



Modern App Development With .NET & Azure



James Montemagno

Principal Lead PM – Developer Community, Microsoft



@JamesMontemagno



/JamesMontemagno



@jamesmontemagno@mastodon.social



The Ultimate Education Destination
ORLANDO 2022

Level: Intermediate





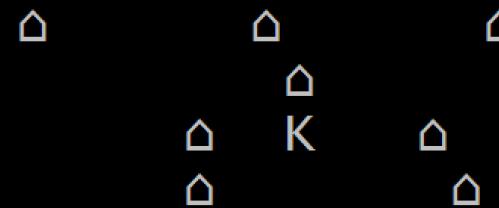






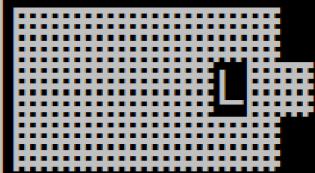


Neutria



K

☺ B §



L



Position

X: -7

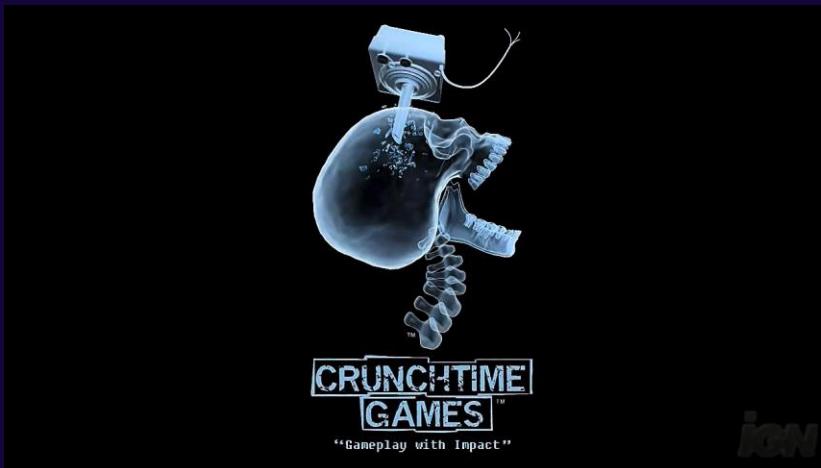
Y: 0

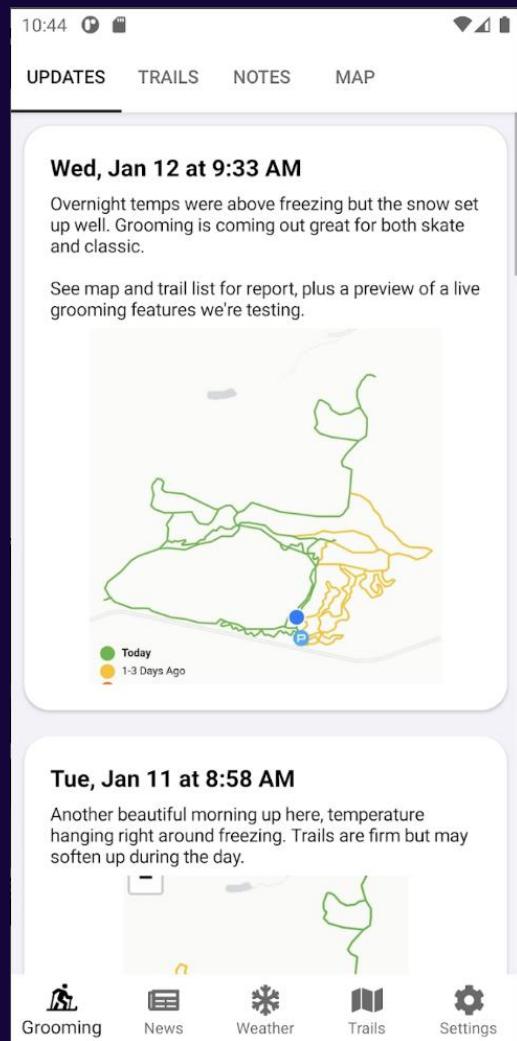
Choose Your Path

-
- 1.) Travel North 2.) Travel East
 - 3.) Travel South 4.) Travel West

Choose Your Path:

-SHRED NEBULA-





The image shows two windows for a "My Stream Timer" application. The top window is active and shows the following settings:

- Time: 6 mins 11 secs
- Live output: Starting in {0:m:ss}
- Finish output: Let's do this!
- File Name: countdown.txt
- Auto Start:

A "Stop" button is visible below these settings. The bottom window is partially visible and shows:

- Time: 8 mins 5 secs
- Output format: Custom
- Custom output: Starting in {0:hh:mm:ss}
- Finish output: Let's do this!
- File Name: countdown.txt
- Auto Start:
- Beep at 0:

At the bottom of the bottom window, it says "Starting in 00:07:58" and "Do not minimize window."

Build anything with a unified platform



.NET 6 adoption

Active users by version

(month since release)

>5.7M total

+1.8x



— Series1 — Series2

Ecosystem

#1

Most Loved Developer Framework (2019-2022)

.NET Core/.NET



Top 5

Language on GitHub



Top 5

Highest velocity OSS project

github.com/dotnet



Sources: survey.stackoverflow.co/2022/#section-most-loved-dreaded-and-wanted-other-frameworks-and-libraries ;
github.com/cncf/velocity/blob/master/reports/top_projects_by_activity.txt; octoverse.github.com/;

Announcing .NET 7

>28k

CONTRIBUTIONS

>10K

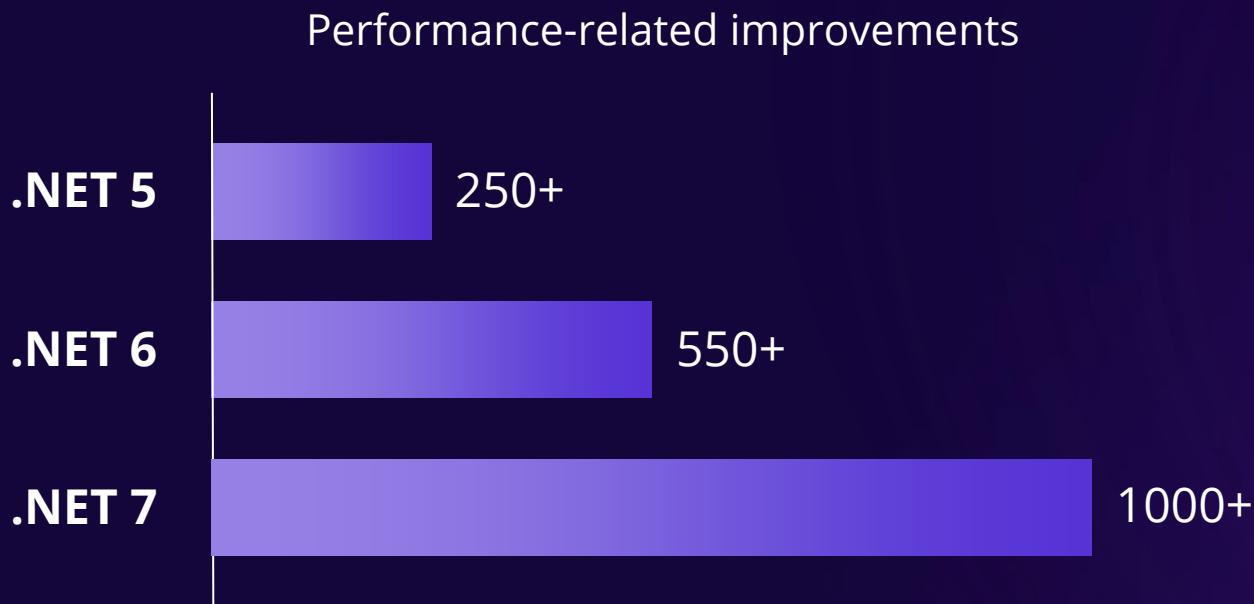
COMMUNITY MEMBERS



“Organizations in every industry are turning to developers to help them **do more with less**. Less time, less cost, less complexity, more innovation, more agility, more resilience.”

Satya Nadella, Ignite 2022

Performance Improvements in every release



Performance Improvements in .NET 7

A screenshot of a blog post titled "Performance Improvements in .NET 7". The post features a profile picture of Stephen Toub - MSFT, the date August 31st, 2022, and engagement metrics (154 comments, 92 likes). The main content area contains a quote: "TL;DR: .NET 7 is fast. Really fast. A thousand performance-impacting PRs went into runtime and core libraries this release, never mind all the improvements in ASP.NET Core and Windows Forms and Entity Framework and beyond. It's the fastest .NET ever. If your manager asks you why your project should upgrade to .NET 7, you can say "in addition to all the new functionality in the release, .NET 7 is super fast."

Developing with .NET

SIMPLE

MODERN

CLOUD NATIVE

Developing with .NET

SIMPLE

MODERN

CLOUD NATIVE

Do more with the CLI

`dotnet new <anything>`

`dotnet watch run`

`dotnet build -a arm64`

More templates, unified SDK

Hot reload via `dotnet watch`

Native support for Arm64 machines

Single file EXEs for all platforms

Simplify your code with C# 11

Syntactic simplifications, less boilerplate

Generic math support

List patterns

Required members

Raw string literals

General availability in .NET 7



```
class Person
{
    public required string FirstName { get; init; }
    public string MiddleName { get; init; }
    public required string LastName { get; init; }
}

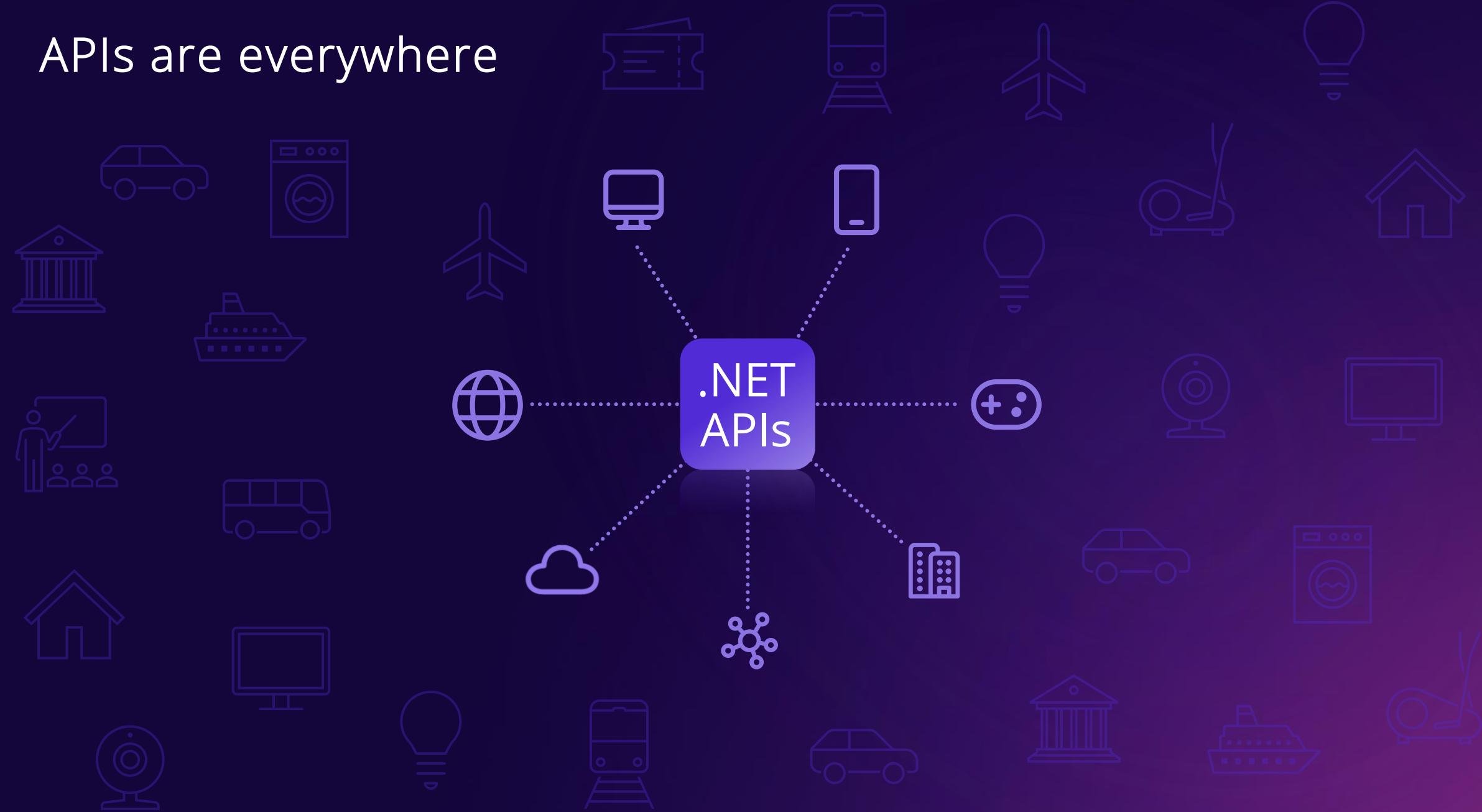
var gaurav = new Person { FirstName = "Gaurav" };
//ERROR: LastName Required

// Ordinary string literals need '\' escapes:
string s0 = "<element attr=\"content\"><body></body></element>";

// Raw string literals have no escapes & easy copy-paste
string s1 = """<element attr="content"><body></body></element>""";

// Quotes in content are overcome with more enclosing quotes
string s2 = """<element attr=""content""><body></body></element>""";
```

APIs are everywhere



.NET REST APIs – Minimal



```
var app = WebApplication.Create(args);

app.MapGet("/", () => "Hello World");

app.Run();
```

Lightweight, single-file, cloud native APIs

Low ceremony, top-level C# programs

Easy to get started

Scale to any app size

.NET REST APIs – Powerful

Organize groups of endpoints

Leverage endpoint filters for validation, logging, and much more

Improved testing and OpenAPI docs



```
var app = WebApplication.Create(args);

var todos = app.MapGroup("/todos")
    .MapTodosApi()
    .AddEndpointFilter<ValidationFilter>()
    .WithOpenApi();

todos.MapGroup("/public").WithTags("PublicAPIs");

todos.MapGroup("/private").WithTags("PrivateAPIs")
    .RequireAuthorization();

app.Run();
```

.NET REST APIs – Secure

.NET 6

```
●●●

using Microsoft.AspNetCore.Authentication.JwtBearer;
using Microsoft.AspNetCore.Authorization;

var builder = WebApplication.CreateBuilder(args);

builder.Services.AddAuthentication(JwtBearerDefaults.AuthenticationScheme)
    .AddJwtBearer(jwtConfig =>
{
    jwtConfig.Authority = "https://example.com";
    jwtConfig.TokenValidationParameters = new()
    {
        ValidationAudience = "MyAudience",
        ValidIssuer = "https://example.com"
    };
});

builder.Services.AddAuthorization(authzOptions =>
{
    authzOptions.AddPolicy("greetable_user", policyConfig =>
    {
        policyConfig.RequireRole("user");
        policyConfig.RequireClaim("permission", "can_greet");
    });
});

var app = builder.Build();

app.UseAuthentication();
app.UseAuthorization();

app.MapGet("/hello", (ClaimsPrincipal user) => $"Hello {user.Identity?.Name}!")
    .RequiredAuthorization("greetable_user");

app.Run();
```

.NET 7

```
●●●

using System.Security.Claims;

var builder = WebApplication.CreateBuilder(args);

builder.Services.AddAuthentication().AddJwtBearer();
builder.Services.AddAuthorizationBuilder().AddPolicy("greetable_user",
    policy => policy.RequireRole("user").RequireClaim("permission", "can_greet"));

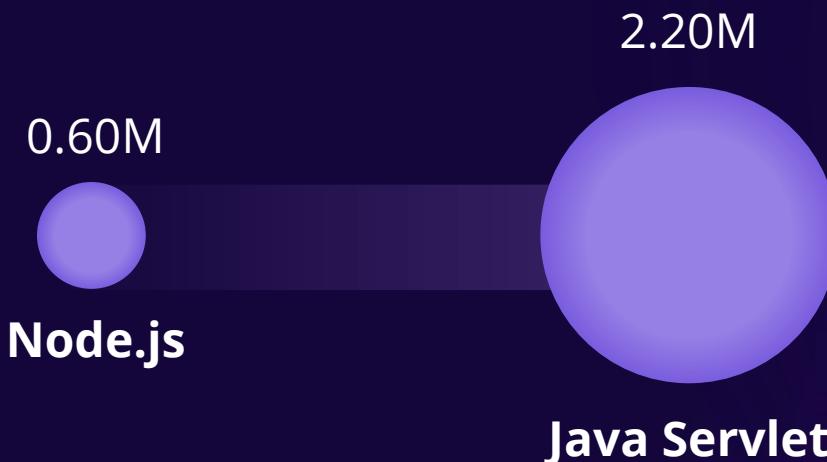
var app = builder.Build();

app.MapGet("/hello", (ClaimsPrincipal user) => $"Hello {user.Identity?.Name}!")
    .RequiredAuthorization("greetable_user");

app.Run();
```

.NET 7 Performance - APIs

Requests Per Second (Millions)



ASP.NET CORE WEB
FRAMEWORK IS

>11X

FASTER THAN
NODE.JS



.NET Data and Entity Framework Core

New Features in .NET 7

Distributed transactions

Mapping to JSON columns for SQL

SaveChanges performance and bulk updates

Custom reverse engineering templates

Stored procedures for insert/update/delete

Time to insert multiple rows
milliseconds (lower is better)

1.7ms

4x faster

.43ms

1

2

4 Rows - SaveChangesAsync

Developing with .NET

SIMPLE

MODERN

CLOUD NATIVE

.NET offers choice for developers



.NET Multi-platform App UI (MAUI)

Generally available

Single project system, single codebase

WinUI Mac Catalyst iOS Android



Unified .NET

Mobile, desktop, hybrid

Productive development

Native APIs, Native performance

Blazor Hybrid apps

Reuse UI components across native and web

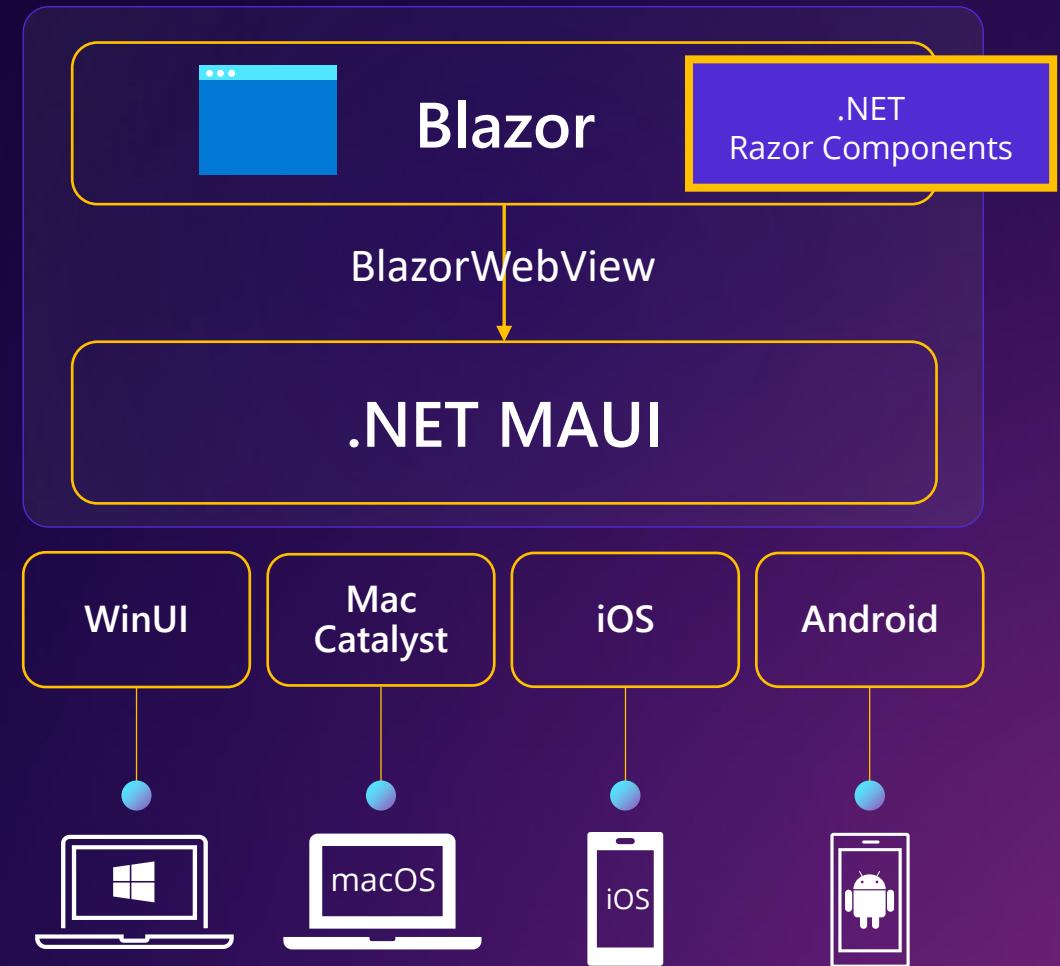
Native app container & embedded controls

No WebAssembly, No Server

Built on top of .NET Multi-platform App UI

Access native APIs

Mix & Match Web/Native UI



Developing with .NET

SIMPLIFIED

MODERN

CLOUD NATIVE

The app of the future is Cloud Native

50%

OF ORGANIZATIONS WILL USE CLOUD-NATIVE
TECHNOLOGIES BY

2024

Scale to meet any demand

Achieve greater resiliency

Deliver better apps faster

Cloud Native Developers

60%

BACKEND DEVELOPERS USE
CONTAINERS

41%

BACKEND DEVELOPERS IDENTIFY
AS CLOUD NATIVE DEVELOPERS

66%

CLOUD NATIVE DEVELOPERS WORK ON
MICROSERVICES IN LAST 12 MONTHS

.NET in Ubuntu

.NET is in-box

- Built by Canonical; help from Microsoft
- Canonical enterprise-grade support
- Same day updates for patches
- x64 and Arm64 with .NET 6
- .NET 7 coming soon



```
sudo apt update  
sudo apt install dotnet7
```

.NET in Ubuntu

.NET in Chiseled Ubuntu containers

Distroless images == Bare minimum

Quicker to pull/start

More secure – no shell

More secure – no package manager

More secure – non-root user

ASP.NET Core on Ubuntu

213 MB

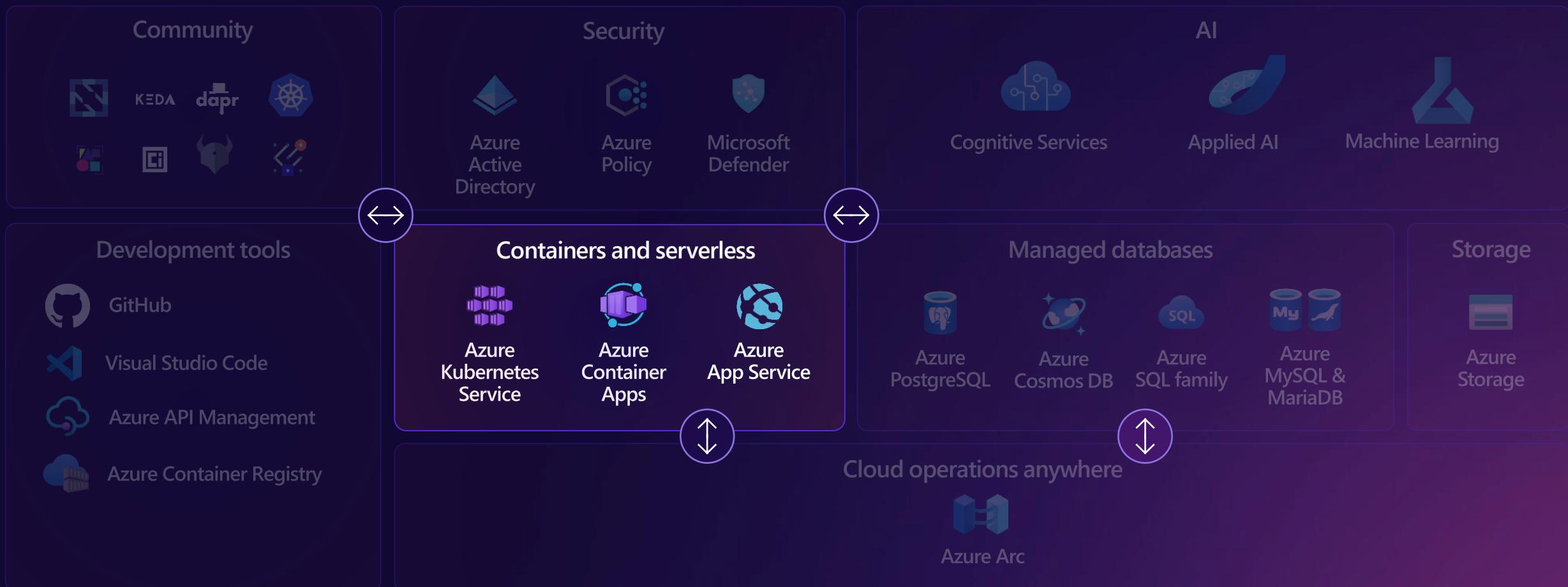
-52%

104 MB

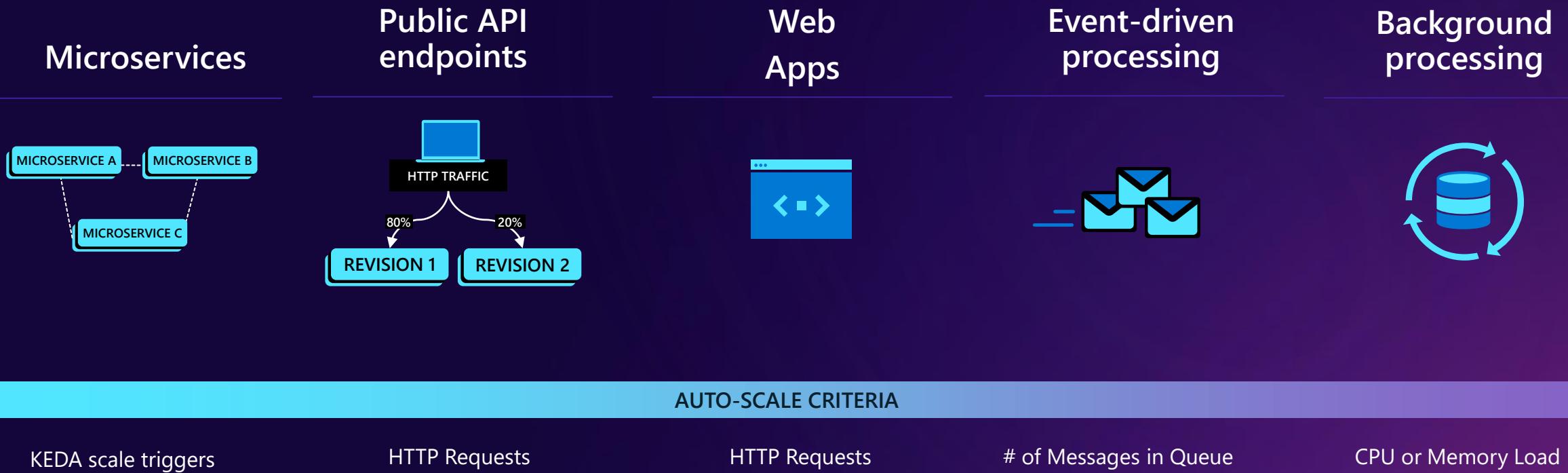
1

2

Building cloud-native on Azure



What can you build with Azure Container Apps?

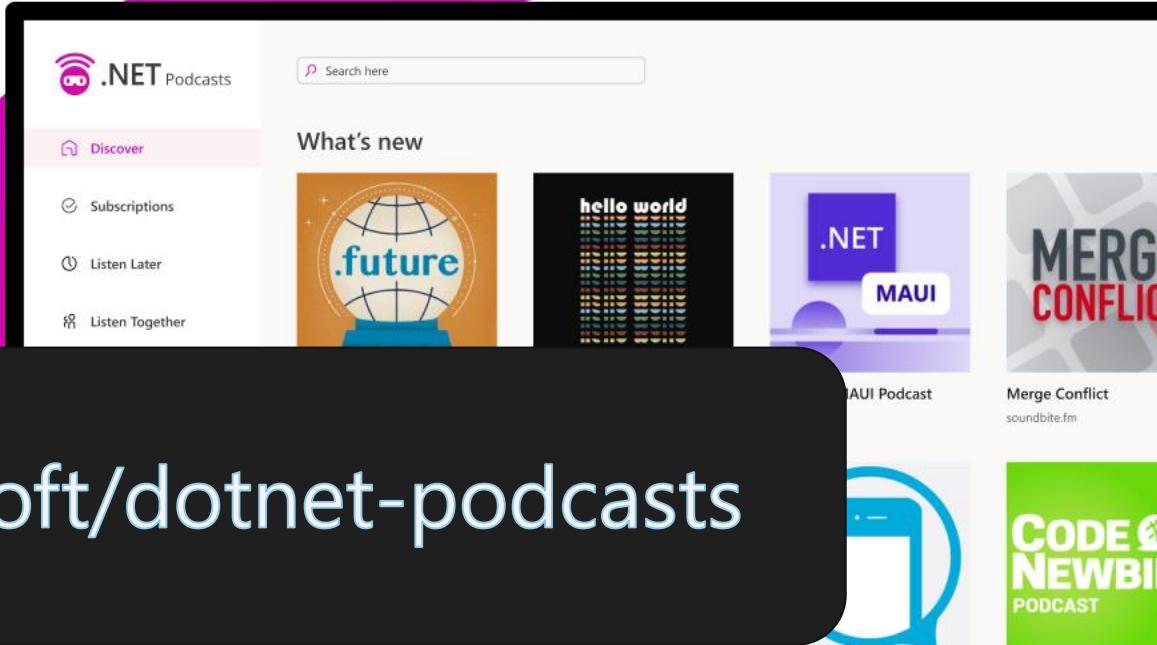
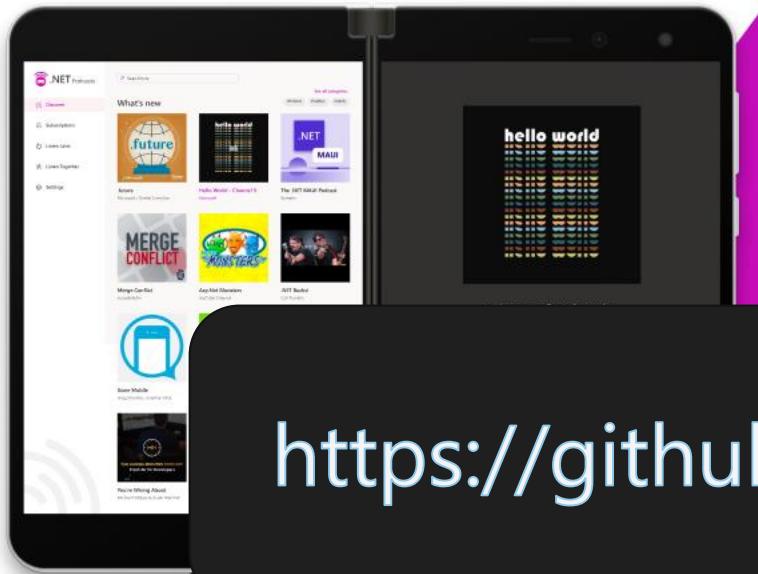


Let's Build with .NET

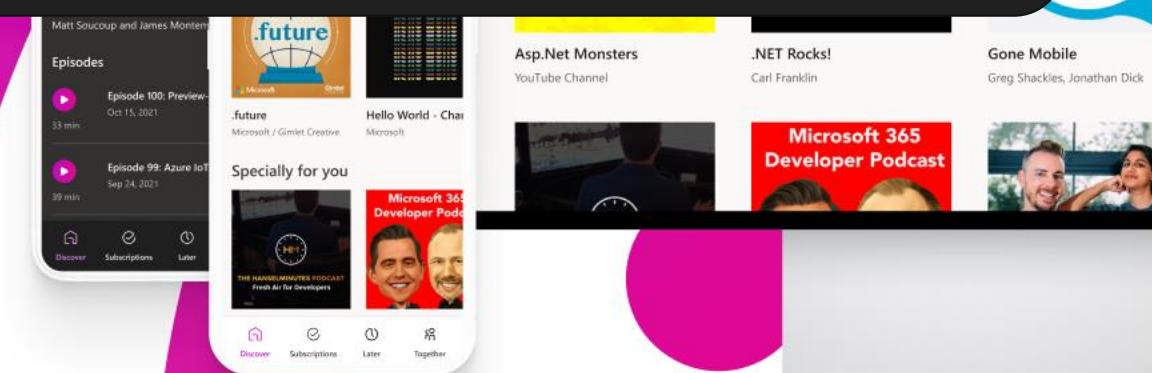
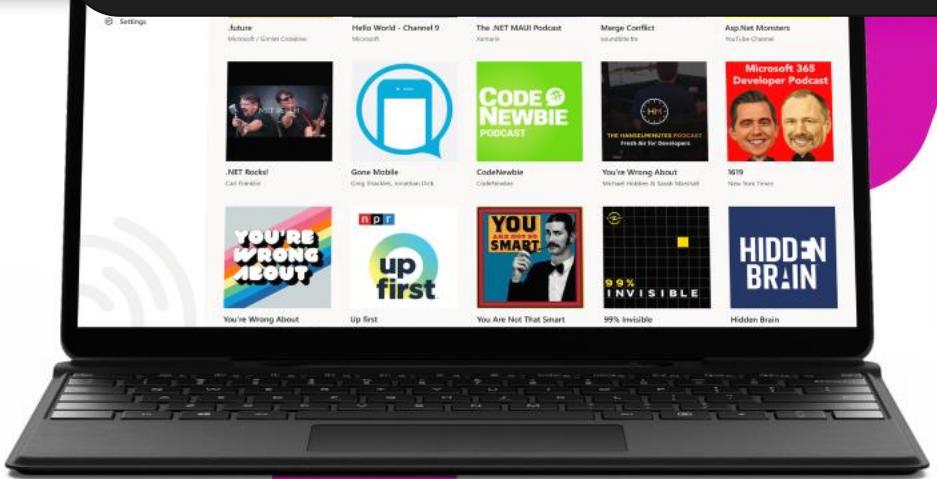
SIMPLE

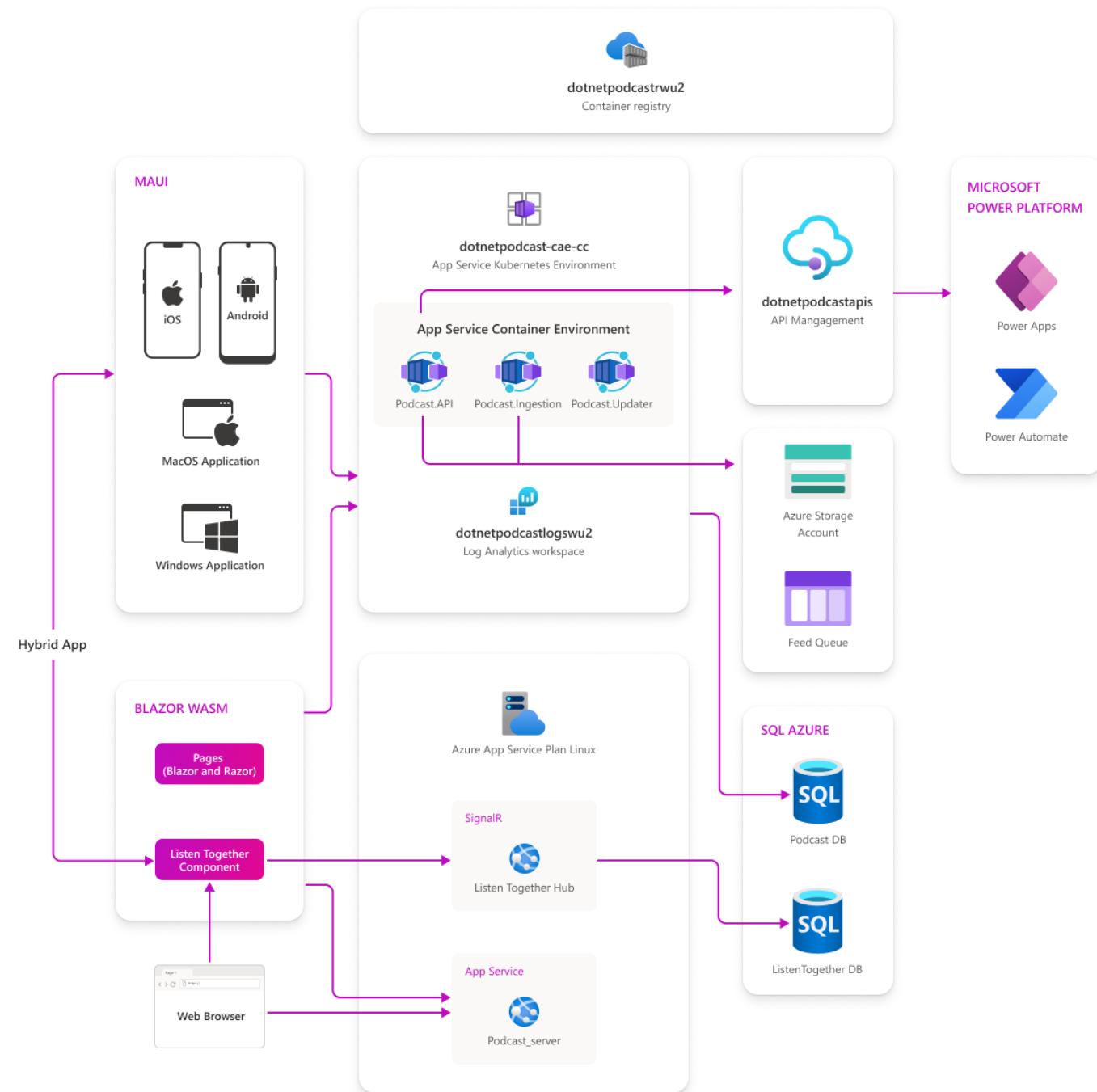
MODERN

CLOUD NATIVE



<https://github.com/microsoft/dotnet-podcasts>





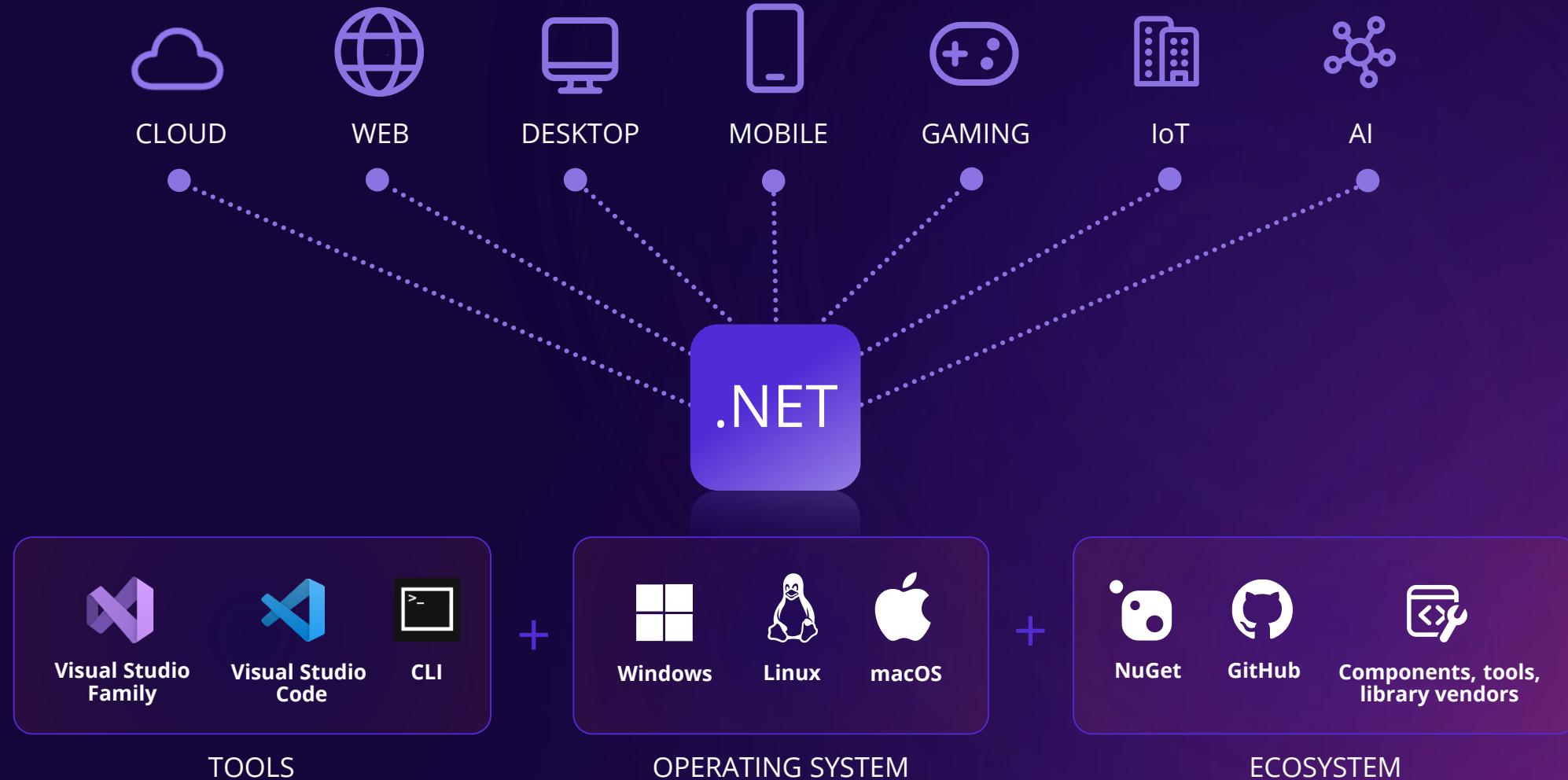
Developing with .NET

SIMPLIFIED

MODERN

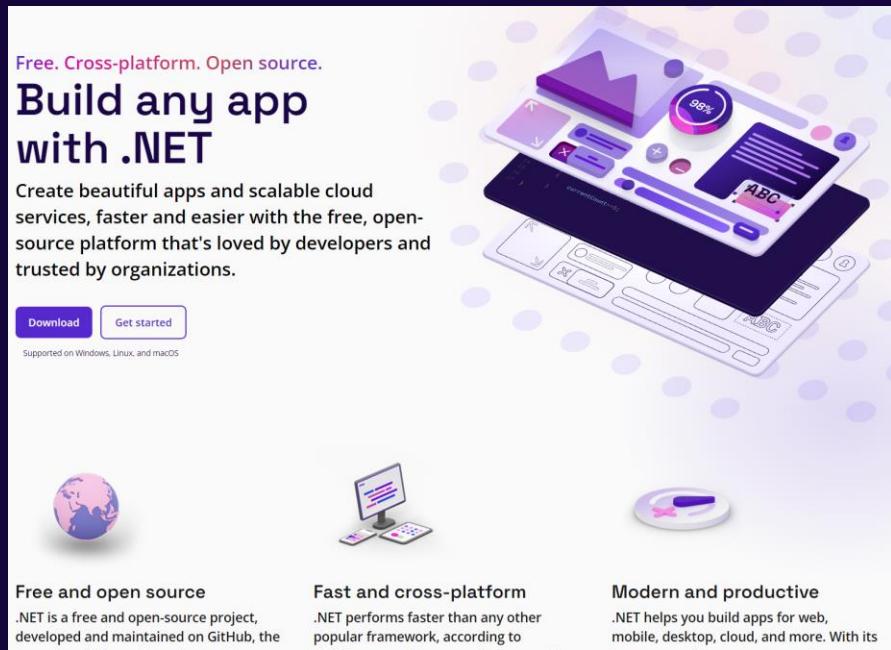
CLOUD NATIVE

Build anything with a unified platform



Get started today!

Get started with .NET



The screenshot shows the official .NET website homepage. It features a large hero section with a purple and white abstract background. The text "Free. Cross-platform. Open source. Build any app with .NET" is prominently displayed. Below this, there's a section for "Create beautiful apps and scalable cloud services, faster and easier with the free, open-source platform that's loved by developers and trusted by organizations." At the bottom, there are two buttons: "Download" and "Get started". A note says "Supported on Windows, Linux, and macOS". There are also icons for a globe, a computer monitor, and a smartphone.

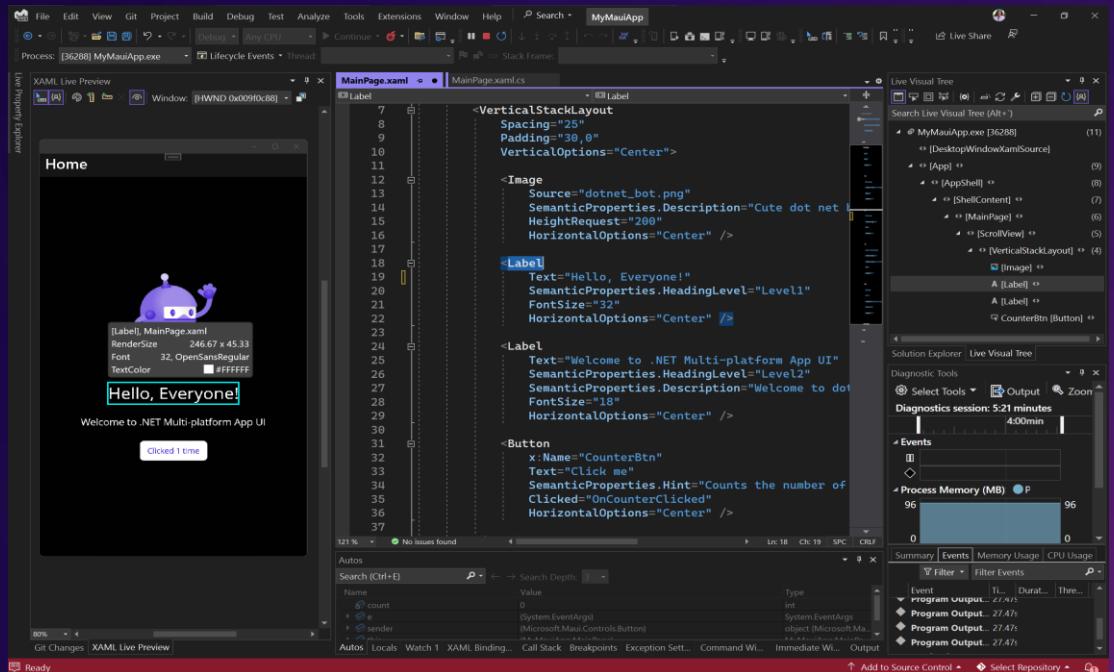
Free. Cross-platform. Open source.
Build any app with .NET
Create beautiful apps and scalable cloud services, faster and easier with the free, open-source platform that's loved by developers and trusted by organizations.
[Download](#) [Get started](#)
Supported on Windows, Linux, and macOS

Free and open source
.NET is a free and open-source project, developed and maintained on GitHub, the

Fast and cross-platform
.NET performs faster than any other popular framework, according to

Modern and productive
.NET helps you build apps for web, mobile, desktop, cloud, and more. With its

Download Visual Studio 2022



dot.net

visualstudio.com/download

Session Survey

Your feedback is very important to us

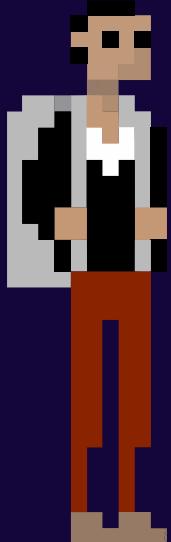
Please take a moment to complete the session survey found in the mobile app

Use the QR code or search for “Converge360 Events” in your app store

Find this session on the Agenda tab
Click “Session Evaluation”
Thank you!



Thank you so much!



James
Montemagno
Principal Lead PM – Developer Community, Microsoft



@JamesMontemagno



/JamesMontemagno



@jamesmontemagno@mastodon.social

motz@microsoft.com

montemagno.com