IGamificationService
{
    bool GamificationEnabledForUser(string employeeId);
}
```

Better Find All References

- Old school
- CTRL + SHIFT + F



Find Results 1

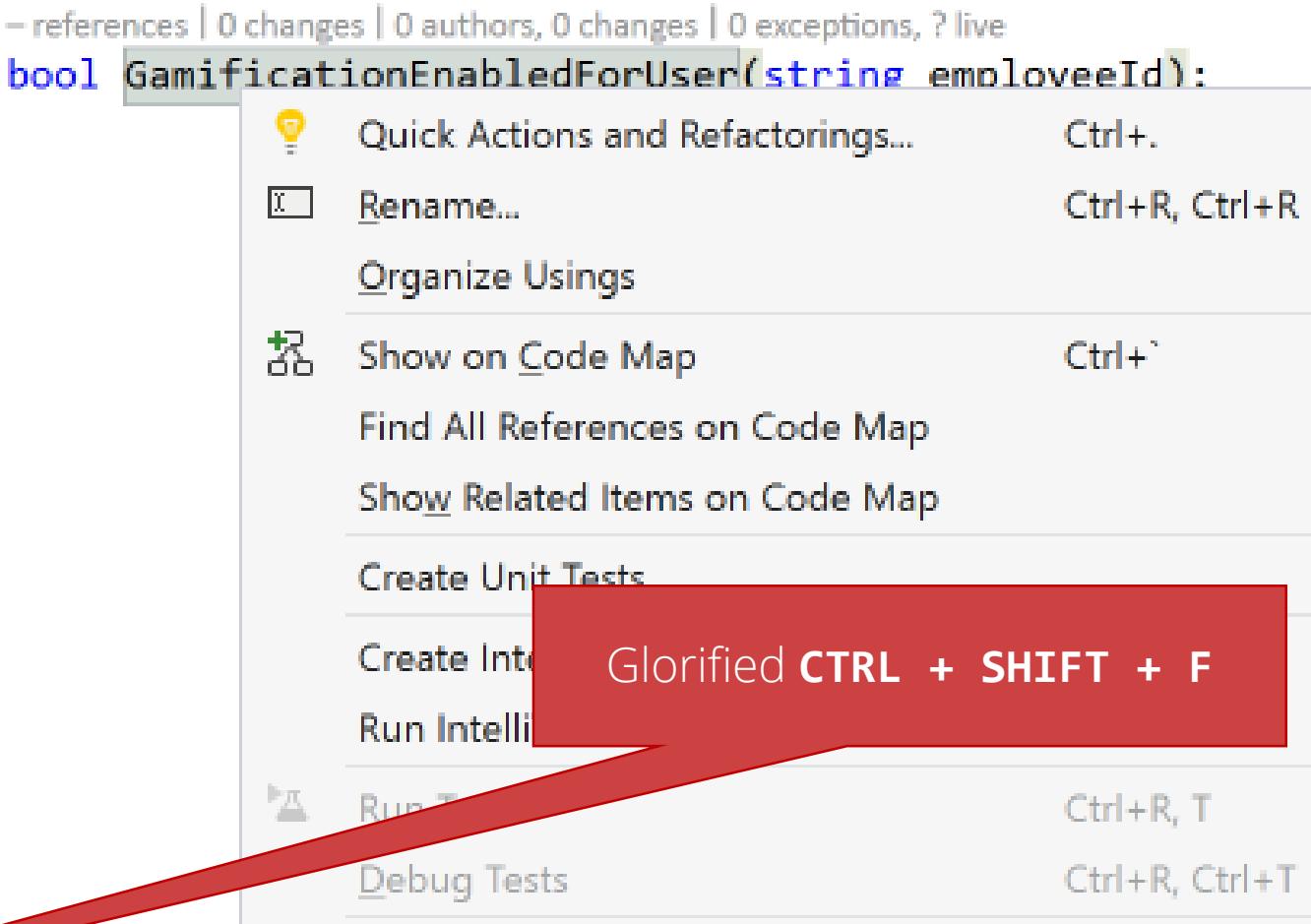
Find all "GamificationEnabledForUser", Subfolders, Find Results 1, Entire Solution, ""

C:\ProjectsTfs\SSW.TimeProDotNet\mvc-trunk\WebUI\Controllers\ReportsController.cs(76):	model.GamificationEnabled = _gamificationService.GamificationEnabledForUser(string employeeId);
C:\ProjectsTfs\SSW.TimeProDotNet\mvc-trunk\WebUI\Controllers\TimesheetController.cs(108):	model.GamificationEnabled = _gamificationService.GamificationEnabledForUser(string employeeId);
C:\ProjectsTfs\SSW.TimeProDotNet\mvc-trunk\Domain\Services\IGamificationService.cs(11):	bool GamificationEnabledForUser(string employeeId);
C:\ProjectsTfs\SSW.TimeProDotNet\mvc-trunk\Services\GamificationService.cs(19):	public bool GamificationEnabledForUser(string employeeId)

Matching lines: 4 Matching files: 4 Total files searched: 50164

Better Find All F

- VS 2015



Find Symbol Results - 2 matches found



- [SSW.TimePRO.Domain] bool IGamificationService.GamificationEnabledForUser(string) (2 references)
 - SSW.TimePRO.WebUI\Controllers\ReportsController.cs - (76, 62) : model.GamificationEnabled = _gamificationService.GamificationEnabledForUser(_userContext.EmployeeID);
 - SSW.TimePRO.WebUI\Controllers\TimesheetController.cs - (108, 62) : model.GamificationEnabled = _gamificationService.GamificationEnabledForUser(_userContext.EmployeeID);
- [SSW.TimePRO.Services] bool GamificationService.GamificationEnabledForUser(string) (0 references)

Find All References

Shift+F12

View Call Hierarchy

Ctrl+K, Ctrl+T

Better Find All References

- VS 2017

The screenshot shows the 'Find All References' tool window in Visual Studio 2017. The window title is 'Find All References 1 - GamificationEnabledForUser'. The interface includes a toolbar with 'Entire Solution', 'Group by', 'Keep Results', and search/filter options. Below the toolbar is a navigation bar with tabs for 'Code', 'File', 'Line', 'Col', and 'Project'. The main content area displays a hierarchical list of references across three projects: SSW.TimePRO.Domain, SSW.TimePRO.Services, and SSW.TimePRO.WebUI. The 'Code' tab is selected, showing the following results:

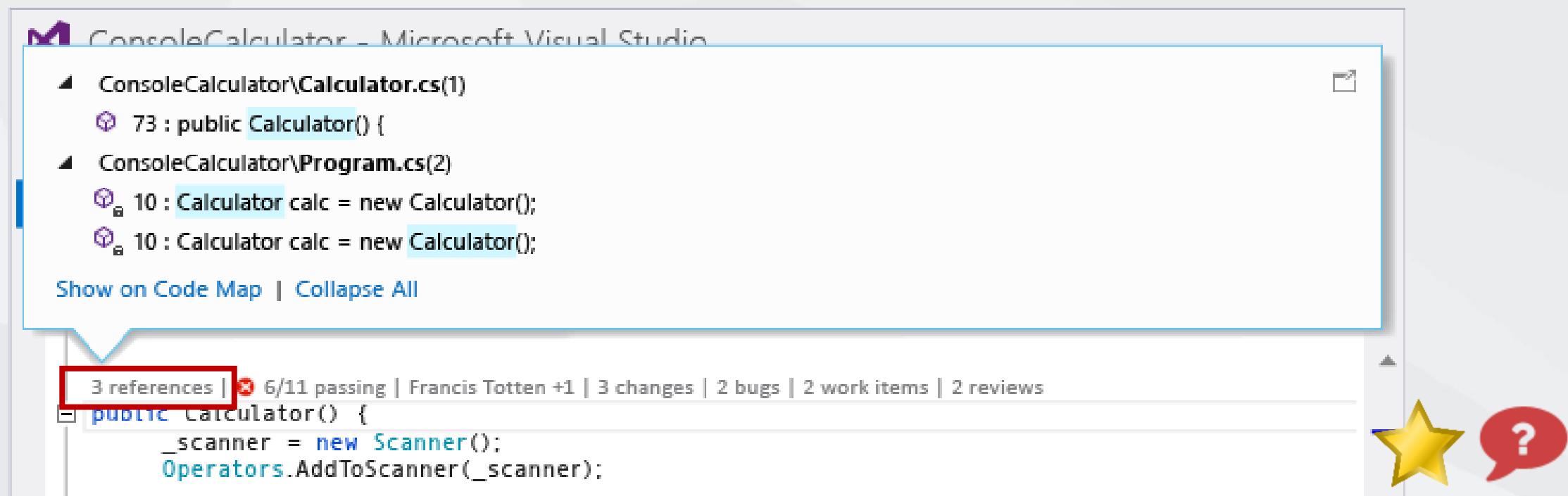
Reference Type	Definition	File	Line	Col	Project
bool IGamificationService.GamificationEnabledForUser(string)	SSW.TimePRO.Domain	GamificationService.cs	19	21	SSW.TimePRO.Services
	SSW.TimePRO.Services	GamificationService.cs	76	62	SSW.TimePRO.WebUI
bool GamificationService.GamificationEnabledForUser(string)	SSW.TimePRO.Services	GamificationService.cs	108	62	SSW.TimePRO.WebUI
	SSW.TimePRO.WebUI	ReportsController.cs			
{	SSW.TimePRO.WebUI	TimesheetController.cs			

Annotations with red arrows point to specific features:

- A red arrow points from the 'More readable grouping' callout to the collapsed sections in the tree view.
- A red arrow points from the 'Syntax highlighting' callout to the highlighted code in the 'Code' tab.
- A red arrow points from the 'Hover over for surrounding code for better context' callout to the mouse cursor hovering over the 'GamificationEnabledForUser' method name in the code preview.

CodeLens - Find All References

- VS2013 - CodeLens also gives you another way to Find All References



CodeLens and DevOps ?

- I want developers to see live bugs, issues and performance metrics with code that they are working on
- We already have this info in Application Insights
- <https://rules.ssw.com.au/do-you-know-the-process-to-improve-the-health-of-your-web-application>

CodeLens – VS 2017

- Visual Studio 2017 includes Developer Analytics Tools
- App Insights metrics live in Code Lens
- ... See usage + exceptions



View in Browser (Google Chrome) Ctrl+Shift+W

Browse With...

Publish Connected Services

Alt+;, Alt+P

Replace Connected Services from server

Alt+;, Alt+R

Add

Add Service Reference...

Add Connected Service...

Scope to This

New Solution Explorer View

Show on Code Map

View History...

Cut

Ctrl+X

Copy

Ctrl+C

Paste

Ctrl+V

Delete

Del

Rename

Properties

Alt+Enter

Overview

Connected Services

Publish

Connected Services

Add code and dependencies for one of these services to your application



Monitoring with Application Insights

Gain visibility into your application using Application Insights right from Visual Studio.



Cloud Storage with Azure Storage

Store and access data with Azure Storage services like Blobs, Queues, and Tables.



Office 365 APIs

Integrate your applications with Office 365 APIs



Authentication with Azure Active Directory

Configure Single Sign-On in your application using Azure AD.

[Find more services...](#)

SSW.SugarLearning - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

Eric Phan

Quick Launch (Ctrl+Q)

Server Explorer

Toolbox

Data Sources

Application Insights Trends SSW.SugarLearning.WebUI Application Insights Configuration

Application Insights

Choose the Azure accounts for App Insights

Resource Settings

Sending telemetry to sugarlearning in Default-Web-westus

CodeLens and Diagnostic Tools are reading telemetry from adamcogan as Eric Phan.

Configure App Insights for the Project

Configured 100%

- SDK added
- App registered with Application Insights
- Exception collection enabled
- Trace collection enabled

Your app is configured to send traces from log4net to Application Insights.

Output Find Symbol Results Task Runner Explorer Data Tools Operations

Ready ↑ 0 ↪ 8 SSW.Induction master

SSW.SugarLearning - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

Debug Any CPU SSW.SugarLearning.WebUI Google Chrome

SSW.SugarLearning.WebUI Application Insights Configuration ModuleController.cs SugarAdminController.cs

Server Explorer Toolbox Data Sources

SSW.SugarLearning.WebUI

```
88 } } return View(model);  
89 }  
90 }  
91 }  
92 [HttpPost]  
93 [AllowAnonymous]  
94 [ValidateAntiForgeryToken]  
95 public async Task<ActionResult> Login(LoginViewModel model, string userName)  
96 {  
97     if (model.IsPasswordForgotten)  
98     {  
99         var forgotPasswordRoute = RouteAnonymouslyTo(ActionFor.Password);  
100        if (!string.IsNullOrEmpty(model.UserName))  
101        {  
102            forgotPasswordRoute.RouteValues.Add("userName",  
103                model.UserName);  
104            return forgotPasswordRoute;  
105        }  
106    }  
107    else  
108    {  
109        if (ModelState.IsValid)  
110        {  
111            // One way
```

Application Insights - Last 24 hours, 3m ago

Requests	Failed Requests	Average Response
0	0	-
4 live (0%)	0 live (0%)	366ms live (+61%)

See All | Investigate See All | Investigate Investigate

0 references | Shigemi Matsumoto, 359 days ago | 4 authors, 16 changes | 8 work items | 0 requests, 4 live | 0 exceptions

Quick Launch (Ctrl+O)

Usage: See number of requests, exceptions and performance!

New CodeLens items for App Insights

Output Find Symbol Results Task Runner Explorer Data Tools Operations

Ln 106 Col 17 Ch 17 INS ↑ 0 ↪ 8 ↳ SSW.Induction ↴ master ↵

SSW.SugarLearning - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

Eric Phan

Quick Launch (Ctrl+Q)

Server Explorer

Toolbox

Data Sources

SSW.SugarLearning.WebUI

Application Insights Configuration

ModuleController.cs

SugarAdminCor

Timeline of events

Readiness:

Explore Telemetry Trends

Enter search terms, or click the Search icon to show all

Time range: Last 24 hours

All Availability Custom Event Dependency Exception Page View Request Trace

4 0 0 0 0 0 4 0

Request name: POST Acco... x

2

1

0

11:00 AM 1:00 PM 3:00 PM 5:00 PM 7:00 PM 9:00 PM 11:00 PM 1:00 AM 3:00 AM 5:00 AM 7:00 AM 9:00 AM 11:00 AM

Results between 31/01/2017 11:47:44 AM and 1/02/2017 11:47:44 AM.

Refine by

Search Fields

2/1/2017 9:31:50 AM - Request

POST Account/Login
Request URL: https://sugarlearning.com/Public/Account/Login?CompanyId=0 Response code: 302 Response time: 362ms

2/1/2017 9:16:23 AM - Request

POST Account/Login
Request URL: https://www.sugarlearning.com/Public/Account/Login?CompanyId=0 Response code: 302 Response time: 222ms

1/31/2017 9:38:33 PM - Request

POST Account/Login
Request URL: https://sugarlearning.com/Public/Account/Login?CompanyId=0 Response code: 302 Response time: 519ms

1/31/2017 12:08:44 PM - Request

POST Account/Login
Request URL: https://sugarlearning.com/Public/Account/Login?CompanyId=0 Response code: 302 Response time: 361ms

Details of each event

Output Find Symbol Results Task Runner Explorer Data Tools Operations

Ready ↑ 0 ↖ 8 ↘ SSW.Induction master ↗

SSW.SugarLearning - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

Eric Phan

Quick Launch (Ctrl+Q)

Server Explorer

Toolbox

Data Sources

SSW.SugarLearning.WebUI Application Insights Configuration ModuleController.cs SugarAdminController.cs ItemController.cs Application Insights Search

Explore Telemetry Trends

Enter search terms, or click the Search icon to show all

Time range: Last 24 hours

All Availability Custom Event Dependency Exception Page View Request Trace

4 0 0 0 0 0 4

Request name: POST Acco... x

Details of the event

Results between 31/01/2017 11:56:51 AM and 1/02/2017 11:56:51 AM.

Refine by

Search Fields

City: Mumbai, Neutral Bay, Point Cook

Client IP address: 210.89.40.0, 220.233.130.0, 58.96.64.0

Country or region: Australia, India

Device type

2/1/2017 9:31:50 AM - Request
POST Account/Login
Request URL: https://sugarlearning.com/Public/Account/Login?CompanyId=0 Response code: 302 Response time: 362ms

2/1/2017 9:16:23 AM - Request
POST Account/Login
Request URL: https://www.sugarlearning.com/Public/Account/Login?CompanyId=0 Response code: 302 Response time: 222ms

1/31/2017 9:38:33 PM - Request
POST Account/Login
Request URL: https://sugarlearning.com/Public/Account/Login?CompanyId=0 Response code: 302 Response time: 519ms

1/31/2017 12:08:44 PM - Request
POST Account/Login
Request URL: https://sugarlearning.com/Public/Account/Login?CompanyId=0 Response code: 302 Response time: 361ms

Request Details | Track Operation

Properties

Standard (21)

City:	Point Cook
Client IP address:	58.96.64.0
Country or region:	Australia
Device type:	PC
Event count:	1.00
Event time:	2/1/2017 9:31:50 AM
Operation ID:	cJt4fPvbUoQ=
Operation name:	POST Account/Login
Operation parent ID:	cJt4fPvbUoQ=
Performance:	250ms-500ms

Output Find Symbol Results Task Runner Explorer Data Tools Operations

Ready ↑ 0 ⌂ 8 SSW.Induction master

SSW.SugarLearning - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

Eric Phan

Quick Launch (Ctrl+Q)

Server Explorer Toolbox Data Sources

SSW.SugarLearning.WebUI Application Insights Configuration ModuleController.cs SugarAdminController.cs ItemController.cs ExposableLogic.cs

SSW.SugarLearning.Business SSW.SugarLearning.Business.Logics.ExposableLogic GetItem<T, TView, TModule>(int itemId, string forUserId)

421 }
422 }
423 } Application Insights - Last 24 hours, 5m ago
424 0 1 ArgumentException at ExposableLogic.GetItem
425 Debug Live itemId
426 See all debug | See all live | Investigate | Analyze impact
427);
428 2 references | Shigemi Matsumoto, 340 days ago | 1 author, 6 changes | 5 work items | 0 exceptions, 1 live
429 public T GetItem<T, TView, TModule>(int itemId, string forUserId)
430 where T : class, IExposedItem<TView>, new()
431 where TView : ItemDetails, new()
432 where TModule : ModuleDetails, new()
433 {
434 // 1. DB hit
435 var isSignedIn = !string.IsNullOrEmpty(forUserId);
436 var data = (
437 from i in _itemRepository.Get().Where(x => x.Id == itemId).Include(x => x.ItemContent,
438 from cu in i.Module.Company.JoinedUsers.Where(x => isSignedIn && x.UserId == forUserId && !x.Re
439 from mr in i.Module.RequestedUsers.Where(x => isSignedIn && x.UserId == forUserId).DefaultIfEmpt
440 from ir in i.Requests.Where(x => isSignedIn && x.UserId == forUserId).DefaultIfEmpty()
441 select new
442 {
Company = i.Module.Company,

Properties Solution Explorer Team Explorer Notifications

Show exceptions happening in production

144 %

Output Find Symbol Results Task Runner Explorer Data Tools Operations

Ln 431 Col 49 Ch 49 INS ↑ 0 ↪ 8 SSW.Induction master

SSW.SugarLearning - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

Eric Phan

Quick Launch (Ctrl+Q)

Server Explorer

Toolbox

Data Sources

Application Insights Configuration

ModuleController.cs

Application Insights Search

SugarAdminController.cs

ItemController.cs

Explore Telemetry Trends

Enter search terms, or click the Search icon to show all

Time range: Last 24 hours

All Availability Custom Event Dependency Exception Page View Request Trace

1 0 0 0 1 0 0

Error details

Problem ID: System.Argu...

1
1
0
0
0

11:00 AM 1:00 PM 3:00 PM 5:00 PM 7:00 PM 9:00 PM 11:00 PM 1:00 AM 3:00 AM 5:00 AM 7:00 AM 9:00 AM 11:00 AM

Results between 31/01/2017 11:49:58 AM and 1/02/2017 11:49:58 AM.

Refine by

Search Fields

Assembly: SSW.SugarLearning.Bu...
City: Beijing
Client IP address: 180.76.15.0
Country or region: China
Device type: PC
Exception type: System.ArgumentExce...

1/31/2017 6:20:56 PM - Exception
itemId
Exception type: System.ArgumentException Failed method: SSW.SugarLearning.Business.Logics.ExposableLogic.GetItem

! Exception Details | Track Operation

Search Properties

Handled Exception (Showing just your code)
System.ArgumentException: itemId
at SSW.SugarLearning.Business.Logics.ExposableLogic.GetItem...
at SSW.SugarLearning.WebUI.Controllers.ForMvc.ExposableCo...

Show all frames | Copy

Properties

Standard (24)
Assembly: SSW.SugarLearning.Business, Version=1.0.0.0, Culture=neutral, PublicKeyToken=null
City: Beijing
Client IP address: 180.76.15.0

Output Find Symbol Results Task Runner Explorer Data Tools Operations

Ready ↑ 0 ⌂ 8 SSW.Induction master

CodeLens – VS 2017

What about other application monitoring software?

- ? New Relic
- ? RayGun
- CodeLens is extensible

CodeLens + RayGun.io (coming soon)

The screenshot shows a Visual Studio code editor with a tooltip overlay. The tooltip is for a crash titled "Crash when first loading program" caused by a NullReferenceException. It indicates 375 total instances, last occurred 27 minutes ago, and 3 users are affected. Below the tooltip, there are links to Resolve, Ignore, Permanently Ignore, View all 13 occurrences, and View Raygun Production. A status bar at the bottom shows "0 references | Raygun: 13 crashes in last 24 hours".

```
using System.Linq;
using Sys
using Sys
namespace
:
    0 reference
class P
{
    0 references | Raygun: 13 crashes in last 24 hours
    static void Main(string[] args)
    {
    }
}
```

Crash when first loading program

NullReferenceException
Object reference not set to an instance of an object
375 total instances | Last occurred 27 minutes ago | 3 users are affected

[Resolve](#) | [Ignore](#) | [Permanently Ignore](#) | [View all 13 occurrences](#) | [View Raygun Production](#)

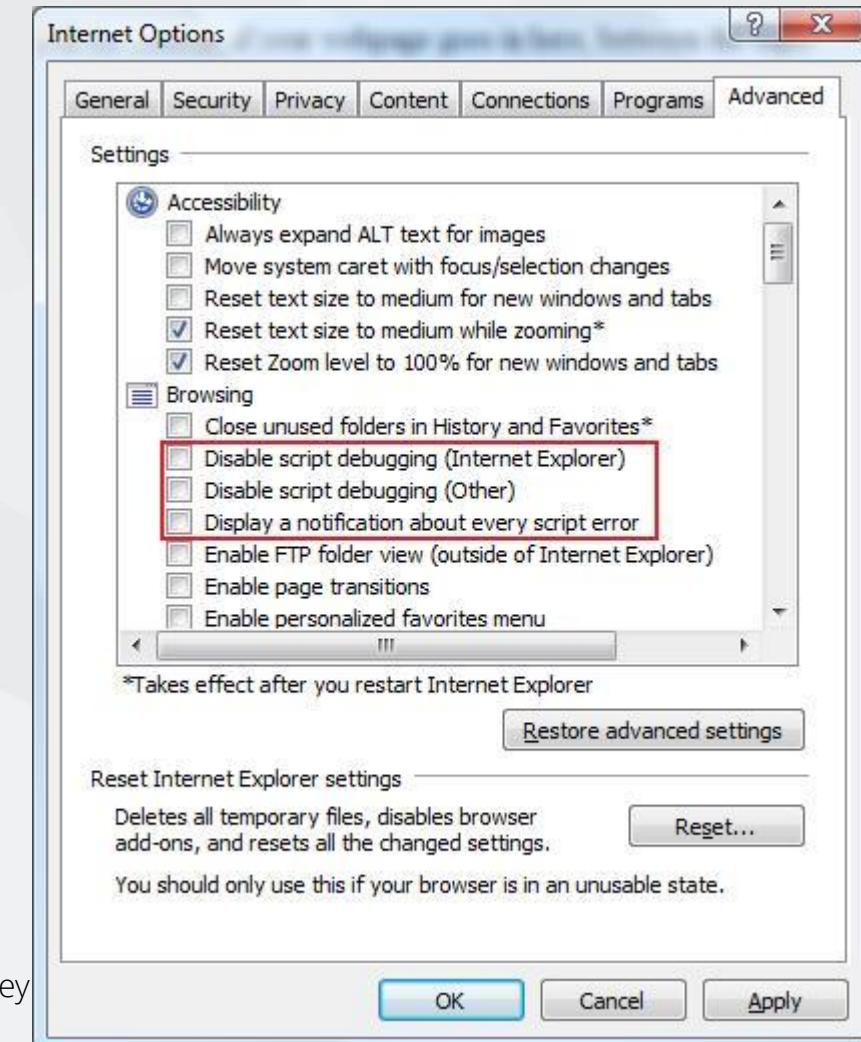


#6 Summary - Better Debugging

- ✓ Easier way to step through code (Don't have to keep hitting F10 – Step Over)
- ✓ Better exception helper
- ✓ Easier ways to navigate and find code
- ✓ More insight into production issues with CodeLens and App Insights
- ✓ Overall cleaner UI for exceptions and finding code

#7 Debug Javascript/Typescript in Visual Studio when using Chrome/Firefox

- Was in IE (not Edge)
- Because dev tools in IE were crap



Search Options (Ctrl+E)



General

- ▷ Environment
- ▷ Projects and Solutions
- ▷ Source Control
- ▷ Work Items
- ▷ Text Editor
- ◀ Debugging
 - General
 - Just-In-Time
 - Output Window
 - Symbols
- ▷ IntelliTrace
- ▷ Performance Tools
- ▷ Database Tools
- ▷ Extensibility Tools
- ▷ GitHub for Visual Studio
- ▷ Live Unit Testing
- ▷ NuGet Package Manager
- ▷ SQL Server Tools

- Highlight entire source line for breakpoints and current statement (C++ c ^)
- Require source files to exactly match the original version
- Redirect all Output Window text to the Immediate Window
- Show raw structure of objects in variables windows
- Suppress JIT optimization on module load (Managed only)
- Enable JavaScript debugging for ASP.NET (Chrome and IE) (Managed only)
- Load dll exports (Native only)
- Show parallel stacks diagram bottom-up
- Ignore GPU memory access exceptions if the data written didn't change t
- Use Managed Compatibility Mode
- Use the legacy C# and VB expression evaluators
- Warn when using custom debugger visualizers against potentially unsafe
- Enable Windows debug heap allocator (Native only)
- Enable UI Debugging Tools for XAML
 - Preview selected elements in Live Visual Tree
 - Show runtime tools in application

OK

Cancel

Application

Configuration: Active (Debug)

Build

Platform: Active (Any CPU)

Web

Package/Publish Web

Package/Publish SQL

Silverlight Applications

Build Events

Resources

Settings

Reference Paths

Signing

Code Analysis

TypeScript Build

General

ECMAScript version:

ECMAScrip

JSX compilation in TSX files:

None

 Compile on save Allow implicit 'any' types

Module system

 None AMD CommonJS UMD System ES 2015

Output

 Keep comments in JavaScript output Combine JavaScript output into file:

Browse...

 Redirect JavaScript output to directory: Generate declaration files Do not emit outputs if any errors are reported

Debugging

 Generate source maps Specify root directory of source maps:

Browse...

 Specify root directory of TypeScript files:

Browse...

PWC.Apportionment...logy.Controller.ts

PWC.Apportionment...yList.Controller.ts

PWC.Apportionment...itable.Controller.ts

PWC.Apportionment.App.ts

TaxObligationController.cs

```
299      });
300
301
302    :e {
303      this.apportionmentService
304        .createApportionmentGroup($scope.name)
305        .then((result) => {
306          PwC.Common.toggleButton($event.srcElement);
307          this.$uibModalInstance.close();
308        });
309
310      :urn true;
311
312
313      close = () => {
314        s.$uibModalInstance.dismiss('cancel');
315
316
317
318
319
```

144 % < Eric Phan, 5 days ago | 3 authors, 25 changes <

Error List Output Find Results 1 Find Symbol Results Mapping Details Data Tools Operations

data:text/html;charset=utf-8, <head> </head> <body>Please%20wait%20while%20we%20attach</body> <!--686aee75-d4ea-4b0a-ae95-a -->

Please wait while we attach



Login

Username or email

Password

I agree to the [Terms and Conditions of Use](#)

Login



PWC.Apportionment...logy.Controller.ts

PWC.Apportionment...yList.Controller.ts

PWC.Apportionment...itable.Controller.ts

PWC.Apportionment.App.ts

TaxObligationController.cs

```
299      });
300
301
302    :e {
303      this.apportionmentService
304        .createApportionmentGroup($scope.name)
305        .then((result) => {
306          PwC.Common.toggleButton($event.srcElement);
307          this.$uibModalInstance.close();
308
309        }
310      );
311
312
313      close = () => {
314        $uibModalInstance.dismiss('cancel');
315
316
317
318
319
```

Breakpoints work!

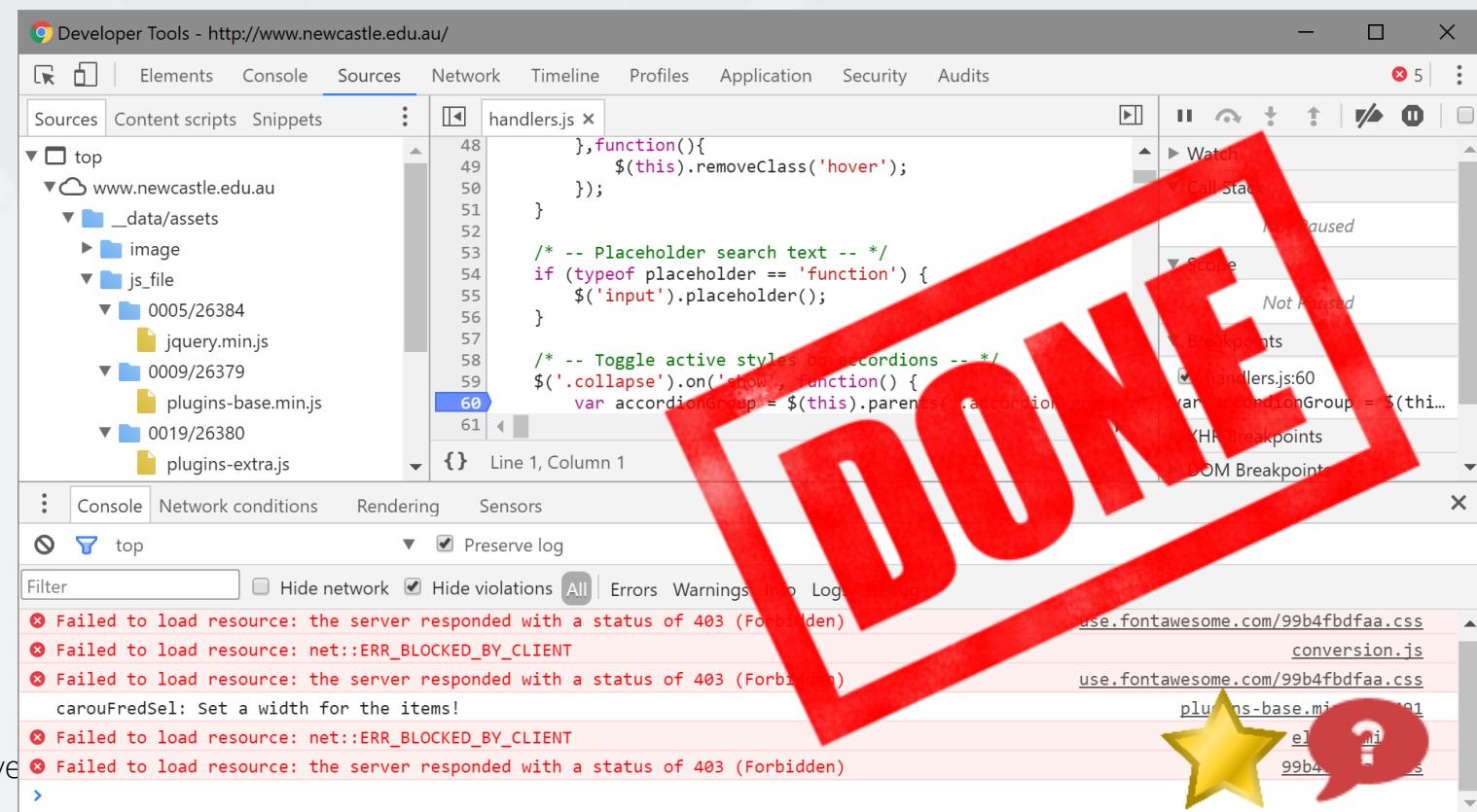
#7 Summary - Javascript/Typescript debugging in Chrome

- ✓ Uses Chrome's Remote Debugging Protocol
- ✓ Lets you debug Javascript/Typescript within VS
- ✓ Support for Firefox and Edge are coming...

Allow debugging JS in Visual Studio (when using Chrome or Firefox)

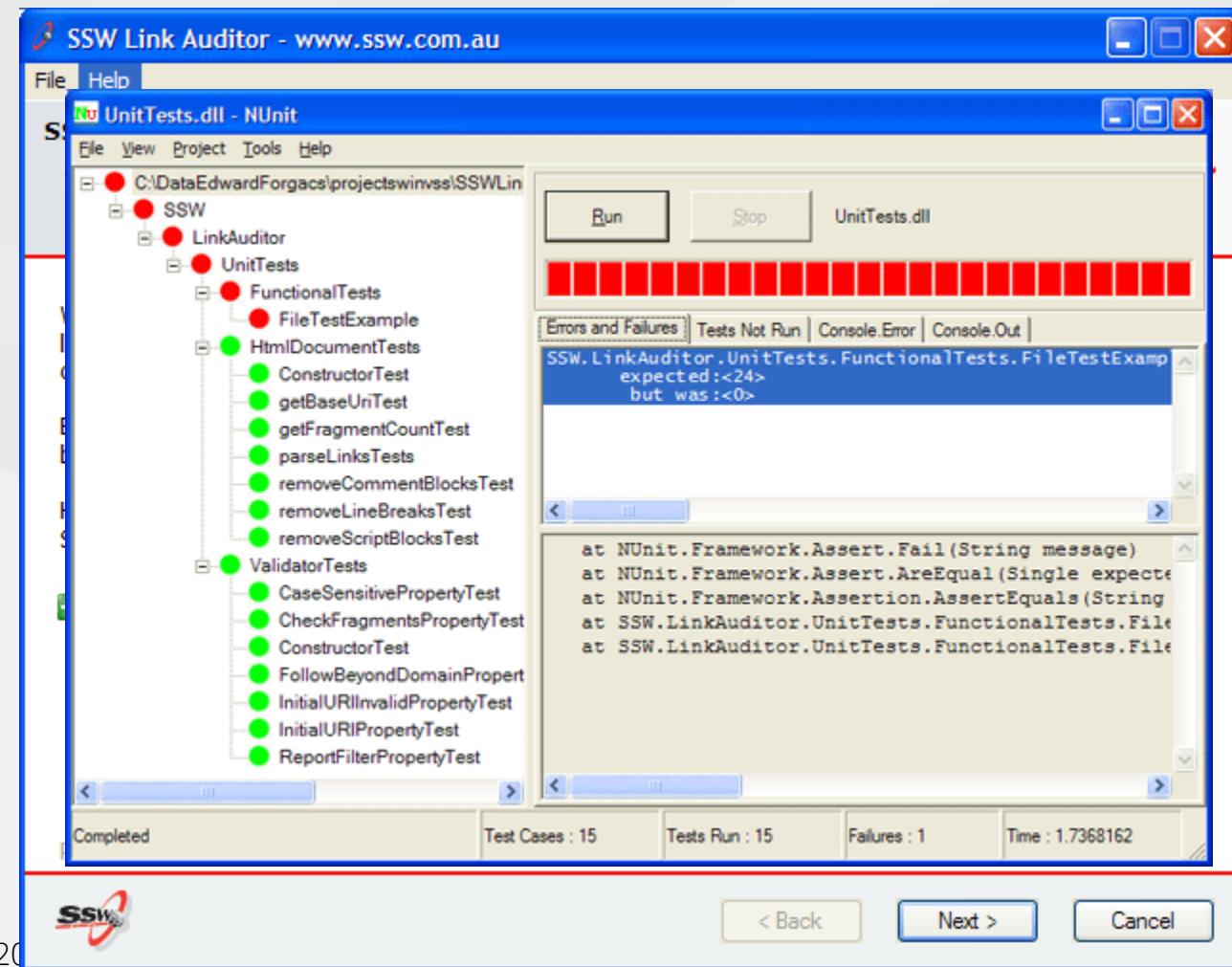
<https://visualstudio.uservoice.com/forums/121579-visual-studio-ide/suggestions/6205061-provide-integrated-javascript-debugging-in-firefox>

1260 votes



#8 Live Unit Tests

- Unit testing has come a long way
- Before...
 - We had NUnit
 - Had to manually run it



Then in VS 2005

- We got MSTest

Test Results

ericphan@ssw@JELLYFISH 2005-08-

Test Run Completed, 4/4 passed; Item(s) checked: 0

Result	Test Name	Project	Error
Passed	CalculationTest	UnitTests2	
Passed	DllDependencyTest	UnitTests2	
Passed	RegExTest	UnitTests2	
Passed	RoundingTest	UnitTests2	

Test Results Output Code Coverage Results Error List

Test View

[All Columns] <Type keyword>

Item(s) selected: 4

Test Name	Project
CalculationTest	UnitTests2
DllDependencyTest	UnitTests2
RegExTest	UnitTests2
RoundingTest	UnitTests2

Description

Run Selection

Debug Selection

Delete

Open

New Test...

Add/Remove Columns...

Description

Cut

Copy

Paste

Open Test Manager

Properties

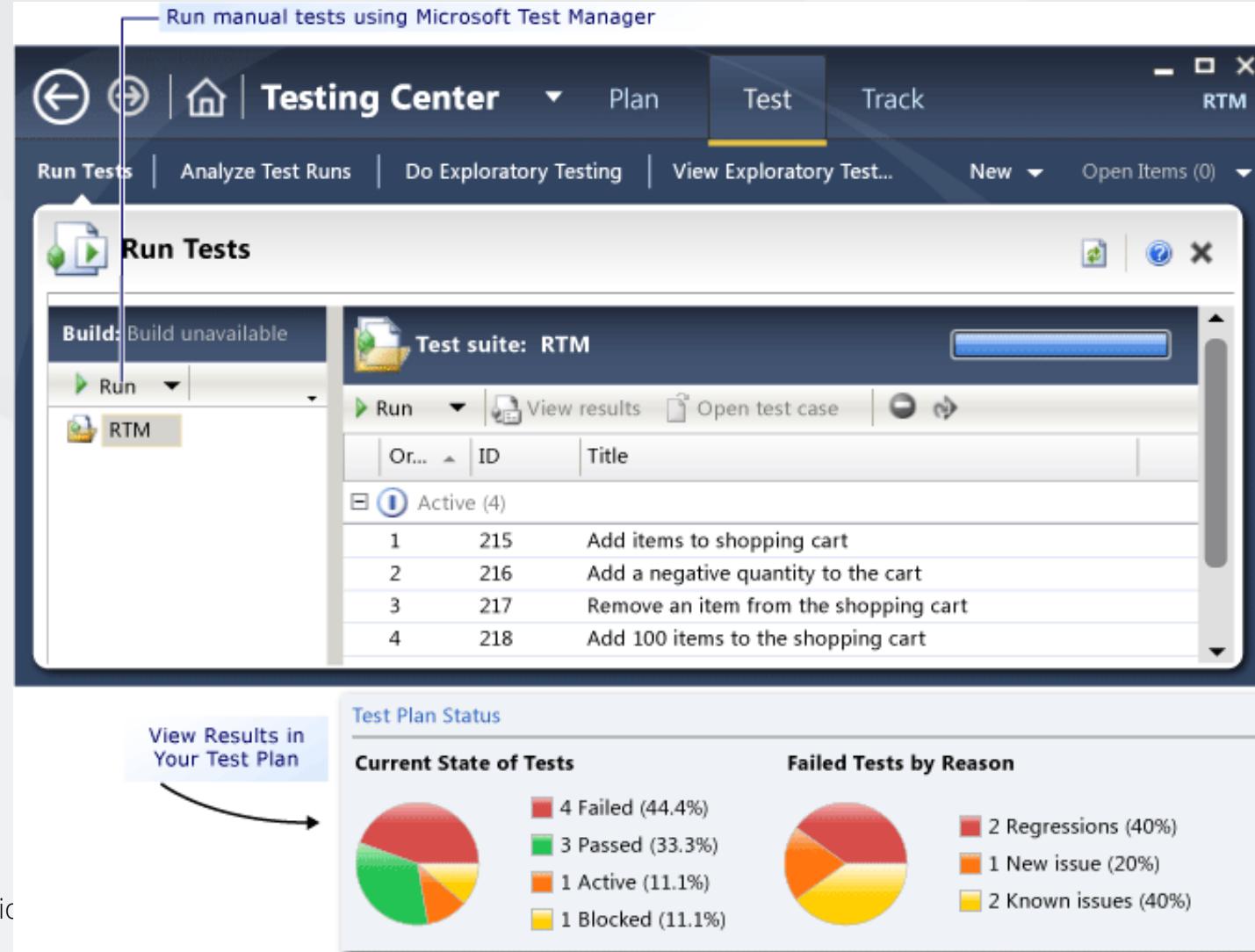
Misc

Agent Properties

Class Name

Then in VS 2010

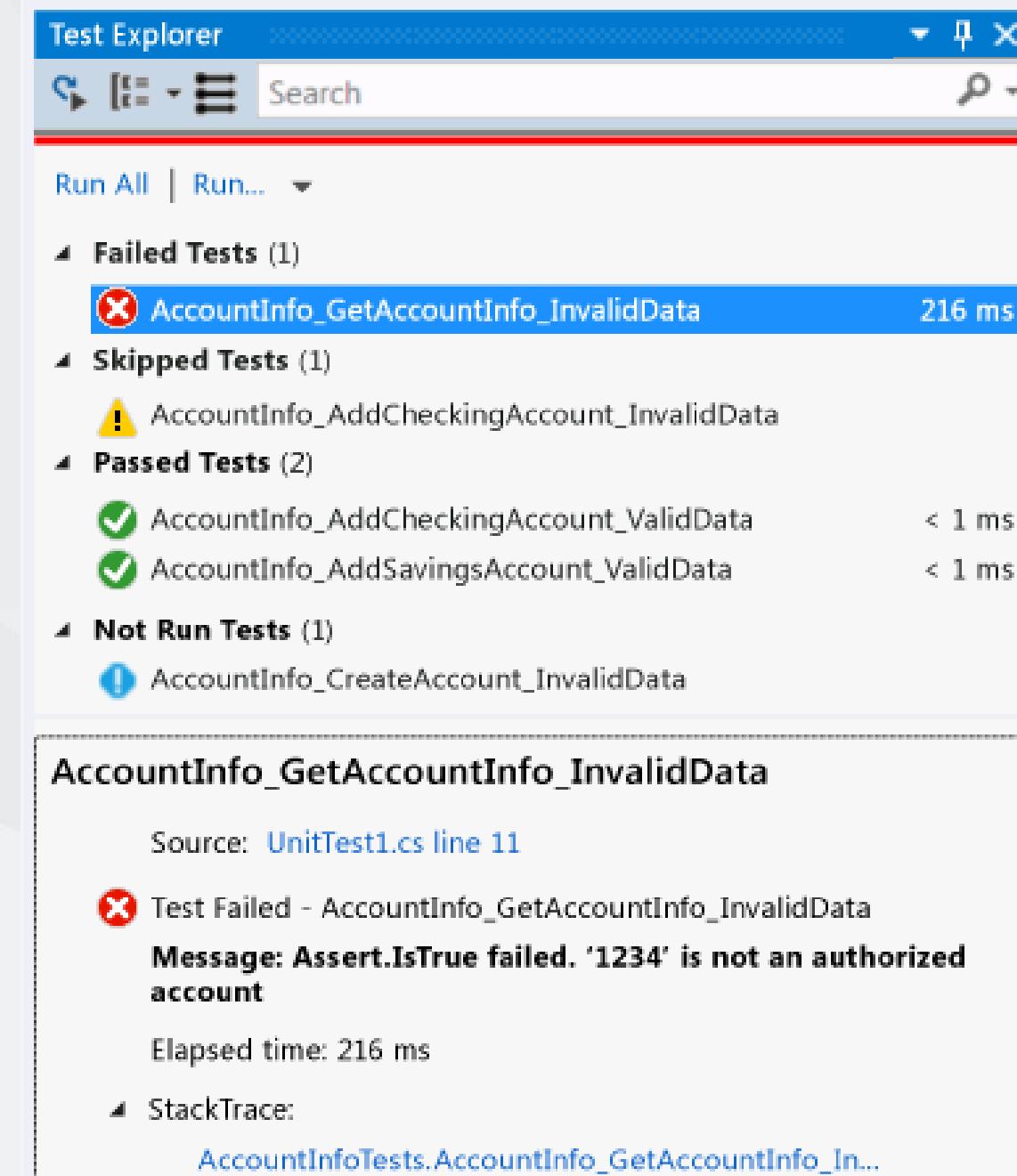
- We got Test Manager
- Dedicated client for testers
- Manual + Automated tests



Join the Conversation

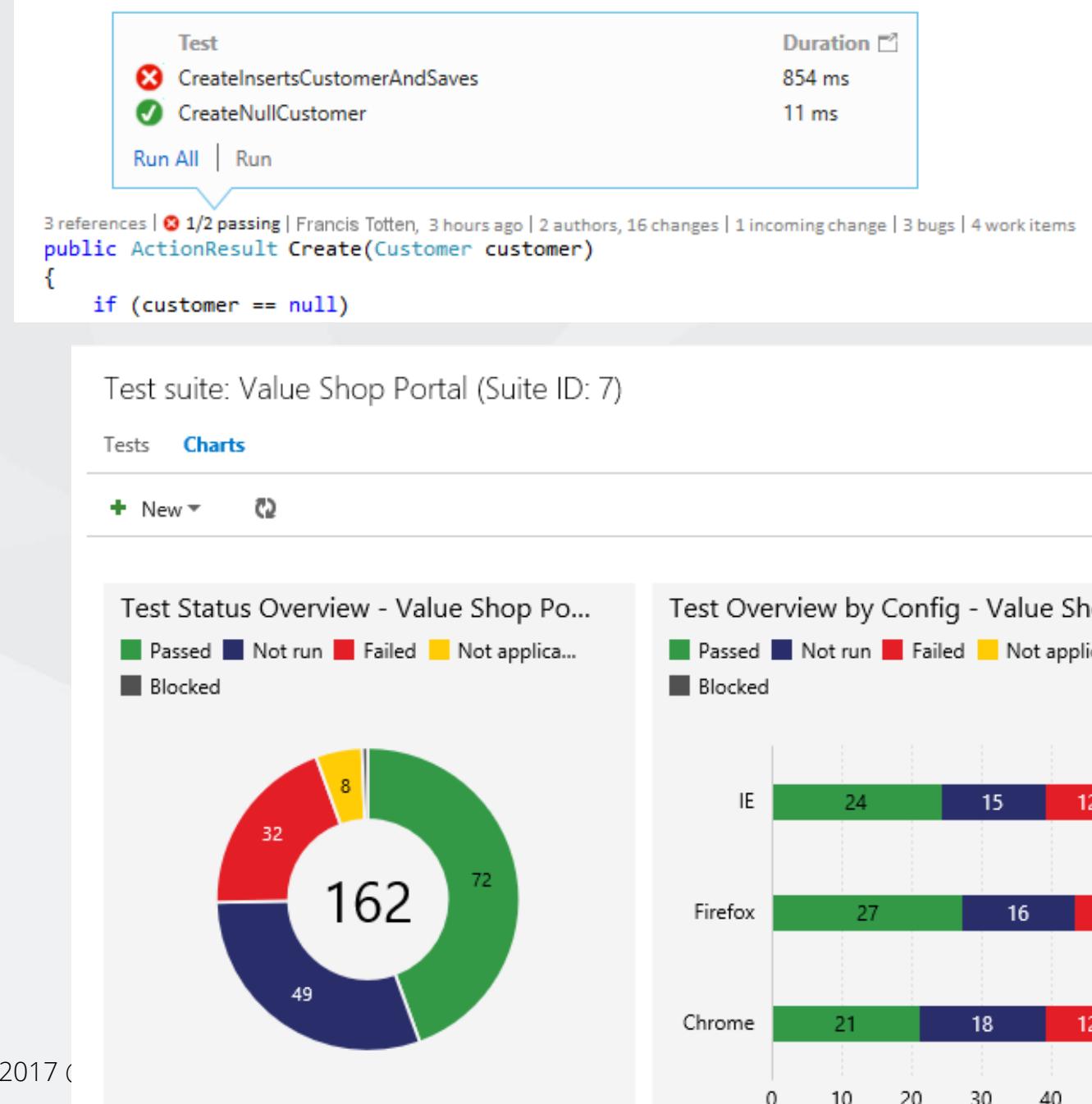
Then in VS 2012

- We got Test Explorer
- Better UI to see passing and failing tests
- Exploratory Testing
- [https://rules\(ssw.com.au/do-you-do-exploratory-testing](https://rules(ssw.com.au/do-you-do-exploratory-testing)



Then in VS 2013

- Code Lens
- Improved Test Charts
- Giving us better visibility
into unit tests



Then in VS 2015

- Smart Unit Tests
(IntelliTest)
- Uses PEX to explore your methods and generate tests

The screenshot shows the Microsoft Visual Studio 2015 interface with the following details:

- Title Bar:** triangle - Microsoft Visual Studio
- Menu Bar:** File, Edit, View, Project, Build, Debug, Team, Tools, Architecture, Test, Analyze, Windows
- Toolbar:** Standard icons for file operations, search, and navigation.
- Solution Explorer:** Shows a single project named "Triangle".
- Code Editor:** Displays the following C# code in Class1.cs:

```
if (lengths.Length < 3)
{
    throw new ArgumentException("length has insufficient size");
}

0 references
public static TriangleKind ClassifyBySideLengths(int[] lengths)
{
    //validate(lengths);
```
- IntelliTest Exploration Results - stopped:** A window showing test results for the `ClassifyBySideLengths` method.
 - Status:** 16/16 blocks, 0/0 asserts, 12 runs
 - Table:** A grid showing test cases, their results, and error messages.
 - Details:** Shows the exception type and message for failing cases.
 - Stack trace:** Shows the call stack for the failing cases.

	lengths	result	Summary/Exception	Error Message
1	null		NullReferenceException	Object refer...
2	{}		IndexOutOfRangeException	Index was out...
3	{0}		IndexOutOfRangeException	Index was out...
4	{0, 0}		IndexOutOfRangeException	Index was out...
5	{0, 0, 0}	Invalid		
6	{5, 538, 0}	Invalid		
7	{67, 0, 0}	Invalid		
8	{422, 536, 6...}	Scalene		
9	{528, 413, 5...}	Isosceles		
10	{2, 2, 3}	Isosceles		
11	{1, 512, 512}	Isosceles		
12	{512, 512, 5...	Equilateral		

Now in VS 2017

- We get Live Unit Tests
- Test | Live Unit Testing | Start

ConsoleApp2 - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

We've noticed that a tool window 'Error List' is slow

Program.cs

```
11     static void Main(string[] args) { ... }
12
13     }
14
15
16     public class InvoiceService
17     {
18         public decimal CalculateTotal(Invoice invoice)
19         {
20             var total = 0M;
21             foreach (var item in invoice.Items)
22             {
23                 total += item.Quantity * item.UnitPrice;
24             }
25             return total;
26         }
27     }
28
29     public class Invoice
```

Start

Run

Debug

Playlist

Live Unit Testing

Test Settings

Analyze Code Coverage

Profile Test

Windows

Properties Solution Explorer Team Explorer Notifications

Quick Launch (Ctrl+Q)

Eric Phan

Server Explorer Toolbox

144 %

Error List Output Find Results 1 Find Symbol Results Mapping Details Data Tools Operations

Ln 21 Col 41 Ch 41 INS ○

Item(s) Saved ↑ Publish ▾

We've noticed that a tool window 'Error List' is slowing Visual Studio. [Manage Visual Studio Performance](#)

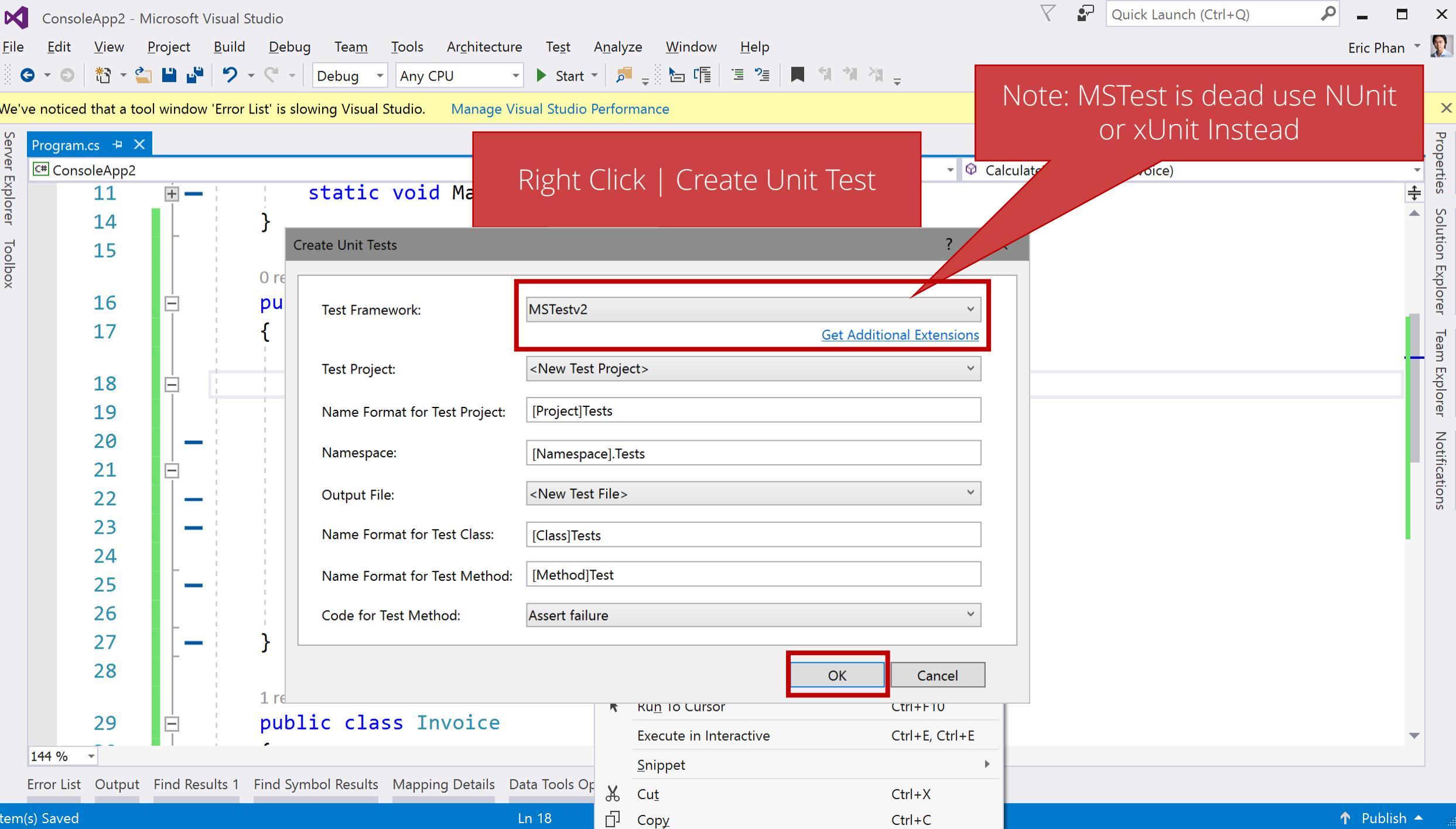
Program.cs

C# ConsoleApp2 ConsoleApp2.InvoiceService CalculateTotal(Invoice invoice)

```
static void Main(string[] args){}  
}  
0 references  
public class InvoiceService  
{  
    0 references  
    public decimal CalculateTotal(Invoice invoice)  
    {  
        var total = 0M;  
        foreach (var item in invoice.Items)  
        {  
            total += item.Price;  
        }  
    }  
}  
1 reference  
public class Invoice
```

Covered by 0 tests.

Hover to see that this line is not covered by any unit tests



ConsoleApp2 - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

Debug Any CPU Start

We've noticed that a tool window 'Error List' is slowing Visual Studio. [Manage Visual Studio Performance](#)

Program.cs InvoiceServiceTests.cs

C# ConsoleApp2Tests

ConsoleApp2.Test

Test()

Write the unit test

```
12 public class InvoiceServiceTest
13 {
14     [TestMethod()]
15     public void CalculateTotalTest()
16     {
17         var n = new InvoiceService();
18         var i = new Invoice()
19         {
20             Items = new[]
21             {
22                 new LineItem { Quantity = 1, UnitPrice = 100M },
23                 new LineItem { Quantity = 2, UnitPrice = 50M },
24             }
25         };
26         Assert.AreEqual(200M, n.CalculateTotal(i));
27     }
28 }
29 }
```

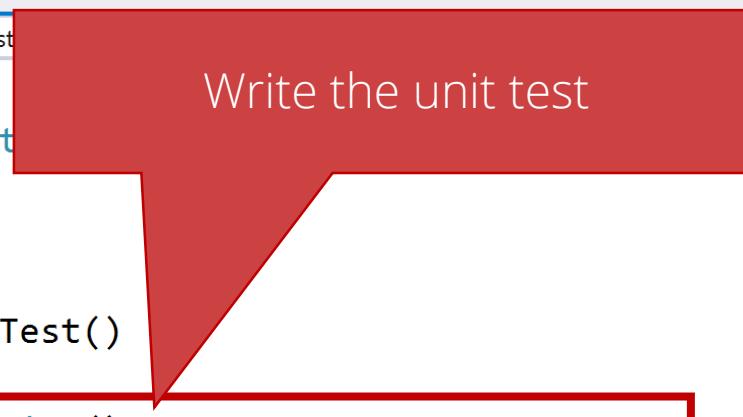
Server Explorer Toolbox Solution Explorer Team Explorer Notifications

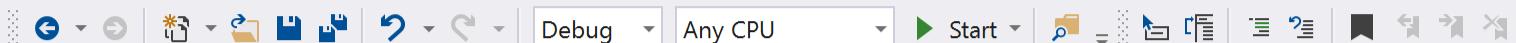
144 %

Error List Output Find Results 1 Find Symbol Results Mapping Details Data Tools Operations

Ln 25 Col 15 Ch 15 INS ⚙ Publish

Item(s) Saved



We've noticed that a tool window 'Error List' is slowing Visual Studio. [Manage Visual Studio Performance](#)

Program.cs X InvoiceServiceTests.cs

ConsoleApp2

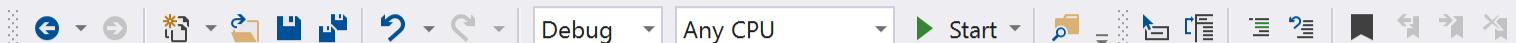
ConsoleApp2.InvoiceService

CalculateTotal(Invoice invoice)

Properties Solution Explorer Team Explorer Notifications

See that all our lines are covered by the unit test

```
11
14
15
16    public class InvoiceService
17
18        public decimal CalculateTotal(Invoice invoice)
19        {
20            var total = 0M;
21            foreach (var item in invoice.Items)
22            {
23                total += item.Quantity * item.UnitPrice;
24            }
25            return total;
26        }
27
28
29    public class Invoice
```

We've noticed that a tool window 'Error List' is slowing Visual Studio. [Manage Visual Studio Performance](#)

Program.cs X InvoiceServiceTests.cs

C# ConsoleApp2

ConsoleApp2.InvoiceService

CalculateTotal(Invoice invoice)

```
1 reference
16 public class InvoiceService
{
17
18     1 reference
19         public decimal CalculateTotal(Invoice inv
20             {
21                 var total = 0M;
22                 foreach (var item in invoice.Items)
23                 {
24                     if (item.TaxRate.HasValue)
25                     {
26                         total += item.Quantity * item.UnitPrice * (1 + item.TaxRate.Value);
27                     } else
28                     {
29                         total += item.Quantity * item.UnitPrice;
30                     }
31                 }
32             }
33 }
```

Add new code to factor in GST

See that this line hasn't been covered

144 %

File Edit View Project Build Debug Team Tools Architecture Test

Debug Any CPU Start

Program.cs InvoiceServiceTests.cs*

ConsoleApp2Tests

```
27 }  
28  
29 [TestMethod()]  
30 public void CalculateTotalWithGstTest()  
31 {  
32     var n = new InvoiceService();  
33     var i = new Invoice()  
34     {  
35         Items = new[]  
36         {  
37             new LineItem { Quantity = 1, UnitPrice = 100M, TaxRate = 0.1M },  
38             new LineItem { Quantity = 2, UnitPrice = 50M, TaxRate = 0.1M },  
39         }  
40     };  
41     Assert.AreEqual(200M, n.CalculateTotal(i));  
42 }  
43 }  
44 }
```

Create a new test to cover the GST

Add tax rates

Total is wrong, this is a failing test

You can see the code coverage shows the failing test

```
ConsoleApp2 - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help
Program.cs InvoiceServiceTests
ConsoleApp2
14
15
16 public class InvoiceService
17 {
18     public decimal CalculateTotal(Invoice invoice)
19     {
20         decimal total = 0;
21         foreach (InvoiceItem item in invoice.Items)
22         {
23             if (item.TaxRate.HasValue)
24             {
25                 total += item.Quantity * item.UnitPrice * (1 + item.TaxRate.Value);
26             }
27             else
28             {
29                 total += item.Quantity * item.UnitPrice;
30             }
31         }
32         return total;
33     }
}

CalculateTotal(Invoice invoice)

Properties Solution Explorer Team Explorer Notifications

Eric Phan

Quick Launch (Ctrl+Q) 🔍
Item(s) Saved Ln 24 Col 18 Ch 18 INS ○ Publish ↑
```

ConsoleApp2.Tests.InvoiceServiceTests.CalculateTotalWithGstTest
ConsoleApp2.Tests.InvoiceServiceTests.CalculateTotalTest

144 %

Output Find Results 1 Find Symbol Results Mapping Details Data Tool Operations #VS2017 @AdamCogan #NDCSydney

ConsoleApp2 - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

Quick Launch (Ctrl+Q)

Eric Phan

Program.cs InvoiceServiceTests.cs

ConsoleApp2Tests

ConsoleApp2.Tests.InvoiceServiceTests

CalculateTotalWithGstTest()

```
27 }  
28  
29 [TestMethod()]  
30 public void CalculateTotalWithGstTest()  
31 {  
32     var n = new Invoice();  
33     var i = new InvoiceItem();  
34     {  
35         Items = new List<InvoiceItem>()  
36         {  
37             new LineItem { Quantity = 1, UnitPrice = 100M, TaxRate = 0.1M },  
38             new LineItem { Quantity = 2, UnitPrice = 50M, TaxRate = 0.1M },  
39         };  
40     };  
41     Assert.AreEqual(220M, n.CalculateTotal(i));  
42 }  
43 }  
44 }
```

Fix the test so it passes

144 %

Output Find Results 1 Find Symbol Results Mapping Details Data Tools Operations

Item(s) Saved

Ln 41 Col 31 Ch 31 INS ○

Publish

ConsoleApp2 - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

Quick Launch (Ctrl+Q)

Eric Phan

Server Explorer

Toolbox

Program.cs □ X InvoiceServiceTests.cs

ConsoleApp2

ConsoleApp2.InvoiceService

CalculateTotal(Invoice invoice)

```
14 }  
15  
16 public class InvoiceService  
17 {  
18     public decimal CalculateTotal(Invoice invoice)  
19     {  
20         var total = 0M;  
21         foreach (var item in invoice.Items)  
22         {  
23             if (item.TaxRate.HasValue)  
24             {  
25                 total += item.Quantity * item.UnitPrice * (1 + item.TaxRate.Value);  
26             } else  
27             {  
28                 total += item.Quantity * item.UnitPrice;  
29             }  
30         }  
31         return total;  
32     }  
33 }  
34 }
```

Our new code is now covered

144 %

Output Find Results 1 Find Symbol Results Mapping Details Data Tools Operations

Ln 24 Col 18 Ch 18 INS ○

Item(s) Saved

Publish

#8 Summary - Live Unit Tests

So now, Visual Studio can:

- ✓ Developers can see live code coverage for the tests
- ✓ Red, Green, Refactor has never been easier
- ✓ No more excuses not to write unit tests!

<https://www.ssw.com.au/ssw/Standards/Rules/RulesToBetterUnitTests.aspx#CodeCoverage>

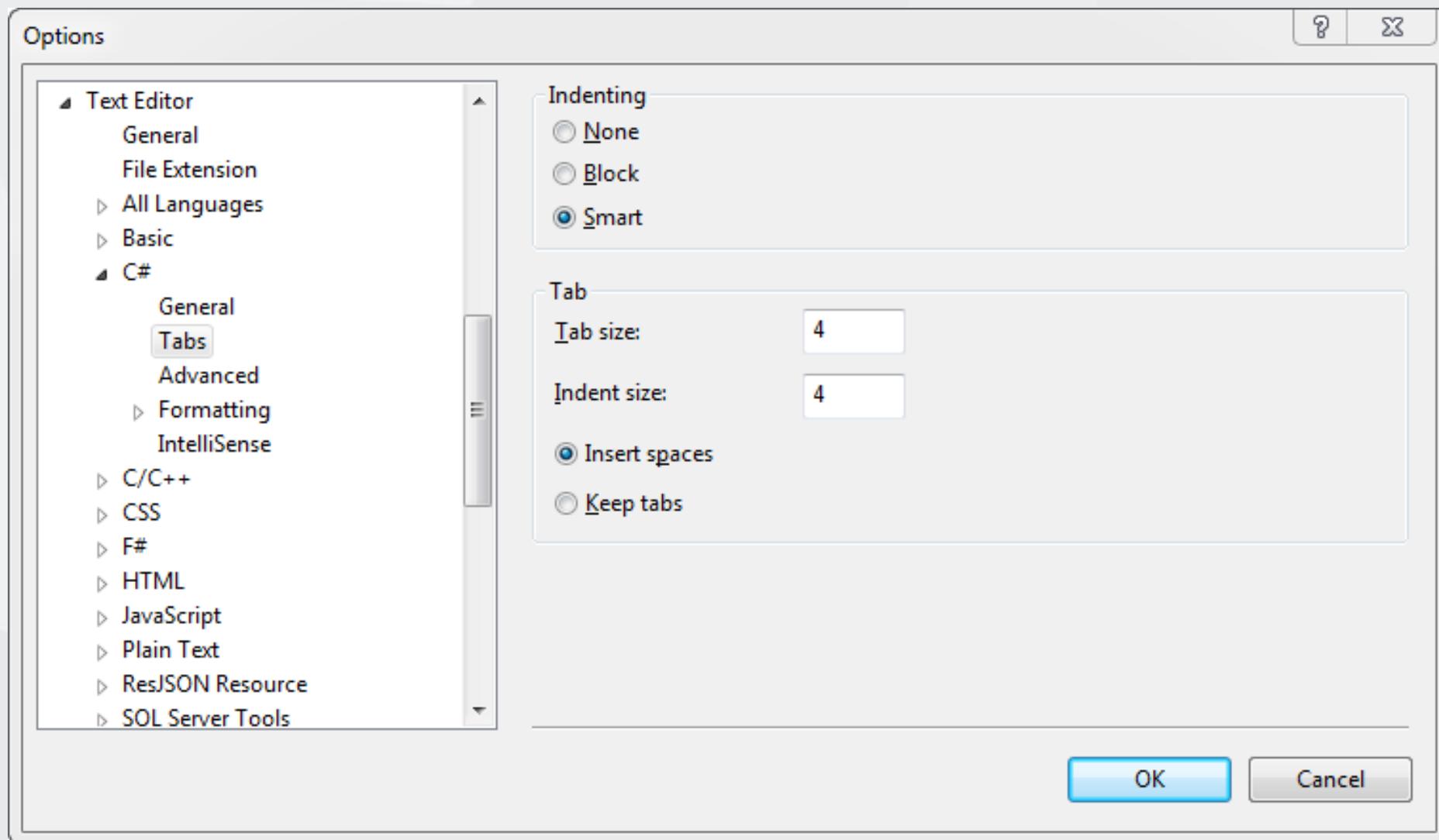
TODO: Make auto-pilot



#9 Code Styling – Editor Config

- Some developers are picky about coding styles on a project
- How do you enforce rules?
- We've got StyleCop and Code Analysis for things like 'use var' and 'use string interpolation'
- What about Tabs vs Spaces?
- That's what the young kids do? <https://www.youtube.com/watch?v=Gu10liXVNlk>
- What do the adults do? <https://www.youtube.com/watch?v=SsoOG6ZeyUI>

VS 2015



VS 2017 – Editor Config

1. Create an .editorconfig file
2. Write some rules
3. Commit it into the solution
4. Now all devs get the same rules

Installed

Sort by: Default



Search Installed Templates (Ctrl+E)



- PowerShell
- Visual C#
 - Code
 - Data
 - General
- Web
 - General
 - Markup
 - Scripts
 - Web Forms
 - MVC
 - Razor
 - SignalR
 - Web API
 - Windows Forms
 - WPF
- ASP.NET Core
- SQL Server



Online

	Application Manifest File	Visual C#
	Assembly Information File	Visual C#
	Class Diagram	Visual C#
	Code Analysis Rule Set	Visual C#
	Debugger Visualizer	Visual C#
	Installer Class	Visual C#
	Resources File	Visual C#
	Runtime Text Template	Visual C#
	Text File	Visual C#
	Text Template	Visual C#
	Windows Script Host	Visual C#
	Directed Graph Document (.dgml)	Visual C#

Type: Visual C#

An empty text file

Name:

.editorconfig

Add

Cancel

PwC.ComplyFirstTime - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Architecture Test Analyze Window Help

Debug Any CPU PwC.ComplyFirstTime.Web Google Chrome

Eric Phan

.editorconfig

```
1 root = true
2
3 [*.cs]
4 indent_style = tab
```

[*.cs] – For all C# files

Make the indent style TAB

Server Explorer Toolbox Data Sources Diagnostic Tools Properties Solution Explorer Team Explorer Notifications

145 % - changes -authors, -changes

Error List Output Find Results 1 Find Symbol Results Mapping Details Data Tools Operations

Item(s) Saved Ln 4 Col 19 Ch 19 INS 0 2 PwC.ComplyFirstTime eric/v2.1.1-Global-Canada

VS 2017 – Editor Config

- Now the next dev that joins the project will automatically get this setting

VS 2017 – Editor Config

Supported Styles include

- indent_style
- indent_size
- tab_width
- end_of_line
- charset
- trim_trailing_whitespace
- insert_final_newline



C# 7.0 – Tuple Types and Tuple Literals

VS 2015

Define the tuple using generics

```
var oldTuple = new Tuple<string, decimal, bool>("A", 123, true);  
Trace.WriteLine($"{oldTuple.Item1} [VIP: {oldTuple.Item3}] ordered {oldTuple.Item2:c2}");
```

Reference items in the Tuple
using .Item1, .Item2,

Problems

- ✖ We have to declare the type for each item in the Tuple
 - Compiler should be able to work it out like “var”
- ✖ Items have no context. What's Item1? What's Item2?

C# 7.0 – Tuple Types and Tuple Literals

VS 2017

```
var literalTuple = ("A", 123, true);  
Trace.WriteLine($"{literalTuple.Item1} [VIP: {literalTuple.Item3}] ordered {literalTuple.Item2:c2}");
```

Simplified declaration

Types are now inferred for Item1,
Item2, ...

C# 7.0 – Tuple Types and Tuple Literals

VS 2017

```
var literalTuple = ("A", 123, true);
Trace.WriteLine($"{literalTuple.Item1} [VIP: {literalTuple.Item3}] ordered {literalTuple.Item2:c2}");
```

Named item declaration

```
var namedTuple = (Name: "A", OrderTotal: 123, IsVIP: true);
Trace.WriteLine($"{namedTuple.Name} [VIP: {namedTuple.IsVIP}] ordered {namedTuple.OrderTotal:c2}");
```

Now the Item1,Item2,.. Have meaning

C# 7.0 – Inline out variables

VS 2015

```
int i;  
if (int.TryParse("123", out i))  
{  
    // Do something  
}
```

Define the output variable first

Pass **i** in as an output variable
using **out**

Problems

- Most of the time, **i** has no meaning outside that **if** statement

C# 7.0 – Inline out variables

VS 2017

```
if (int.TryParse("123", out var i))  
{  
    // Do something  
}
```

Define the output variable where we actuall use it

The variable **i** now only exists withing this **if** block

TIP - Refactoring

VS 2017 will suggest you use the new language features

The screenshot shows a code editor in Visual Studio 2017. A tooltip is displayed over the line of code "int i;". The tooltip contains the following information:

- IDE0018** Inline variable declaration
- ...
Trace.WriteLine(\$"{namedTuple.Name} [VIP: {namedTuple.IsVIP}] ordered {namedTuple.OrderTotal:c2}");
- int i;
- if (int.TryParse("123", out i))
- if (int.TryParse("123", out int i))
- {
- ...

Below the tooltip, there are two buttons: "Preview changes" and "Fix all occurrences in: Document | Project | Solution".

```
14
15     int i;
16
17     Inline variable declaration >
18     Suppress IDE0018 >
19
20     }
21
22     }
23
24     }
25
26     }
27
28     }
29
30     }
31
32     }
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34     }
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74     }
75
76     }
77
78     }
79
80     }
81
82     }
83
84     }
85
86     }
87
88     }
89
90     }
91
92     }
93
94     }
95
96     }
97
98     }
99
100 }
```

C# 7.0 Pattern matching in 'switch'

Lets define some classes first

```
class Bird { }

class Magpie : Bird {
    public bool IsSwoopingSeason { get; set; } = false;
}

class Budgie : Bird {
    public string FavouriteFood { get; set; } = "Bird seed";
}
```

We've got a base class **Bird**

There's a derived class **Magpie** which has a
special property **IsSwoopingSeason**

There's a derived class **Budgie** which has a
special property **FavoriteFood**

C# 7.0 Pattern matching in 'switch'

VS 2015

```
public string SuggestAnAction(Bird bird)
{
    if (bird == null) throw new ArgumentNullException(nameof(bird));
    if (bird is Magpie) {
        var magpie = bird as Magpie;
        if (magpie.IsSwoopingSeason) return "Bring a helmet";
        return "Go for a stroll";
    } else if (bird is Budgie) {
        var budgie = bird as Budgie;
        return $"Bring {budgie.FavouriteFood} for the walk";
    }
    else return "Do nothing";
}
```

Check if a **Magpie** has been passed in

If yes, then create a local variable **magpie** and cast the **Bird** to a **Magpie** so we can access the special property **IsSwoopingSeason**

Repeat for **Budgie**

Problems

- ✖ Lots of type casting and use of local variables to convert the base type to a derived type

C# 7.0 Pattern matching in 'switch'

VS 2017

```
public string SuggestAnAction2(Bird bird) {  
    switch (bird)  
    {  
        case Magpie m when m.IsSwoopingSeason == true:  
            return "Bring a helmet";  
        case Magpie m when m.IsSwoopingSeason == false:  
            return "Go for a stroll";  
        case Budgie b:  
            return $"Bring {b.FavouriteFood} for the walk";  
        case null:  
            throw new ArgumentNullException(nameof(bird));  
        default:  
  
            return "Do nothing";  
    }  
}
```

We can now do the type check and
create a local variable and check special
properties within the case statement

If **bird** is a **Magpie** then create a
variable **m** and check if
IsSwoopingSeason is **false**

#10 – C# 7.0 Language Extensions

- ✓ Making C# developers code more readable and short
- ✓ Quick refactoring tooling to help developers learn and use the new language features
- ✓ Note: VS2015 came with C# 6.0 but the refactoring only came later

Getting Started with ASP.NET Core

Dev Superpowers Tour

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Demo: Getting Started

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

Demo: Returning Views

Returning views within an ASP.NET Core MVC app

Demo: Working with Views

Working with Views in ASP.NET Core MVC

Demo: Returning Data

Returning data within an ASP.NET Core Web API
application

Single Page Applications

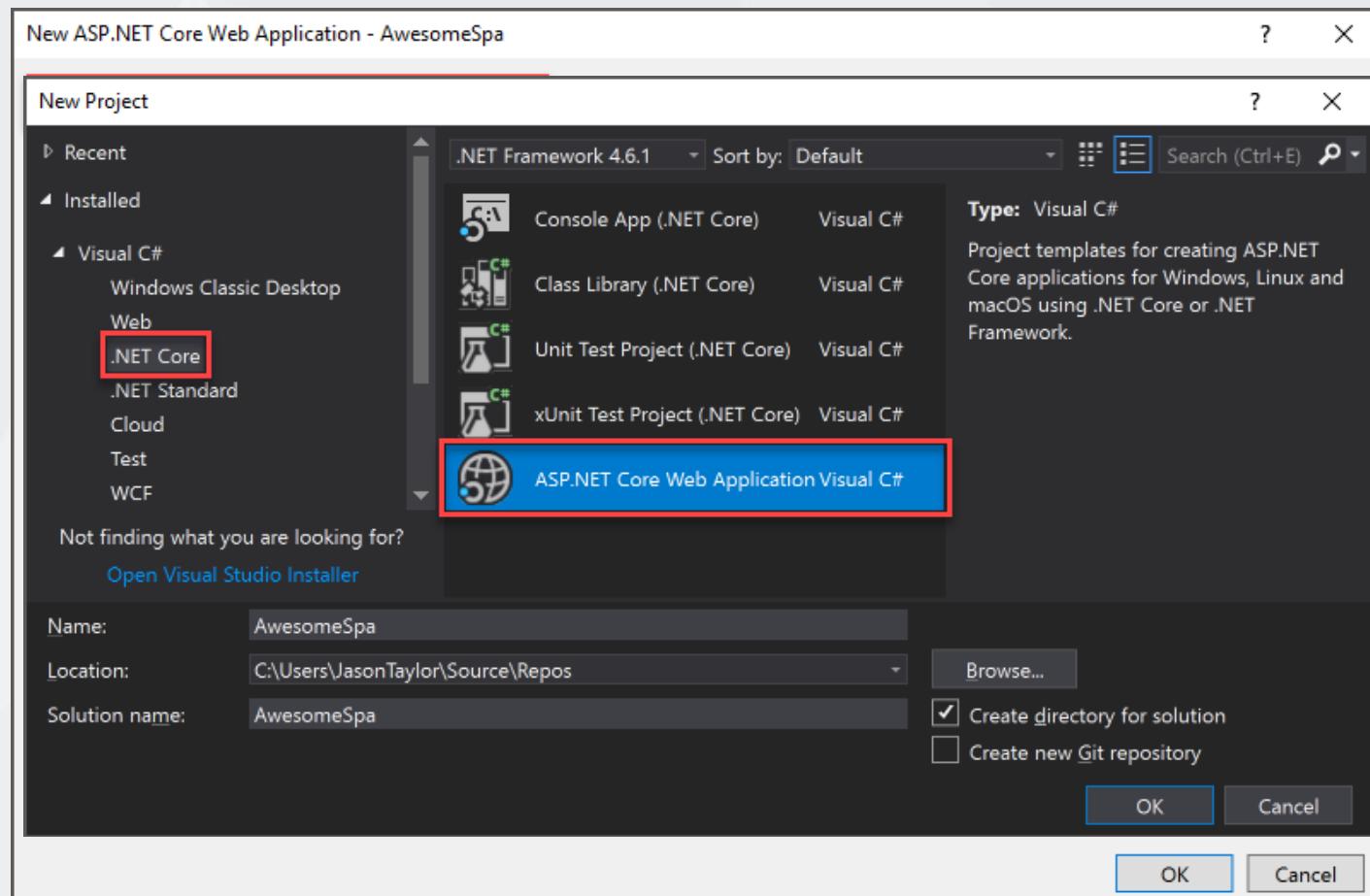
ASP.NET Core has built-in support for SPA

Supports all major client-side frameworks

Cross-platform Windows, Mac, or Linux

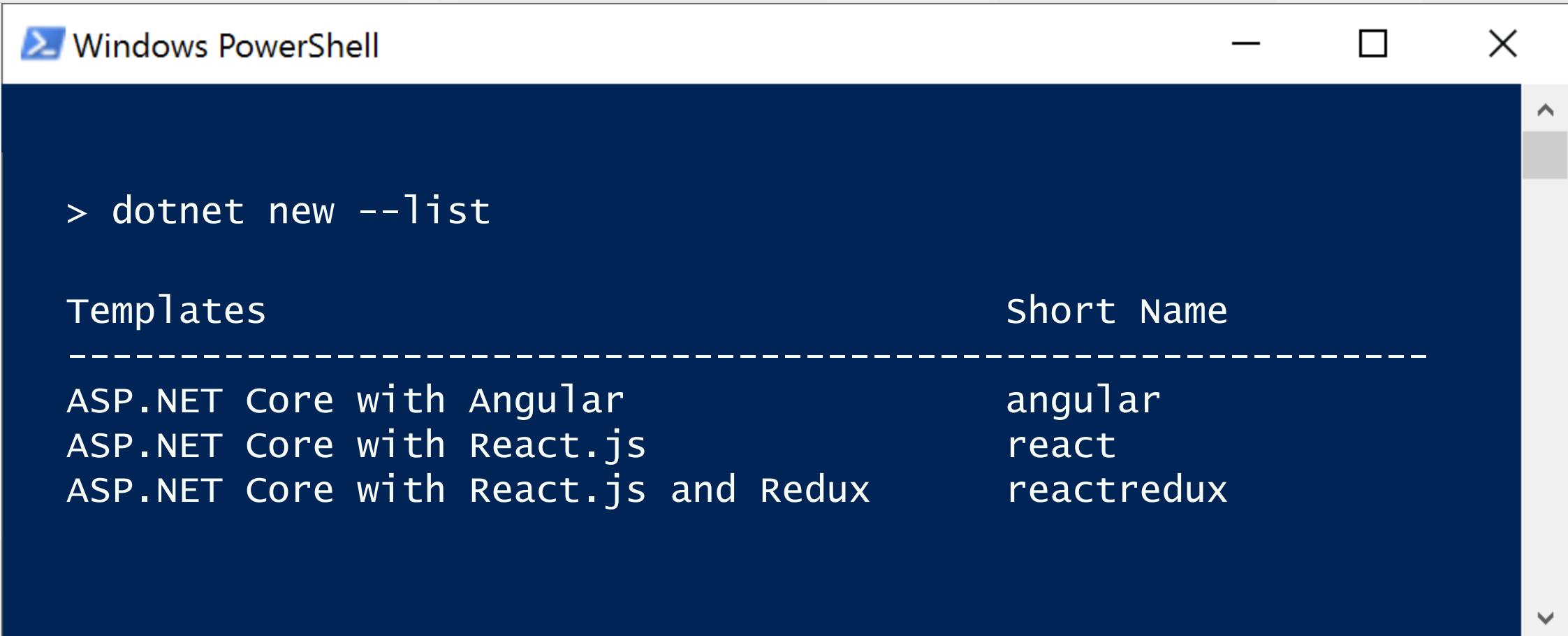
Use your preferred IDE or code editor

Using Visual Studio 2017



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Using .NET Core CLI

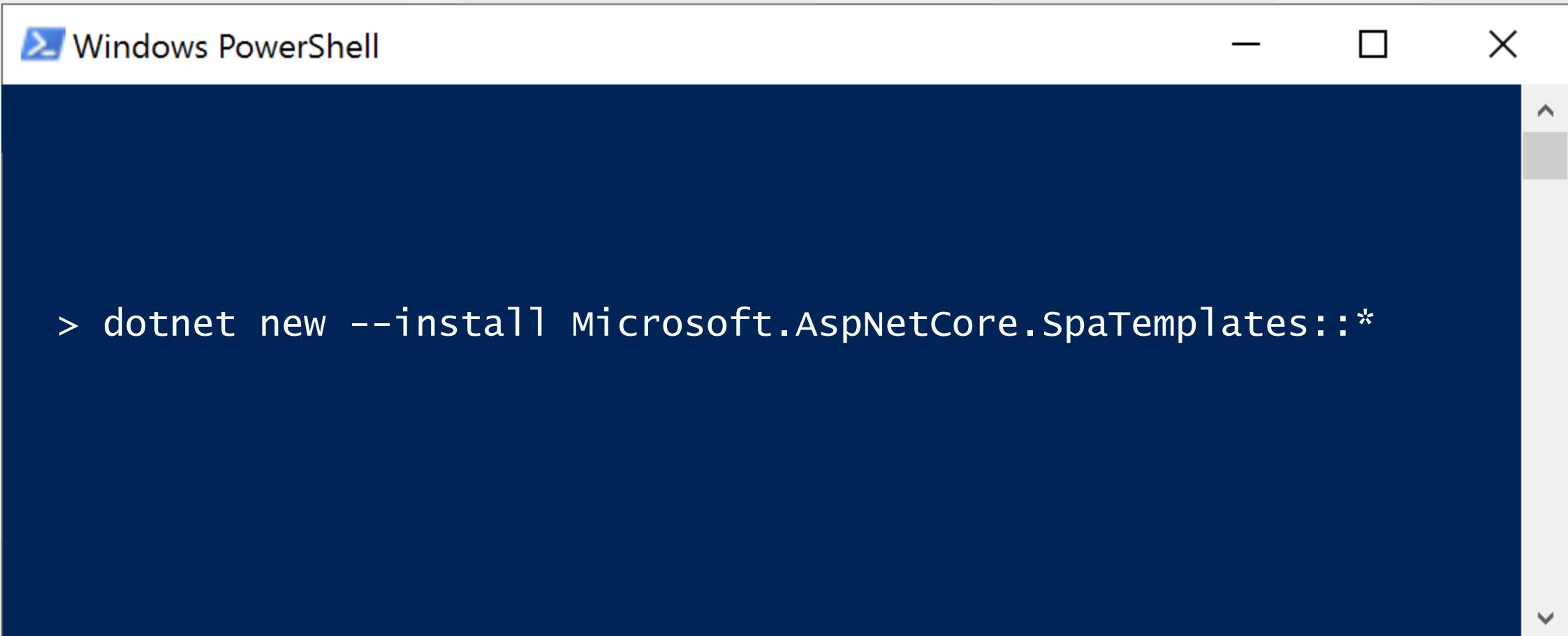


```
Windows PowerShell

> dotnet new --list

Templates                                         Short Name
-----
ASP.NET Core with Angular                         angular
ASP.NET Core with React.js                       react
ASP.NET Core with React.js and Redux            reactredux
```

Additional Templates



A screenshot of a Windows PowerShell window titled "Windows PowerShell". The window has a dark blue background and white text. At the top right are standard window controls: a minus sign for minimize, a square for maximize/minimize, and an X for close. On the right side of the window frame, there are scroll bars with arrows pointing up and down. In the main area of the window, the command `> dotnet new --install Microsoft.AspNetCore.SpaTemplates::*` is displayed in white text.

```
> dotnet new --install Microsoft.AspNetCore.SpaTemplates::*
```

Angular + ASP.NET Core

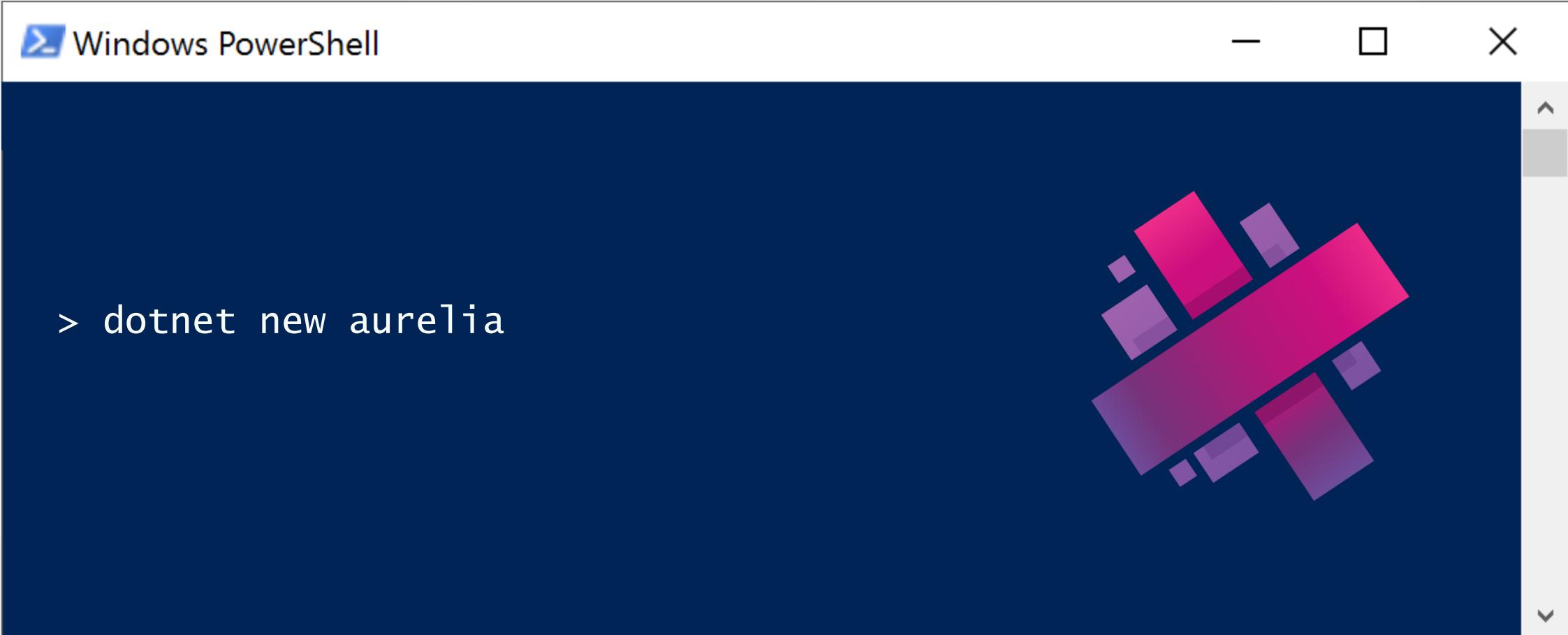
A large red hexagon containing a white uppercase letter 'A', representing the Angular framework.

Windows PowerShell

```
> dotnet new angular
```

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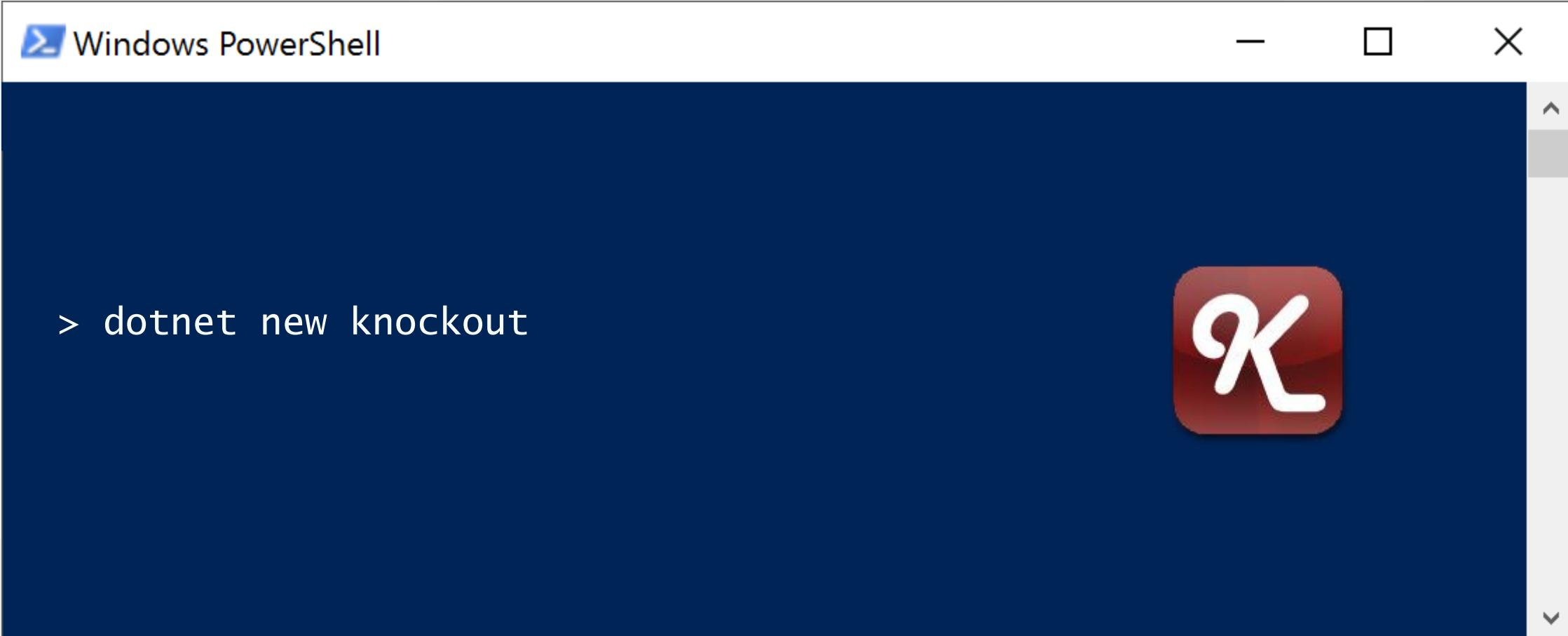
Aurelia + ASP.NET Core

A screenshot of a Windows PowerShell window titled "Windows PowerShell". The window contains the command "> dotnet new aurelia" entered by the user. The background of the window is dark blue, and there is a decorative graphic of overlapping pink and purple rectangles in the bottom right corner. The window has standard operating system window controls (minimize, maximize, close) at the top right.

```
> dotnet new aurelia
```

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Knockout + ASP.NET Core

A screenshot of a Windows PowerShell window titled "Windows PowerShell". The window contains the command "> dotnet new knockout" entered by the user. To the right of the command, there is a large, stylized white "K" logo on a red rounded square background, which is the official logo for the Knockout.js library. The PowerShell interface includes standard window controls (minimize, maximize, close) and scroll bars on the right side.

```
> dotnet new knockout
```

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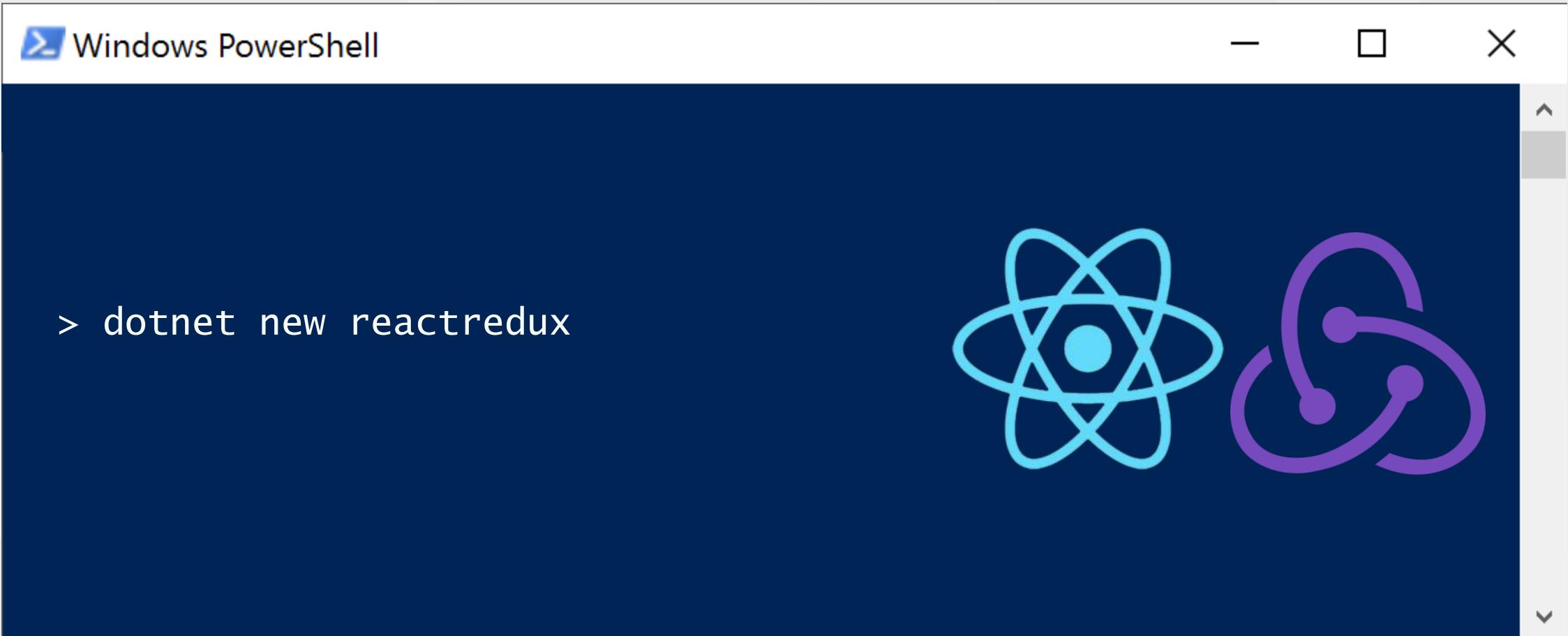
React + ASP.NET Core



A screenshot of a Windows PowerShell window titled "Windows PowerShell". The window contains the command "> dotnet new react" entered by the user. To the right of the command, there is a large, stylized blue React logo consisting of three nested, elliptical arcs forming a hexagonal pattern. The background of the PowerShell window is dark blue.

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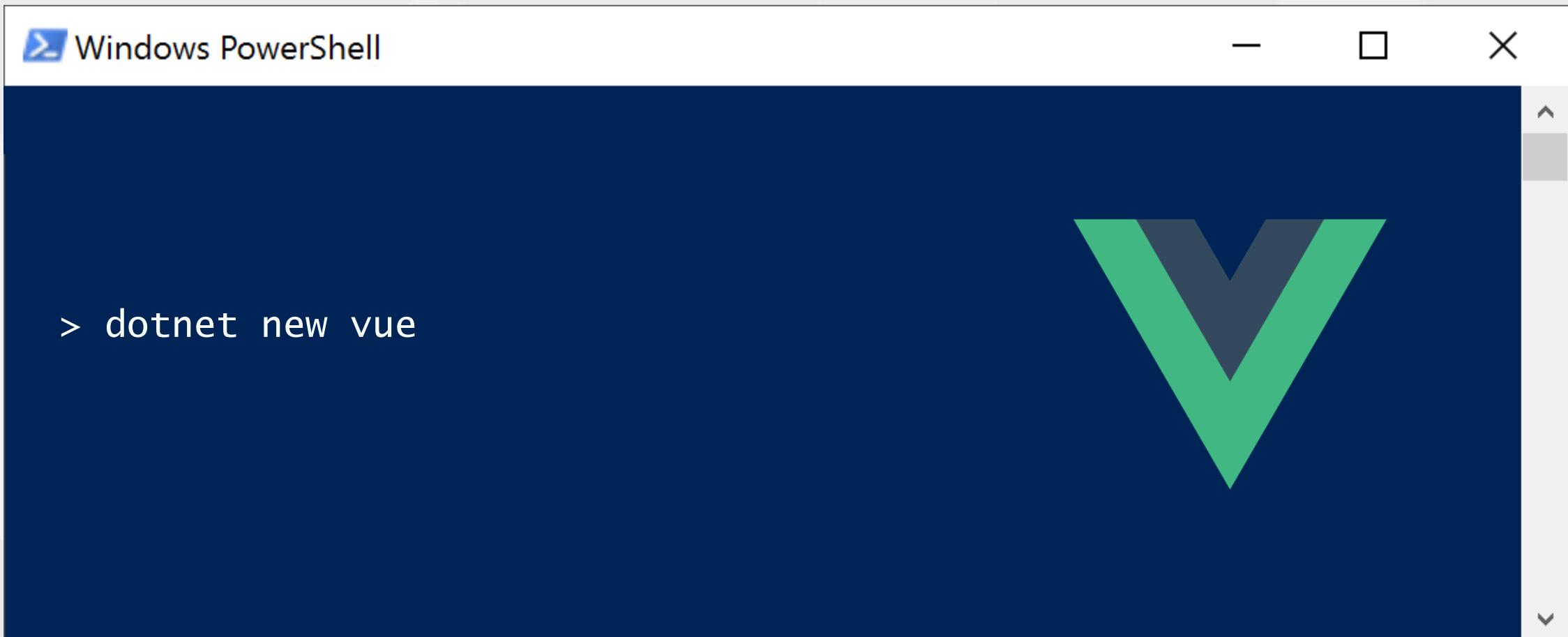
React + Redux + ASP.NET Core



A screenshot of a Windows PowerShell window titled "Windows PowerShell". The window contains a single command: "> dotnet new reactredux". To the right of the command, there are two large, stylized icons: a blue atom-like symbol with three intersecting orbits around a central core, and a purple circular icon with a central node and connecting lines.

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Vue + ASP.NET Core



A screenshot of a Windows PowerShell window titled "Windows PowerShell". The window contains the command "> dotnet new vue" which is being typed. The background of the window is dark blue, and the text is white. In the bottom right corner of the window, there is a large, stylized "V" logo composed of green and grey triangles.

```
> dotnet new vue
```

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Demo: Single Page Applications

Building single page applications with ASP.NET Core

Demo: Building a Web API

Creating an awesome ASP.NET Core Web API

Entity Framework Core

Dev Superpowers Tour

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Entity Framework Core

Lightweight, extensible, and cross-platform

Runs on .NET Core or .NET Framework

Choosing between EF6.x and EF Core (bit.ly/ef6-vs-core)

Porting from EF6.x to EF Core (bit.ly/ef6-to-core)

EF Core Roadmap (bit.ly/efcore-roadmap)

Entity Framework Concepts

DbContext – “Heavyweight” ORM that tracks changes

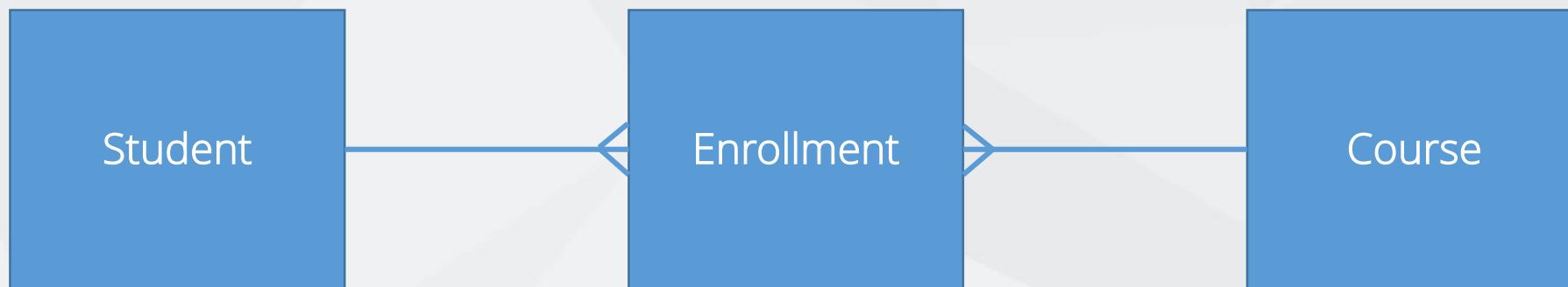
States: Added, Unchanged, Modified, Deleted, Disconnected

“Code First” Only – but you can Scaffold

Migrations – Used to generate and publish schema changes

Lazy Loading – not implemented yet

Simple Model



Demo: DTO / View Models

Managing data with DTOs and ViewModels

Demo: EF Core Scaffolding

Scaffolding a new data model from an existing database



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JasonGT / NorthwindTraders

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NorthwindTraders / README.md

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History



NorthwindTraders

Northwind Traders is a sample application built using ASP.NET Core and Entity Framework Core.

The initial purpose of this solution is to create a code first version of Northwind, using the .NET Core stack.

Getting Started

Northwind Traders EF Core - bit.ly/efcore-northwind

Use these instructions to get the project up and running.

Clean Architecture

Dev Superpowers Tour

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Clean Architecture

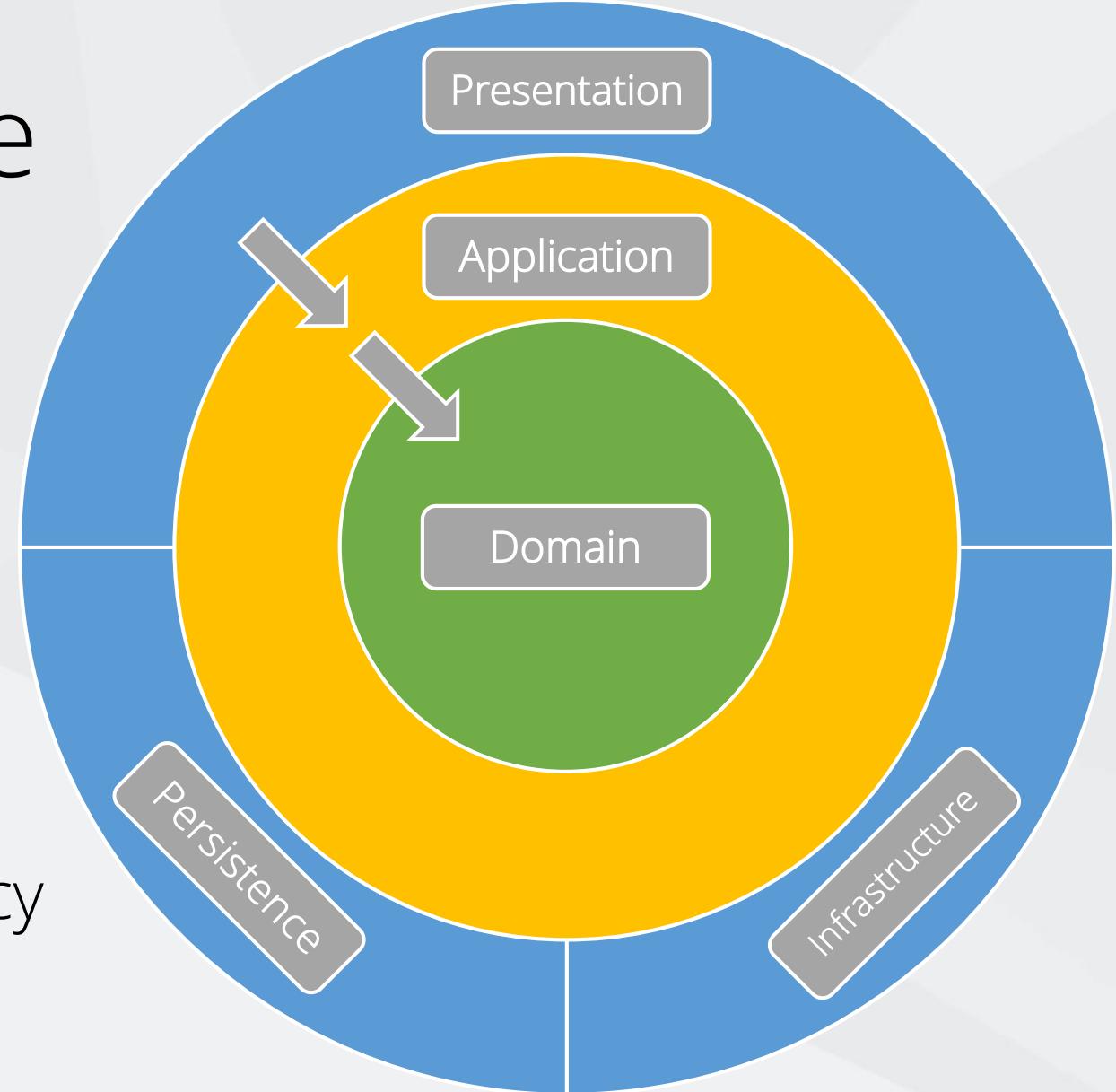
Independent of frameworks

Testable

Independent of UI

Independent of database

Independent of external agency



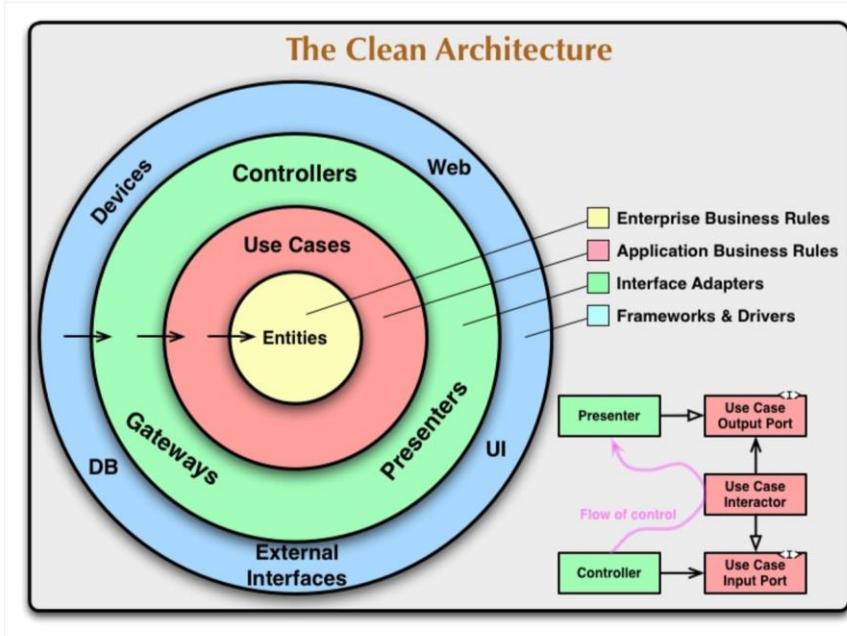
Demo: Clean Architecture

A review of the Northwind solution

The Clean Architecture

Uncle Bob / 13 Aug 2012 | Architecture | Craftsmanship

Tweet



Over the last several years we've seen a whole range of ideas regarding the architecture of systems. These include:

- [Hexagonal Architecture](#) (a.k.a. Ports and Adapters) by Alistair Cockburn and adopted by Steve Freeman, and Nat Pryce in their wonderful book [Growing Object Oriented Software](#)
- [Onion Architecture](#) by Jeffrey Palermo
- [Screaming Architecture](#) from a blog of mine last year
- [DCI](#) from James Coplien, and Trygve Reenskaug.
- [BCE](#) by Ivar Jacobson from his book *Object Oriented Software Engineering: A Use-Case Driven Approach*

Though these architectures all vary somewhat in their details, they are very similar. They all have the same objective, which is the separation of concerns. They all achieve this separation by dividing the software into layers. Each has at least one

The Clean Architecture

By Robert C. Martin

Original article by Uncle Bob

Published August 2012

bit.ly/clean-architecture

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Robert C. Martin Series

The image shows the front cover of the book "Clean Architecture". The title "Clean Architecture" is prominently displayed in large white letters at the top left. Below it is a photograph of ocean waves under a blue sky. At the very top edge, there is a small white rectangular logo with the text "APPRENTICE HALL". The author's name, "Robert C. Martin", is printed at the bottom center.

Clean Architecture

Clean Architecture

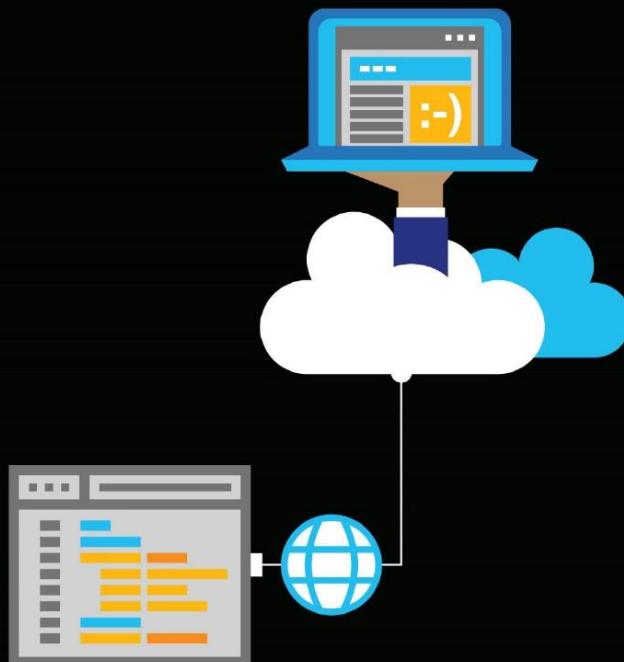
By Robert C. Martin

Author of Clean Code & Clean
Coders

bit.ly/clean-architecture-book

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Architecting Modern Web Applications with ASP.NET Core and Microsoft Azure



Steve Smith

Architecting Modern Web Applications with ASP.NET Core and Azure

By Steve Smith

Microsoft Architecture Guidance

aka.ms/WebAppEbook

github.com/ardalis/CleanArchitecture

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The screenshot shows a dark-themed course page. At the top left is a search bar with a magnifying glass icon and the placeholder text "What do you want to learn?". To its right is a three-line menu icon. The main title "Clean Architecture: Patterns, Practices, and Principles" is displayed prominently in white text. Below it is a five-star rating icon followed by the text "By Matthew Renze". A descriptive paragraph follows: "In this course, you will learn about Clean Architecture, a set of modern patterns, practices, and principles for creating software architecture that is simple, understandable, flexible, testable, and maintainable." Two call-to-action buttons are visible: a red button on the left labeled "Start free trial now" and a white button on the right labeled "▶ Play course overview". At the bottom, there's a "Course info" section with fields for "Rating" (5 stars, 298 reviews), "Level" (Beginner), and "Updated" (January 11, 2017).

Clean Architecture: Patterns,
Practices, and Principles

★★★★★ By Matthew Renze

In this course, you will learn about Clean Architecture, a set of modern patterns, practices, and principles for creating software architecture that is simple, understandable, flexible, testable, and maintainable.

Start free trial now

▶ Play course overview

Course info

Rating ★★★★★ (298)

Level Beginner

Updated January 11, 2017

Clean Architecture: Patterns, Practices, and Principles

By Matthew Renze

Pluralsight Course

bit.ly/clean-architecture-course

bit.ly/clean-architecture-demo

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Swashbuckle

Dev Superpowers Tour

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Demo: Installing Swashbuckle

Installing, configuring and using Swagger and
Swashbuckle

Unit Testing

Dev Superpowers Tour

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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)

Typical Approach

Remove dependencies on EF

Implement abstractions

Create test doubles

Write unit tests

Simplified Approach

~~Remove dependencies on EF~~

~~Implement abstractions~~

~~Create test doubles~~

Write unit tests

Demo: Unit Testing

Writing unit tests for systems that depend on EF Core

EF Core InMemory Provider

Just a database provider

Uses in-memory database

Built for testing purposes

No overhead of I/O operations

Lightweight with minimal dependencies

Limitations

InMemory is not a relational database provider

Constraints won't be enforced, you can violate
referential integrity

For unit testing, this does not matter

Concerns

You're writing integration tests, not unit tests

Concerns

Lack of isolation, e.g. tests are exercising code
with dependencies on EF

Concerns

Unit of work and repository patterns
are best practice!



Filter

Entity Framework

> Compare EF Core & EF6.x

Entity Framework Core

> Getting Started

> Creating a Model

> Querying Data

> Saving Data

> Database Providers

API Reference

> Command Line Reference

> Tools & Extensions

Miscellaneous

Connection Strings

Logging

Resiliency

Testing

Testing with SQLite

Testing with InMemory

2016-10-27 • 3 min to read • Contributors **Note**

This documentation is for EF Core. For EF6.x, see [Entity Framework 6](#).

The InMemory provider is useful when you want to test components using something that approximates connecting to the real database, without the overhead of actual database operations.

Tip

You can view this article's [sample](#) on GitHub.

InMemory is not a relational database

EF Core database providers do not have to be relational databases. InMemory is designed to be a general purpose database for testing, and is not designed to mimic a relational database.

Microsoft Docs - Testing with InMemory - bit.ly/efcore-inmemory

Some examples of this include:

- InMemory will allow you to save data that would violate referential integrity constraints in a relational database.

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In this article

[InMemory is not a relational database](#)[Example testing scenario](#)[Get your context ready](#)[Writing tests](#)



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NorthwindTraders

Northwind Traders is a sample application built using ASP.NET Core and Entity Framework Core.

The initial purpose of this solution is to create a code first version of Northwind, using the .NET Core stack.

Getting Started

Northwind Traders EF Core - bit.ly/efcore-northwind

Use these instructions to get the project up and running.

Key Points

- ✖ Don't remove dependencies on EF
- ✖ No need to implement abstractions
- ✖ Don't create test doubles
- ✓ Just write unit tests

Validation

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Demo: Using Fluent Validation

Installing and configuring Fluent Validation

Logging & Exceptions

Dev Superpowers Tour

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Overview

Built-in support for structured logging

Supports numerous providers

Logging providers take some action on logged data, e.g.
display on console, store in event log

Supports third-party providers such as NLog or Seq

Demo: Logging

Logging with ASP.NET Core

Centralised Logging with Seq

Seq is a powerful log server

Centralised, supports structured logging

Supports ASP.NET Core and others

Easy to install and configure

Demo: Centralised Logging

Adding centralised logging to ASP.NET Core with Seq

Security

Dev Superpowers Tour

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Security Choices

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

No System.DirectoryServices (yet)

ADFS can be support OIDC and OAuth2

Startup.cs

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

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

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
}
```

Startup.cs

```
public void Configure(IApplicationBuilder app,
    IHostingEnvironment env,
    ILoggerFactory loggerFactory)
{
    loggerFactory.AddConsole(Configuration.GetSection("Logging"));
    loggerFactory.AddDebug();

    app.UseStaticFiles();

    app.UseIdentity(); // This line is highlighted with a yellow background

    app.UseMvc(routes =>
```

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.

```
graph TD; AS[ASP.NET Core WebAPI] --> IS[Identity Server]; IS --> AT[Auth Token]; IS --> B[Browser]; B --> auth_html[auth.html]; B --> oidc_client_js[oidc-client.js]
```

ASP.NET Core WebAPI

Identity Server

Auth Token

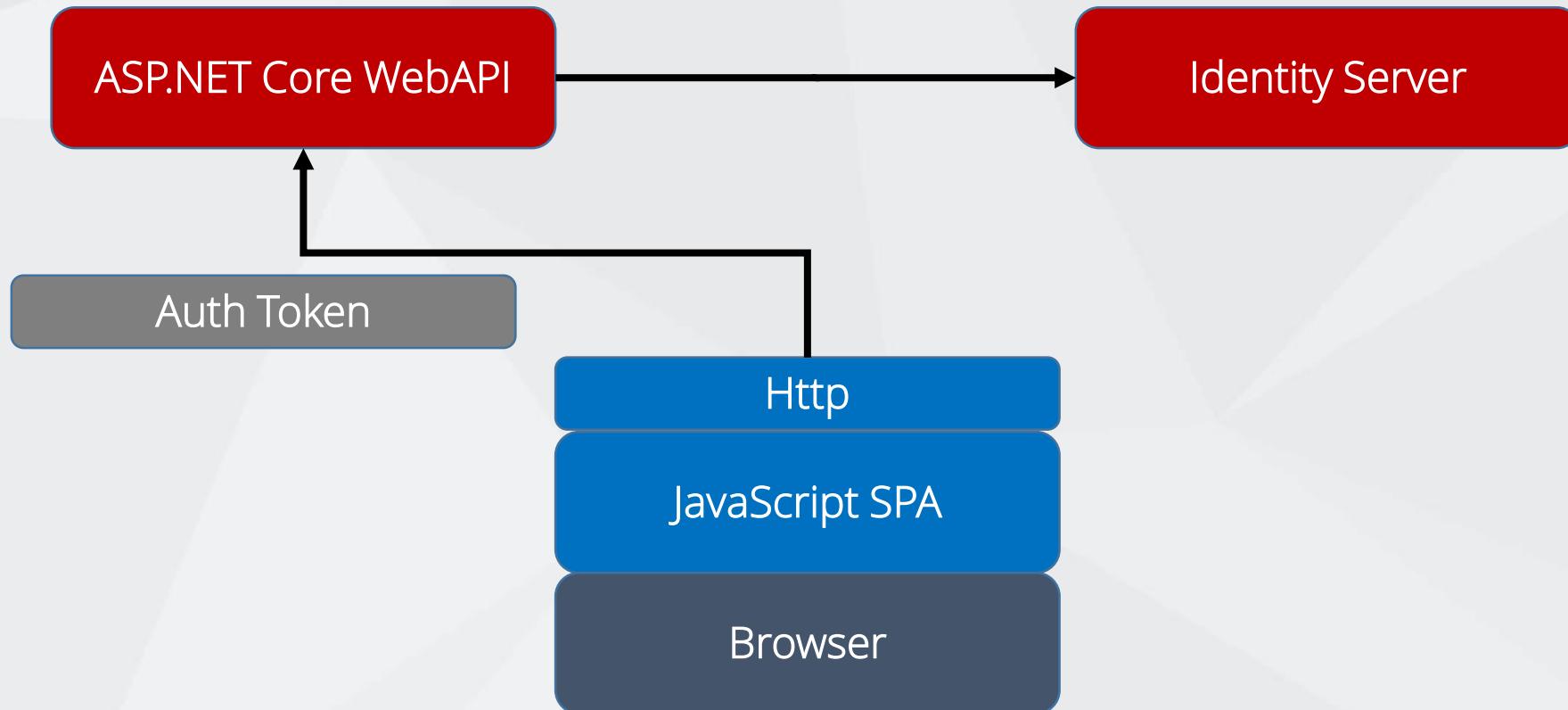
auth.html

oidc-client.js

Browser

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

Deployment

Dev Superpowers Tour

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Overview

Framework-Dependent Deployment (FDD)

Self-Contained Deployment (SCD)

Demos

Framework-Dependent Deployment (FDD)

Default deployment model for .NET Core apps

Deploy your app and third-party dependencies

Uses shared system-wide version of .NET Core

Framework-Dependent Deployment (FDD)

- ✓ No need to define target operating systems
- ✓ Small deployment package
- ✓ Multiple apps share same .NET Core installation
- ✗ Requires compatible version of .NET Core on host system
- ✗ .NET Core installation changes could impact your app

Demo: FDD with .NET Core CLI

Creating a framework-dependent deployment with the
.NET Core CLI

Self-Contained Deployment (SCD)

Deploy your app, third-party dependencies, and .NET Core

Supports side-by-side versioning of .NET Core

Self-Contained Deployment (SCD)

- ✓ Complete control of .NET Core version
- ✓ Target system can run your .NET Core app
- ✗ Must select target platforms in advance
- ✗ Size of deployment package is large
- ✗ Numerous self-contained apps can consume significant space on target system

Demo: SCD with .NET Core CLI

Creating a self-contained deployment with the .NET Core CLI

Feedback + Q & A

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Upcoming Events

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Accelerated learning,
knowledge sharing and lots
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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

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

Brisbane - Saturday, 11th November - 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.



Home > Events > Training > The Angular Superpowers Tour



The Angular Superpowers Tour

Learn to build Angular 2 apps with real-world best practices from start to finish



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About the presenters



Duncan Hunter

Duncan Hunter a Software Architect at SSW. Making sustainable software that solves real world issues is what makes Duncan tick.

He is a full stack web developer specialising in making responsive

DDD BRISBANE

DDD Brisbane is a non profit community event run by developers, for developers & will be held on Sat 2nd December 2017

DDD Brisbane 0x7

DDD Brisbane is a non profit community event run by developers for developers. Anyone can submit a session to the event and delegates then vote on the sessions they want to see.

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- Sep 18 - Earlybird registration opens
- Oct 6 - Submission closes
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- Oct 18 - Voting closes

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Thank you!

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