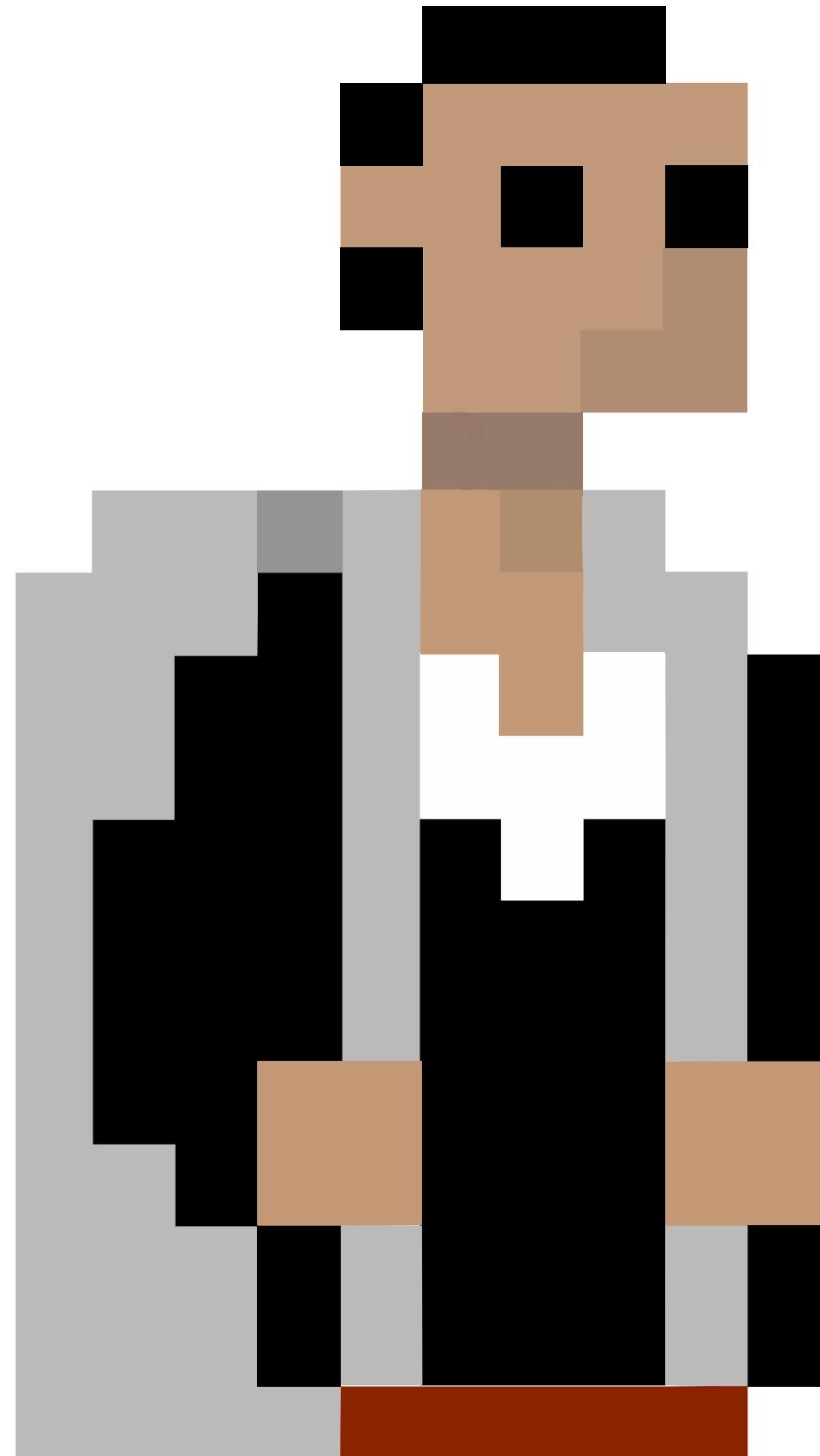


# Go Mobile with C#, Visual Studio, and Xamarin

James Montemagno  
Program Manager,  
Microsoft

# Who's this guy?



James  
Montemagno  
Principal Program Manager – Mobile Developer Tools,  
Microsoft

---

[motz@microsoft.com](mailto:motz@microsoft.com)

Weekly development podcast

[motzcod.es/podcast](http://motzcod.es/podcast)



[motzcod.es](http://motzcod.es)

@JamesMontemagno



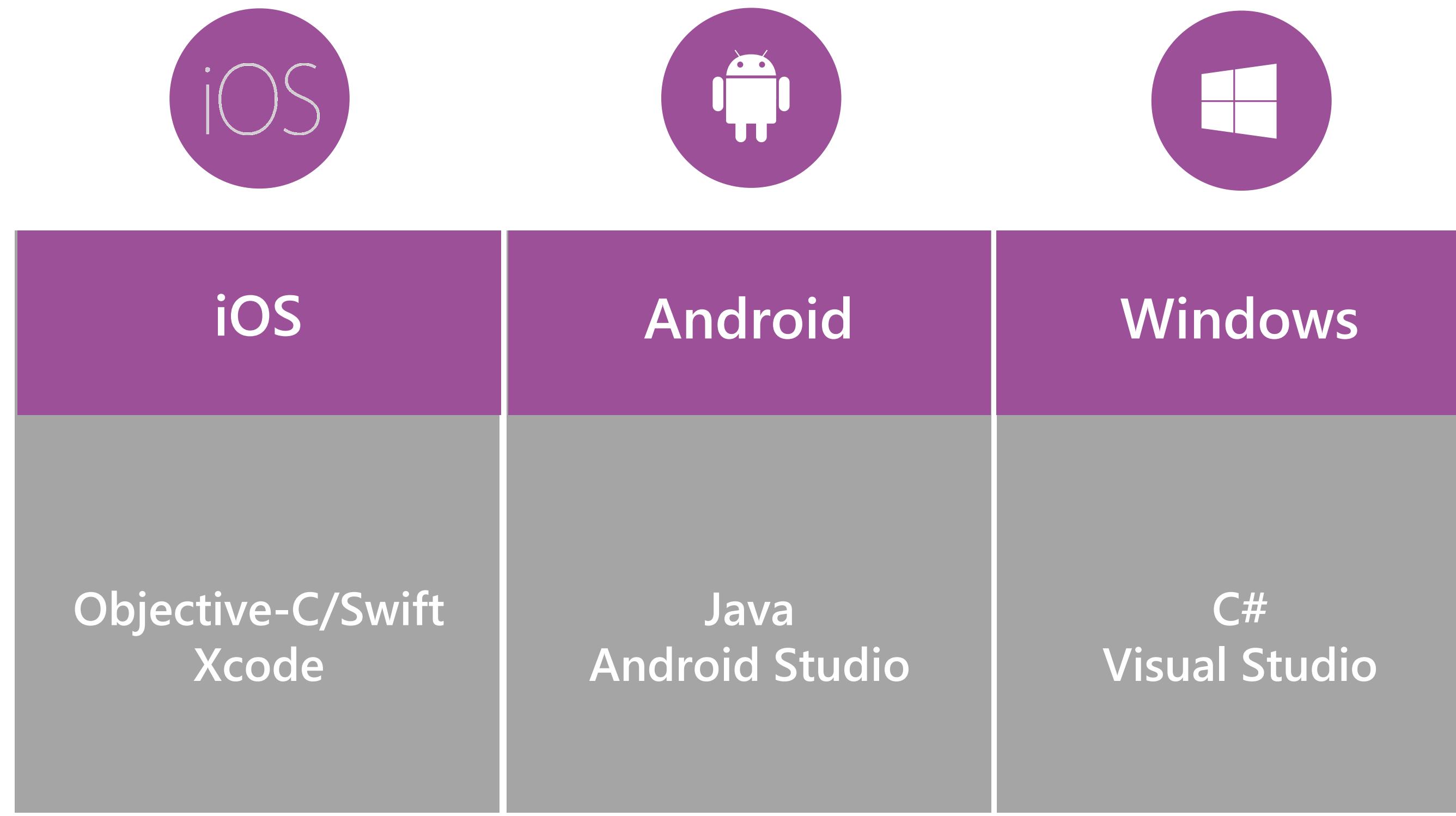
What is native?



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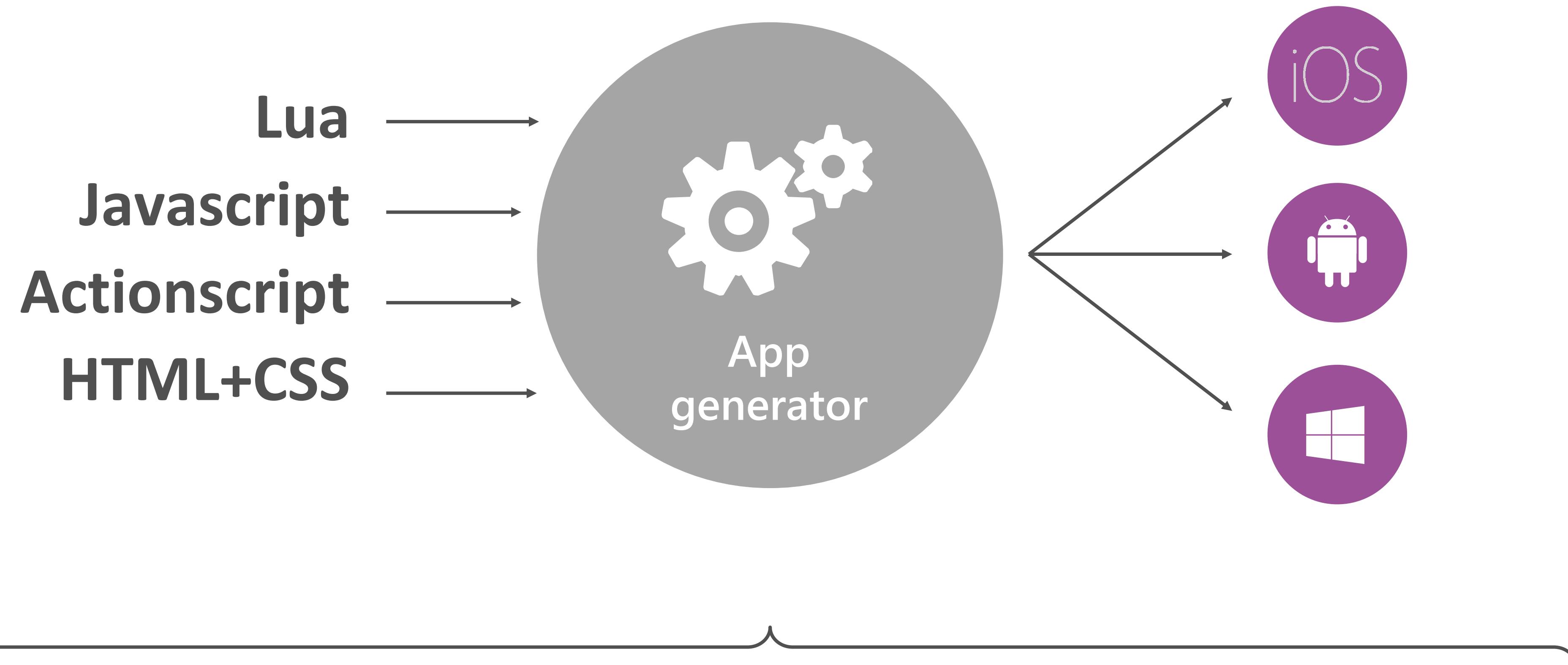
# Architecting mobile apps

# Silo approach



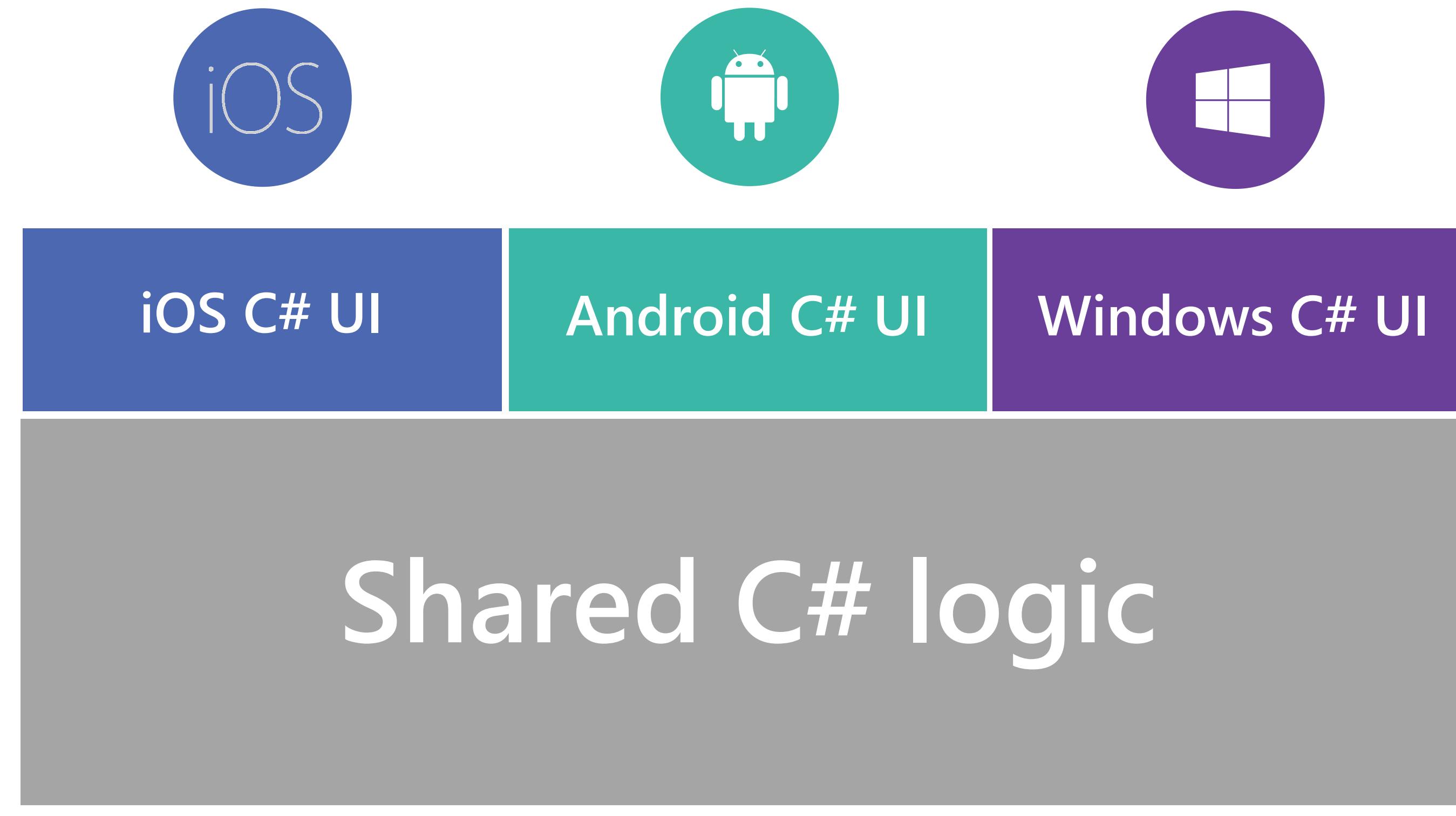
No shared code • Many languages and development environments • Multiple teams

# Write once, run anywhere



Limited native API access • Slow performance • Poor user experience

# Xamarin's unique approach



Shared C# codebase • 100% native API access • High performance

# How Xamarin Works

# Windows APIs

<b>Microsoft.Phone</b>	<b>Microsoft.Networking</b>	<b>Windows.Storage</b>	<b>Windows.Foundation</b>	<b>Microsoft.Devices</b>
System.Net	System	System.IO	System.Linq	System.Xml
System.Data	System.Windows	System.Numerics	System.Core	System.ServiceModel

C#

# iOS – 100% API coverage

MapKit	UIKit	iBeacon	CoreGraphics	CoreMotion
System.Net	System	System.IO	System.Linq	System.Xml
System.Data	System.Windows	System.Numerics	System.Core	System.ServiceModel

C#

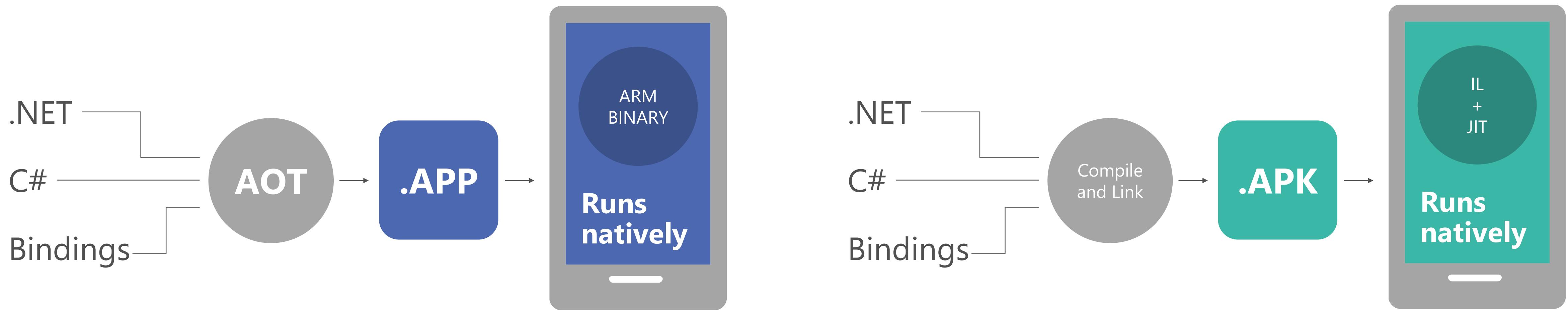
# Android – 100% API coverage

Text-to-speech	ActionBar	Printing Framework	Renderscript	NFC
System.Net	System	System.IO	System.Linq	System.Xml
System.Data	System.Windows	System.Numerics	System.Core	System.ServiceModel



C#

# Native performance



**Xamarin.iOS** does full Ahead Of Time (AOT) compilation to produce an ARM binary for Apple's App Store.

**Xamarin.Android** takes advantage of Just In Time (JIT) compilation on the Android device.

# ✓ Always up-to-date

## Same-day support:

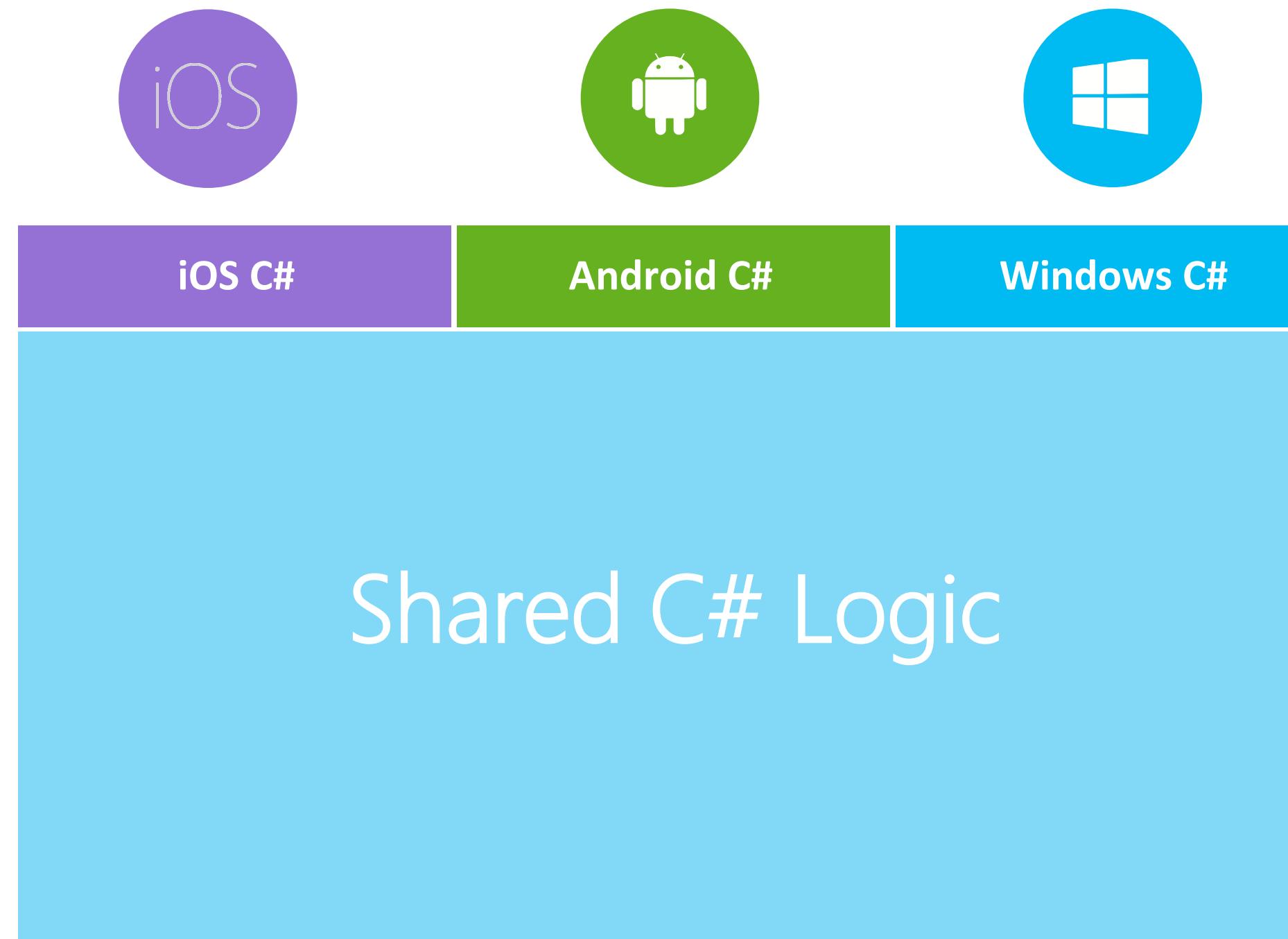
- iOS 5
- iOS 6
- iOS 7
- iOS 8
- iOS 9
- iOS 10

## Full support for:

- Apple Watch
- Apple TV
- Android Wear
- Amazon Fire TV
- Google Glass
- and much more

# Building the User Interface

# Xamarin Native – Traditional UI



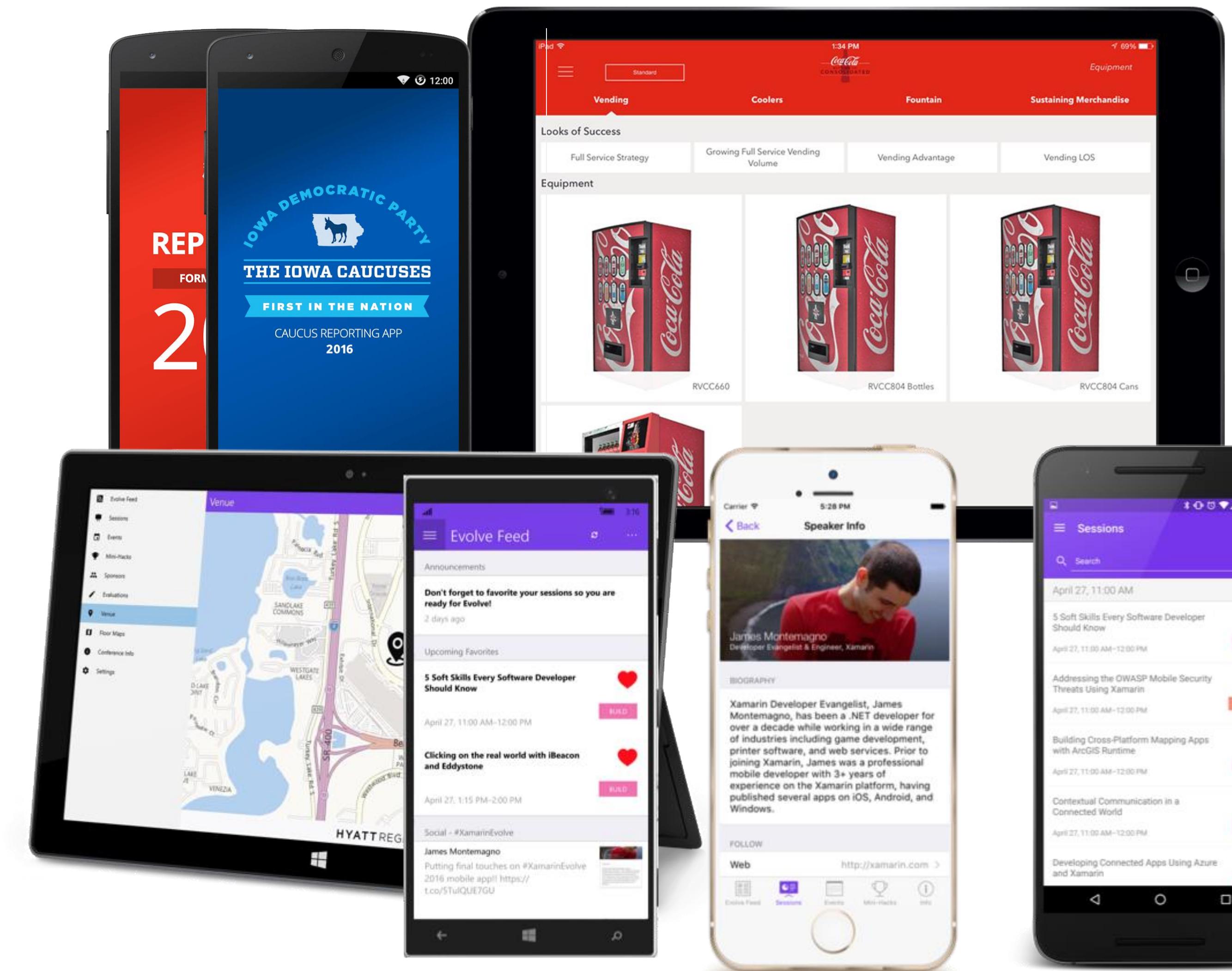
3 Native User Interfaces  
Shared App Logic



# Xamarin.Forms- Cross Platform UI



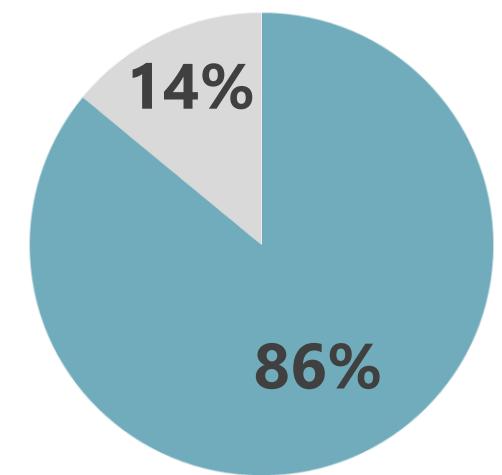
Shared Native User Interface  
Shared App Logic



# Code sharing stats

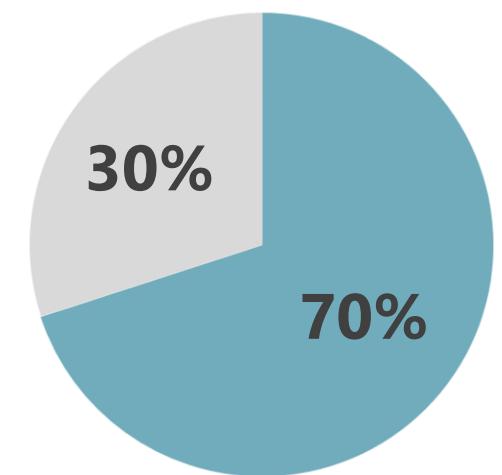
iCircuit

Android



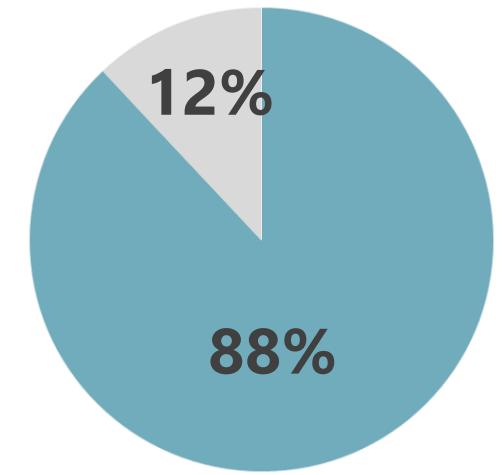
Touch Draw

iOS

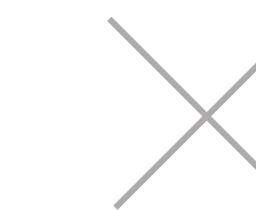
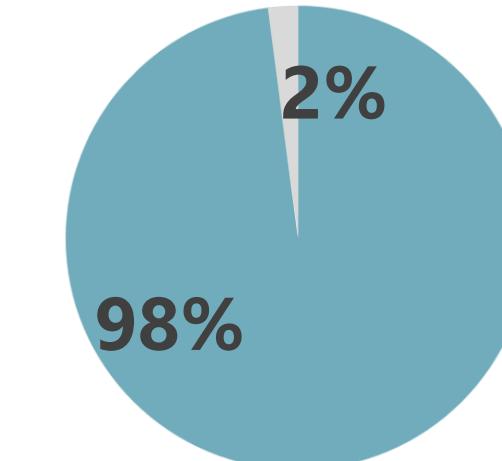
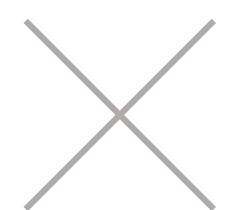
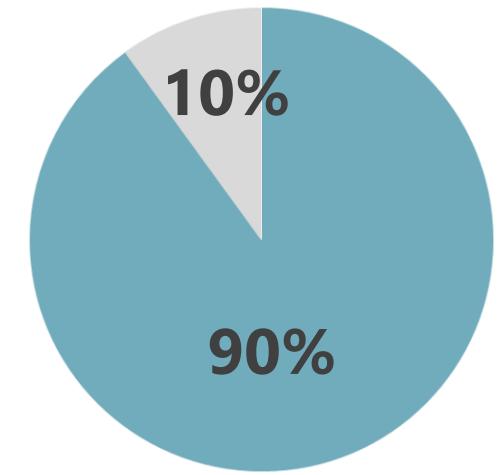


Evolve App  
(Xamarin.Forms)

Mac



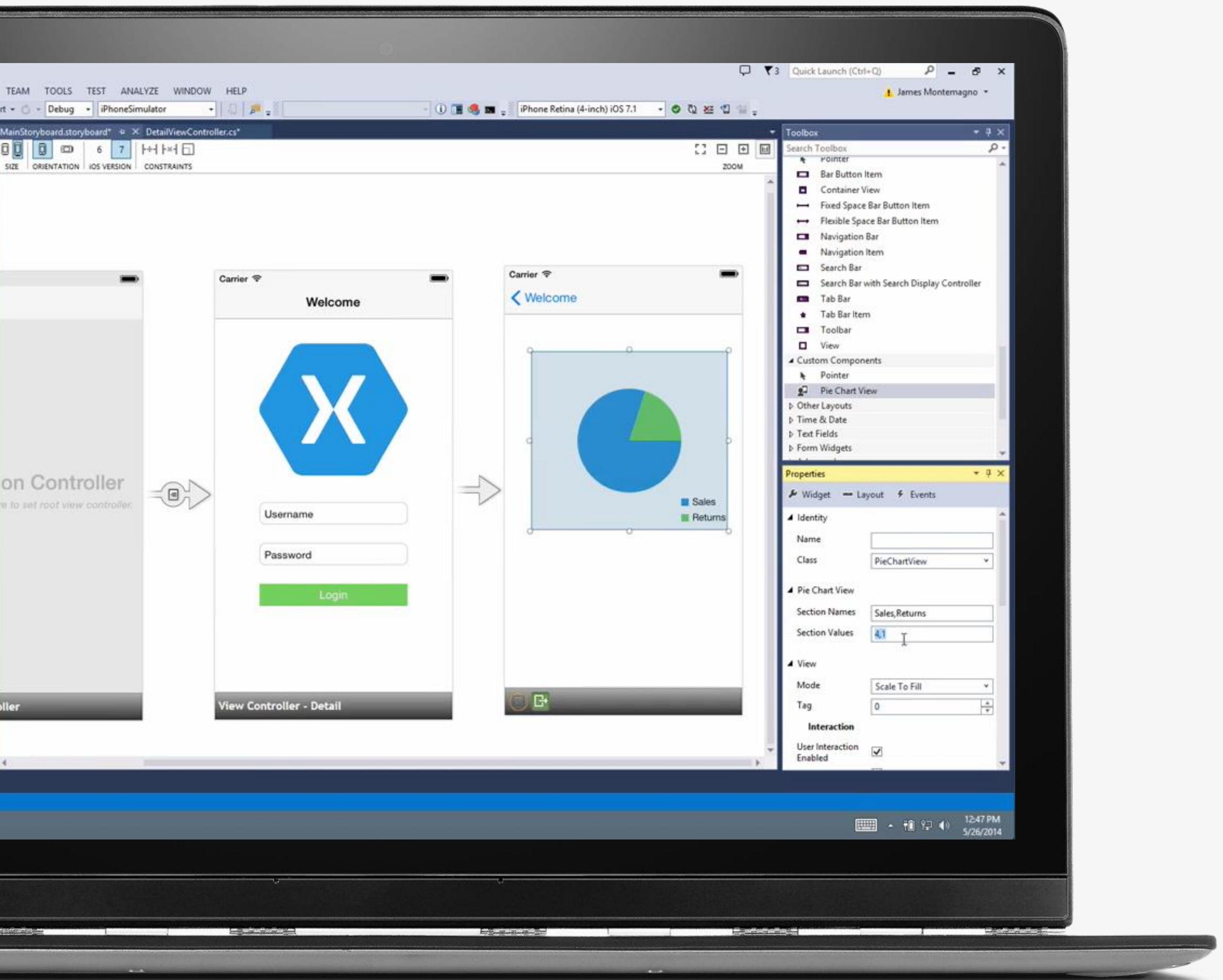
Windows



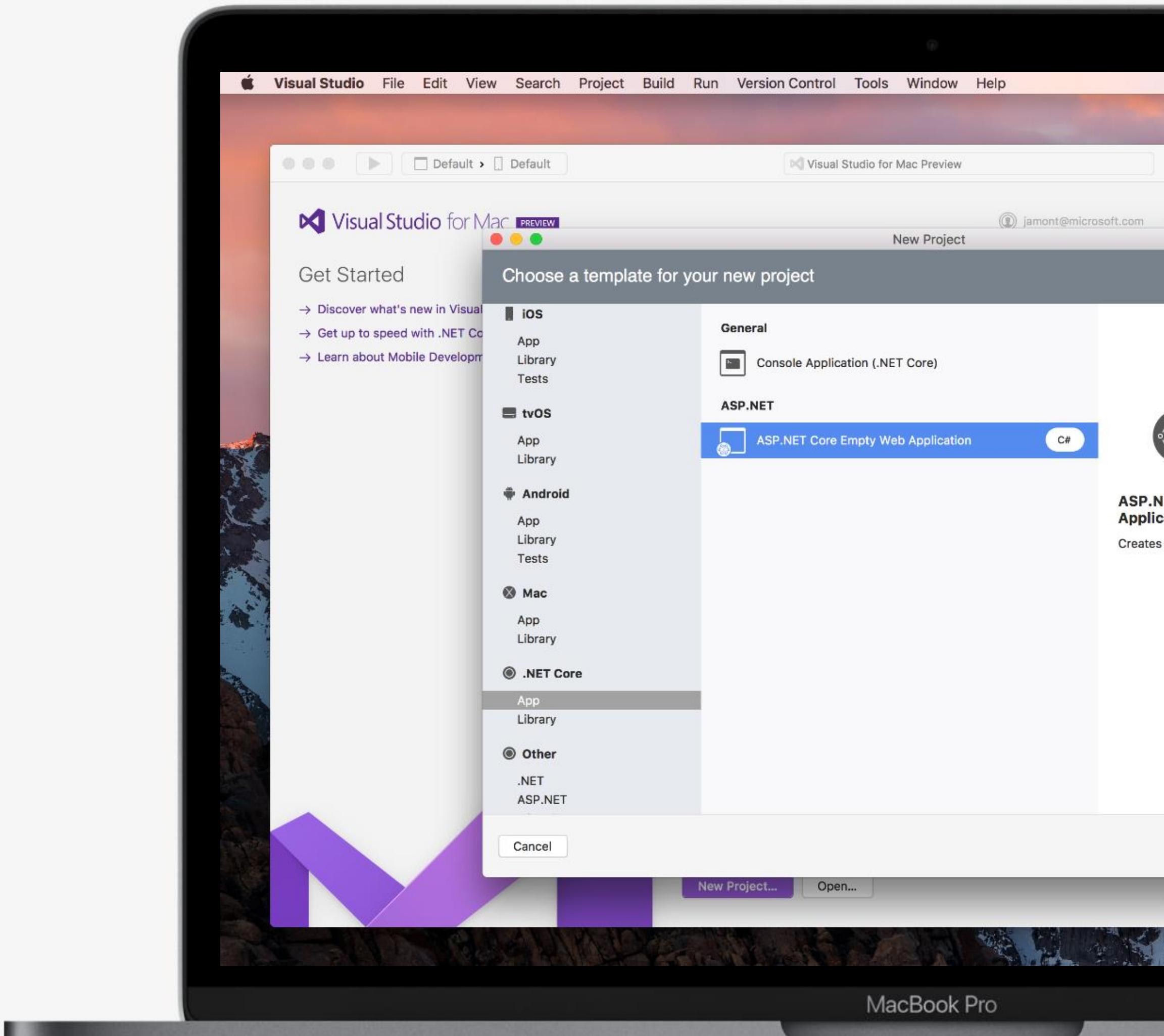
Xamarin Platform is  
included in Visual Studio

Including Community Edition

# Visual Studio



# Visual Studio for Mac



# Open Source – open.xamarin.com



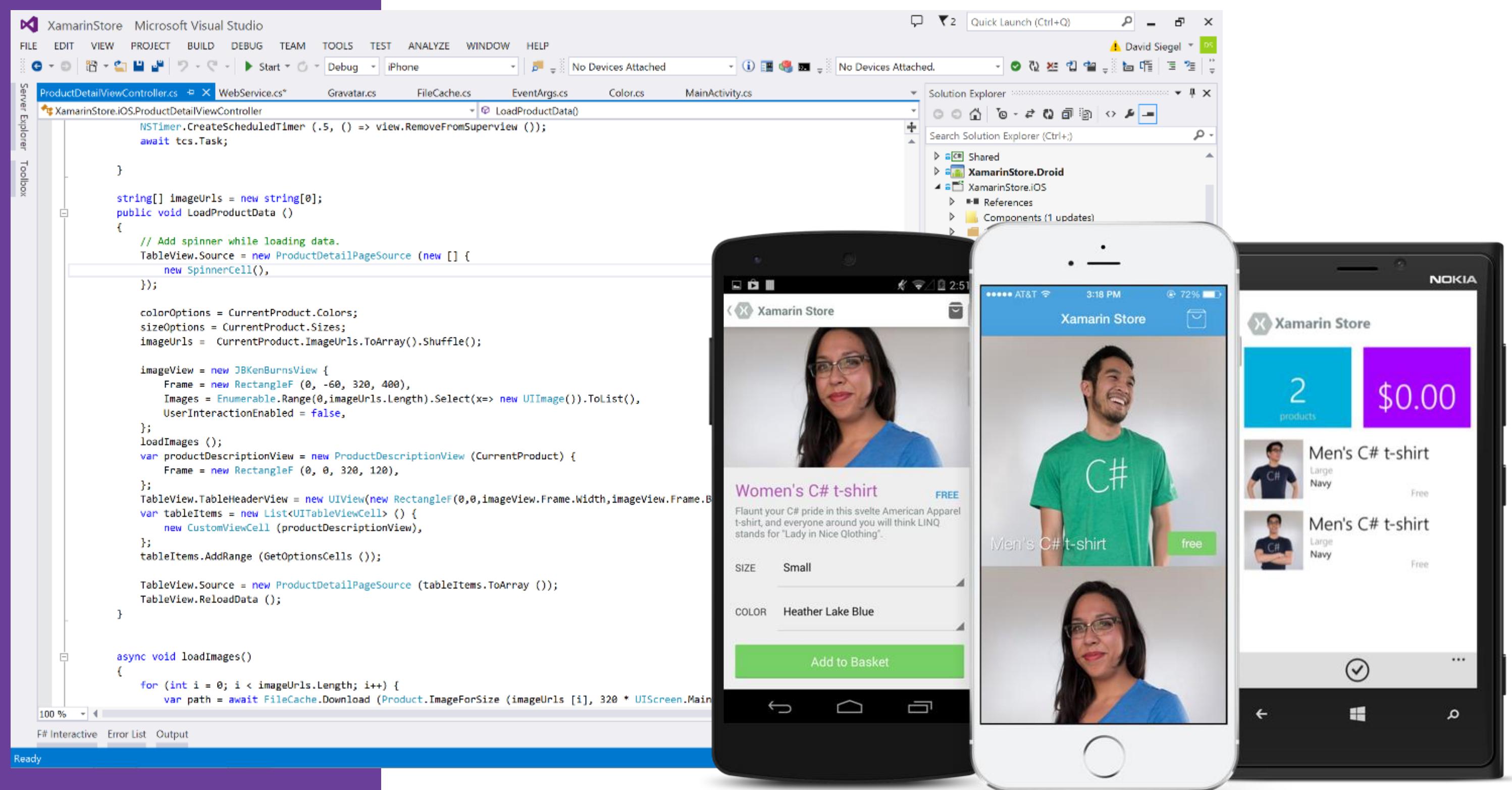
Xamarin SDK Documentation Community

Contribute

Build the future of apps  
with Xamarin.

Xamarin SDK is now fully available under the MIT license.

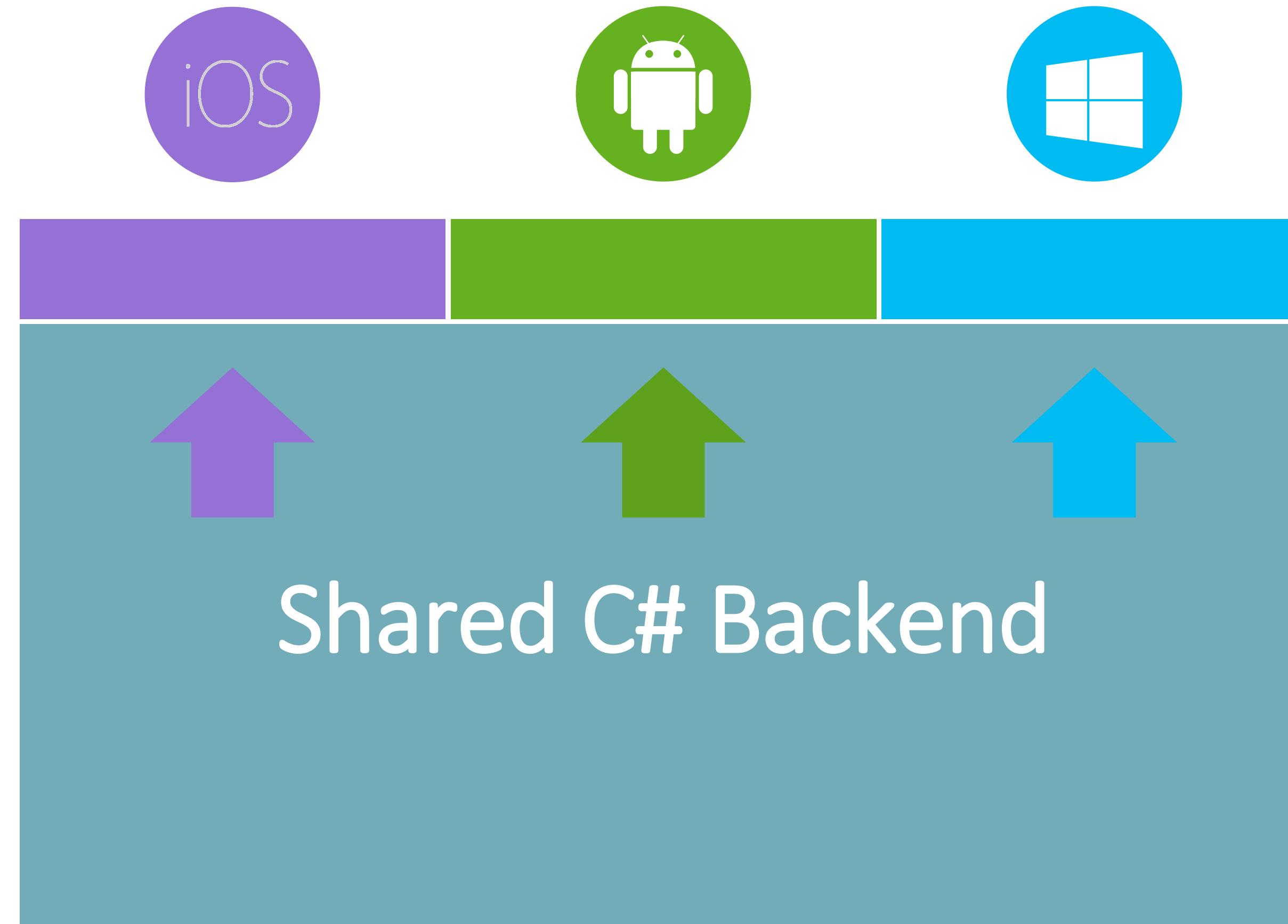
# Anything you can do in Objective-C, Swift, or Java can be done in C# with Xamarin

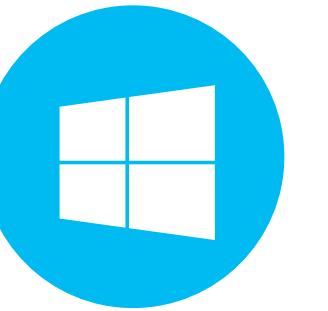


A white diagonal bar runs from the top-left corner to the bottom-right corner of the slide.

# Let's Build An App

# Simplifying Development





**UI+APIs**

Battery  
GPS  
Lights  
Notifications  
Settings  
Text To Speech

**UI + APIs**

Battery  
GPS  
Lights  
Notifications  
Settings  
Text To Speech

**UI + APIs**

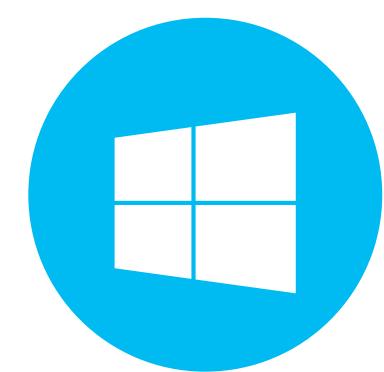
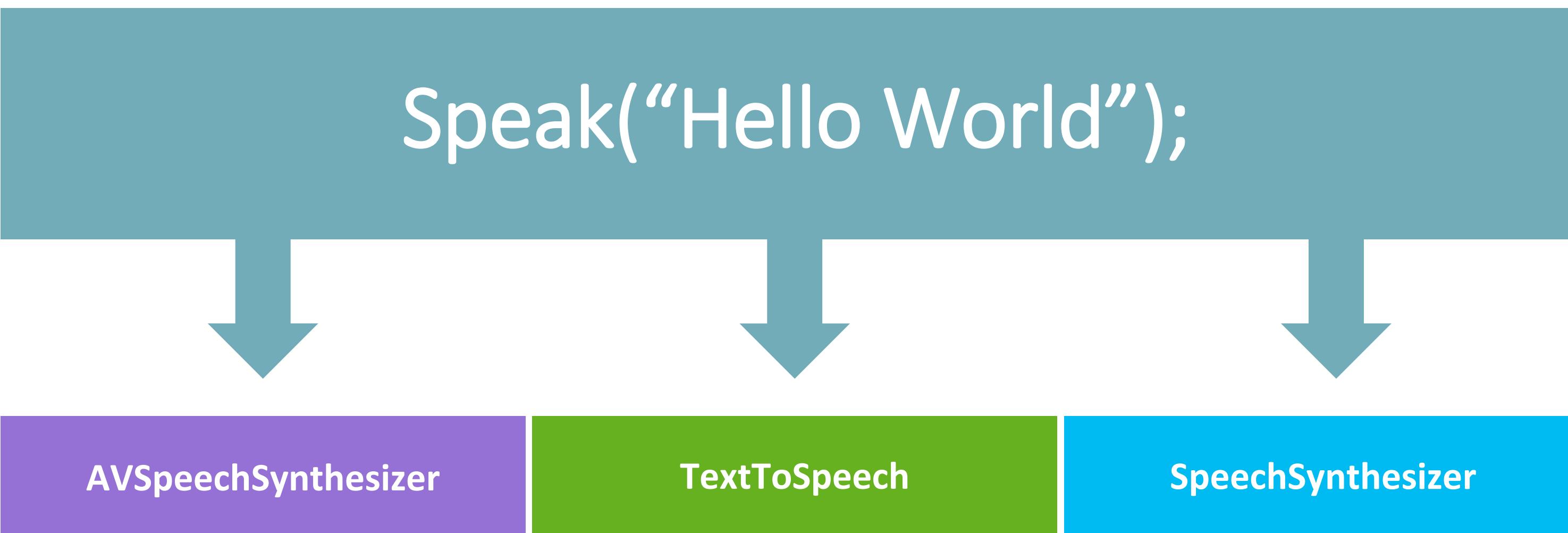
Battery  
GPS  
Lights  
Notifications  
Settings  
Text To Speech

# Platform Specific Code

What if we didn't have to write this code?

What if we could access it from shared code?

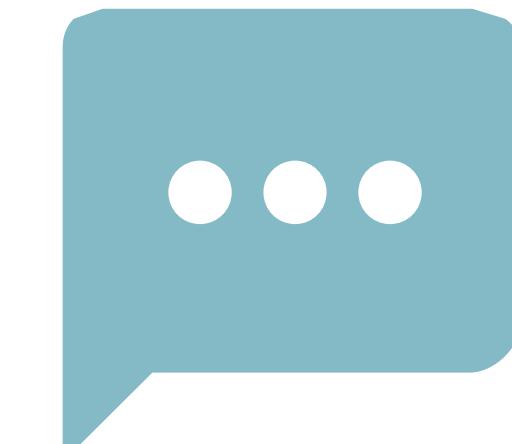
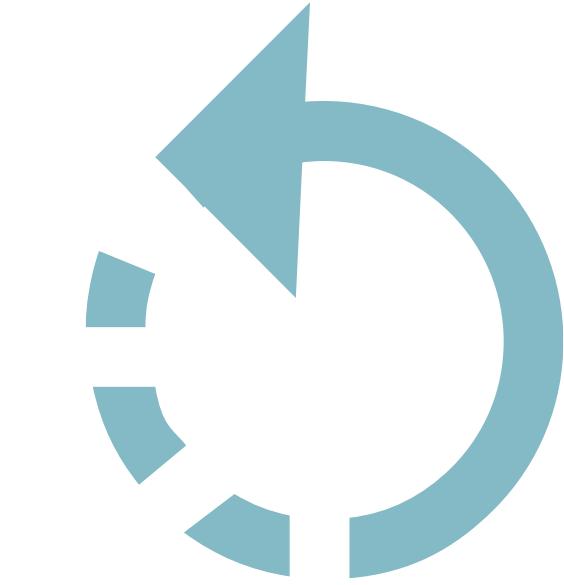
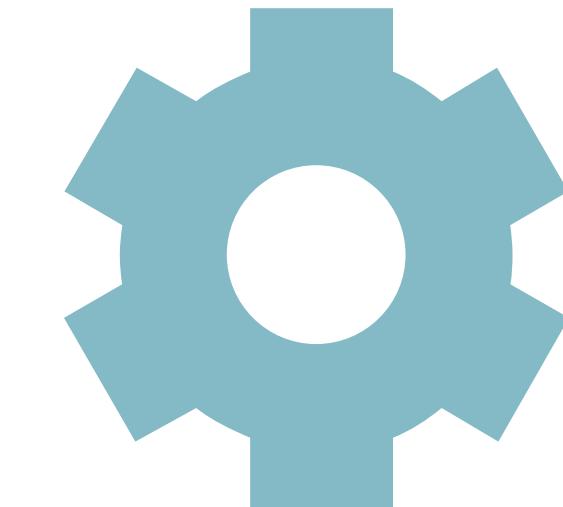
```
Speak("Hello World");
```



# Plugins for Xamarin & Windows

xamarin.com/plugins

Common API



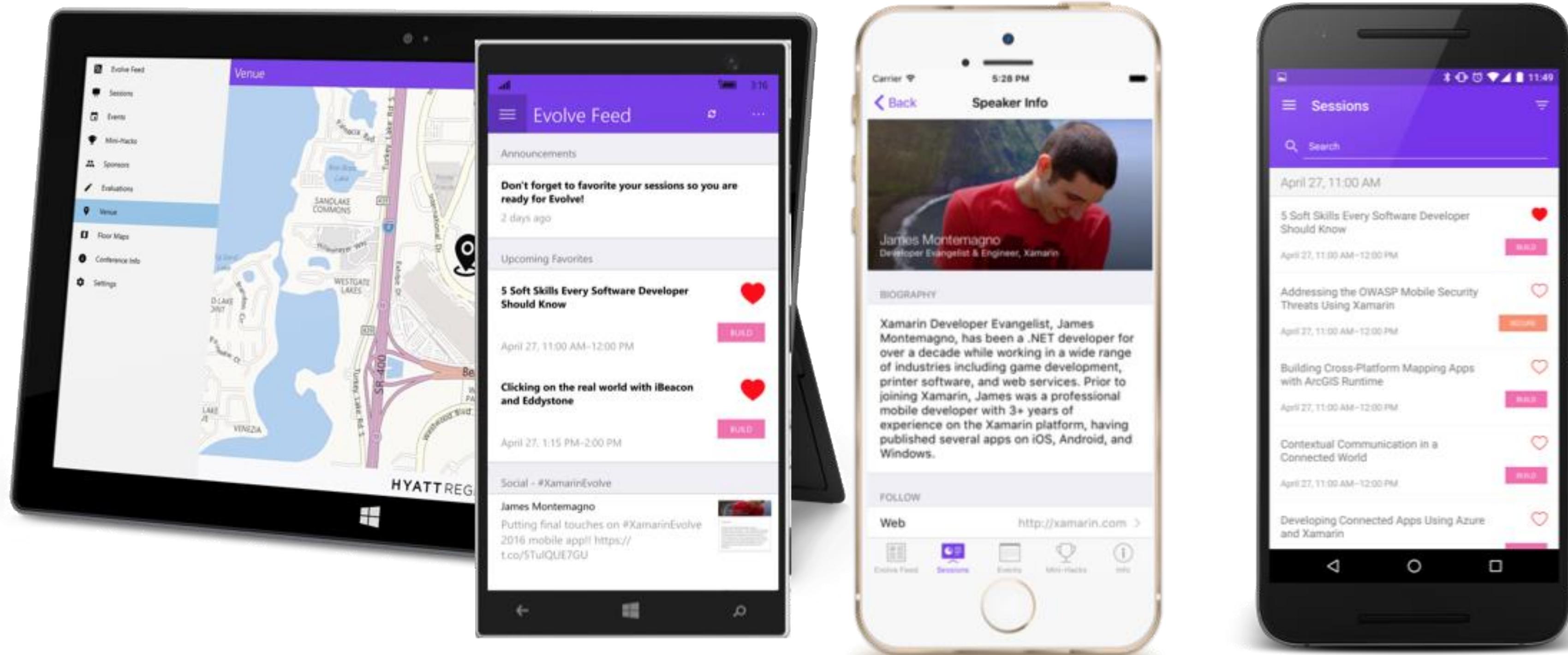
# Developing with Plugins



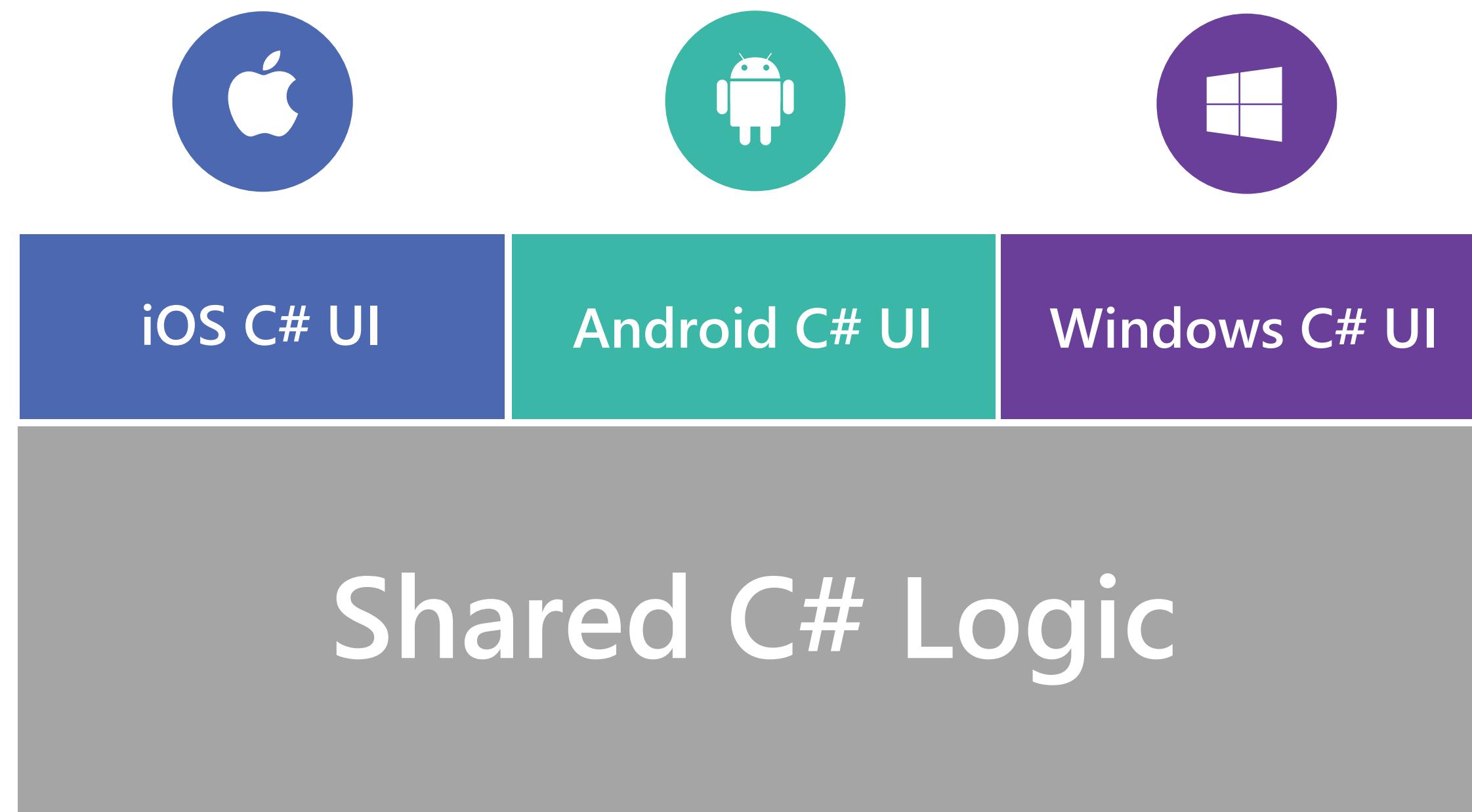
# Cross-platform UI

# Meet Xamarin.Forms

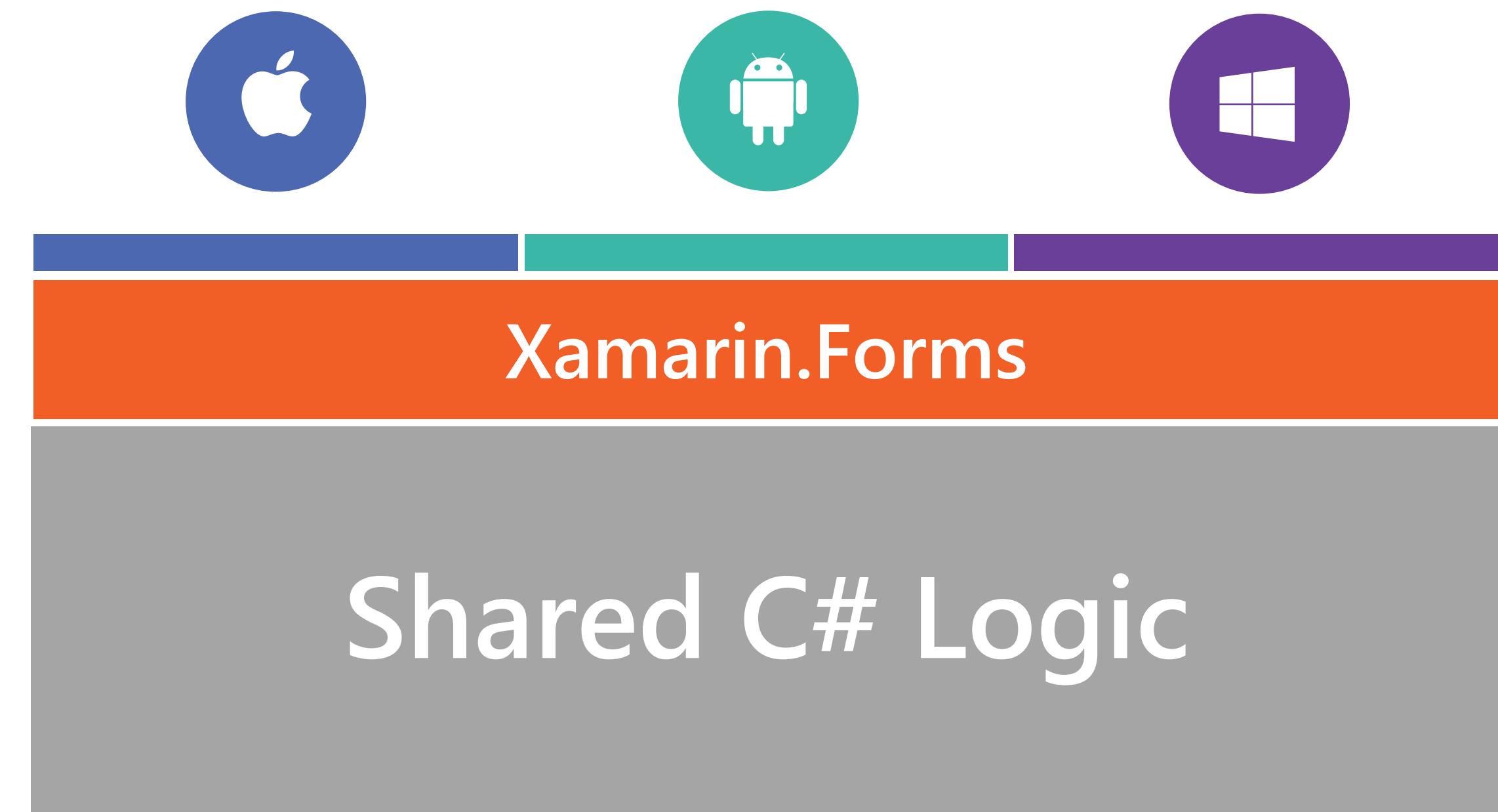
Build native UIs for iOS, Android, and Windows from a single, shared C# codebase.



# Xamarin + Xamarin.Forms

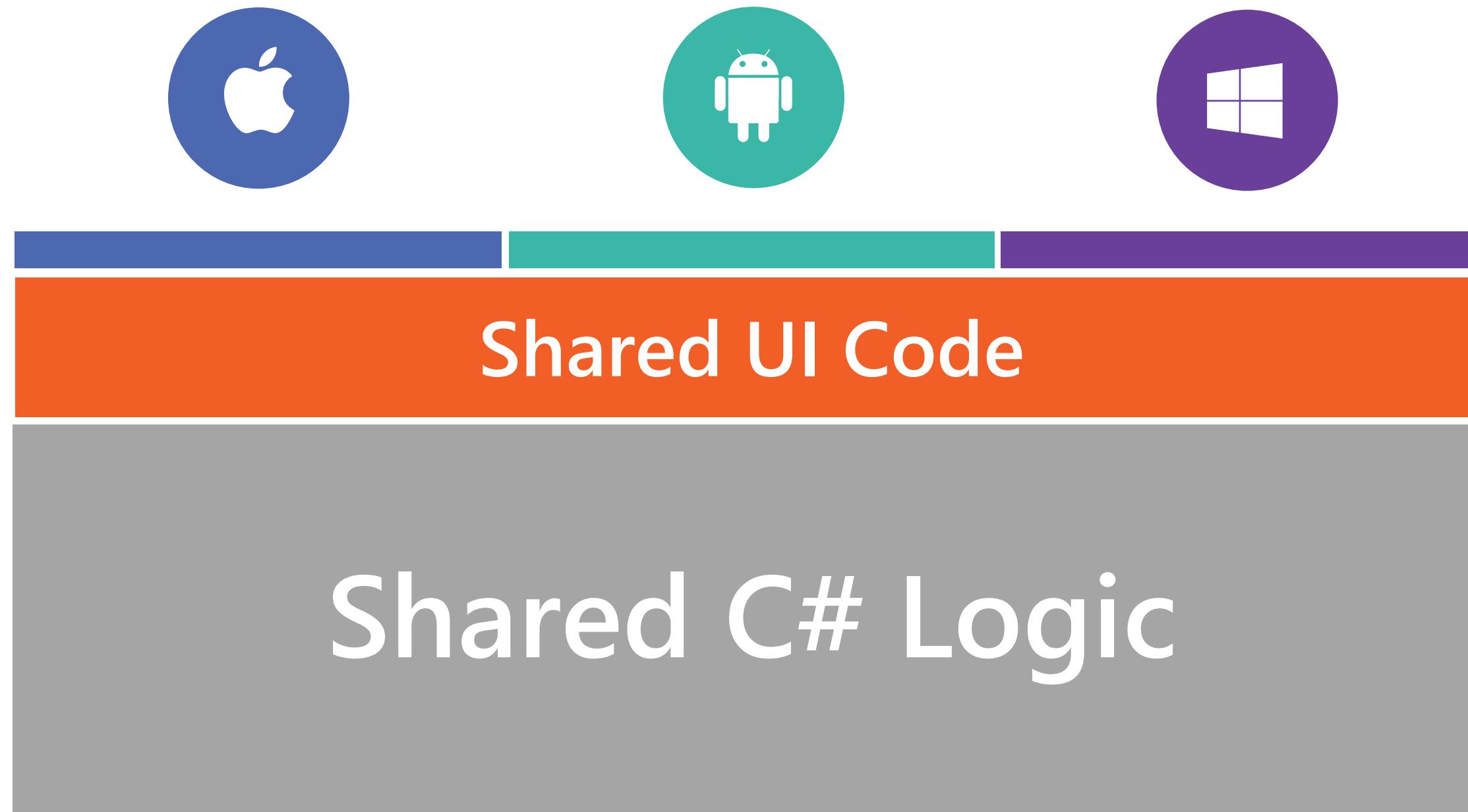


Traditional Xamarin approach



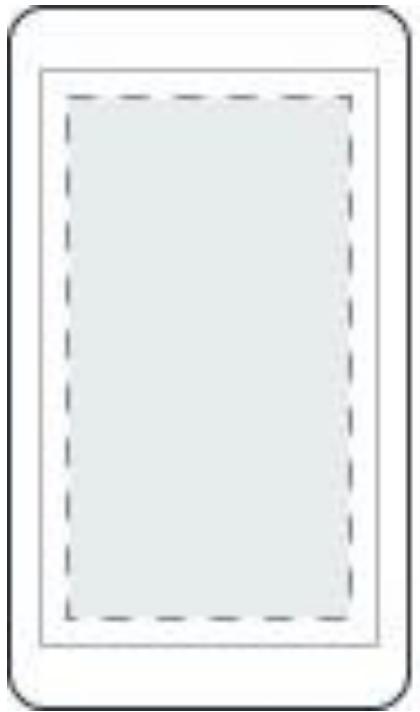
With Xamarin.Forms:  
More code-sharing, all native

# What's included

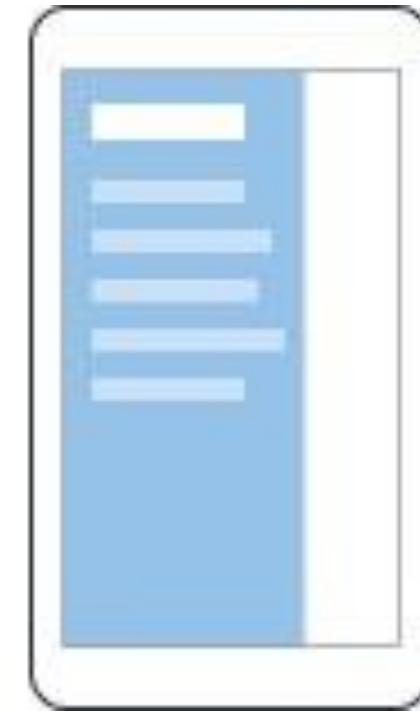


- ✓ 40+ Pages, layouts, and controls  
(Build from code behind or XAML)
- ✓ Two-way data binding
- ✓ Navigation
- ✓ Animation API
- ✓ Dependency Service
- ✓ Messaging Center

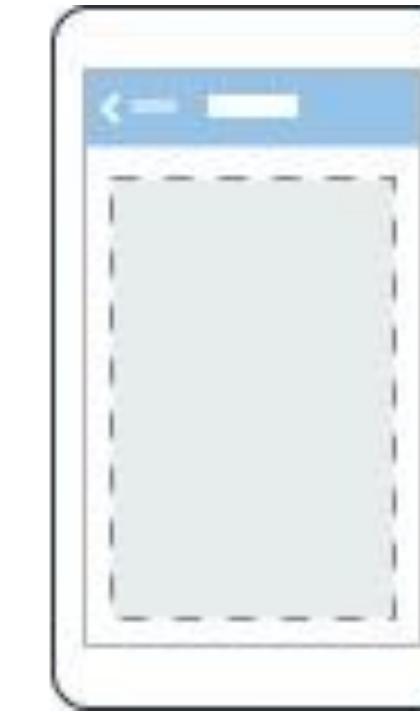
## Pages



**Content**



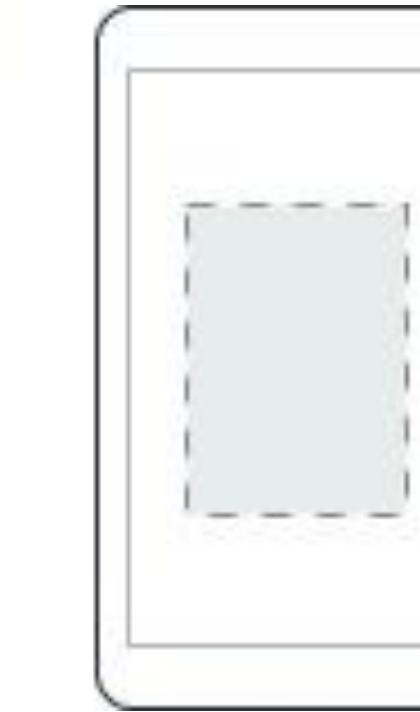
**MasterDetail**



**Navigation**

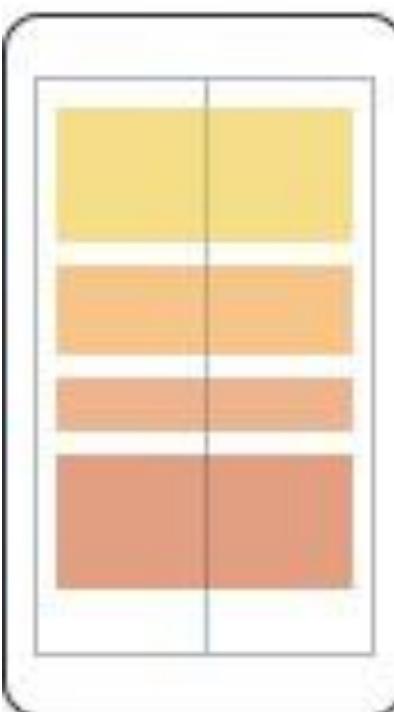


**Tabbed**

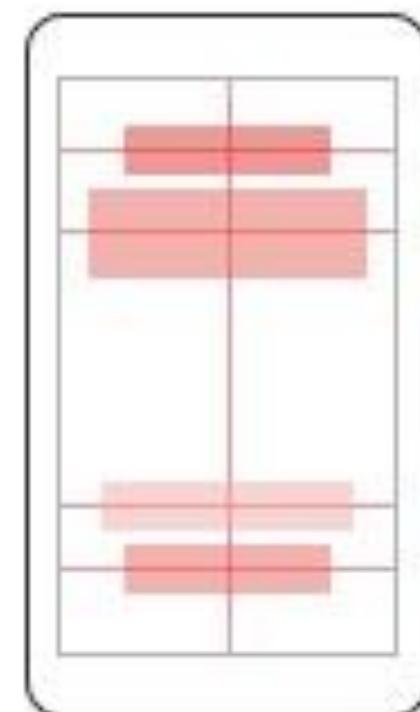


**Carousel**

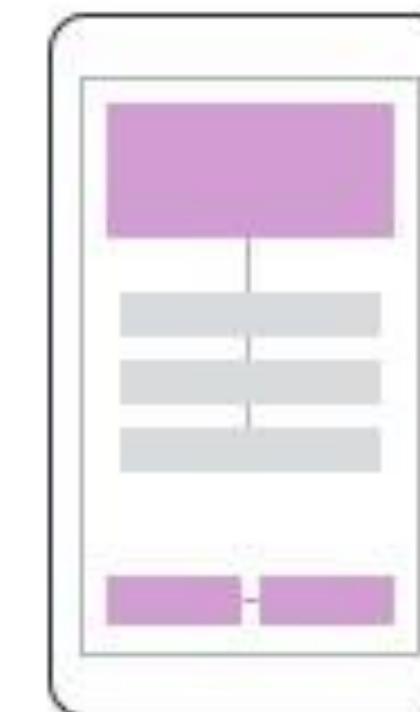
## Layouts



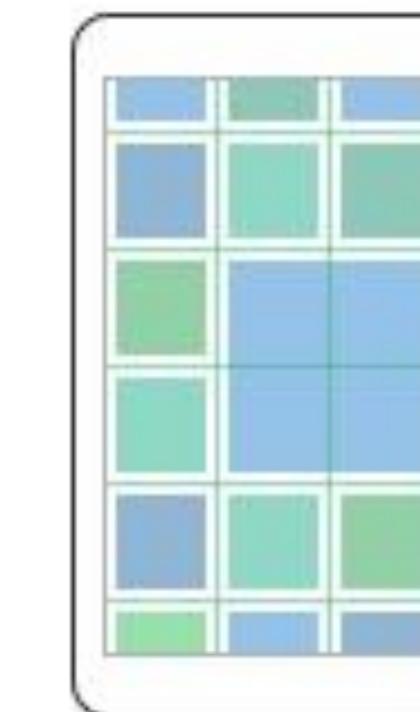
**Stack**



**Absolute**



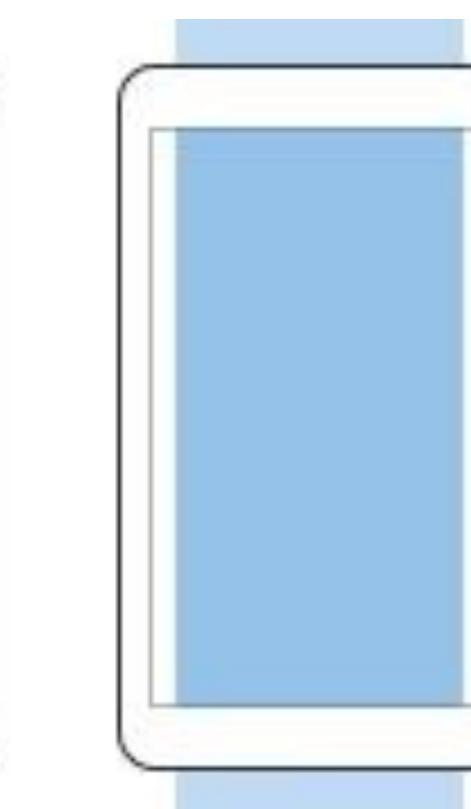
**Relative**



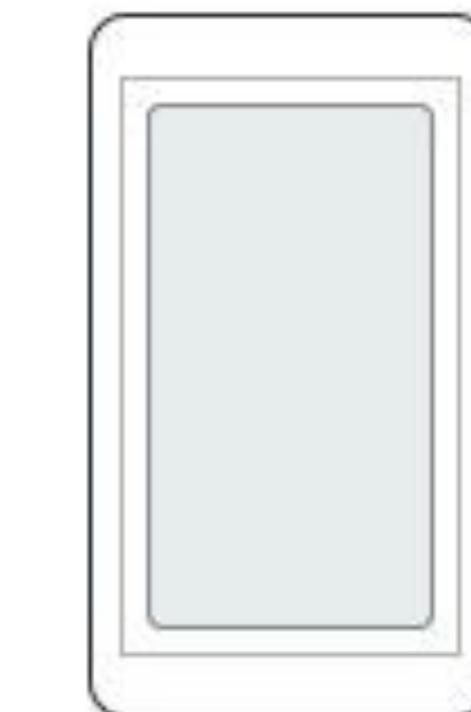
**Grid**



**ContentView**



**ScrollView**



**Frame**

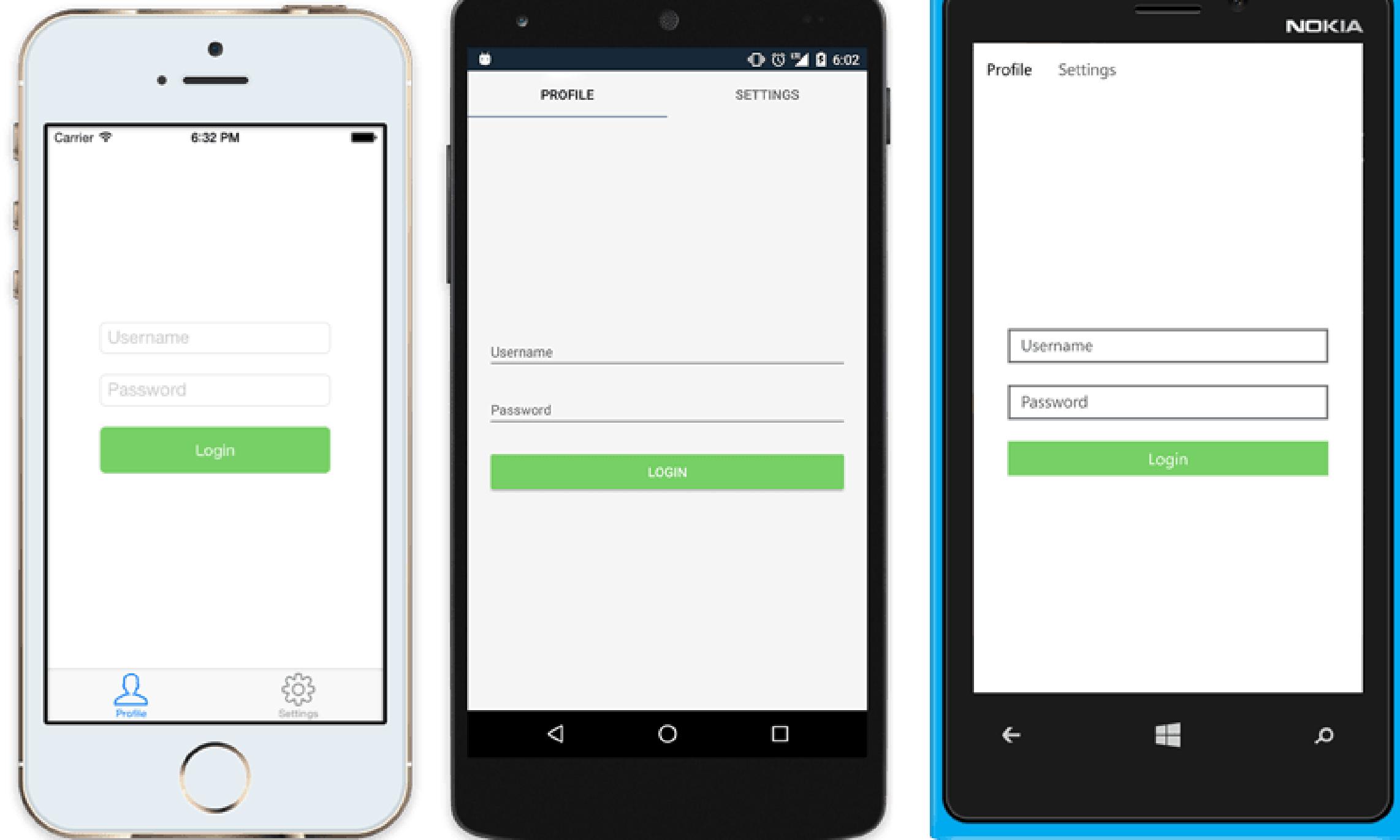
# Controls

<b>ActivityIndicator</b>	<b>BoxView</b>	<b>Button</b>	<b>DatePicker</b>	<b>Editor</b>
<b>Entry</b>	<b>Image</b>	<b>Label</b>	<b>ListView</b>	<b>Map</b>
<b>OpenGLView</b>	<b>Picker</b>	<b>ProgressBar</b>	<b>SearchBar</b>	<b>Slider</b>
<b>Stepper</b>	<b>TableView</b>	<b>TimePicker</b>	<b>WebView</b>	<b>EntryCell</b>
<b>ImageCell</b>	<b>SwitchCell</b>	<b>TextCell</b>	<b>ViewCell</b>	

# Xamarin & Xamarin.Forms ecosystem



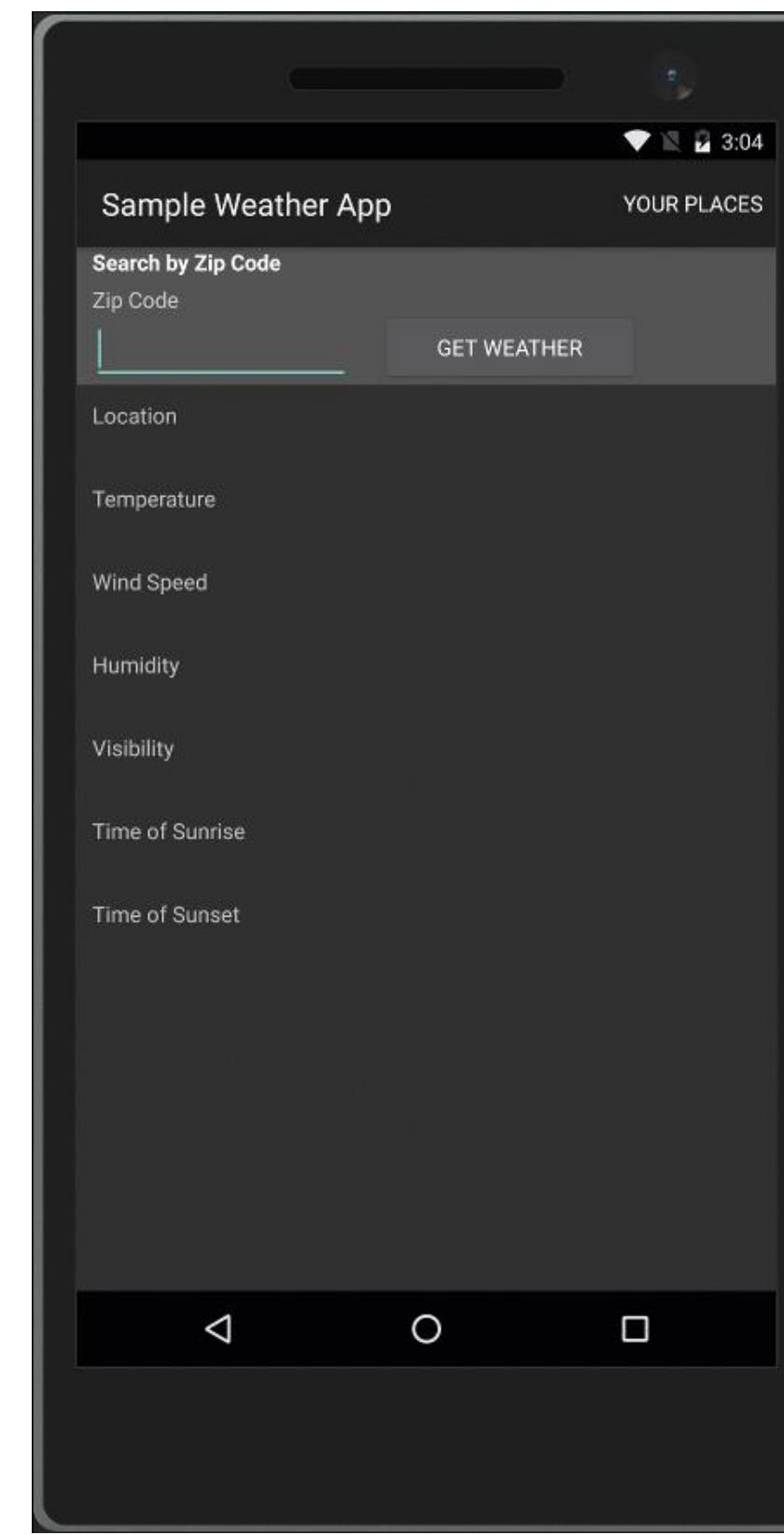
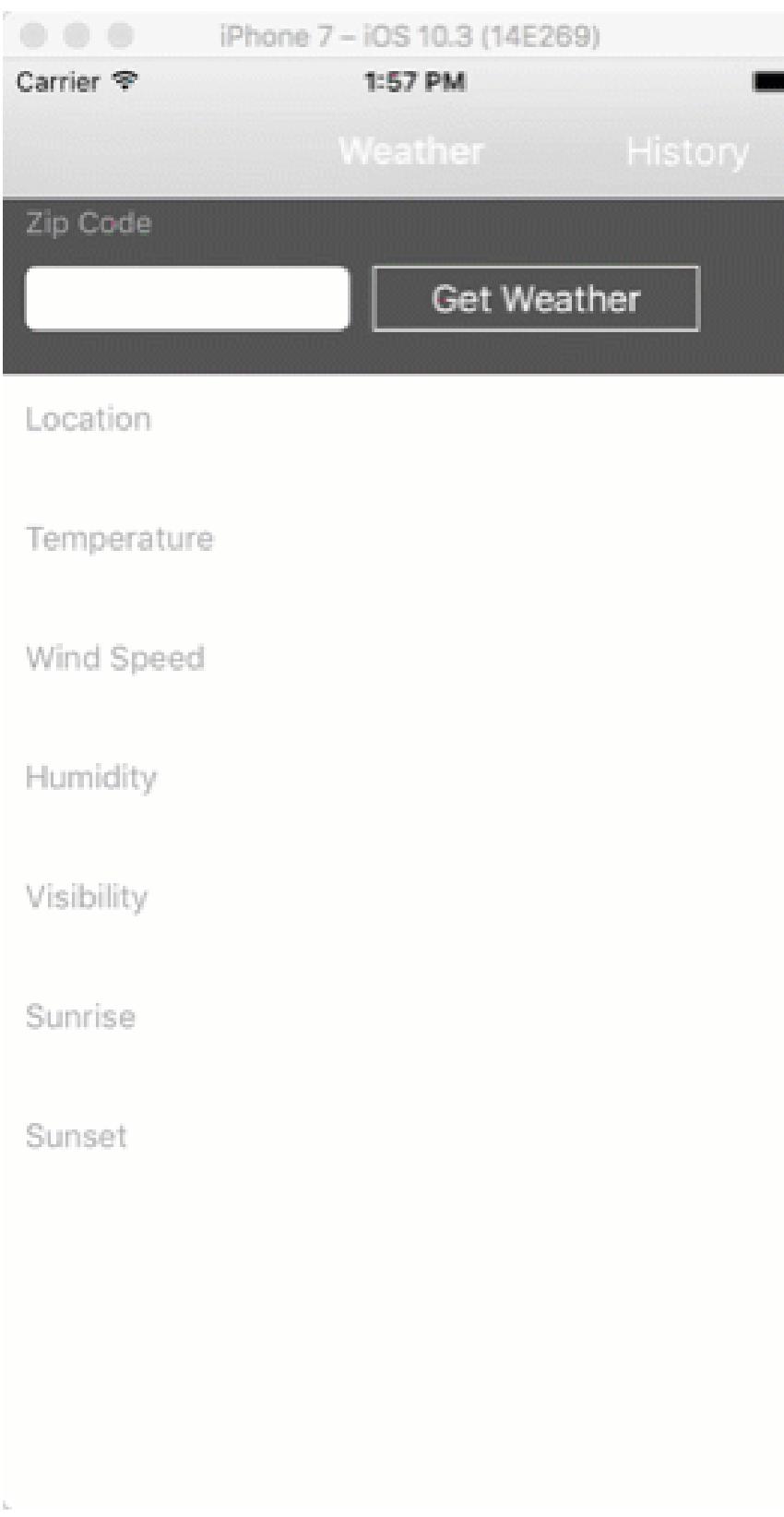
# Native UI from shared code



```
<?xml version="1.0" encoding="UTF-8"?>
<TabbedPage xmlns="http://xamarin.com/schemas/2014/forms"
    xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
    x:Class="MyApp.MainPage">
<TabbedPage.Children>
<ContentPage Title="Profile" Icon="Profile.png">
    <StackLayout Spacing="20" Padding="20"
        VerticalOptions="Center">
        <Entry Placeholder="Username"
            Text="{Binding Username}"/>
        <Entry Placeholder="Password"
            Text="{Binding Password}"
            IsPassword="true"/>
        <Button Text="Login" TextColor="White"
            BackgroundColor="#77D065"
            Command="{Binding LoginCommand}"/>
    </StackLayout>
</ContentPage>
<ContentPage Title="Settings" Icon="Settings.png">
    <!-- Settings -->
</ContentPage>
</TabbedPage.Children>
</TabbedPage>
```

# Xamarin.Forms Embedding

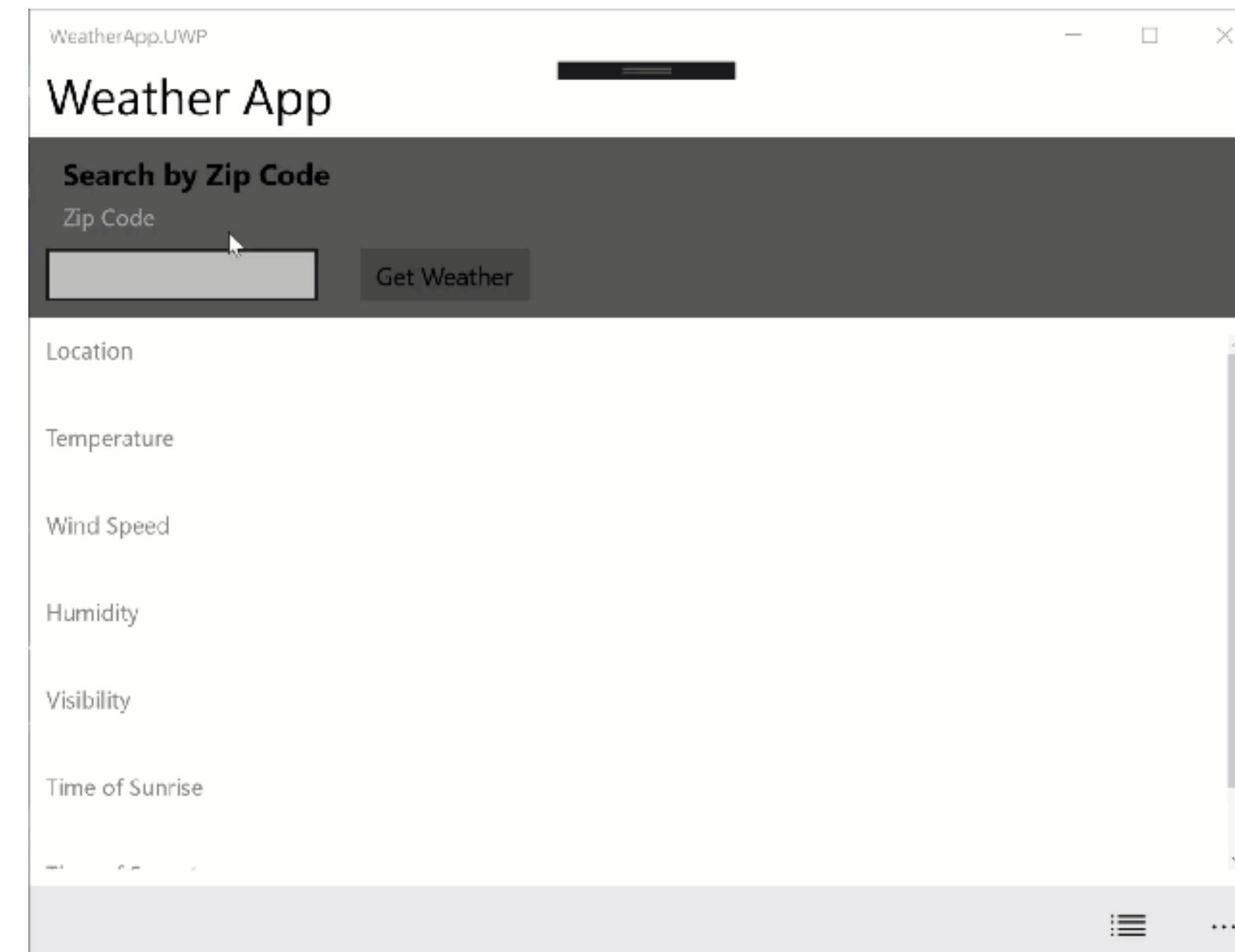
- Easily embed any page into a Xamarin Native Application



```
// Android  
Forms.Init(this, null);  
var androidFragment = new MyFormsPage().CreateFragment(this);
```

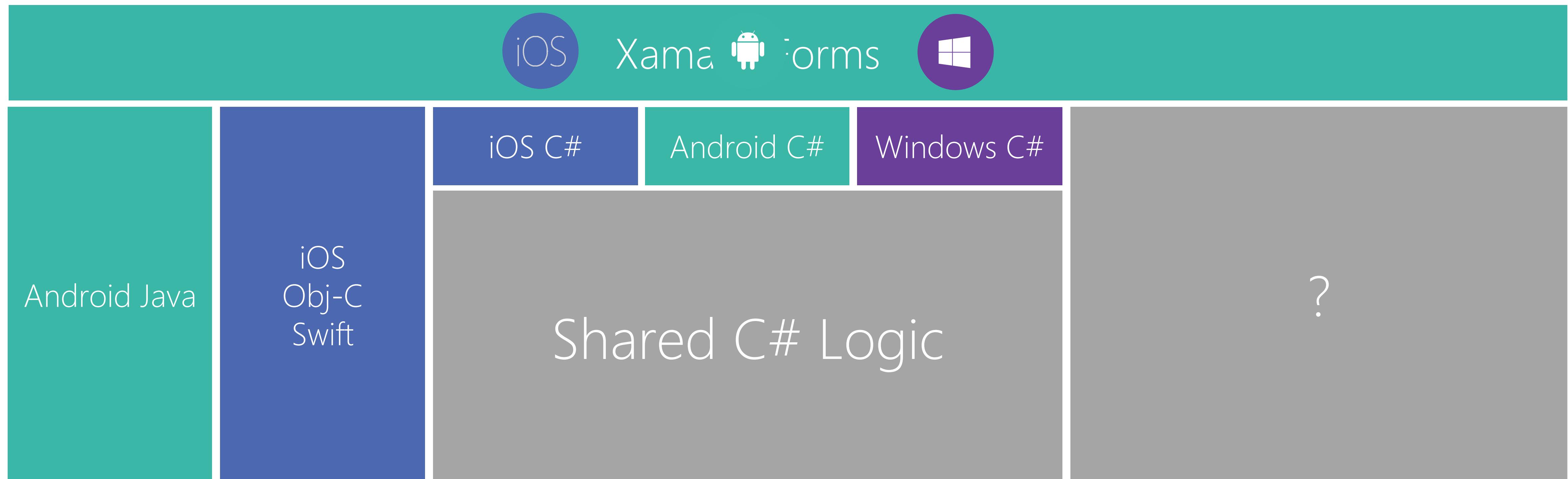
```
// iOS  
Forms.Init()  
var iosViewController = new MyFormsPage().CreateViewController();
```

```
// UWP  
Forms.Init(e);  
var uwpElement = new MyFormsPage().CreateFrameworkElement();
```



# Embedding

- Works on ContentPages
- Full support for DependencyService and MessagingCenter

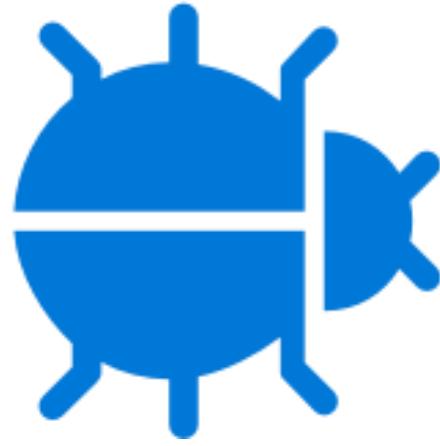
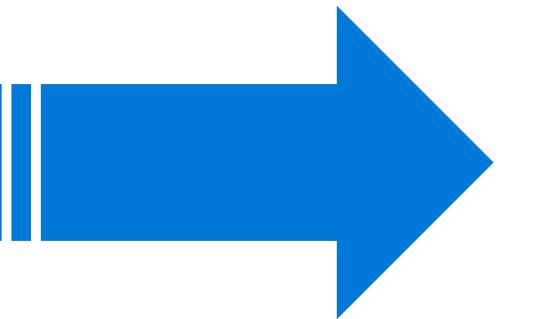
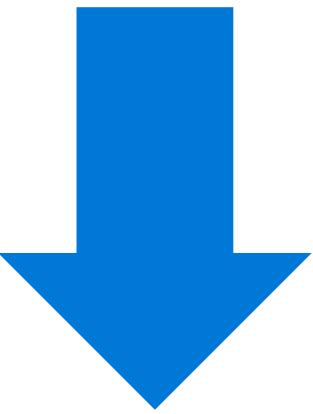


# Xamarin.Forms in Action



On The Horizon

# Easier to get started



Installation

First Run

Improve  
Build/Debug Cycles

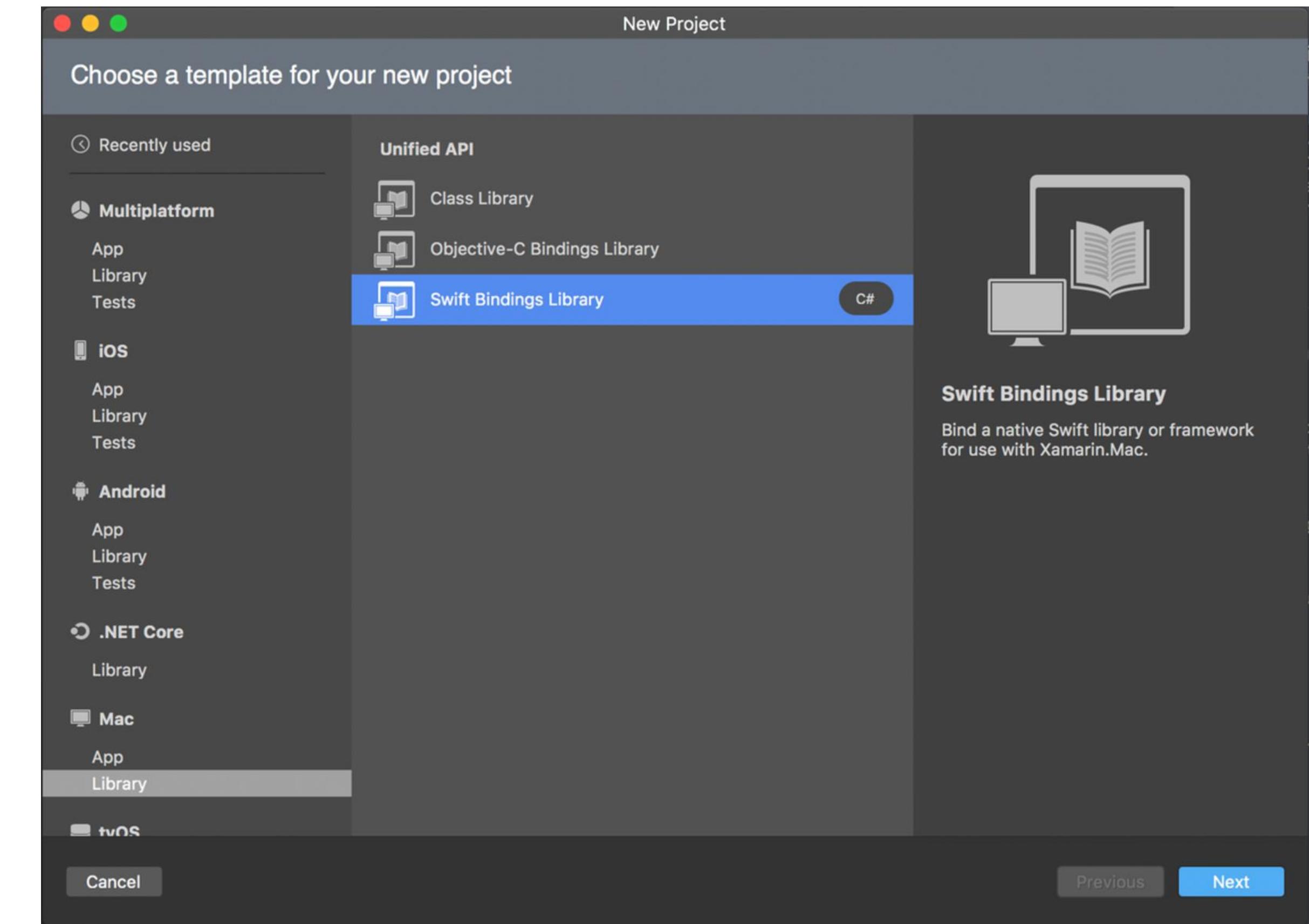
# Third Party Native APIs made Easy

Android:

- Java Binding Projects

iOS:

- ObjC Binding Projects
- New! CocoaPods Importer

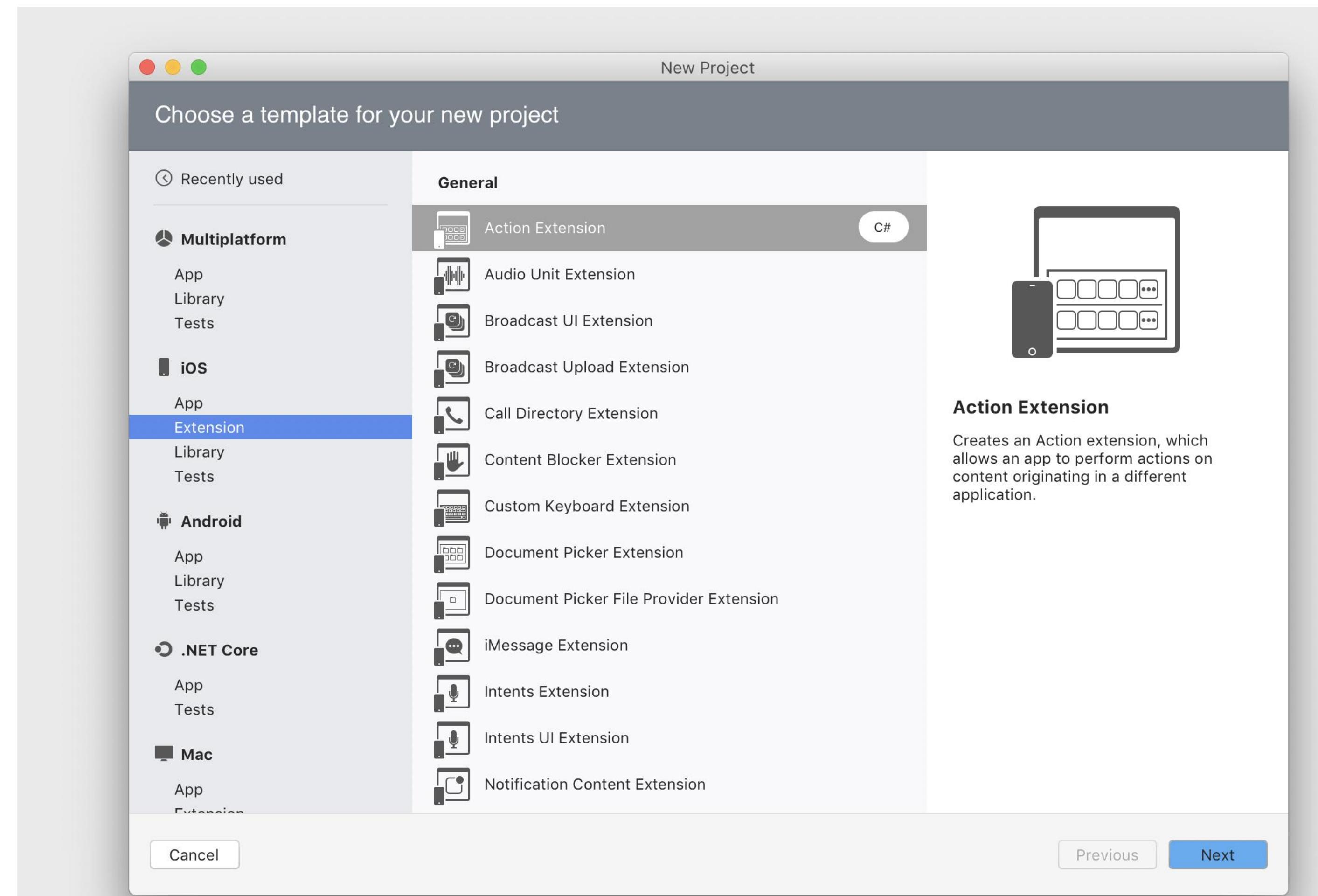


Upcoming

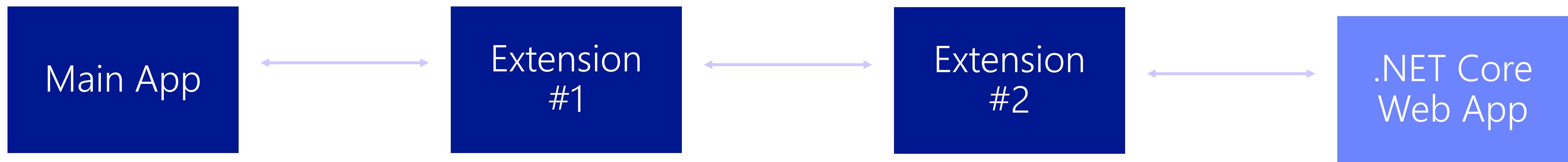
- SwiftNetifier – project and consume Swift APIs into .NET
- Fully automated

# Apple—extensions

- Extensions are everywhere
- Mac and iOS

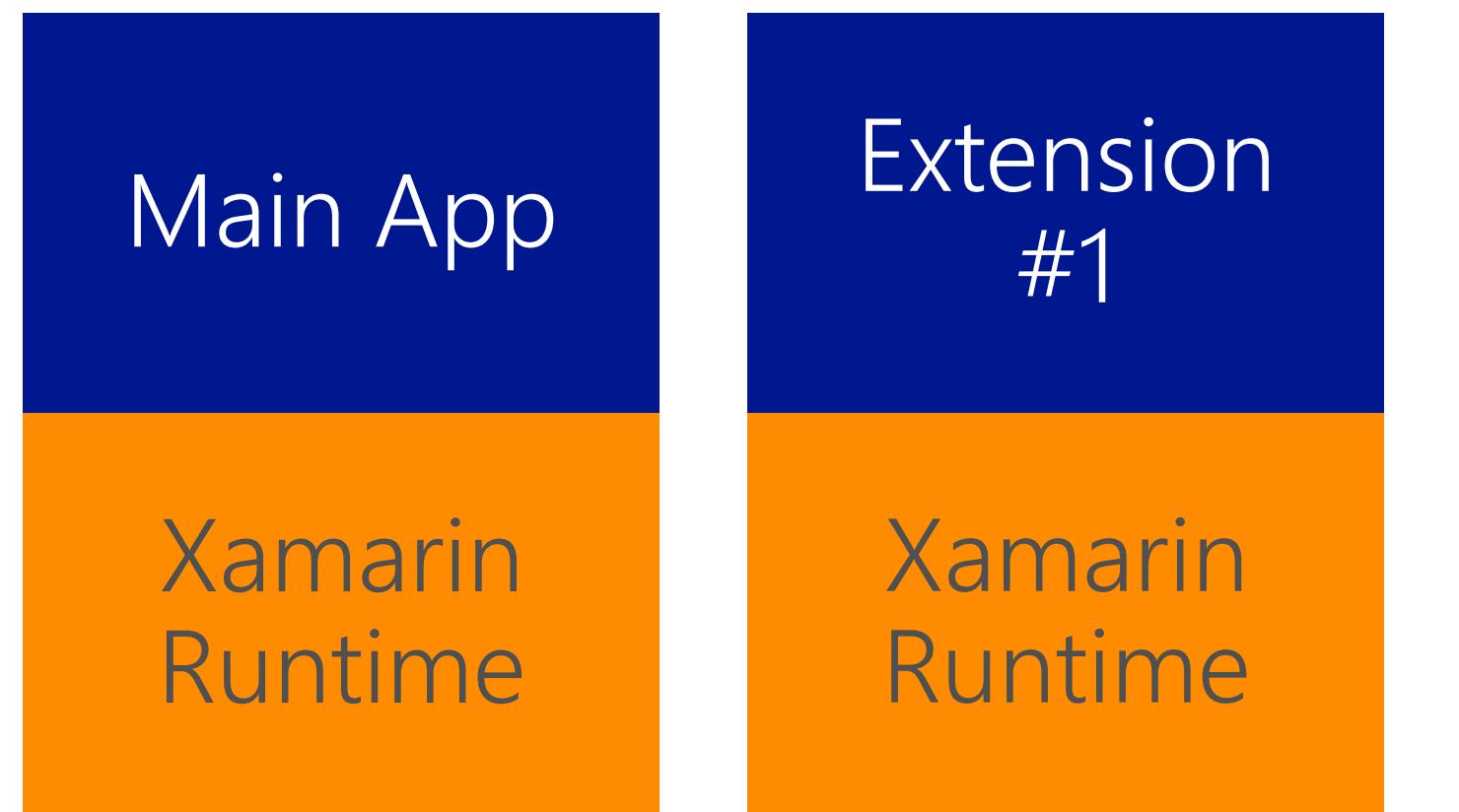


# Multi-process debugging



# Sharing code

Last Year



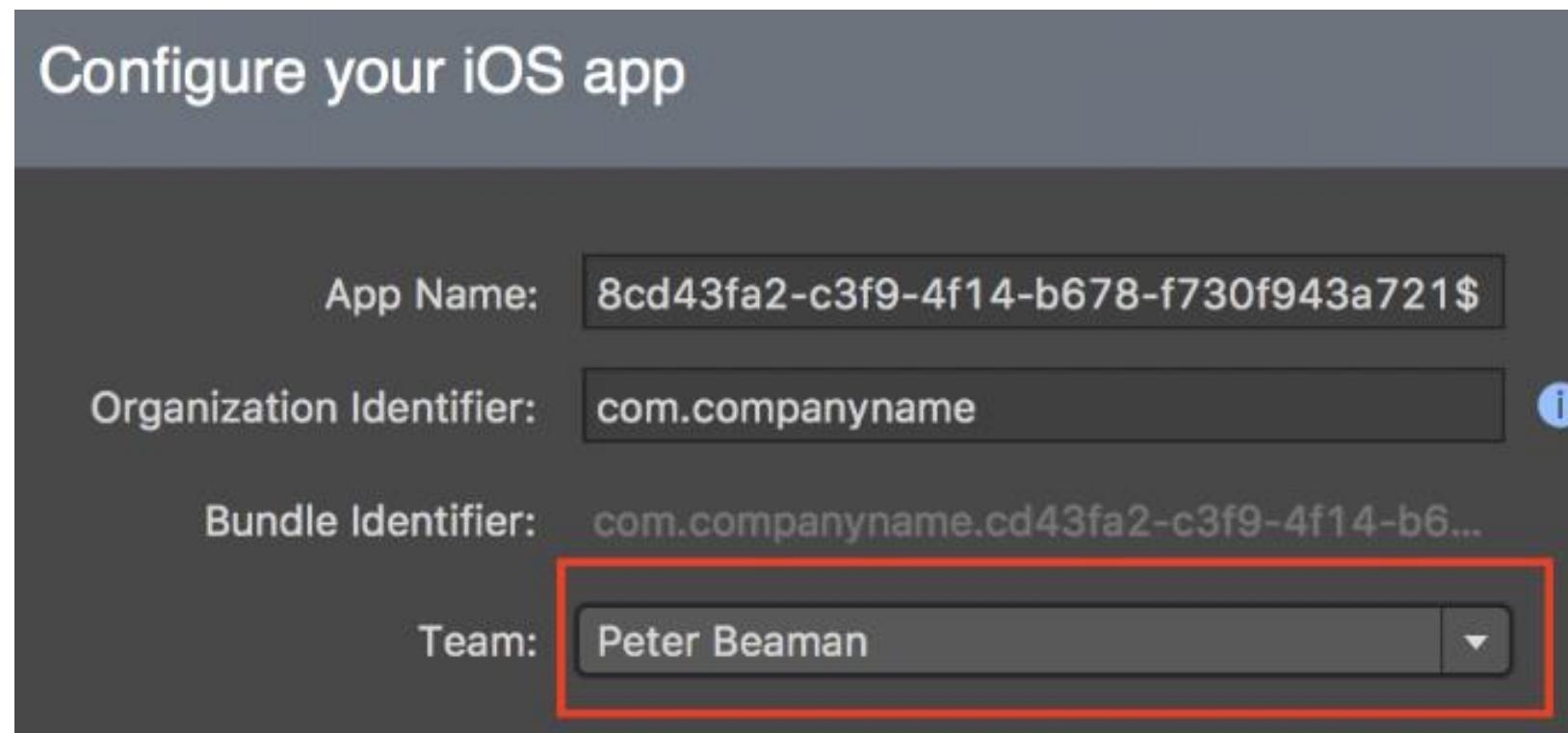
Now



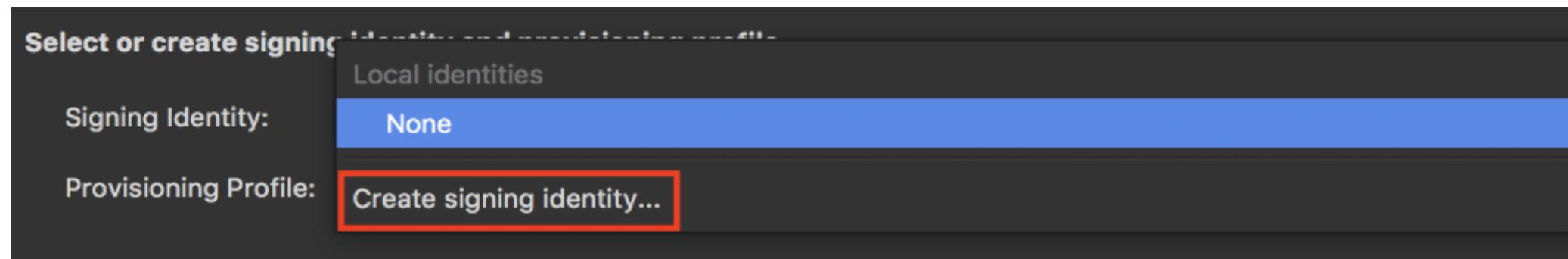
# Simplified Provisioning

- Fastlane integration in VS for Mac

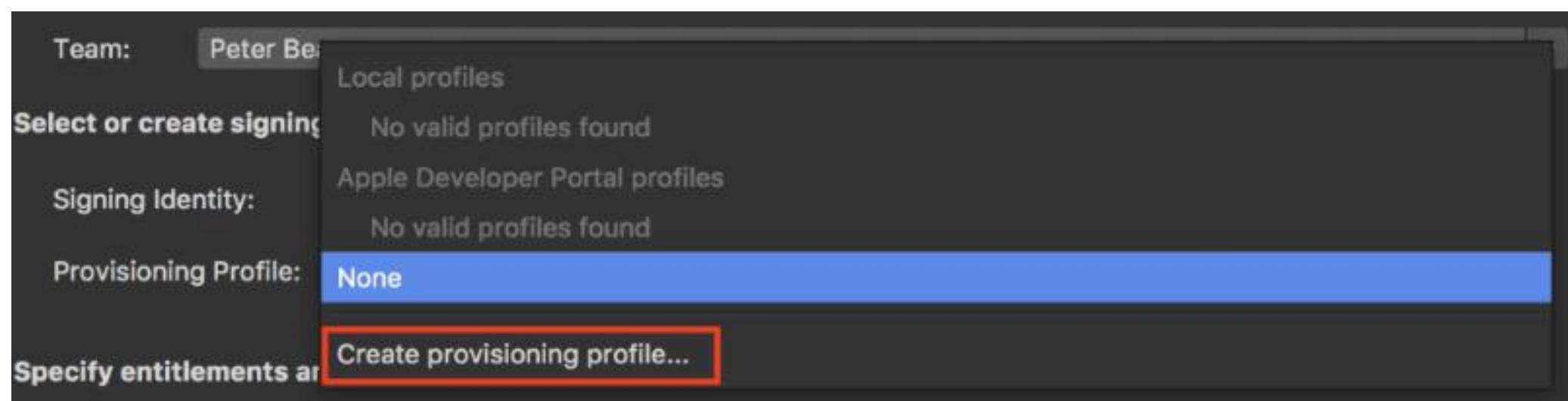
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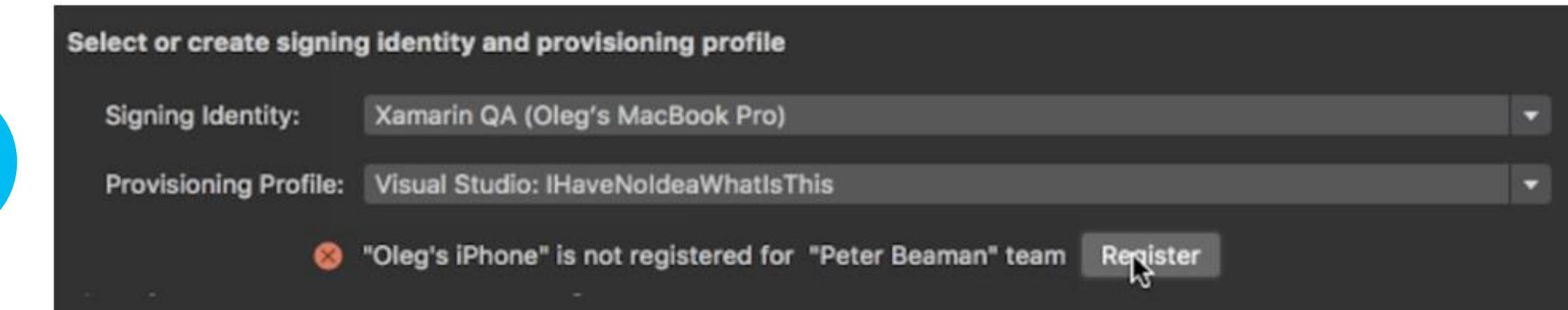
2



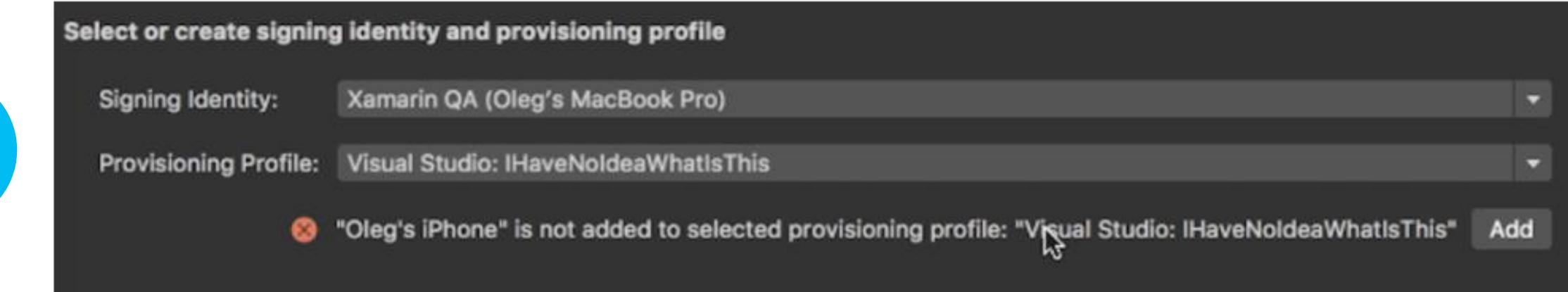
3



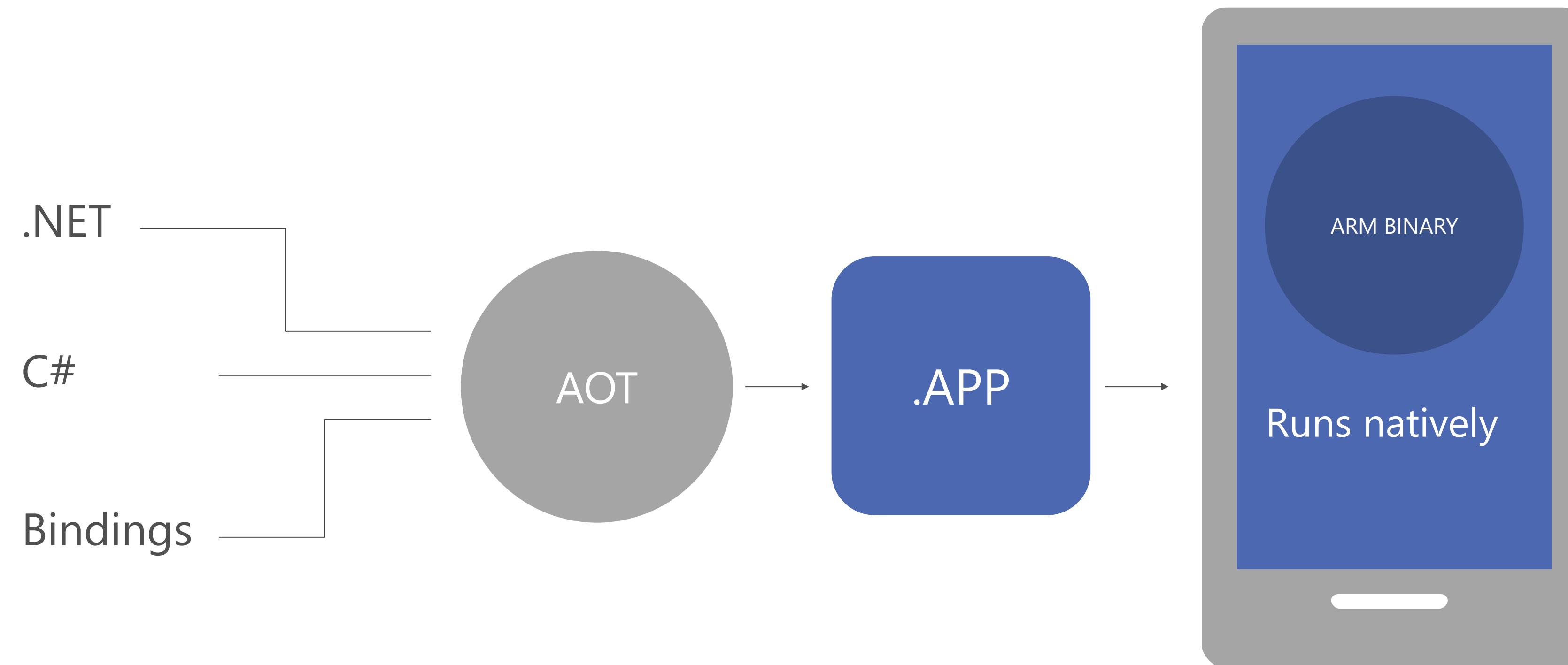
4



5



# AOT comes to Android and Mac



Take advantage of LLVM optimizing compiler for high performance code

# Why not both?

On platforms that can do AOT and JIT

- Android, Mac

## Hybrid mode

- Pre-compile, optimize, obfuscate
- You do not give up dynamic code loading or generation
- The JIT is still present
- `Assembly.LoadFile` still works



Get started today  
[xamarin.com/download](http://xamarin.com/download)



# Xamarin University

Free self-guided courses

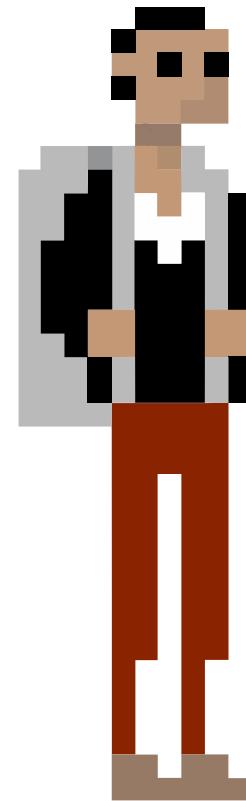
Take free self-guided courses that cover the core Xamarin concepts and count towards certification.

Register at  
[university.xamarin.com/self-guided](http://university.xamarin.com/self-guided)

Get a full subscription for live classes, advanced topics, and to complete certification.

Sign up at  
[xamarin.com/university](http://xamarin.com/university)

# Thank you.



James  
Montemagno

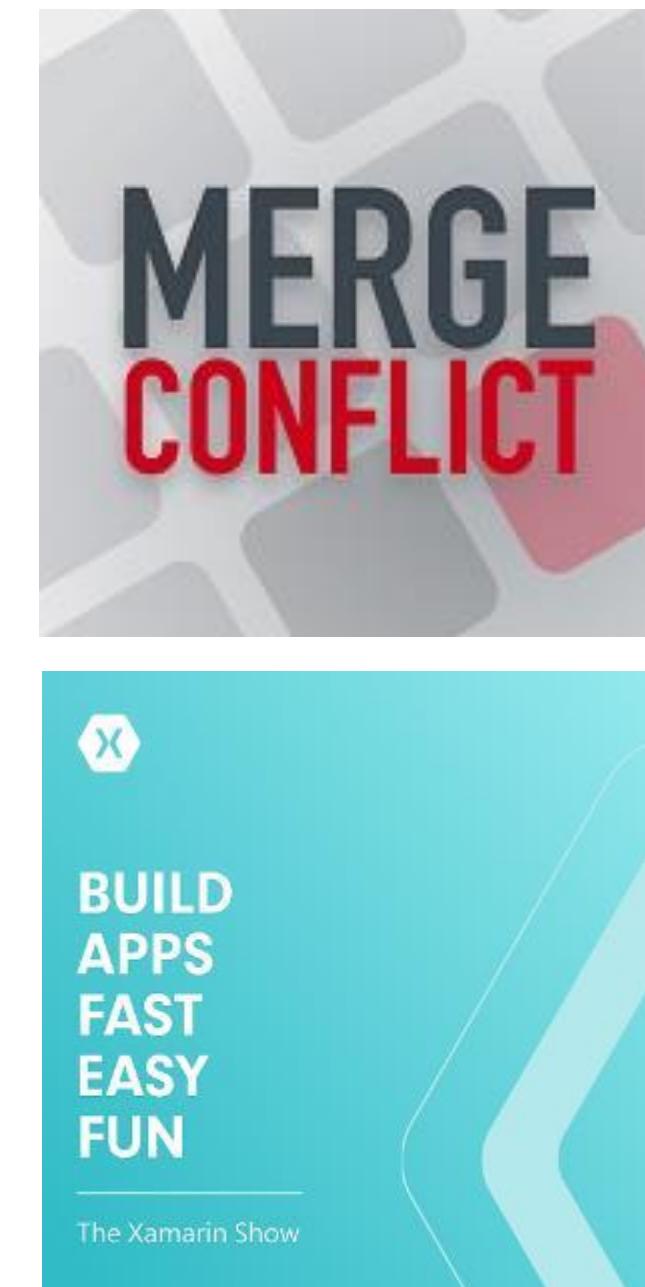
Principal Program Manager – Mobile Developer Tools,  
Microsoft

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[motz@microsoft.com](mailto:motz@microsoft.com)

[motzcod.es](http://motzcod.es)

@JamesMontemagno



Weekly development podcast  
[mergeconflict.fm](http://mergeconflict.fm)

Weekly development show  
[xamarinshow.com](http://xamarinshow.com)