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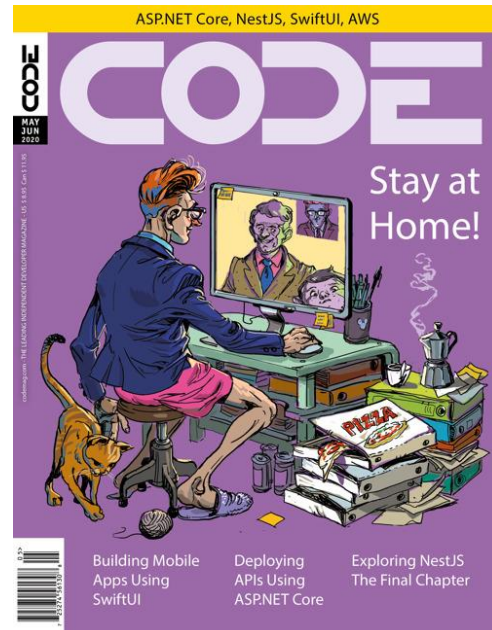# .NET 5 Preview

Markus Egger

President and Chief Software Architect

CODE Magazine & Consulting

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About the Presenter

- **Markus Egger**

- President and Chief Software Architect
  EPS Software Corp. (dba CODE Consulting)

- Publisher – CODE Magazine

- International Author and Speaker

- Microsoft RD (Regional Director)

- Microsoft MVP since 1995

- Email: markus@eps-software.com

- Twitter: @markusegger
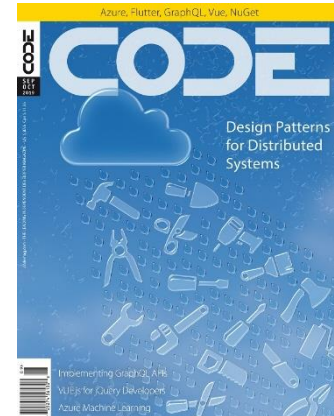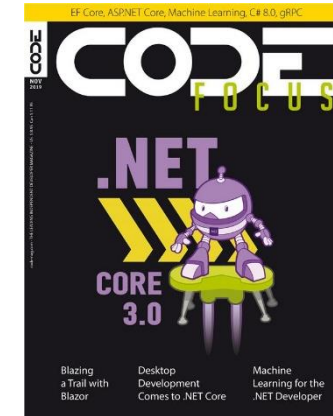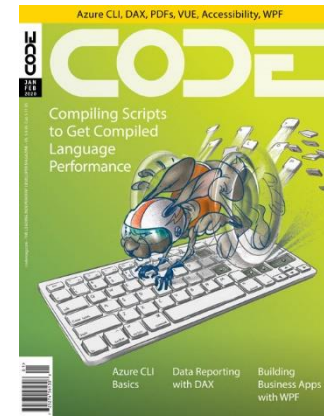
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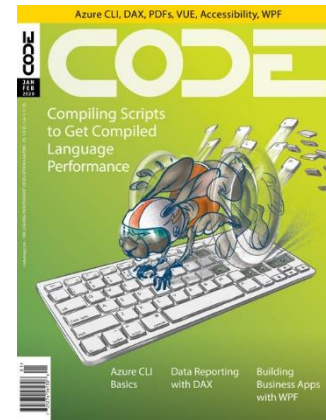

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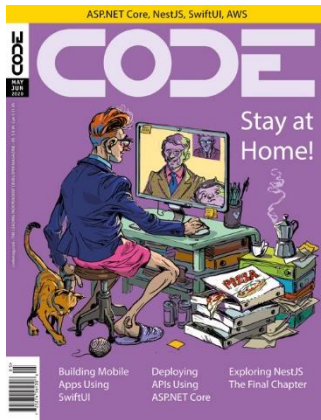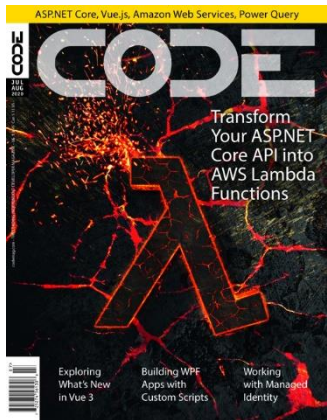
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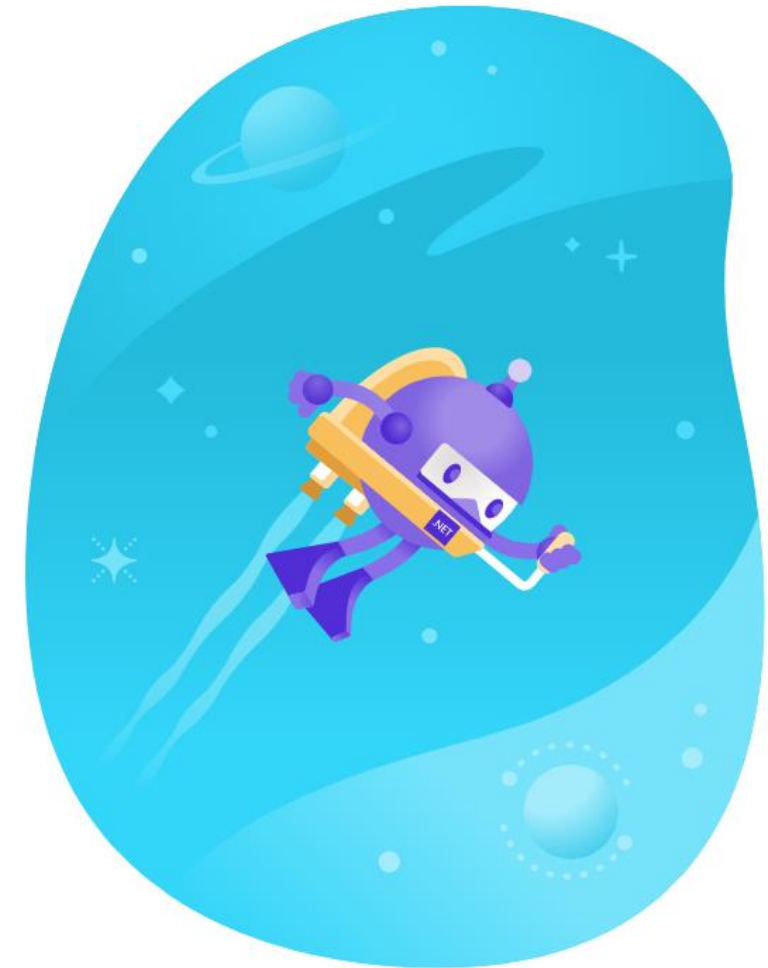
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THIS SLIDE WILL BE REPEATED AT THE END OF THE WEBINAR!

Agenda

- .NET 5 Overview
- New Platform Features and Improvements
- Language Improvements
- Web Development Improvements
- Desktop Development Improvements

.NET 5 Overview

One .NET from Desktop, to Web, Mobile, and Beyond!

The Journey to One .NET

- .NET now looks back at a history lasting two decades...

- ...with many twists and turns

- .NET Framework, .NET Core, Mono, Xamarin, UWP, Silverlight, Windows Phone,...

- Different components, project structures, APIs,...

- .NET 5 is a huge step in the journey towards (re)unifying the .NET platform

- The goal is to get away from worrying about "what runs where" and simply "targeting .NET" with code that runs everywhere

.NET – A unified platform

DESKTOP	WEB	CLOUD	MOBILE	GAMING	IoT	AI
WPF Windows Forms UWP	ASP.NET	Azure	Xamarin	Unity	ARM32 ARM64	ML.NET .NET for Apache Spark

TOOLS

.NET STANDARD

.NET 5

INFRASTRUCTURE

RUNTIME COMPONENTS	COMPILERS	LANGUAGES

VISUAL STUDIO

VISUAL STUDIO FOR MAC

VISUAL STUDIO CODE

COMMAND LINE INTERFACE

.NET Timeline/Roadmap

Sept 2019	Nov 2019	Nov 2020	Nov 2021	Nov 2022	Nov 2023
.NET Core 3.0 GA	.NET Core 3.1 LTS	.NET 5.0 GA	.NET 6.0 LTS	.NET 7.0 GA	.NET 8.0 LTS

- .NET 5 Release: November 10th, 2020
- Annual, predictable releases (started a year ago with .NET Core 3.1)
- Minor Releases if needed

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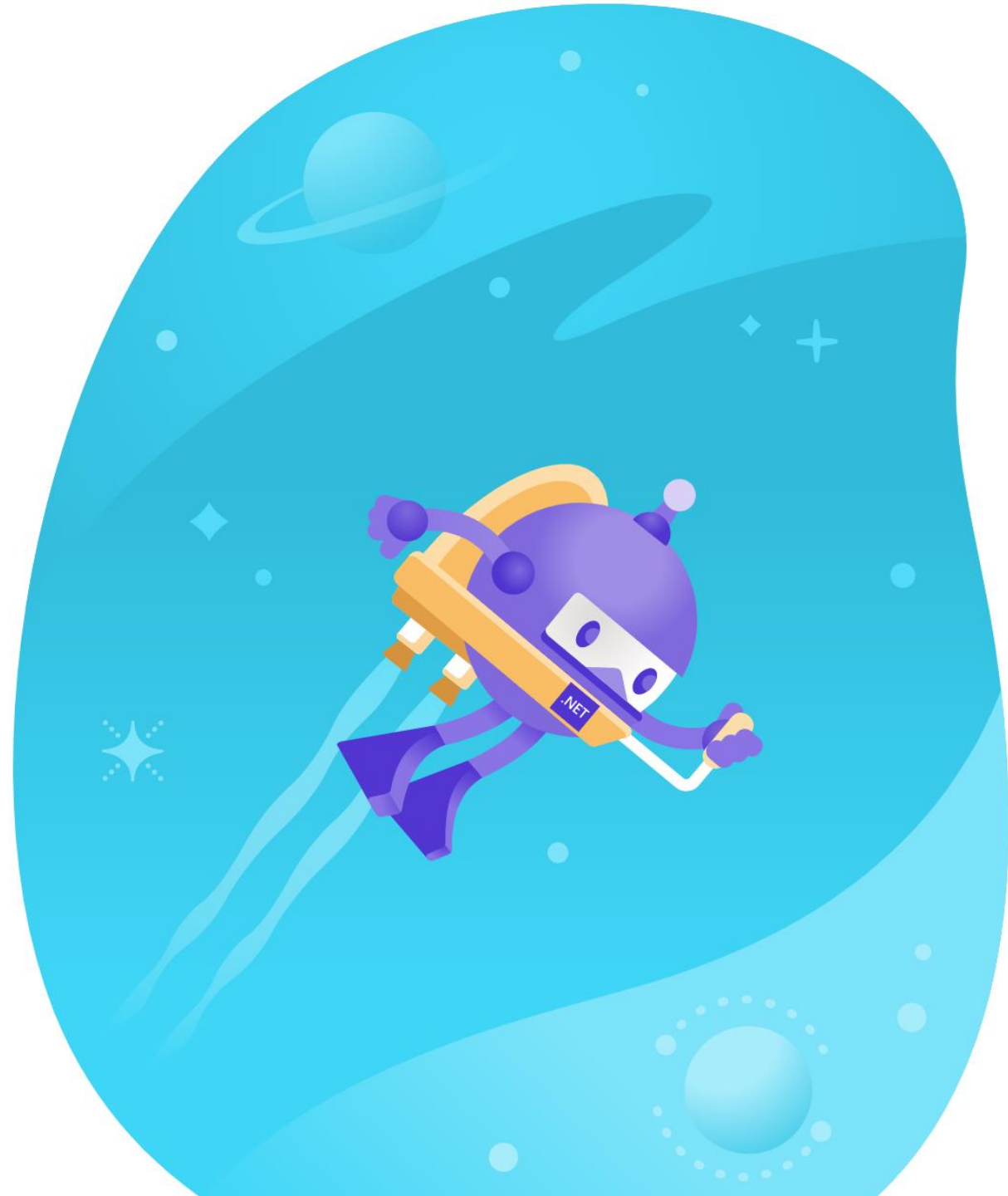
CODE Focus Magazine: .NET 5

- We are working on a CODE Focus issue on .NET 5

- Great source of free information

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Visual Studio 2019 - Preview

- To use .NET 5, download the Visual Studio 2019 Preview version
- https://visualstudio.microsoft.com/vs/preview

.NET 5 - The Platform

The .NET 5 Platform

- .NET 5 represents a shared code base for .NET Core, Mono, Xamarin, and future .NET implementations

- Instead of targeting "netstandard", we now target "net5.0" (TFM = Target Framework)

- For platform specific projects, we will target things like "net5.0-windows"
  - In .NET 6, targets for things like "net6.0-ios" and "net6.0-android" will be added

- "net5.0" can be thought of as the next ".NET Standard" version

Merging .NET Core and .NET Standard

- Rather than maintaining .NET Standard independent of the .NET implementations, .NET 5 simply defines what the standard is that runs everywhere

- From now on, there will be a unified/singe code base for all flavors of .NET

- The TFM clearly defines what is and isn't supported
  - Example: "net5.0-windows" supports all of .NET, plus Windows-specific components, but not components found in iOS or Android

- Everything added immediately becomes available everywhere

What Version to Target

- .NET 5 is fully backwards compatible with .NET Standard 2.x
- The reason to target .NET 5 is to get access to newer APIs
- If you are aiming for large reach, you want to target .NET Standard 2.0...
  - ...because that is the last version also supported by .NET Framework 4.8
- If you consider targeting .NET Standard 2.1, you can probably just go to .NET 5.0

Dealing with Platform Issues

- The goal is to allow the developer to create code bases that work in as many scenarios as possible

- This was also the goal with .NET Standard 1.0...

- ...and .NET Standard 2.x...

- ...and now .NET 5 (and beyond)

- Sometimes, creating truly generic code is too restraining. Therefore, every subsequent version added more features.

- In .NET 5, the IDE provides good design-time experience for features that may not be available everywhere.

Single File Applications

- .NET 5 aims to re-introduce the experience of publishing small, self-contained version of applications
  - Across all .NET application formats (Windows, Web,…)
  - Across all the platforms (Windows, Mac, Linux)
- Required Framework components are included in the deployment
- True xcopy-enabled, single-file executables
- Assembly Trimming
- .NET 5 has come a long way for this

ARM64

- .NET 5 has many performance and size optimizations specifically driven by support for ARM chips

- ARM chips are very popular in phones, but they are also becoming more popular in laptops

- Surface Pro X is ARM-based

- Apple has announced that their future Apple Silicon-based Macs will be ARM based

- IoT devices are often based on ARM chips

- Raspberry Pi 3 & 4 are ARM-based

JSON Improvements

- Performance and reliability improvements
- Easier to adopt for developers familiar with JSON.NET
- Deserializing JSON to Records

.NET 5 - The Languages

C# 9.0

- C# 9.0 is part of .NET 5 and depends on features in .NET 5
  - Therefore, it only works in conjunction with .NET 5

Top-Level Statements

- Simplification of simple apps

```csharp
using System;

namespace HelloWorld
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.WriteLine("Hello World!");
        }
    }
}
```

```csharp
using System;
Console.WriteLine("Hello World!");
```

Record Types

- Provide immutable reference types that are very easy to handle
- Simplified declaration of this kind of type and its properties
- Easy cloning
- Value-type-style comparison

Init-Only Setters

- Ability to create properties that are read-only after the type has been initialized
- Works great with Record types

Enhanced Pattern Matching

- Type patterns match a variable as a type
- Parenthesized patterns enforce or emphasize the precedence of pattern combinations
- Conjunctive and patterns require both patterns to match
- Disjunctive or patterns require either pattern to match
- Negated not patterns require that a pattern doesn't match
- Relational patterns require that the input be less than, greater than, less than or equal, or greater than or equal to a given constant

Odds and Ends

- Types in new() expressions can be omitted

```
PersonX x = new();
```

- Static modifier on Lambda expressions

- Covariant return types in virtual functions

- Discards (_) as parameters to lambda expressions

- Attributes on local functions (especially useful for nullable)

F# 5

- Making F# 5 a first-class citizen in .NET 5
- Full support for F# Interactive (FSI)
- Package manager support
- F# support in Jupyter Notebooks
- F# support in Visual Studio Code Notebooks
- Enhanced Computation Expressions
- Interpolated strings
- Great support for "Analytical Programming"
- Improved .NET Interop

Desktop & Mobile Development

Windows Development

- WPF and Windows Forms supported as first-class citizens in .NET 5
- Improved Designer Support (both WinForms and XAML)
- Improved ClickOnce Support

WebView2

- New Edge-Chromium-based HTML control
- Available in Windows Forms, WPF
- .NET Framework, .NET Core 3.x, and .NET 5
- Windows 7 and later
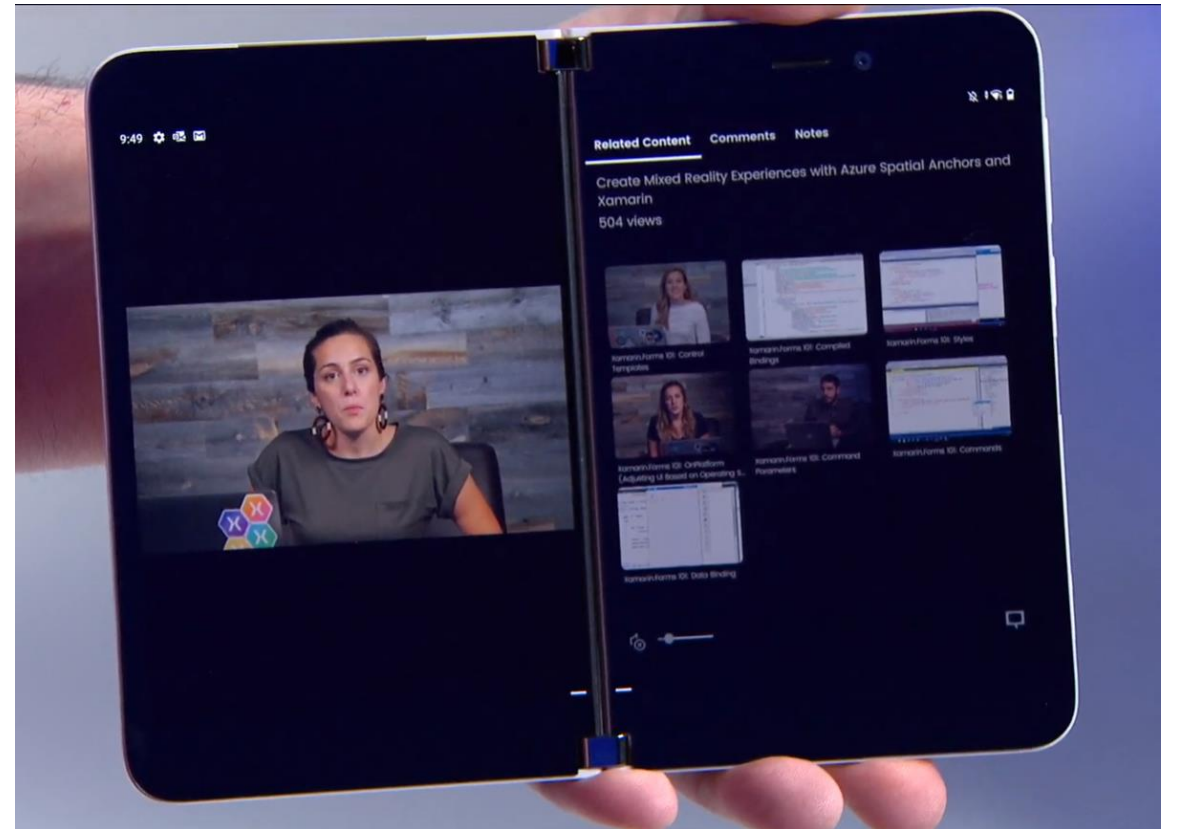- Evergreen (updated every 6 weeks)

WinUI 3

- Continuation of WinRT, XAML Islands,…

- Windows 10 only

- Currently available as a preview

Xamarin.Forms 5

- Dual Screens

- Dark Mode

- Improved Design-Time Support

Web Development

Blazor Updates in .NET 5

- Move to the new .NET 5 runtime (away from Mono)
- Significant Performance Improvements
  - Computational performance up to 30% faster
  - Component rendering 2-4x faster
- Virtualization support
  - Virtualize component rather than foreach-loops
- Prerendering for performance and search optimization
- CSS Isolation
- Lazy Loading of assemblies

Other Announcements

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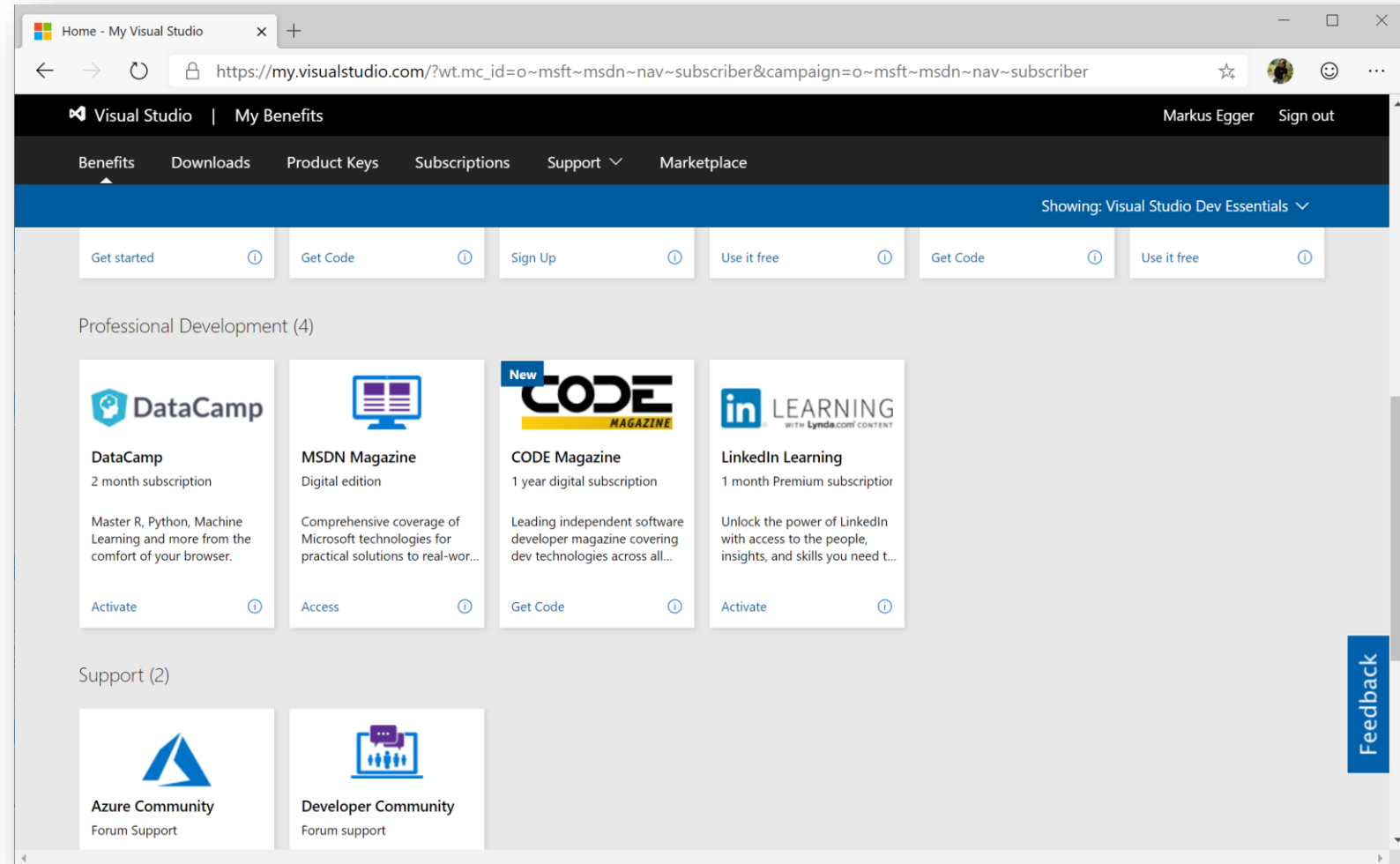
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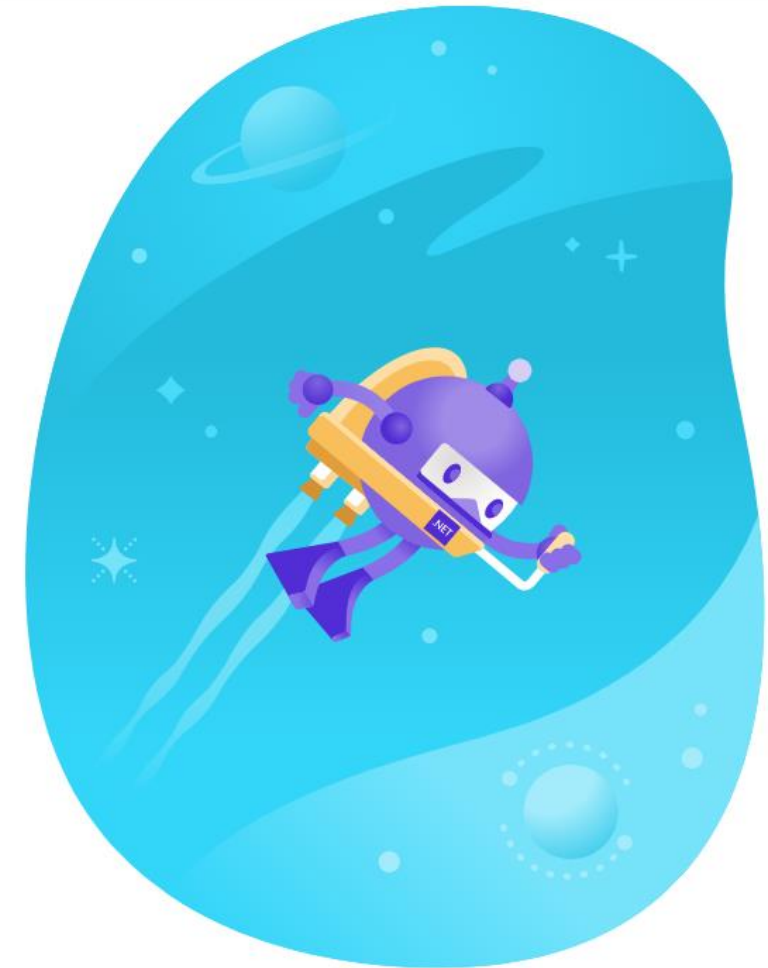**.NET 5 In-Depth (.NET Conf Review)**

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29	30					

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