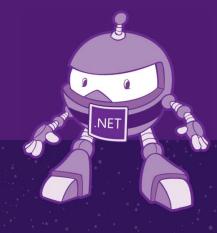
What's new in ASP.NET Core?

Jon Galloway Microsoft @jongalloway



What We'll Cover

- .NET Core Stuff
- Top Features In ASP.NET Core 2.1
- Top Features in ASP.NET Core 2.2 Preview
- Blazor Sneak Peek



.NET Core 2.1 Top Features

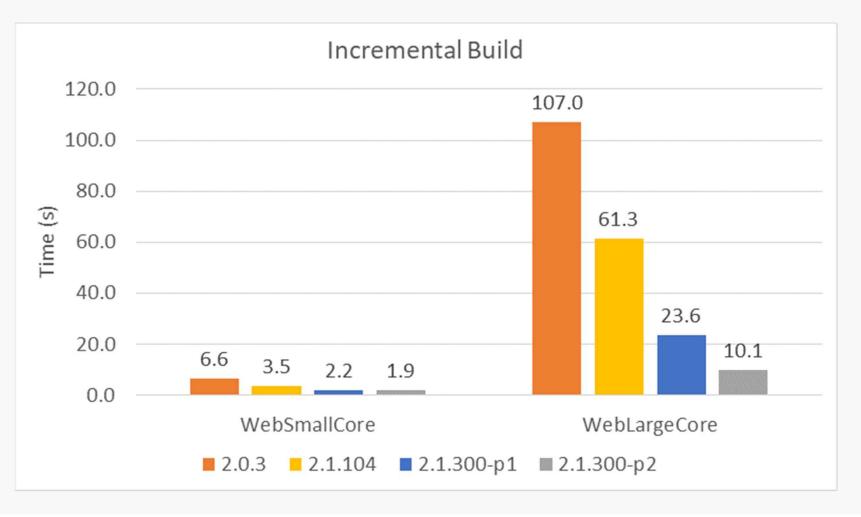
Build Performance

Global Tools

Span<T>,
Memory<T>
and friends



.NET Core 2.1 Build Performance





.NET Core 2.1: Global Tools

```
C:\> dotnet tool install -g dotnetsay
You can invoke the tool using the following command: dotnetsay
Tool 'dotnetsay' (version '2.0.0') was successfully installed.
C:\> dotnetsay
        Welcome to using a .NET Core global tool!
```

Span<T> and Friends

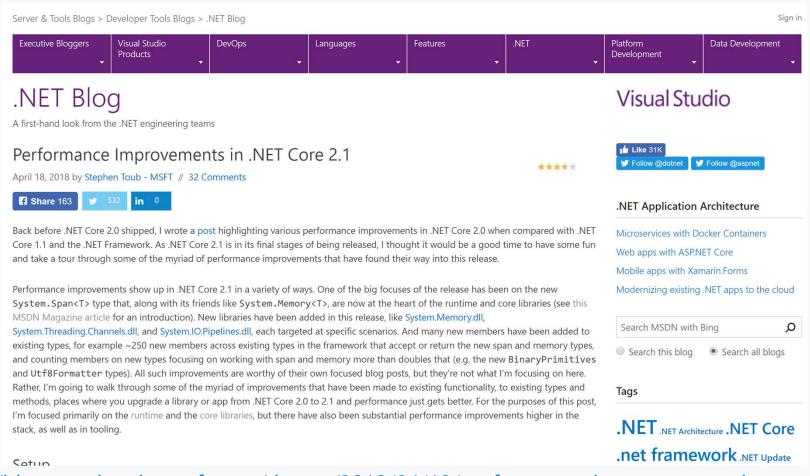
```
var arr = new byte[10];
Span<byte> bytes = arr; // Implicit cast from T[] to Span<T>
Span<byte> slicedBytes = bytes.Slice(start: 5, length: 2);
slicedBytes[0] = 42;
slicedBytes[1] = 43;
Assert.Equal(42, slicedBytes[0]);
Assert.Equal(43, slicedBytes[1]);
Assert.Equal(arr[5], slicedBytes[0]);
Assert.Equal(arr[6], slicedBytes[1]);
slicedBytes[2] = 44; // Throws IndexOutOfRangeException
bytes[2] = 45; // OK
Assert.Equal(arr[2], bytes[2]);
Assert.Equal(45, arr[2]);
```

Span<T> and Friends

TLDR: Manipulate a chunk of data without copying it

[coreclr example]





https://blogs.msdn.microsoft.com/dotnet/2018/04/18/performance-improvements-in-net-core-2-1/

Example: StringBuilder

```
private static readonly StringBuilder s_builder = new StringBuilder();

public void StringBuilderAppend()
{
    StringBuilder sb = s_builder;
    sb.Length = 0;

    for (int i = 0; i < 100_000; i++)
        sb.Append(i);
}</pre>
```

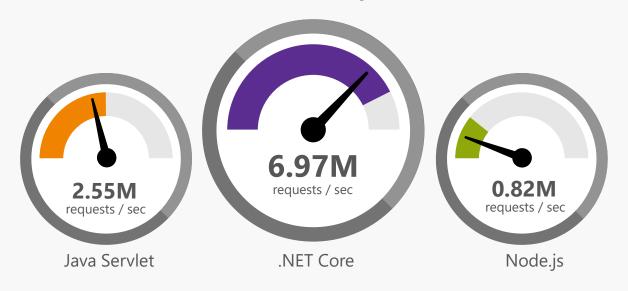
Toolchain	Mean	Allocated
.NET Core 2.0	6.523 ms	3992000 B

Example: StringBuilder

```
public string StringToLowerChangesNeeded() =>
"This is a test to see what happens when we call ToLower.".ToLower();
public string StringToLowerAlreadyCased() =>
"this is a test to see what happens when we call tolower.".ToLower();
```

Method	Toolchain	Mean	Allocated
StringToLowerChangesNeeded	.NET Core 2.0	187.00 ns	144 B

ASP.NET Core is Fast. Really Fast!



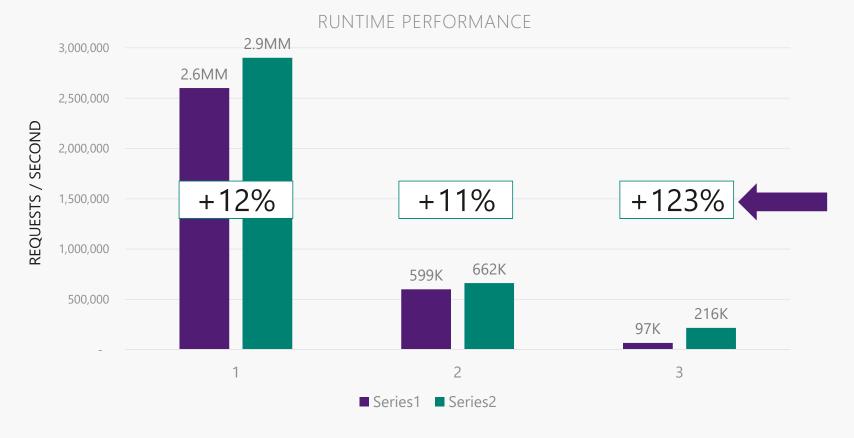
Data sourced from official tests available at **TechEmpower Round 16**.

"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."

— Raygun

https://www.microsoft.com/net/customers

.NET Core 2.1 is faster!





Data sourced from tests in our labs on same hardware as TechEmpower

New in ASP.NET Core 2.1

Identity UI library Razor class SignalR **HTTPS** & scaffolding libraries MVC functional [ApiController], **IHttpClientFactory GDPR** ActionResult<T> testing Generic host Updated SPA Kestrel on Sockets Performance templates builder

ASP.NET Core SignalR

Real-time web framework for ASP.NET Core

Push content to connected clients as it becomes available

New features

JavaScript/TypeScript client
New binary protocol based on MessagePack
Open protocol with extensibility
Streaming
Simplified scaleout



Azure SignalR Service

- Add real-time web functionalities easily with Azure and .NET Core 2.1
- Enable via "services.AddSignalR().AddAzureSignalR()"



Fully managed service

No more worries about capacity provisioning, scaling, or persistent connections



Native SignalR development

Use ASP.NET Core SignalR to build real-time experiences such as chat, stock tickers, live dashboards, and instant broadcasting





Identity UI library & scaffolding

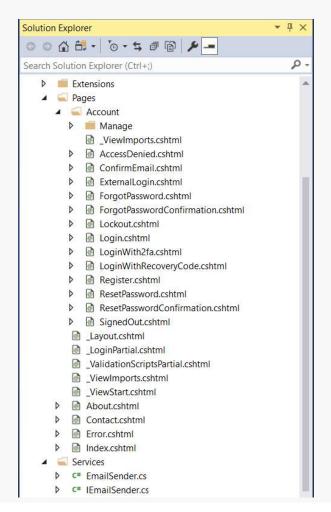
Prebuild UI for using ASP.NET Core Identity Register, login, manage, etc.

Override parts of the UI by scaffolding specific pages

Scaffold all the identity UI into an existing project or add it as a package



Identity UI library



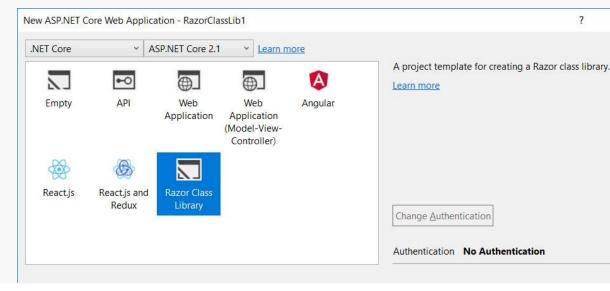




DEMO: NET ldentity UI library & scaffolding

Razor class libraries

Compile Razor (cshtml) files into reusable UI libraries Works with MVC Views and Razor Pages Override individual views or pages New Razor class library template



DEMO: Razor class libraries NET





Security & Privacy

HTTPS enabled by default

HTTPS redirection
HTTP Strict Transport Security (HSTS)
Server Name Indication (SNI)

GDPR

Cookie consent

Download & delete personal data

Extensibility for encrypting identity data



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DEMO: HTTPS, GDPR







MVC functional testing

Write MVC functional tests completely in-memory

Use WebApplicationFactory<TEntryPoint> to create HttpClient instances for testing your app

Calls Program.CreateWebHostBuilder(string[] args) by convention to access the app web host builder public static [WebHostBuilder CreateWebHostBuilder(string[] args)

DEMO: MVC functional testing





[ApiController] & ActionResult<T>

Add [ApiController] to controllers for web API specific conventions

Attribute routes only

Automatic error responses for validation failures

Infer [FromBody] for complex types

Infer [FromRoute] for route values and [FromQuery] for other simple types

Return ActionResult < T > from web API actions to return IActionResult or T

Supports implicit conversions form IActionResult or T Makes the response type explicit without additional attributes



DEMO: [ApiController] & NET ActionResult<T>

IHttpClientFactory

HttpClient as a service

Manage HttpClient instances and configuration across your application

Build named or typed clients with independent configuration

Configure message handlers for outbound request handling

Integrates with Polly for resilience and transient-fault-handling

Retry, Circuit Breaker, Timeout, Bulkhead Isolation, and Fallback

Polly integration package: Microsoft.Extensions.Http.Polly

Detailed diagnostic logging



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DEMO: IHttpClientFactory NET





Updated ASP.NET Core SPA templates

ASP.NET Core projects setup with Angular/React/React+Redux

Read to go with hot module reload, source maps, unit testing, etc

Now with support for the Angular CLI and createreact-app





ASP.NET Core 2.2 Preview 2



Get started with ASP.NET Core 2.2 Preview 2

Install the .NET Core 2.2 Preview 2 SDK

https://www.microsoft.com/net/download/dotnet-core/2.2

Install Visual Studio 2017 15.9 Preview 2

https://visualstudio.com/preview/



Get started with ASP.NET Core 2.2 Preview 2



ASP.NET Core 2.2 features

- Template updates: Bootstrap 4, Angular 6
- Web API improvements
- HTTP/2
- IIS in-process hosting
- Health checks
- Endpoint routing
- SignalR Java client



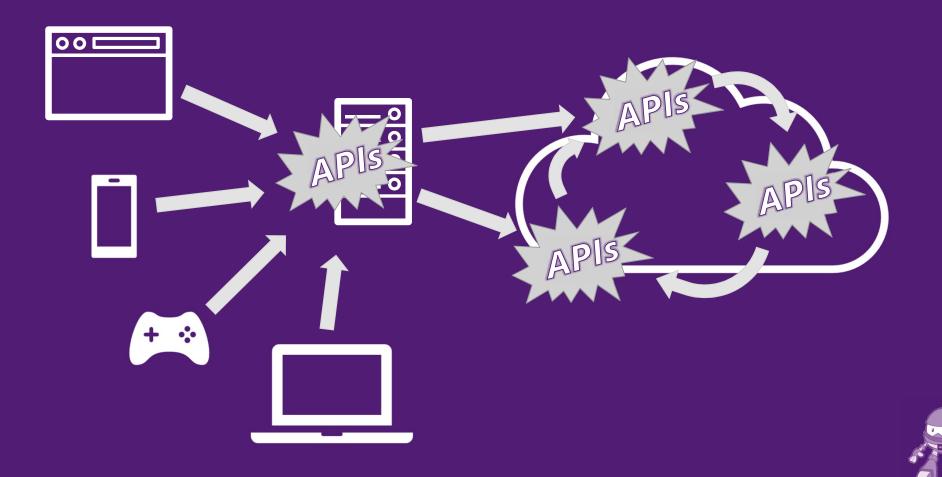
DEMO: Templates







APIs are everywhere!



Web API improvements in ASP.NET Core 2.2

- Easier to create
- Easier to test & debug
- Easier to document
- Easier to consume
- Easier to secure
- Easier to monitor
- Improved performance



Web API improvements in ASP.NET Core 2.2

Easier to create

Easier to test & debug

Easier to document

Easier to consume

Easier to secure

Easier to monitor

Improved performance

→ API Scaffolding

→ HTTP REPL, Problem Details

→ API conventions & analyzer

→ Code generation (Preview 3)

→ Web API security (Preview 3)

→ Health checks integration

→ HTTP/2, endpoint routing, IIS inproc hosting



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Web API improvements ______NE





HTTP/2

- Now available cross-platform in Kestrel
- Application-Layer Protocol Negotiation (ALPN)
- Header compression
- Multiplexed streams over same connection
- Some limitations
 - Server push, stream prioritization not currently supported
 - Not supported for edge use at this time



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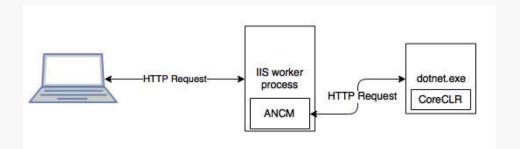




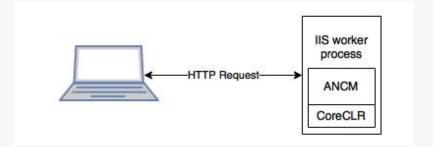
HTTP/2

IIS in-process hosting

Out of process (current)



In process (NEW!)



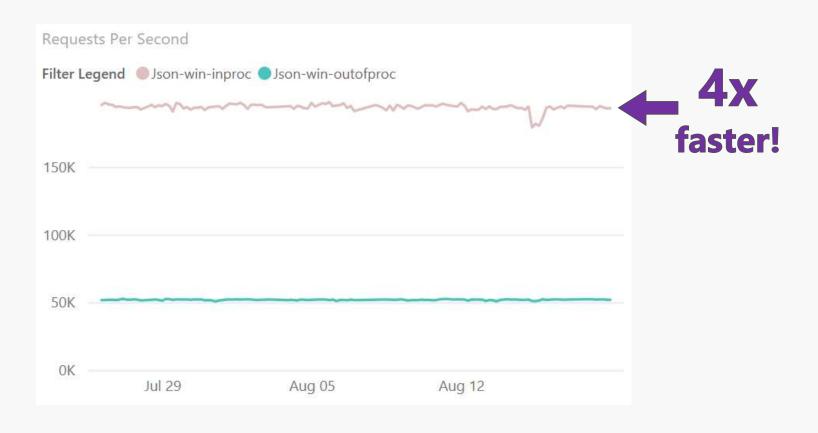


IIS in-process hosting

• Improved performance, reliability, and diagnostics



IIS in-process hosting – Performance!





IIS in-process hosting







Health checks

- Add dedicated health endpoints to your application
- Integrate with container orchestrators and load balancers
- Support liveness and readiness probes



Health checks

Enabled

Subscription (change)

Visual Studio Enterprise

Subscription ID

2e628147-ae64-40f2-ad73-87e75d801ed1

Tags (change)

Click here to add tags

Degraded

Routing method

Performance



∠ Search endpoints				
NAME	↑ STATUS	MONITOR STATUS	ŤĻ	TYPE
health-us	Enabled	Degraded		Azure endpoint
health-eu	Enabled	Online		Azure endpoint



Health checks







Endpoint routing

- New routing implementation
 - On by default for 2.2 with compatibility switches
- Better throughput (~10%) and scalability
- Link to endpoints from outside of MVC
- Various minor improvements
 - Parameter transformers, new catch all syntax {**path}



SignalR Java client

- Connect to ASP.NET Core SignalR hubs in Java
- Available via Gradle and Maven
- Now supports Azure SignalR Service
- Complete Android sample
 - https://github.com/aspnet/SignalR-samples/tree/master/AndroidJavaClient



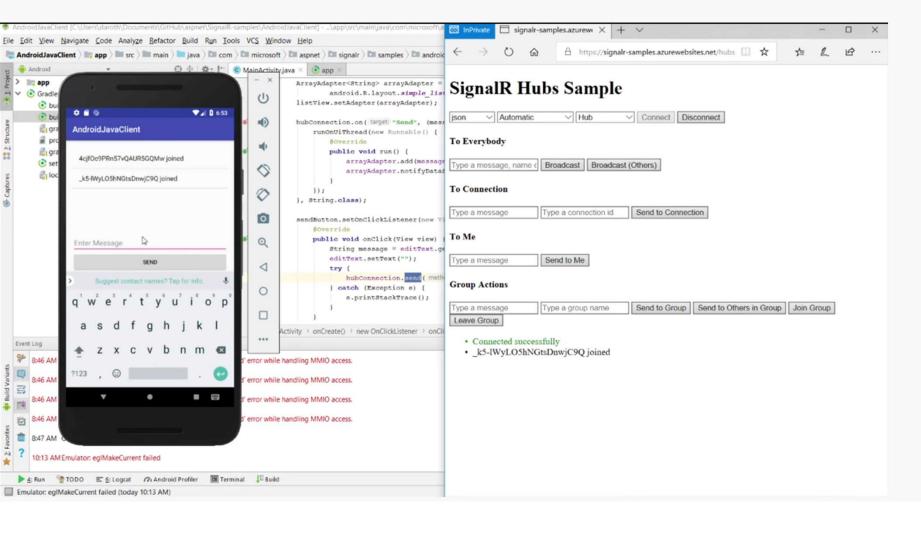
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SignalR Android client NET





SignalR Android Client





ASP.NET Core 2.2 features

- Template updates: Bootstrap 4, Angular 6
- Web API improvements
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- Health checks
- Endpoint routing
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ASP.NET Core 2.2 schedule

- Preview 2 Sept
- Preview 3 Oct
- RTW Year-end 2018



Install the .NET Core 2.2 Preview 2 SDK

https://www.microsoft.com/net/download/dotnet-core/2.2



C#

.NET

Python

Go

Ruby

WA

Rust

F#

Java



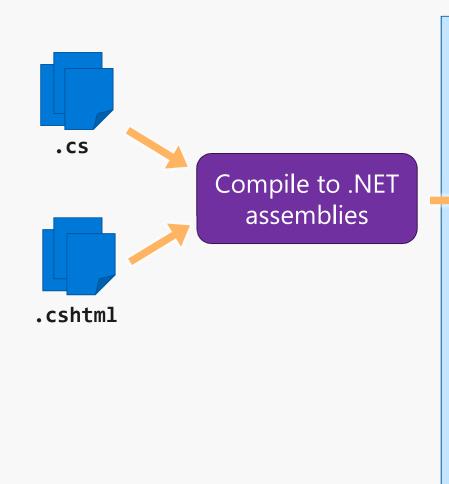
"Blazor" experimental project

Full-stack web development with .NET via WebAssembly

Requires no plugin or code transpilation Works in all modern browsers including mobile browsers

Browser + Razor = Blazor!





BROWSER

App.dll

.NET (mscorlib.dll, System.Core.dll,...)

WebAssembly (mono.wasm)

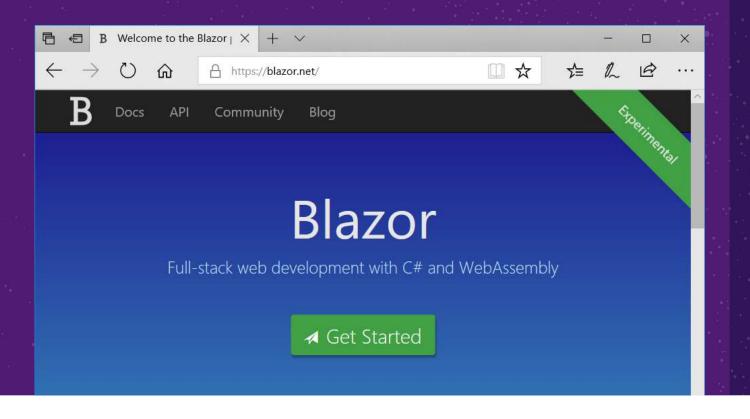
DEMO: Blazor







Try it out! https://blazor.net



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Notes and Links

- https://dot.net
- What's New in ASP.NET Core? .NET Conf 2018

• All presentation links (Scan QR Code)

