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Power of .NET

An Introduction to Microsoft .NET

By
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Co-founder & CTO, Teknorix

What is .NET?

.NET is an open source **developer platform** for building different types of apps.

Languages

You can write .NET apps in C#, F#, or Visual Basic.

- C# is a simple, modern, object-oriented, and type-safe programming language.
- F# is a programming language that makes it easy to write succinct, robust, and performant code.
- Visual Basic is an approachable language with a simple syntax for building type-safe, object-oriented apps.

Platforms

- .NET Framework supports websites, services, desktop apps, and more on Windows.
- .NET(earlier known as .NET Core) is a cross-platform implementation for websites, servers, and console apps on Windows, Linux, and macOS.
- Xamarin/Mono is a .NET implementation for running apps on all the major mobile operating systems.

Libraries

- To extend functionality, Microsoft and others maintain a healthy package ecosystem built on .NET Standard.

- NuGet is a package manager built specifically for .NET that contains over 90,000 packages.

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Is .NET really free & open source?

Evolution of .NET

"Today's Internet experience can be confusing and difficult, with a jumble of applications, Web pages and devices, none of which work with one another on your behalf," Gates said.
"With the emergence of standards like XML, we now have the opportunity to revolutionize the way computers talk to one another on our behalf just as the browser changed the way we interact with computers."

Introducing the .NET Platform

FEATURE

Microsoft .Net and C#

By Tom Yager, InfoWorld

InfoWorld | 7 JANUARY 2002 13:30 IST

After being thrashed in the enterprise software market by the likes of Sun Microsystems Inc., IBM and Linux, Microsoft Corp. is pinning its comeback hopes on its new application framework, .Net. Although the freedom to use practically any programming language is key to .Net's appeal, developers are most excited about C#, the C++ derivative that Microsoft created with .Net in mind. The disruptive potential of these technologies is enormous because they change the rules for all types of Windows development, from desktop software to Web-enabled enterprise solutions.

Web services are so conceptually simple -- remote object access via HTTP and XML -- that one might wonder how Microsoft can score its implementation of Web services as a major win over J2EE. Indeed, there are several ways to create Web services in Java. What sets .Net, Visual Studio.Net and C# apart is that their designs revolve around making Web services easier to create and consume. Visual Studio.Net reduces the discovery, creation, deployment and use of Web services to point-and-click operations.

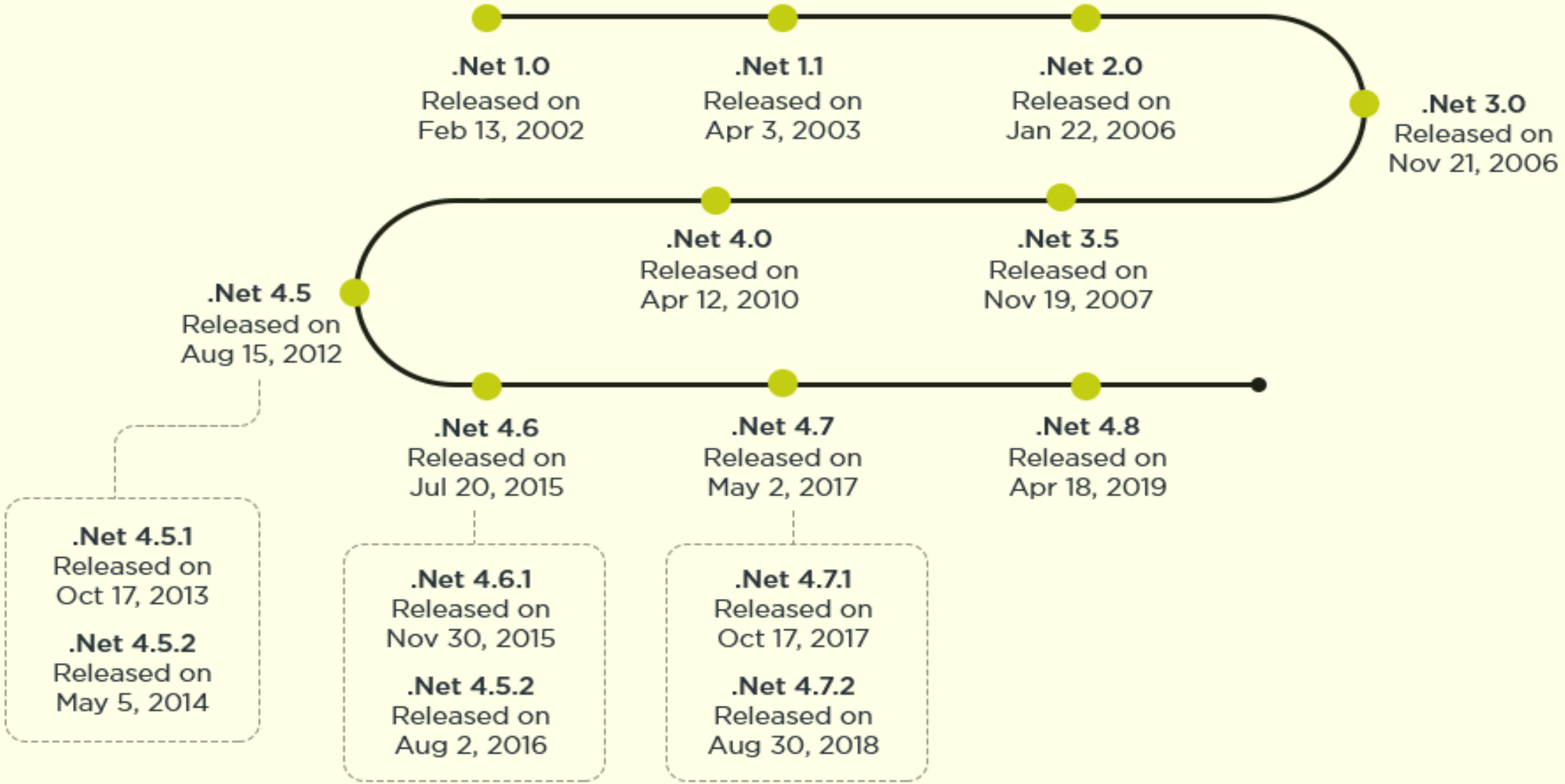
Microsoft's new enterprise technologies will certainly create turmoil as companies involved in Windows development adjust to the changing landscape. The combination of .Net and C# will also have an unsettling influence in some non-Windows shops, forcing the review of long-standing assumptions about Windows' role in their operations. Java and Unix are well established, but their reign as unchallenged rulers of the enterprise software domain is coming to an end.

This story, "Microsoft .Net and C#" was originally published by InfoWorld.

Microsoft Unveils Vision for Next Generation Internet

June 22, 2000 |

JOURNEY OF .NET FRAMEWORK



Microsoft joins the Linux Foundation, 15 years after Ballmer called it 'cancer'

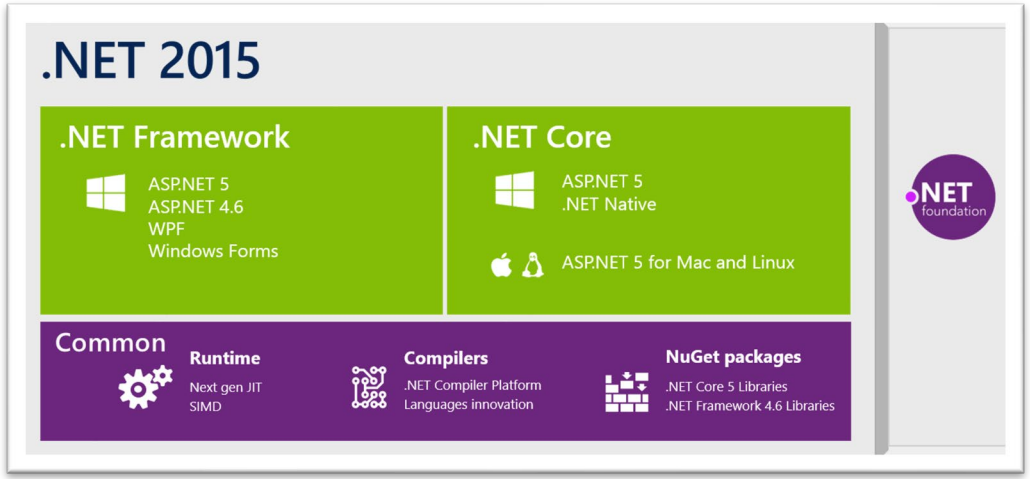
Google joins the .NET Foundation

November 12th, 2014 | 1

Today is a huge day for .NET! We're happy to announce that .NET Core will be open source, including the runtime as well as the framework libraries.

This is a natural progression of our open source efforts, which already covers the managed compilers (C#, VB, and F#) as well as ASP.NET:

- C# & Visual Basic ("Roslyn")
- Visual F# Tools
- ASP.NET 5
- Entity Framework



MICROSOFT IS NOW THE SINGLE BIGGEST CONTRIBUTOR TO OPEN-SOURCE PROJECTS IN THE WORLD

Microsoft really does love Linux

Redmond has truly embraced the open source community

Microsoft: we were wrong about open source

Microsoft has embraced open source and even Linux in recent years

Microsoft ♥ Open Source

.NET Core Release History

Version	Release Date
.NET Core 1.0	Jun 2016
.NET Core 2.0	Aug 2017
.NET Core 2.1 LTS	May 2018
.NET Core 3.0	Sep 2019
.NET Core 3.1 LTS	Dec 2019
.NET 5.0	Nov 2020
.NET 6.0 LTS	Nov 2021
.NET 7.0	Nov 2022 (expected)

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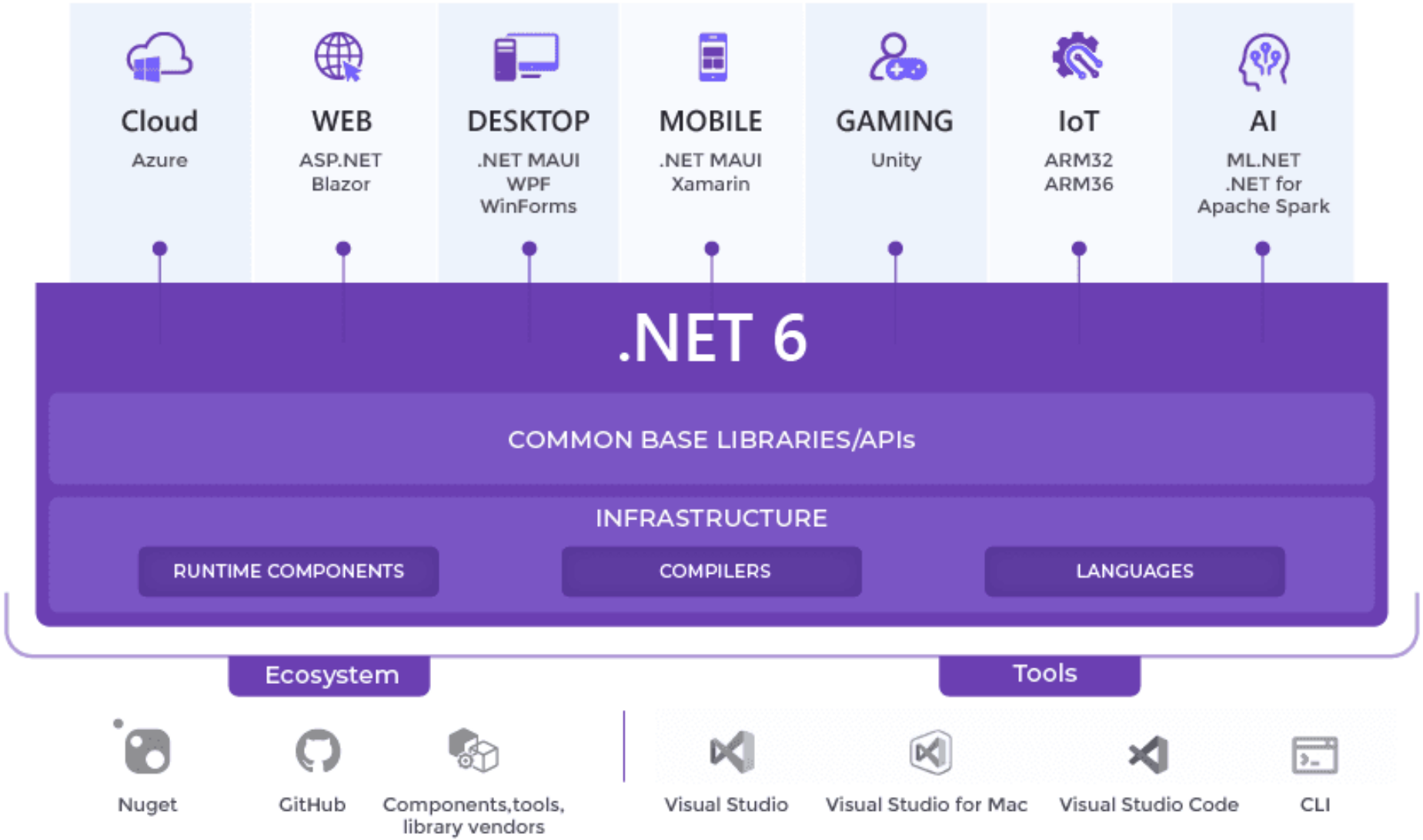
What can I build with .NET?


Cloud
Azure
WEB
ASP.NET
Blazor
DESKTOP
.NET MAUI
WPF
WinForms
MOBILE
.NET MAUI
Xamarin
GAMING
Unity
IoT
ARM32
ARM36
AI
ML.NET
.NET for
Apache Spark
.NET 6
COMMON BASE LIBRARIES/APIs
INFRASTRUCTURE
RUNTIME COMPONENTS
COMPILERS
LANGUAGES
Ecosystem
Tools
Nuget
GitHub
Components,tools,
library vendors
Visual Studio
Visual Studio for Mac
Visual Studio Code
CLI

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Who uses .NET?

Who uses .NET

- “30% of Fortune 500 Companies use .NET”
- “95% Of Fortune 500 Companies Are Running On Azure Today”,
  - Dr Rohini Srivathsa, National Technology Officer, Microsoft India

App performance monitoring provider increases throughput by 2,000 percent

- The core of the product was written in Microsoft .NET
- The API, which receives data from customers was written in NodeJS
- Over time, Raygun engineers noticed that the Node.js API performance was degrading
- “As new versions came out, we found that Node.js as a framework was becoming slower and more heavyweight,” says Jeremy Boyd, Raygun Co-founder and Chief Technology Officer

“Using the same-size server, we were able to go from 1,000 requests per second per node with Node.js to 20,000 requests per second with .NET Core.”

—John-Daniel Trask: Chief Executive Officer and Co-Founder Raygun

Startup chooses Blazor and Xamarin for full-stack development using C#

- The Postage is a startup that helps people plan for end-of-life, so that they can live fully now.
- Team was able to do full-stack development across the web, back-end services, and mobile applications—all using C#.
- Resulted in rapid time to market
- Ability to continue moving quickly as the company continues to grow.

"I knew we wanted to use .NET, and Azure is the best cloud for .NET. What's more, with .NET, we would get access to Blazor and Xamarin, which let us use C# across the entire application stack, from front end to back end to mobile—an approach that has proven to be very effective in terms of both speed and cost."

—Ken Myers: Chief Technology Officer
The Postage

GE Digital helps make the skies safer with Microsoft development tools

- GE developed FlightPulse®, an app that puts data and analytics in the hands of more than 3,000 pilots to help them improve safety and efficiency on every flight.
- GE built the back-end APIs for FlightPulse using ASP.NET Core and used Blazor to build its Config Console App, used by flight safety and efficiency departments to configure and aggregate the data pilots see.
- Using Blazor, GE could share code between the front end and back end.

"We were able to build the app faster and work more efficiently given the componentization that we were able to use out of the box with Blazor,"

"It worked a lot more seamlessly than some of the stuff we'd done previously in Angular."

Ken Kozman
Principal Architect, GE Digital

GE Digital

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Why choose .NET over other technologies?

There isn’t a one size fits all…..

Why choose .NET?

- Modern constructs like **Generics**, Language Integrated Query (**LINQ**), and **asynchronous** programming.
- Developers can reuse skills and code **across platforms** and applications.
- Easier to manage large projects.
- Platform has a lot of **built in functionality** – don't have to mix and match everything! All this by not being as opinionated as it used to be!
- Continuously moving ahead! In terms of performance, features, stability, platforms (Apple Silicon Arm64 supported in .NET 6).

- .NET ranked as the #1 most-loved framework on the Stack Overflow Developer Survey in both 2019 and 2020 editions.
- The .NET platform is officially supported by Microsoft and trusted by thousands of companies and millions of developers. Microsoft takes security very seriously and releases updates quickly when threats are discovered.

Example Performance Gain in .NET 6

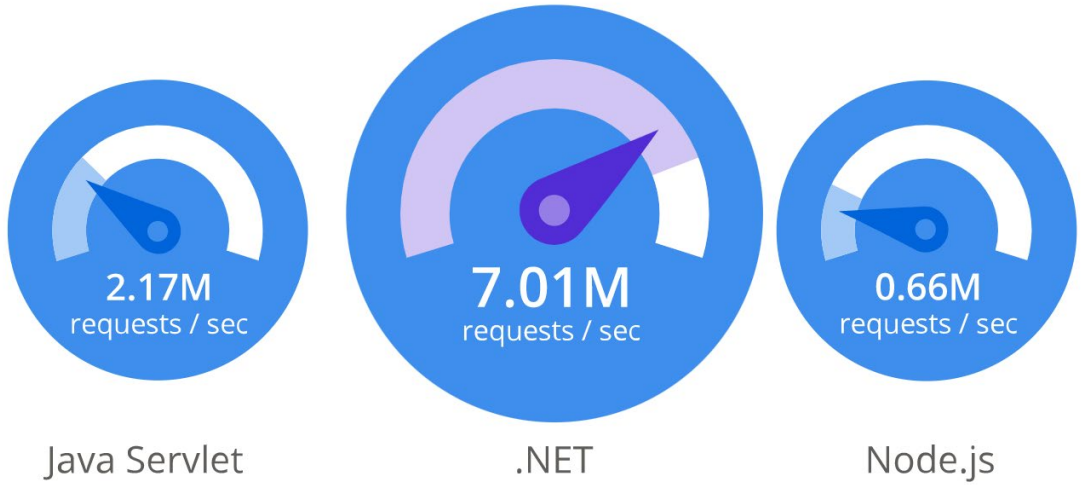
```
private byte[] _data = Enumerable.Range(0, 10_000_000).Select(i => (byte)i).ToArray();
private MemoryStream _destination = new MemoryStream();

[Benchmark]
public async Task Encode()
{
    _destination.Position = 0;
    using (var toBase64 = new ToBase64Transform())
    using (var stream = new CryptoStream(_destination, toBase64, CryptoStreamMode.Write, leaveO
    {
        await stream.WriteAsync(_data, 0, _data.Length);
    }
}
```

Method	Runtime	Mean	Ratio	Allocated
Encode	.NET Framework 4.8	329.871 ms	1.000	213,976,944 B
Encode	.NET Core 3.1	251.986 ms	0.765	213,334,112 B
Encode	.NET 5.0	146.058 ms	0.443	974 B
Encode	.NET 6.0	1.998 ms	0.006	300 B

Performance

The popular TechEmpower benchmark compares web application frameworks with tasks like JSON serialization, database access, and server side template rendering.



.NET performs faster than any other popular framework.

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Open Source

- The .NET Foundation is an independent non-profit supporting the innovative, commercially friendly, open source .NET ecosystem.

- .NET has over 100,000 contributions from developers from over 3,700 companies outside of Microsoft.

- In addition to the community and Microsoft, Technical Steering Group members, **Google**, **JetBrains**, **Red Hat**, **Samsung** and **Unity** are guiding the future of the .NET platform.

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Hands on demo!

Getting started with .NET

Build your first .NET Application

Build your first Web Application

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Q & A

Any questions?

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Thank you for listening!

This session will continue as a learning series with sessions covering different implementation of .NET and more!


Tune in for the celebration
.NET 20 YEARS
February 14th 9 AM PT
www.dot.net