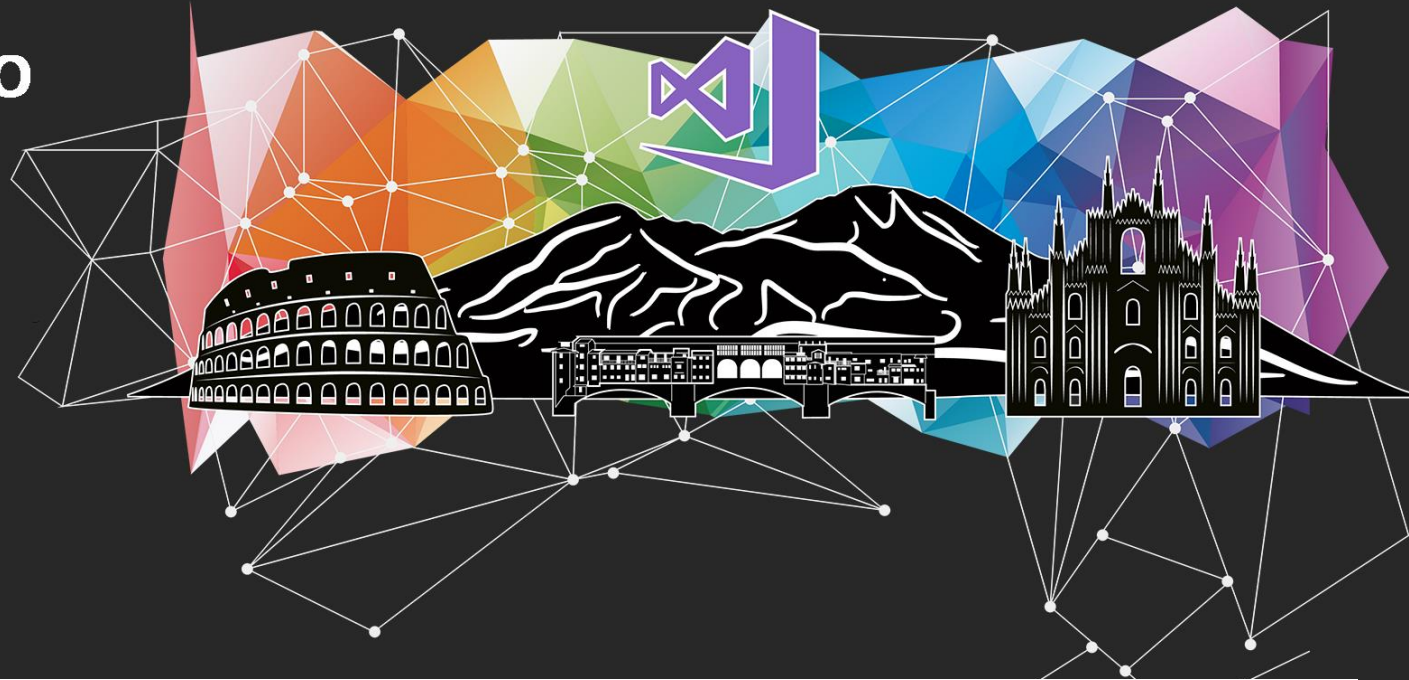


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## THE EVOLUTION OF .NET CORE

**Massimo Bonanni**

Paranormal Developer, with the head in the Cloud and all the REST in microservices!



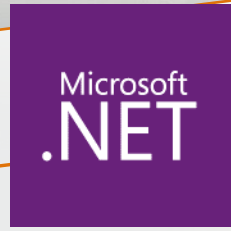
Community



Sponsor







2017

2015

2012

2010

2007

2006

2005

**.NET Framework 4.7**

**.NET Framework 4.6.1**

**.NET Framework 4.5**

**.NET Framework 4.0 (MVC)**

**.NET Framework 3.5 (LINQ, AJAX.NET, EF)**

**.NET Framework 3.0 (WCF, WPF & Workflow)**

**.NET Framework 2.0 (Generics, Collections)**



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# .NET CORE ... WHO IS HE?





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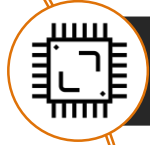


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# .NET CORE IN 7 POINTS



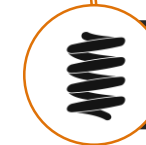
**Cross-platform**



**Consistent across architectures**



**Command-line tools**



**Flexible deployment**



**Compatible**



**Modular**



**Open source**



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# THE BRIEF HISTORY OF .NET CORE



## .NET Core 1.0

The first version of .NET that was open source and cross-platform (Windows, macOS and Linux), side-by-side support

2016



## .NET Core 2.0

Support for .NET Standard 2.0, Windows Compatibility Pack

2017



## .NET Core 3.0

Support for .NET Standard 2.1  
WPF, WinForm, ML.NET, C#8, EF6

Q3/Q4 2019



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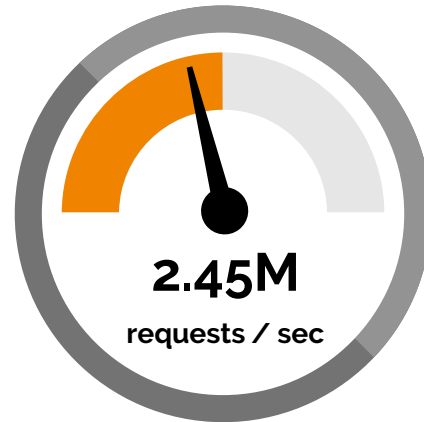
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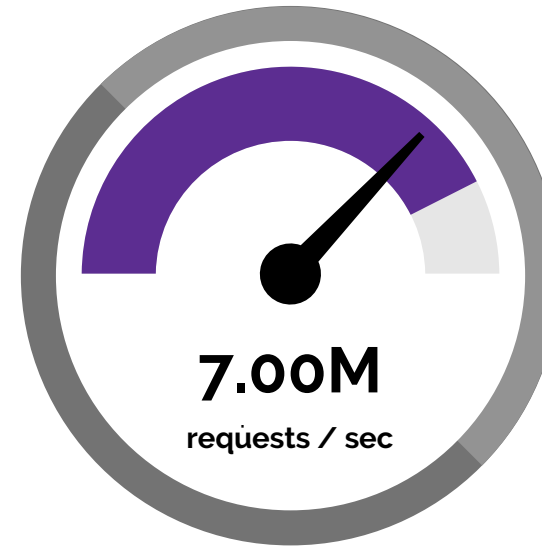


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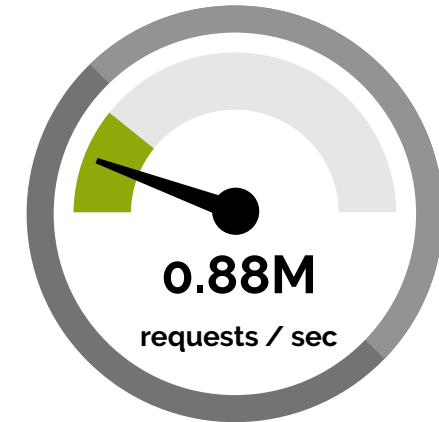
## .NET IS FAST



Java Servlet



.NET Core



Node.js

Data sourced from official raw platform tests available at [TechEmpower Round 17](#).

| Best plaintext responses per second, Dell R440 Xeon Gold + 10 GbE (307 tests) |                    |                                     |        |        |     |     |     |     |     |     |
|---|--------------------|-------------------------------------|--------|--------|-----|-----|-----|-----|-----|-----|
| Rnk   | Framework          | Best performance (higher is better) |        | Errors | Cls | Lng | Plt | FE  | Aos | IA  |
| 1   | ulib               | 7,034,945                           | 100.0% | 1      | Plt | C++ | Non | ULi | Lin | Rea |
| 2   | fasthttp           | 7,033,219                           | 100.0% | 0      | Plt | Go  | Non | Non | Lin | Rea |
| 3   | libreactor         | 7,027,558                           | 99.9%  | 0      | Mcr | C   | Non | Non | Lin | Rea |
| 4   | wizzardo-http      | 7,026,401                           | 99.9%  | 0      | Mcr | Jav | Non | Non | Lin | Rea |
| 5   | ulib-plaintext_fit | 7,022,947                           | 99.8%  | 0      | Plt | C++ | Non | ULi | Lin | Rea |
| 6   | actix-raw          | 7,021,312                           | 99.8%  | 0      | Plt | Rus | Non | act | Lin | Rea |
| 7   | aspcore            | 7,016,017                           | 99.7%  | 0      | Plt | C#  | .NE | kes | Lin | Rea |
| 8   | hyper              | 7,013,819                           | 99.7%  | 0      | Mcr | Rus | Rus | Hyp | Lin | Rea |
| 9   | tokio-minihttp     | 7,009,815                           | 99.6%  | 0      | Mcr | Rus | Rus | tok | Lin | Rea |
| 10  | httpbeast          | 7,008,766                           | 99.6%  | 0      | Plt | Nim | Non | Non | Lin | Rea |
| 11  | rapidoid-http-fast | 7,008,679                           | 99.6%  | 0      | Plt | Jav | Rap | Non | Lin | Rea |
| 12  | rapidoid           | 6,994,610                           | 99.4%  | 0      | Plt | Jav | Rap | Non | Lin | Rea |



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# .NET CORE AND .NET FRAMEWORK

## Similarities

- Support the latest C#, VB.NET, F#
- Implements .NET Standard API
- Supports ASP.NET Core and EF Core
- Best experience in Visual Studio
- Great experience in Visual Studio Code
- Can be used in/with Docker





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# .NET CORE AND .NET FRAMEWORK

## Differences

- .NET Framework comes with Windows
- .NET Core installs side-by-side
- .NET Core is cross-platform and OSS
- .NET Core works on Nano Server
- .NET Core has a strong CLI experience





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# SUPPORT LIFECYCLE

## Long Term Support (LTS) Releases

- Supported for **three years** after the general availability date of a LTS release
- Or **one year** after the general availability of a subsequent LTS release

Customers using LTS will need the latest patch update installed to qualify for support.

| Version           | Original Release Date | Latest Patch Version | Patch Release Date | Support Level | End of Support  |
|-------------------|-----------------------|----------------------|--------------------|---------------|---|
| .NET Core 2.2     | December 4, 2018      | 2.2.0                | December 4, 2018   | Current       |   |
| .NET Core 2.1     | May 30, 2018          | 2.1.6                | November 13, 2018  | LTS           | At least three years from LTS declaration (August 21, 2018) |
| .NET Core 2.1 RC1 | May 8, 2018           | n/a                  | n/a                | n/a           | June 30, 2018   |
| .NET Core 2.0     | August 14, 2017       | 2.0.9                | July 10, 2018      | EOL           | October 1, 2018   |

<https://www.microsoft.com/net/core/support>



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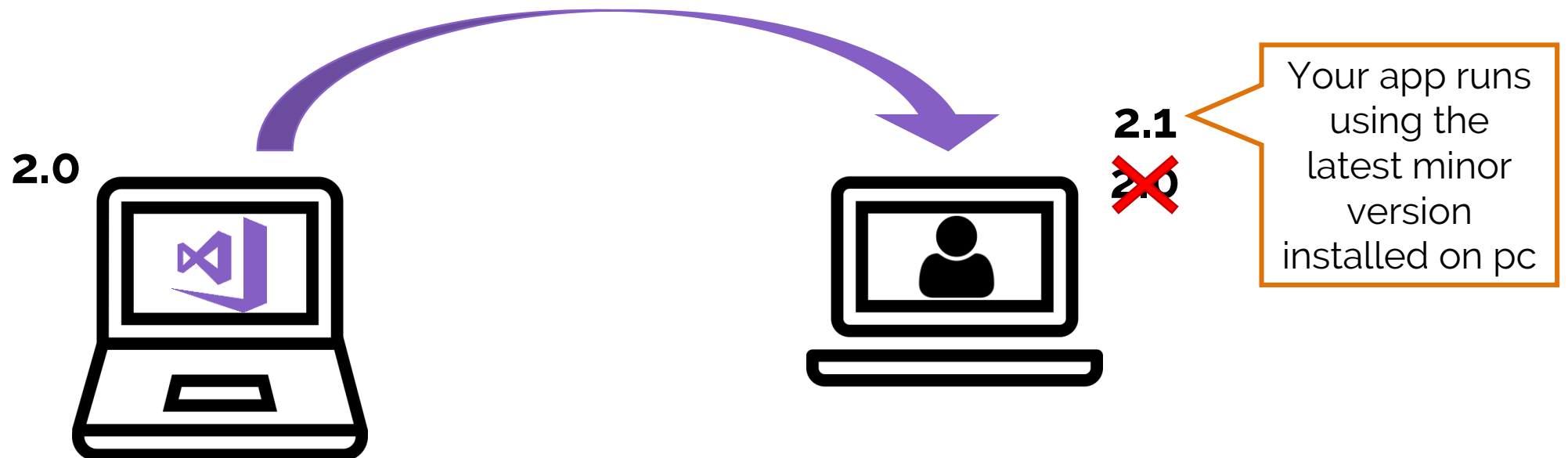
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# ROLL FORWARD

All .NET Core applications starting with .NET Core 2.0 automatically roll forward to the latest minor version installed on a system.

The roll-forward behavior doesn't apply to preview releases and to major releases.

You can disable this behavior.





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# .NET CORE CLI





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# WHAT ARE THE .NET CORE COMMAND-LINE TOOLS?

**Cross-platform**  
command-line  
set of tools that  
are...

...**focused** on  
building code...

...for both  
**humans**...

...and **machines**



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# WHAT ARE THE .NET CORE COMMAND-LINE TOOLS?

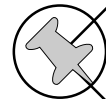
**Cross-platform**  
command-line  
set of tools that  
are...

...**focused** on  
building code...

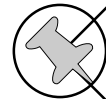
...for both  
**humans**...

...and **machines**

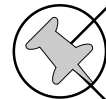
## Design principles



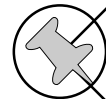
**NuGet (and \$PATH-based) extensibility**



**Every command is a verb ("compile", "run",  
"restore" etc.)**



**The driver knows enough to run the command(s)  
and no more**



**All core commands are consumable by humans and  
machines**

**dotnet      build      --output [path]**

the driver

verb (command)

verb arguments



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# WHAT ARE THE .NET CORE COMMAND-LINE TOOLS?

Cross-platform  
command-line  
set of tools that  
are...

...focused on  
building code...

...for both  
**humans**...

...and **machines**

**dotnet** **build** **--output [path]**

the driver

verb (command)

verb arguments

**Driver**, dotnet, is invoked first, followed by a **verb**

The verb is a **command** that is implemented as:

- A NuGet package
- A binary in the \$PATH

Driver invokes the command passing the **arguments** to it

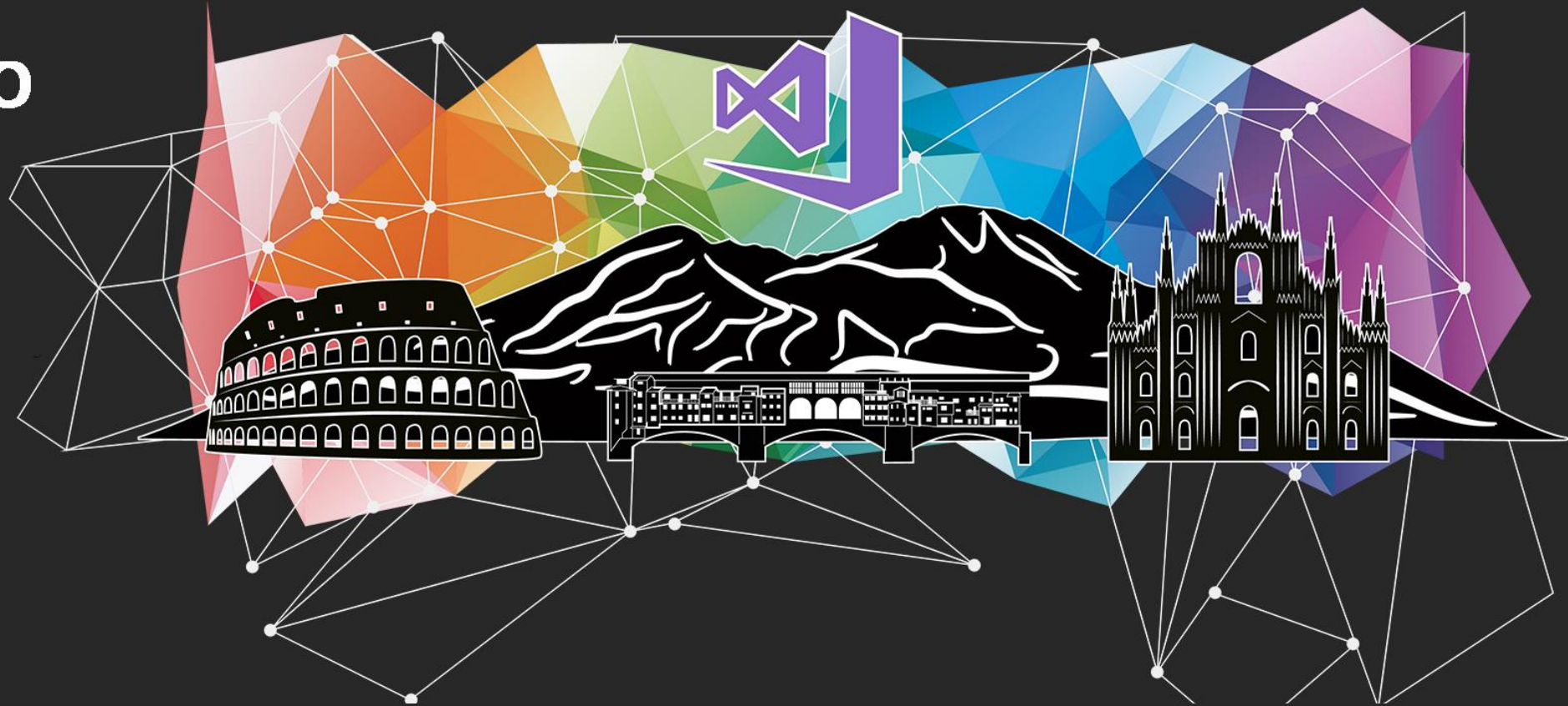
- The command is responsible for the arguments



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# DEMO

Hello .NET Core!!



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# .NET CORE 3.0

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# .NET CORE 3



WEB



CLOUD

.NET Core is perfectly suited for the requirements of cloud-native, cross-platform workloads

.NET Core 3 expands supported workloads to include Windows Desktop, IoT & AI



DESKTOP



IoT



AI

.NET CORE

LIBRARIES

INFRASTRUCTURE

RUNTIME COMPONENTS

COMPILERS

LANGUAGES





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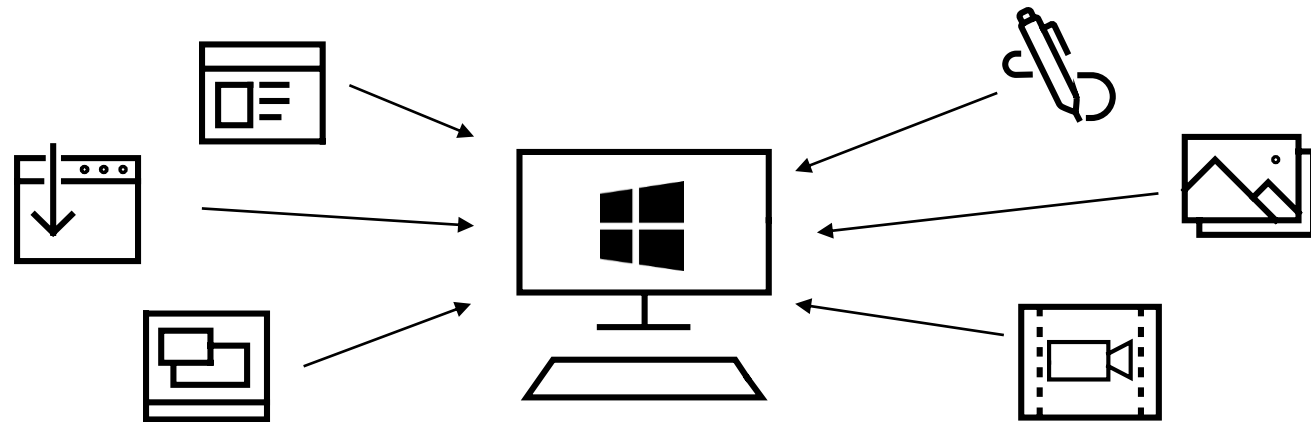
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# DESKTOP IMPROVEMENTS

- **UI Framework Enhancements**
  - WPF and WinForms come in .NET Core world
  - XAML Islands - WinForms & WPF can host UWP
  - XAML Controls - WinForms & WPF browser and media UWP controls
  - High DPI fixes for WinForms
- **Access to all the Windows 10 APIs**
- **Also available in next version of .NET Framework (4.8)**





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# Finally WinForm and WPF also on Linux ....

A close-up shot of a young boy with dark skin and short, curly hair. He has a questioning or skeptical expression on his face, with his eyebrows slightly furrowed and his mouth slightly open. He is looking upwards and to the left. He is wearing a red jacket over a white collared shirt and a green sweater. The background is a plain, light blue wall.

What you  
talking  
about, Max?





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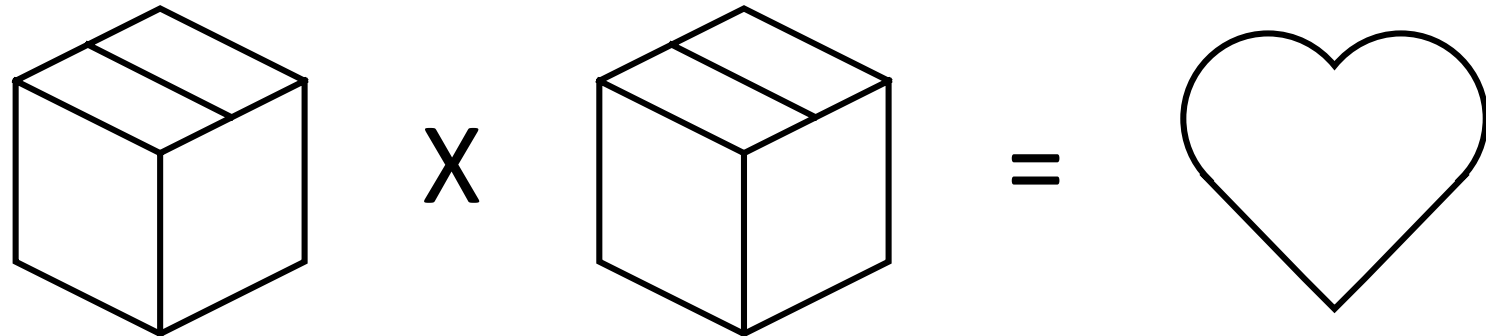
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# WHY WINDOWS DESKTOP ON .NET CORE?

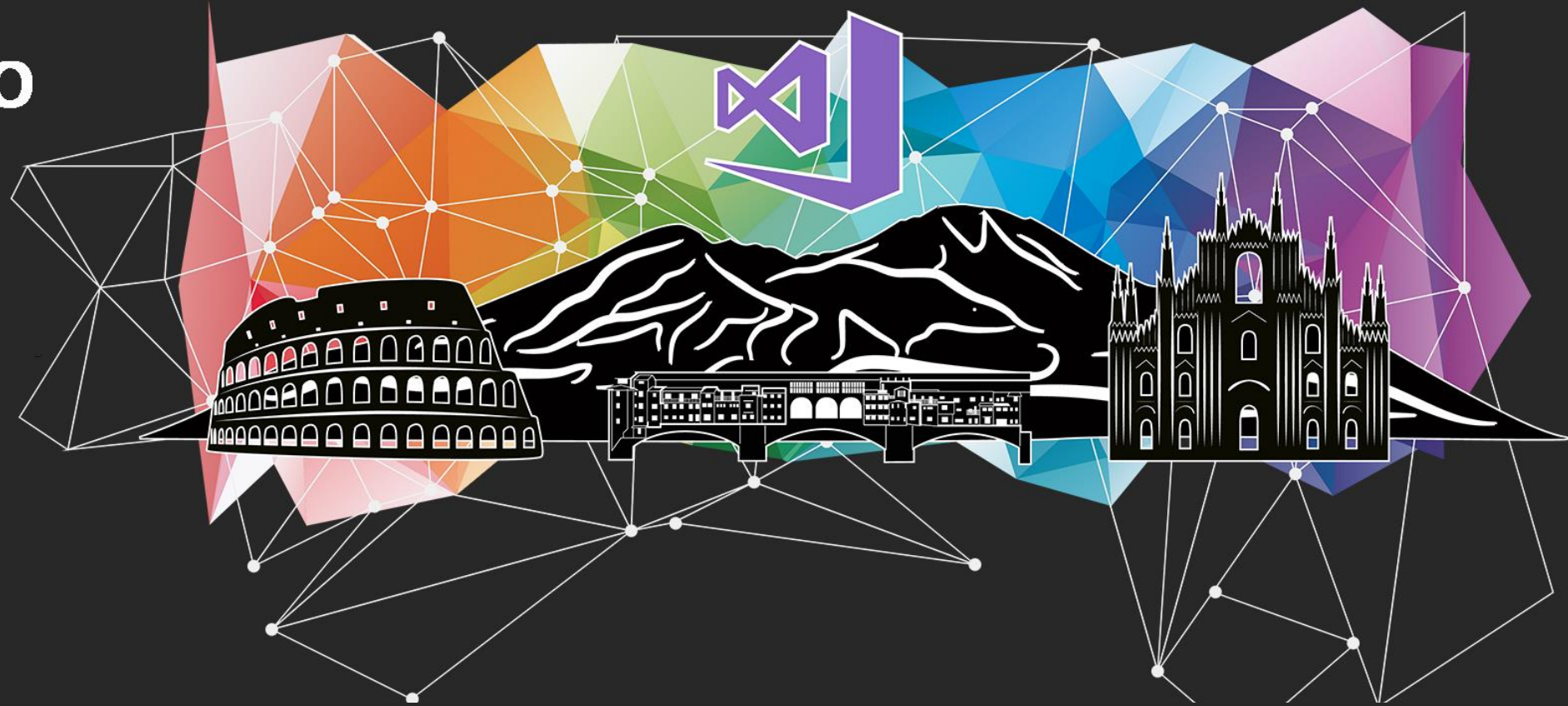
- **Deployment Flexibility**
  - Side-by-side support
  - Machine global or app local framework
  - Self-contained EXEs
- **Core runtime and API improvements**
- **Performance**



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# DEMO

WinForm with Core!!!



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# .NET STANDARD



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# WHAT IS .NET STANDARD?

- .NET Standard **is a specification**
- A set of APIs that **all .NET platforms have to implement**

.NET Standard

~

HTML specification

.NET Framework

~

Browsers

.NET Core

Xamarin





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# .NET STANDARD LIBRARY

- A set of APIs that all .NET platforms have to implement
- Unifies the .NET platform and prevents future fragmentation
- .NET Standard replaces Portable Class Libraries (PCLs) for building multi-platform .NET libraries
- .NET Standard handles this by:
  - Defining the set of BCL APIs for all .NET implementations to implement
  - Enabling developers to produce libraries that are portable across .NET implementations, using this same set of APIs
  - Reducing or even eliminating conditional compilation of shared source due to .NET APIs, only for OS APIs.



# .NET TODAY - REUSING CODE

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APP  
MODELS

BASE  
LIBRARIES

## .NET FRAMEWORK

WPF

Windows  
Forms

ASP.NET

.NET Framework BCL

## .NET CORE

UWP

ASP.NET Core

.NET Core BCL

## XAMARIN

iOS

Android

OS X

Mono BCL



# .NET TODAY - REUSING CODE

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.NET FRAMEWORK

.NET CORE

XAMARIN

## CHALLENGES

### **Difficult to reuse skills**

- Need to master 3 base class libraries

### **Difficult to reuse code**

- Need to target a fairly small common denominator

### **Difficult to innovate**

- Need implementations on each platform



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APP  
MODELS

BASE  
LIBRARIES

**.NET FRAMEWORK**

WPF

Windows  
Forms

ASP.NET

**.NET CORE**

UWP

ASP.NET Core

**XAMARIN**

iOS

OS X

Android

**.NET Standard**





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.NET FRAMEWORK

.NET CORE

XAMARIN

## BENEFITS

### Reuse skills

- Master one BCL, not a Venn diagram

### Reuse code

- Common denominator is much bigger

### Faster innovation

- Target .NET Standard & run anywhere



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# THE FUTURE OF .NET FRAMEWORK

## **.NET Framework is slowing down**

### **Why? We want to stop breaking your apps!**

- Billions of installs. Getting much harder to release major features without compatibility issues
- Can innovate much faster with .NET Core because of its side-by-side nature

### **We will continue to update**

- Many major product lines within Microsoft depend on .NET Framework
- We will continue to update .NET Framework for years to come. High-compact features only.
- Things like... new security protocols, bug fixes, Windows features, etc.

### **No changes to support policy**

- Support for 10 years (5 mainstream+5 custom) per Windows support policy for each release
- .NET Framework will remain a Windows component and service policy is the same as Windows

### **Recommend new development on .NET Core**



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# WHEN YOU USE WICH FRAMEWORK

|   |   |
|---|---|
| High-Performance and scalable system without UI                           | .NET Core   |
| Docker containers support   | Both, but .NET Core is born to live in container                              |
| Heavily rely on command line  | .NET Core has a better support  |
| Cross-platform needs  | .NET Core   |
| User interface centric Web Application                                    | Both, but .NET Core is the future   |
| Windows Client applications using WinForms or WPF                         | .NET Framework until the WPF and Win Form support in .NET Core will be mature |
| Already have a pre-configured environment and systems                     | .NET framework is better  |
| Stable version for immediate need to build and deploy                     | .NET Framework has been around since 2001, .NET Core is a baby                |
| Have existing experienced .NET Team                                       | .NET Core has a learning curve  |
| Time is not a problem. Experiments are acceptable. No rush to deployment. | .NET Core is the future of .NET   |



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# Thanks for your attention!!!!



## Massimo Bonanni



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*@massimobonanni*

*<https://www.linkedin.com/in/massimobonanni/>*





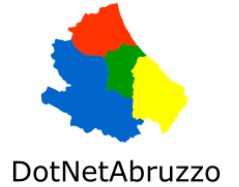
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